

Disclosure of emerging trends: Evidence from climate change business opportunities

Jody Grewal
Harvard Business School

Draft: December 10, 2018

Abstract

Responding to social, technological and environmental trends can be critical to firm survival and competitiveness. I use the development and sale of low-carbon products in response to the business opportunities that arise from climate change ('green opportunities') as the setting to study firms' disclosures of emerging trends. I find, on average, firms delay disclosing green opportunities in their 10-K until 2.5 years after disclosing green opportunities in their sustainability report. Despite both disclosure channels providing reliable information about future revenues from low-carbon products, withholding disclosure from the 10-K has capital market implications. A value-weighted portfolio of firms disclosing only in the sustainability report earned an annual alpha of 3.09%, while a portfolio of 10-K disclosers does not earn abnormal returns. Firms disclosing only in their sustainability report also exhibited significantly more positive forecast errors and earnings announcement returns. I find that the disclosure delay is shorter when there is greater shareholder support for climate change resolutions consistent with managerial perceptions of shareholder preferences influencing disclosure decisions.

I am very grateful to my dissertation committee: Paul Healy (co-chair), George Serafeim (co-chair), Srikant Datar, Krishna Palepu and Eddie Riedl. I thank FTSE Russell for providing proprietary data, Tony Campos, Dan Carson and Jason Meyer from FTSE, and a number of industry experts and practitioners for sharing institutional insights. I appreciate helpful comments and suggestions from Wei Cai, Aiysha Dey, Gerardo Perez Cavazos, Liran Eliner, Susanna Gallani, Jonas Hesse, Bob Kaplan, Trung Nguyen, Ethan Rouen, Tatiana Sandino, Alexa Scherf, Bob Simons, Matthew Shaffer, Eugene Soltes and Charlie Wang. I gratefully acknowledge financial support from the Deloitte Foundation's Doctoral Fellowship. All errors and omissions are my own. Comments are welcome and can be sent to jgrewal@hbs.edu

1. Introduction

I study the economic consequences of disclosures that firms provide about their plans to address emerging trends. Given changing technological, legal, political, demographic and geographic trends, firms make decisions on how to act on the resulting risks and opportunities. While the Securities and Exchange Commission (SEC) emphasizes investors' need for information about trends and uncertainties (SEC 1989, 2003), research on disclosure of emerging trends is limited. However, emerging trends may affect product development decisions, resource allocations and ultimately firm profitability; disclosure could therefore be relevant to investors. Moreover, given the broader impacts that trends could have on society and the economy (Reeves and Deimler 2011), other stakeholders of the firm (e.g., customers, employees, governments) are likely interested in, and potentially affected by, firm responses. Firms may as a result disclose not only in financial reports but also in channels that are more accessible to non-investors (e.g., corporate websites). Nevertheless, expected costs of disclosing could affect whether and where firms disclose their plans to address emerging trends. In this paper, I provide empirical evidence on such disclosures and their consequences for capital markets.

Firms have incentives to communicate their plans to address emerging trends to investors. Doing so could signal to investors that the firm is responsive to changing market conditions (e.g., Wells 2012). Moreover, disclosing could improve investors' ability to estimate the firm's future performance (i.e., expected cash flows) and potentially reduce the firm's cost of capital through lower information risk (e.g. Easley and O'Hara 2004). Firms also have incentives to inform non-equity stakeholders (e.g., customers, governments, etc.) of their plans. For example, many of the non-technology companies selected to participate in meetings with White House officials about federal funding, policies and regulation relating to artificial intelligence (AI) were selected on the basis of information they provided on their websites about AI (American Leadership in Emerging Technology, 2017). Relative to investors, non-equity stakeholders are less likely to use financial reporting channels such as SEC filings and conference calls, since disclosures in these channels may be limited in scope or difficult to process. Given incentives to inform both investors and non-equity stakeholders of their responses to emerging trends, companies may disclose in financial channels and newer (i.e., nonfinancial) channels.

However, firms likely expect costs from disclosing their plans. Prior research shows that managers fear the consequences of failing to deliver on stated plans (e.g., Waymire 1985), which may be exacerbated in the high-uncertainty context of emerging trends. In addition, if disclosing invites questions from analysts who seek more information than managers can provide given the uncertainty, firms could lose credibility (Graham et al. 2005). Though firms are liable for information disclosed in all sources, managers may perceive lower accountability for disclosures provided outside of financial channels. As a result, firms will withhold disclosure of emerging trends from financial channels until they have more certainty about their ability to deliver on stated plans, while disclosing *outside* of financial channels where disclosure-related costs are expected to be lower. Alternatively, firms may be deterred from selectively disclosing since regulators and other market participants can identify this behavior, potentially leading to regulatory intervention and loss of reputational capital.

The disclosure channels used to communicate plans to address emerging trends could have consequences for capital markets. For instance, investors and analysts may miss information outside of financial reporting channels owing to frictions (e.g., search costs or limited attention). Another possibility is that capital market participants will rationally decide to ignore information outside of financial channels owing to concerns about its credibility and financial relevance (e.g., Bamber and Cheon 1998).

My setting to study disclosures about emerging trends is climate change. Climate change is a trend that is expected to have significant operating and financial implications for many companies (SEC 2010). I study firm disclosure of plans to capitalize on the business opportunities that arise from climate change (‘green opportunities’) using forward-looking statements about the sale of low-carbon goods, technologies and services (‘green products’). This setting has a number of benefits. First, the financial implications of green opportunities have materialized in recent years with the launch of green products in every sector of the U.S. economy.¹ This allows me to obtain data on the revenues generated from the sale of green products for 747 U.S. firms from 2009 to 2016, and compare green opportunity disclosures with subsequent green product revenues (‘green revenues’).² Second, firms have incentives to disclose green opportunities in financial reports for

¹ See Table 2 Panel B for examples of green products across sectors.

² Climate change risks are another candidate for study in this setting. However, the difficulty in studying climate risk disclosures is that, like other risk-related reporting, there is often no ex-post settling up (Schrand and Elliott 1998).

investors, as well as in sustainability reports for non-equity stakeholders (e.g., environmental non-governmental organizations or NGOs). Sustainability reports are voluntary reports disclosing environmental and social information that can enhance the firm's sustainability reputation (Unerman, 2008). Firms may expect lower disclosure-related costs relative to financial reports since sustainability reports are less regulated and rarely audited (Brown and Zamora 2015). I compare green opportunity disclosure decisions within a firm and across its financial and sustainability reports and examine the consequences of these decisions. Third, green opportunities represent an economically significant phenomenon: green revenues in my sample amounted to \$259 billion in 2016 and grew by 93% over the years 2009-2016 (see Figure 1).

I identify green opportunity disclosures using textual analysis of the MD&A sections of 10-Ks and sustainability reports.³ A green opportunity disclosure is a sentence that contains a forward-looking term such as “company expects” or “management anticipates” (using the approach in Bozanic et al., 2018), and a green product term obtained from proprietary data provided by FTSE Russell. For each firm-year, I determine whether green opportunity disclosure is made in the 10-K and in the sustainability report. Descriptive statistics reveal that, in nearly a quarter of firm-year observations, firms make different green opportunity disclosure decisions across financial and sustainability reports. In virtually all instances, disclosure is initially made *only* in the sustainability report, without an accompanying green opportunity disclosure in the 10-K. However, 95% of firms that disclose green opportunities in the sustainability report subsequently include disclosure in their 10-K. On average, firms start disclosing green opportunities in the 10-K 2.5 years *after* first disclosing in the sustainability report.

I examine whether managers make disclosure channel decisions based on the reliability of green opportunity disclosures.⁴ If managers delay disclosure of green opportunities in the 10-K until they can reliably predict future green revenues, or if sustainability disclosures are insincere (i.e., ‘greenwashing’ as in Ramus and Montiel, 2005), I expect green opportunity disclosures in

³ I combine the text in firms' stand-alone sustainability report with text from firm responses to a climate change survey (provided as part of the stand-alone report or on the firm's website) and refer to this text collectively as firms' sustainability report.

⁴ Reliability, according to the Financial Accounting Standards Board (FASB), represents the extent to which the information is unbiased, free from error, and representationally faithful (FASB 1980). It is challenging to specify and identify reliability precisely (Maines & Wahlen, 2006). In this paper I adopt the view that green opportunity disclosures are reliable if they relate positively to future green revenues and green revenue growth.

the 10-K to provide reliable information about future green revenues, but not green opportunity disclosures provided only in the sustainability report. To test this, I examine the association between green opportunities disclosed in sustainability reports only (i.e., not accompanied by a green opportunity disclosure in the 10-K) and green opportunities disclosed in both sustainability reports and 10-Ks, and future green revenues. My results suggest that disclosing green opportunities only in the sustainability report is positively and significantly related to future green revenues and green revenue growth over multiple years, as is disclosing in both the 10-K and in the sustainability report. Supplementing sustainability report disclosure with disclosure in the 10-K does not, on average, convey incremental information about future green revenues or green revenue growth.

Since green opportunity disclosures in both channels are reliable, I study whether analysts incorporate these disclosures in forming earnings and revenue forecasts. My analysis shows that green opportunity disclosures made only in the sustainability report are associated with positive one- and two-year earnings and revenue forecast errors, while green opportunity disclosures made in both the sustainability report and the 10-K are not. My interpretation is that positive earnings and revenue surprises arise in part because analysts do not fully incorporate information from the sustainability report. Analysts' forecasts therefore do not include the 'green' component of earnings and revenues when green opportunities are disclosed only in the sustainability report.

Next, I examine whether withholding disclosure of green opportunities from the 10-K has aggregate capital market consequences. Frictions (e.g., search costs and investor inattention) could prevent investors from using all information sources (Gow et al. 2018; Dellavigna and Pollet 2009). Alternatively, investors may rationally discount green opportunity disclosures in sustainability reports owing to concerns about the credibility of these unaudited reports. I assess the market's incorporation of green opportunity news and the valuation implications (if any) of this news. I find that a portfolio of firms disclosing green opportunities in their 10-K and in their sustainability report does not exhibit significant abnormal returns. Conversely, a portfolio of firms disclosing only in their sustainability report earns significantly positive abnormal returns, with alpha estimates suggesting that investors are able to earn as high as 3.09% annual abnormal returns. This implies that investors do not immediately and fully impound green opportunities disclosed in sustainability reports, but do so more efficiently when disclosure is provided in the 10-K. I show

that earnings announcement returns account for a meaningful proportion of the outperformance, suggesting that the price change (alpha) is realized as green opportunities pay off through observable metrics such as higher sales revenues and accounting returns.

Given my findings that withholding green opportunity disclosure from the 10-K, relative to the sustainability report, has implications for price discovery and information intermediation, an interesting question is why managers delay disclosing these opportunities in the 10-K. I explore two potential explanations, but leave further investigation of this question to future research. The first explanation is that managers perceive net costs (benefits) from disclosing green opportunities in the 10-K (sustainability report) when green revenues are lower and less certain. Over time, as green revenues increase, the expected costs of disclosing in the 10-K fall and managers choose to disclose green opportunities in the 10-K. The second (non-mutually exclusive) explanation is that the 10-K delay is due to firms' disclosure policies on financial materiality, which require revenues from green products to be material before discussing green opportunities in financial reports.

Consistent with both explanations, green revenues are, on average, 4.5% of total revenues when firms start disclosing green opportunities in the 10-K, compared to being, on average, 1.5% of total revenues when firms start disclosing in the sustainability report. In addition, firms with higher green revenues disclose more promptly in the 10-K, consistent with the financial materiality explanation. Tests of potential costs of disclosure provide no evidence that 10-K disclosure delays are longer for firms with higher expected proprietary and litigation costs; however, firms receiving greater shareholder support for climate change-related proposals have shorter 10-K delays. A plausible explanation is that the expected costs of disclosing green opportunities in the 10-K are lower when investors pressure firms to improve performance and transparency on climate change impacts. In the absence of this shareholder engagement, firms expect investors to draw adverse inferences from green opportunity news given widespread concerns that sustainability-related efforts are driven by managers' personal and political beliefs rather than by shareholders' interests (e.g., Di Giuli and Kostovetsky 2014).

My paper makes a number of contributions. First, I contribute to the literature on discretionary disclosure by providing evidence in a setting where I can observe disclosure being withheld in one report versus another. Relatively few papers have examined settings where underlying disclosure choices can be observed. Gow, Wahid and Yu (2018) observe when director

biographies withhold information on other directorships using data from Equilar, and Berger and Hann (2007) observe concealed segment profits using the retroactive application of SFAS No. 131. Whereas these papers examine settings where information is withheld altogether, I study firm decisions to withhold disclosure in one report, but provide it in another.

Second, I contribute to the relatively understudied question of which reporting channels are used by managers (Bamber and Cheon 1998; Plumlee & Yohn 2010; Elliot et al. 2012; Crowley 2018; Lansford et al. 2018). Firms disclose information in several different venues, such as SEC filings, government filings, conference calls and websites. While prior literature studies disclosure decisions across traditional financial reporting channels (e.g., SEC filings and conference calls), I show that firms also make disclosure choices across traditional and newer reporting channels, such as sustainability reports. My paper is timely in light of the SEC's recent approval of social media networks, such as Twitter and Facebook, as channels for firm disclosure (SEC 2013).

Third, my study is related to literature examining managers' presentation and disclosure choices (e.g., Riedl and Srinivasan 2010; McVay 2006; Merkley 2014) and how information users are affected by these choices (e.g., Schrand & Walther 2000; Bowen et al. 2005; Hirst & Hopkins 1998). This literature mainly studies choices made *within* a given report or SEC filing, whereas I show that investors and analysts are affected by disclosure choices made *across* reports. I also add to the research on limited investor attention (e.g., Hirshleifer and Teoh 2003; Dellavigna and Pollet 2009; Barber and Odean 2008), since inattention is one possible explanation for why investors and analysts do not fully incorporate green opportunity disclosures provided in sustainability reports.

Last, I contribute to research on the capital market implications of voluntary sustainability disclosure (e.g., Dhaliwal et al. 2011 and 2012; Matsumura et al. 2014). Most of this research focuses on disclosure in sustainability reports or on climate risk reporting in the 10-K (e.g., Matsumura et al. 2017; Berkman et al. 2018), but no study examines disclosure of the same information across financial and sustainability reports. I show that investors and analysts do not fully incorporate green opportunity disclosure in sustainability reports when firms do not also include disclosure in the 10-K, suggesting that frictions or credibility concerns over sustainability reporting may affect price discovery and information intermediation.

2. Background and hypothesis development

2.1 Background

Virtually no large company is immune to the effects of rapid technological advances, shifts in consumer preferences, changing regulation, or other macroeconomic trends that have the potential to transform industries and the economy (McKinsey 2017). The potential and realized implications of emerging trends have generated considerable practitioner and academic interest in how firms adapt to changing market conditions (e.g., Reeves and Deimler 2011; Wells 2012; Martin 2014). The SEC encourages companies to voluntarily disclose information about trends, plans and uncertainties in the MD&A (SEC 1989, 2003), but prior research on these disclosures is limited.

Firms also have incentives to share their plans to address emerging trends with non-equity stakeholders (e.g., customers, employees, government officials) who are interested in, or implicated by, the risks and opportunities created by trends. For instance, in response to estimates that thousands of American workers could lose their jobs owing to advancements in artificial intelligence (AI), companies are providing information on their websites about programs to retrain existing workers (Illanes et al. 2018). This communication could help assuage the concerns of current employees, while also helping the firm attract new talent if prospective employees see this as positive signal about how the firm treats its workers. Disclosing responses to emerging trends could also increase the likelihood of influencing federal policy and regulation – which could be strategically beneficial to the firm – since government officials consult with companies at the forefront of emerging trends and use corporate websites to help identify such companies (American Leadership in Emerging Technology, 2017).

My setting to study corporate disclosure of emerging trends is climate change. In particular, I study disclosures that firms provide about their plans to capitalize on the business opportunities that arise from climate change. Relative to other trends, a benefit of this setting is the ability to observe the financial implications of green opportunities given the launch of low-carbon or ‘green’ products in recent years. I obtain data on the revenues generated from the sale of green products for U.S. firms from a data provider, allowing me to draw more direct inferences relative to settings where the outcomes of emerging trends have not yet materialized or are difficult to observe.

A growing number of companies recognize the current and potential effects on their operations, both positive and negative, associated with climate change.⁵ I study climate change opportunity disclosure, rather than climate change risk disclosure, for two reasons. The first is that assessing the financial implications of risk reporting is challenging since costs may be incurred far into the future and are often unobservable (Schrand and Elliott 1998). Data on the revenues generated from the sale of low-carbon products for several hundred U.S. firms helps me overcome this challenge in studying climate change opportunities. The second reason is that climate change risk reporting may be mandatory given the SEC's requirement for firms to disclose material risks in Item 1A of the 10-K. By comparison, firms are not mandated to disclose opportunities. Opportunity disclosures are therefore preferable to study firms' incentives to voluntarily disclose information relating to emerging trends (Heiztman, Wasley and Zimmerman 2010).⁶

Similar to other trends, corporate plans to address the business opportunities that arise from climate change could be of interest to both investors and non-equity stakeholders. Relevant non-equity stakeholders in this setting include environmental non-governmental organizations (NGOs), climate change activists and consumers with environmental preferences. These stakeholders refer to sustainability reports, rather than to financial reports, for information about firms' environmental practices and performance (LeBlanc and DeRose 2013).

Sustainability reports contain 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, etc.) information. The number of firms issuing sustainability reports increased from less than 50 in 1995 to over 6,000 in 2015 (Ioannou and Serafeim, 2017).⁷ Despite 87% of the S&P 500 Index reporting on sustainability in 2017, the SEC does not mandate

⁵ Over 3,500 companies globally, of which approximately 800 are U.S. companies, reported climate change information in 2016. See the Carbon Disclosure Project's website for more information: www.cdproject.net.

⁶ Heiztman, Wasley and Zimmerman (2010) state that, for mandatory disclosures, firms must disclose information that it deems to be material. Thus, accounting researchers should recognize that disclosure is often provided because of reporting obligations, and is not voluntary. HWZ state that this does not apply to settings where managers have no obligation to disclose, such as disclosures of forward-looking information.

⁷ In the past, the terms "sustainability," "environmental, social, and governance" (ESG), and "corporate social responsibility" (CSR) have been used interchangeably. Throughout this paper, I use the word sustainability, given that more firms use this word rather than CSR or ESG to describe voluntary actions to manage the environmental and social impacts of the firms' activities.

sustainability disclosure.⁸ Much of this voluntary reporting is driven by demands for transparency from non-equity stakeholders, such as environmental NGOs and human rights advocacy groups. Some firms issue sustainability reports to market the firm's activities and policies as sustainable when they are not, a practice known as 'greenwashing' (e.g., Ramus and Montiel, 2005; Marquis and Toffel, 2015; Burbano and Delmas, 2015). Increased investor interest in sustainability data is another reason for voluntary sustainability reporting (e.g., Eccles et al. 2011).⁹

2.2 Hypothesis development

2.2.1 Green opportunity disclosure in financial and sustainability reports

An extensive literature in accounting studies the factors that drive disclosure decisions and the capital market implications of disclosure (Healy and Palepu, 2011). Most prior research focuses on the decision to disclose or not to disclose. By comparison, relatively few studies examine disclosure decisions across reporting channels (Crowley 2018; Elliot et al. 2012; Ma 2012; Plumlee and Yohn 2010; Lansford et al. 2009; Bamber and Cheon 1998).¹⁰

Firms taking action to capitalize on the business opportunities that arise from climate change have incentives to communicate these plans to investors. This information could improve the prediction of the firm's future performance (i.e., expected cash flows) and reduce the firm's cost of capital through lower information risk (e.g., Easley and O'Hara 2004). Moreover, disclosing green opportunities could signal good news to investors about firm responsiveness to changing market conditions (e.g., Wells 2012). Firms also have incentives to disclose green opportunities to non-equity stakeholders (e.g., environmental NGOs) interested in identifying companies contributing to the transition to a low-carbon economy. Disclosure could increase the

⁸ Though the SEC mandates governance disclosures such as executive compensation and pay ratios, the governance portion of sustainability disclosures typically does not cover these topics, but rather includes issues such as business ethics and political lobbying.

⁹ For instance, as of 2017 the United Nations Principles for Responsible Investment (UNPRI) had over 1,400 signatories with \$60 trillion in assets under management who had committed to incorporate sustainability issues into their investment analysis and ownership policies and practices.

¹⁰ Crowley (2018) develops a model of disclosure incentives across an easy-to-process and a hard-to-process channel in the presence of informed and uninformed investors. Elliot, Hodge and Sedor (2012) examine how subjects perceive earnings restatements made in online videos versus text-based press releases. Ma (2012) examines disclosure of material events in 8-Ks and press releases. Plumlee and Yohn (2010) examine whether restatements are filed in an 8-K report, an amended report or in subsequent regulatory filings. Lansford et al. (2009) examine whether management guidance is issued in conference calls or in press releases. Bamber and Cheon (1998) study the location of earnings forecasts across special press releases and in response to questions from analysts.

firm's sustainability reputation and help the firm attract talent, reduce the risk of consumer boycotts and smearing campaigns, and form partnerships with key stakeholders (e.g., Cheng et al. 2014; Burbano 2018; Turban and Greening 1997; Henisz et al. 2014). Given these incentives, I expect managers to disclose green opportunities in two reporting channels: a financial reporting channel (e.g., the 10-K) and a nonfinancial reporting channel (e.g., the sustainability report).

However, firms likely anticipate costs from disclosing green opportunities. Prior research suggests that managers fear the legal sanctions that could result from making misleading statements and the loss to firm credibility and reputation from missed projections (e.g., Waymire 1985; Graham et al. 2005).¹¹ These expected costs could be exacerbated in the high-uncertainty context of emerging trends, leading managers to withhold disclosure of green opportunities. Nevertheless, these costs might not prevent firms from disclosing green opportunities in sustainability reports. Firms are liable for disclosures made in all mediums (SEC 2013) but firms may perceive lower accountability for disclosures made in sustainability reports. This could arise due to firms' beliefs that frictions (e.g., search costs and inattention) prevent investors from being attentive to disclosures in sustainability reports. Firms might also expect sustainability reports to be disregarded given investor concerns about the reliability of these unaudited reports (e.g., Amel-Zadeh and Serafeim 2017). Moreover, CEOs are rarely asked about sustainability matters in quarterly earnings calls and no firm has been held liable for claims made in sustainability reports (Eccles and Serafeim 2013). Firms may therefore expect lower investor and regulator monitoring of disclosures made in sustainability reports.

This suggests that firms will withhold disclosure of green opportunities from financial reports until they have more certainty about their ability to deliver on stated opportunities, while disclosing *in* sustainability reports where disclosure-related costs are expected to be lower. Assuming that certainty about the ability to deliver on green opportunities increases over time as green product sales increase, this leads to the prediction that firms will disclose green opportunities in the 10-K with a delay relative to the sustainability report.

¹¹ Waymire (1985) conjectures that "executives expect legal sanctions, brought by disgruntled shareholders or regulatory agencies like the SEC, to be associated with unattained earnings forecasts." (p. 293). Graham et al. (2005) find that failing to achieve targets (especially those set by management) could cause the firm to lose credibility and raises questions about whether managers have control over the firm. Skinner (1994) also points out that credibility with analysts is an important motivation to avoid negative earnings surprises.

Alternatively, firms may be deterred from selectively disclosing since regulators and investors could identify and penalize this behavior. This is a relevant concern given that the SEC issued interpretive Guidance on climate change disclosures to remind companies of their obligations to “consider climate change as they prepare disclosure documents” and cautioned that some of the climate change-related information being provided by firms in their sustainability reports may also be required in regulated filings (SEC 2010). Thus, firms may expect regulatory action – in the form of comment letters or forced revisions of previously filed reports – if they do not disclose green opportunities consistently across financial and sustainability reports (e.g., Bozanic et al. 2017).

2.2.2 Reliability of green opportunity disclosures

Prior research in accounting examines firms’ presentation and disclosure choices, documenting evidence consistent with both informational and opportunistic motivations behind reporting decisions (e.g., Merkley 2014; Riedl and Srinivasan 2010; McVay 2006; Bowen et al. 2005; Schrand and Walther 2000; Hirst and Hopkins 1998). I examine whether firms’ disclosure channel decisions are motivated by the reliability of green opportunity disclosures. Reliability, according to the Financial Accounting Standards Board (FASB), represents the extent to which information is unbiased, free from error, and representationally faithful (FASB 1980). Though reliability is challenging to identify in practice (Maines & Wahlen, 2006), I adopt the position that green opportunity disclosures are reliable if they relate positively to future green revenues.

Green opportunity disclosures in the sustainability report may be unreliable if firms expect low accountability over disclosures provided in sustainability reports. The majority of sustainability reports issued by U.S. firms are unaudited (Brown and Zamora 2015). Thus, firms can more easily disclose green opportunities in sustainability reports without having any current or future intentions to pursue them. Even in the absence of misrepresentations, higher expected litigation and reputation costs associated with claims made in the 10-K could lead firms to wait until they are more certain about future green revenues before disclosing in the 10-K than in the sustainability report. As a result, green opportunity disclosures will be a reliable indicator of future green revenues in the former, but not in the latter.

On the other hand, if firms expect sustainability reports to be monitored by non-equity stakeholders, firms will not make misrepresentations and will require reasonable certainty about future green revenues before disclosing green opportunities in sustainability reports. In that case, green opportunity disclosures are expected to be reliable predictors of future green revenues when disclosed in either the 10-K or the sustainability report.

2.2.3 Capital market implications of green opportunity disclosures

It is conceivable that investors will be skeptical of green products and may even require a higher rate of return for firms that disclose green opportunities. Given that venture capital investors lost over \$12.5 billion in early-stage clean energy technology investments, investors are apprehensive of new green product developments (Gaddy et al. 2016). Moreover, concerns that sustainability-related efforts are motivated by managers' personal and political beliefs rather than shareholder interests, further cast doubt on the financial returns to green product investments (e.g., Cheng, Hong, and Shue 2014; Benabou and Tirole 2010).

It is also possible that capital market participants are affected by the disclosure channel used by the firm to disclose green opportunities. Investors and analysts may dismiss green opportunity disclosures in sustainability reports owing to concerns about the credibility of disclosures made in these unaudited reports (e.g., Brown and Zamora 2015). This is consistent with research suggesting that investors are less willing to rely upon forecasts that are viewed as less credible or precise (e.g., Bamber and Cheon, 1998).

There may also be frictions (e.g., search costs or investor inattention) that limit the ability of capital market participants to impound all relevant information, regardless of where it is disclosed. Limited investor attention has been modeled theoretically (e.g., Hirshleifer, Lim and Teoh 2011; Hirshleifer and Teoh 2003; Merton 1987) and shown empirically (e.g., Dellavigna and Pollet 2009; Barber and Odean 2009). Recent research also suggests that search costs may prevent investors from being aware of information in all sources (Gow et al. 2018).

The above reasons suggest that investors and analysts may not incorporate green opportunity disclosures into valuation and forecast decisions, respectively. If capital market participants do not immediately and fully impound green opportunity news, disclosures may be associated with future stock returns. Returns could be positive, negative, or zero, depending on

whether green products increase or decrease shareholder wealth, or are neither value-creating nor value-destroying. It is therefore an empirical question whether markets incorporate green opportunity disclosures and the valuation implications (if any) of green opportunities.

3. Data and Sample

3.1 Green Opportunity Disclosure

I use textual analysis to identify green opportunity disclosure in financial and nonfinancial reporting channels. My source for the financial reporting channel is the Management Discussion & Analysis (MD&A) section of the 10-K. I use the MD&A because public companies are mandated to file MD&A sections as part of 10-K filings, but the content of the MD&A is largely voluntary (SEC 1980; Beyer et al. 2010). Given my focus on green opportunity disclosure, the MD&A is appropriate because the SEC has guided companies to voluntarily disclose trends, events, commitments, plans, and uncertainties in the MD&A (SEC 1989, 2003). The SEC has also guided companies to voluntarily disclose climate change-related matters in MD&A disclosure (SEC 2010). I restrict my sample to 10-K filings because (1) my review of green opportunity disclosures indicates that those in the 10-K are more comprehensive than those in 10-Q filings and (2) the annual reporting frequency is more appropriate for my empirical analyses since the green revenues data I have are on an annual basis. Therefore, my conclusions about green opportunity disclosures in financial reporting channels relate only to the MD&A disclosures in 10-K filings.¹²

My sources for the nonfinancial reporting channel are (1) sustainability reports and (2) responses to the Carbon Disclosure Project survey questions “*Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?*” and “*Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.*”¹³ The Carbon Disclosure Project (CDP) is an investor-led partnership that asks companies to respond to questions about their climate change risk management and performance through an annual online survey. I use the GRI’s Sustainability

¹² For completeness, I have also analyzed the text of management forecasts provided in earnings announcements, earnings calls, press releases and 8-K filings. I have noted no instance of green opportunity disclosure in these other financial reporting channels *before* the 10-K.

¹³ Although the wording of these questions has changed somewhat over the years that the CDP has administered their survey (i.e., 2004-present), the questions’ objective (i.e., to elicit responses about climate change business opportunities) has remained unchanged. I thank Tim Fryer from the CDP for this insight.

Disclosure Database to identify sustainability reports, which is considered the most comprehensive repository of sustainability reports for North American firms (CSE, 2017). All firms in my sample either issue a sustainability report or respond to the CDP survey – or do both – throughout the sample period.

I develop a Python code that downloads 10-K filings from the SEC EDGAR database and extracts the text from MD&A sections from the 10-K filings. CDP responses are converted to text files. For sustainability reports, which are typically in PDF format, I use the Python package ‘pdfMiner’ and the programs ‘pdf2txt’ and ‘textract’ to convert PDF files into readable text.¹⁴ Since firms generally provide CDP responses as part of their sustainability report, or provide them in the same section of the corporate website where sustainability reports are filed, I combine text from the firm’s CDP response and sustainability report and hereafter refer to the combined text collectively as sustainability report disclosure. Next, I parse the text from 10-Ks and sustainability reports into sentences. I use sentences as the unit of analysis (rather than words or text lines), consistent with prior research (e.g., Muslu et al. 2015; Bozanic et al. 2018).¹⁵ I classify a sentence as a green opportunity disclosure if the sentence includes (1) a forward-looking term and (2) a green product term. The forward-looking term serves to identify statements that companies make about the future and the green product term serves to identify discussion about low-carbon goods, technologies and services. Together, my measure identifies forward-looking statements about low-carbon products.

I identify forward-looking terms using a library-based approach which relies on lists from prior literature that have been found to be well-specified and powerful in identifying forward-looking information. I use the lists from three studies employing textual analysis for forward-looking information (i.e., Li 2010; Muslu et al. 2015; Bozanic et al. 2018). In these studies, the authors identify words that characterize forward-looking statements and classify any sentence including at least one of those words as a forward-looking sentence. The full list of forward-looking terms that I use is provided in the Internet Appendix. To identify green product terms, I use data provided by FTSE Russell (FTSE) based on its review of thousands of public documents

¹⁴ These programs do not have a way to extract tables, images, charts, or other media from PDF documents, but can extract the text and return it as a Python string.

¹⁵ For example, Muslu et al. (2015) justifies the use of sentences with Ivers (1991), which states that a sentence is the smallest unit of text that communicate an idea, message, notion or thought.

(e.g., industry reports, product descriptions, news articles, press releases, regulated filings, websites, market research, etc.). The data I receive consists of descriptions of products, services, goods and technologies that, according to FTSE’s research, are contributing to the transition to a low-carbon economy. FTSE collected this data to identify companies that sell green products and to quantify revenue exposure that companies have to green products. The proprietary nature of this data precludes me from sharing the list of green product terms. The green product terms consist of both firm-specific products (e.g., “Ford Focus Electric”) and general products (e.g., “electric vehicle”). There are also duplicate terms for the same green product (e.g., “solar panel”, “solar powered panel”, “photovoltaic panel”) to accommodate multiple ways that a green product can be described.

This approach allows me to process 10-Ks and sustainability reports relatively quickly but, as with all library-based approaches used for textual analysis, there are limitations. Since my process for measuring green opportunity statements will likely do so with error, I consider how noise in the measure could affect my inferences. One potential concern is that the disclosure I identify will be too vague or uncertain (1) to warrant an assessment of its reliability, and (2) for investors to price it. Consistent with Hutton et al. (2003) and Bozanic et al. (2018), I do not require green opportunity disclosures to be forecast-like in nature or quantitative.¹⁶ However, I remove the keywords “shall”, “should”, “can”, “could”, “may”, or “might” from the list of forward-looking terms because prior research has identified these keywords as being associated with uninformative boilerplate disclosures (e.g., legal Safe Harbor language) that do not contain any real forward-looking information (Muslu et al. 2015). Another potential concern is my assumption that forward-looking statements about green products reflect positive (rather than negative) intentions behind the development and sale of green products. To improve my measure’s consistency with this interpretation, I remove library terms that include negations (e.g., “does not expect” or “not intending”), since these forward-looking terms are less likely to be associated with the pursuit of green opportunities. The comprehensiveness of the green product terms from FTSE’s data is also a potential concern. If FTSE’s process did not identify all green product descriptions that firms use to discuss green opportunities in their sustainability or 10-K reports, my green opportunity

¹⁶ Hutton et al. (2003) note that statements need not be quantitative to be verifiable, and Bozanic et al. (2018) document that non-quantitative forward-looking information generates significant analyst and investor responses. For example, a statement that the firm expects growth in electric vehicle sales is not quantitative, but can be compared to data on the firm’s electric car sales.

disclosure measure will be understated. This will most likely introduce noise into the estimates. For instance, in tests that examine disclosure reliability, an understated disclosure variable will bias the association between disclosure and future green revenues towards zero. In tests that examine disclosure and future stock returns, estimates are also likely to be biased towards zero. Moreover, in tests that evaluate the financial implications green opportunity disclosure decisions across 10-Ks and sustainability reports, the estimates should not be systematically biased so long as my measure is equally noisy across both reports.

3.2 Green Revenues

I obtain data on revenues from the sale of green products from FTSE Russell's Green Revenues data model. The purpose of FTSE's model is to provide investors with data that allows them to monitor the companies and sectors engaged in the transition to a low-carbon economy.¹⁷ FTSE first utilizes data that firms are required to report to the U.S. Environmental Protection Agency (EPA) on the sale of certain low-carbon products. Since the late 1990s, the U.S. EPA has required firms to report sales from products that receive low-carbon certifications from third party organizations, such as electric or hybrid vehicles, renewable energy, machinery and equipment meeting EPA requirements for low emissions, and energy efficient-certified appliances and technologies (Office of the Federal Register, 1997). Since firms are mandated to report this data and could lose their low-carbon product certifications if they do not comply, this provides increased reliability over the data.¹⁸ For other low-carbon products, FTSE has developed a proprietary taxonomy for green goods, products, technologies, and services. FTSE uses its taxonomy to analyze sub segment revenue data in the audited financial reports of the company and identify what proportion, if any, of the firm's total revenues are generated from green sectors and subsectors. The Green Revenues Factor is calculated for each company between 0 and 100% of revenues and represents green revenues generated by the company in a given year as a fraction of the company's total revenues. FTSE indicates whether the green revenues are calculated using data that firms were required to provide to third-party certifiers, or from firms' sub segment revenue

¹⁷ See FTSE Russell's description of its Green Revenues model, available at <https://www.ftserussell.com/index-series/index-spotlights/green-revenues>

¹⁸ The EPA also performs periodic audits of the company-reported data.

disclosures; for the tests that I perform that utilize this data, I do not find that my inferences are affected by the source of the green revenues data.

3.3 Sample

My sample consists of a subset of firms analyzed by FTSE Russell in their Green Revenues data model. The data provided to me from FTSE consists of FTSE All-World Index constituents, which are large and mid-cap stocks from developed and emerging markets covering 90-95% of the world's investable market capitalization.¹⁹

Table 1 shows how I arrive at my final sample. I start with 3,042 firms and 23,553 firm-year observations from FTSE Russell's Green Revenues data model. I remove 2,233 non-U.S. firms (17,613 firm-years). I focus on U.S. firms because sustainability reporting in the U.S. is voluntary and the SEC has not mandated sustainability reporting as of 2018.²⁰ This contrasts several other countries which, in recent years, mandated corporate disclosure of environmental and social responsibility data.²¹ These sustainability reporting mandates specify or suggest the sustainability issues that companies should focus their reporting on, which increases the likelihood that firms will not discuss other topics – for instance, climate change opportunities – if the regulation does not explicitly refer to them. Focusing on a voluntary sustainability reporting setting is preferable in allowing me to observe unconstrained disclosure practices. After removing 62 firms (149 firm-years) for which I am unable to obtain data for the control variables that I require for my analyses, I am left with 747 unique U.S. firms and 5,791 firm-year observations. This sample represents approximately 70% of the market capitalization value of U.S. firms as of 2016.

Table 2 presents the frequency distributions of observations in my sample. In Panel A, I provide an overview of the distribution across years. All years have an approximately equal number of observations. In Panel B, I show the distribution across sectors. My sample is not heavily weighted toward any specific sector, with the most frequently represented sectors being

¹⁹ See FTSE Russell's All-World Index factsheet, available for download from <https://www.ftse.com/products/indices/geis-series>

²⁰ Though the SEC has adopted rules relating to disclosures of conflict minerals, health and safety violations at mine sites and payments to foreign governments for the extraction of natural resources, no broad sustainability reporting mandate has been adopted.

²¹ For example, in 2014 the European Commission mandated new sustainability disclosures for all large companies in the European Union. Mandated sustainability reporting for corporate entities has also occurred in: Australia, Brazil, China, Denmark, Finland, France, India, Indonesia, Malaysia, Netherlands, Norway, South Africa, Spain, Sweden and Taiwan (see the Internet Appendix in Grewal, 2018).

Financials, Consumer Discretionary and Industrials, comprising 16.7%, 15.8% and 14.3% of the sample, respectively. Table 2 also reports average green revenues (measured as a percentage of total revenues) across years (Panel A) and sectors (Panel B). Panel A shows a year-over-year increase in green revenues from 2009 to 2016, with mean green revenues doubling from 6% to 12.1% over the 7-year period. Panel B shows variation in green revenues across sectors, with Financials and Telecommunication Services having the lowest green revenues (0.9% and 1.4%, respectively) and Utilities, Industrials and Consumer Staples having the highest proportion (12.4%, 10.5% and 10.1%, respectively).

4. Research design and empirical tests

4.1 Descriptive statistics

I present the frequency of green opportunity disclosures across 10-Ks and sustainability reports in Table 3. Panel A shows frequencies of green opportunity disclosures where the unit of observation is a firm-year. 42% of firm-years have a green opportunity disclosure in the sustainability report while 20% have a green opportunity disclosure in the 10-K. 19% of firm-years have green opportunity disclosure in both the 10-K and the sustainability report, while 57% have neither. 23% of firm-year observations have a green opportunity disclosure in the sustainability report *only* without an accompanying green opportunity disclosure in the 10-K and 1% of observations have a green opportunity disclosure in the 10-K but not in the sustainability report.²² The difference between 23% and 1% suggests that firms are more likely to disclose in the sustainability report without also disclosing in the 10-K, rather than disclosing in the 10-K without also disclosing in the sustainability report.

Table 3 Panel B shows frequencies of green opportunity disclosures using the firm as the unit of observation. Out of 368 firms that ever disclose green opportunities (49% of the full sample of 747 firms), 351 (95%) disclose green opportunities in *both* reporting channels at some point in the sample period, while the remaining 17 firms (5%) only disclose in one reporting channel throughout the entire sample period.²³ Of these 17 firms, 15 report in the sustainability report only

²² The null hypothesis of independence between disclosing green opportunities in the 10-K and disclosing green opportunities in the sustainability report is rejected (Chi-square = 6.371; $p < 0.01$).

²³ Data is calculated from Table 1 Panel B: $351 + 15 + 2 = 368$.

(without ever disclosing in the 10-K) and 2 report in the 10-K only (without ever disclosing in the sustainability report). All 17 firms start disclosing green opportunities towards the end of the sample period (i.e., in years 2015 or 2016) so it is possible (but not yet observable) that these firms will eventually disclose in the alternate report.

Table 4 Panel A shows the summary statistics for variables used in this study. Green revenues as a percentage of total revenues (*GreenRevenues*) has a mean of 9.4% and a standard deviation of 16%. Consistent with Panel A of Table 3, the mean of the indicator variable for green opportunity disclosure in the 10-K (*10KGreenOpp*) is 0.20 and the mean of the indicator for green opportunity disclosure in the sustainability report (*SustGreenOpp*) is 0.42. I also tabulate statistics for control variables used in my models. Green opportunity disclosure is likely related to the firm's overall sustainability disclosure strategy and contains forward-looking terms. As a result, I account for potential correlated omitted factors with an array of variables identified in prior literature as being associated with sustainability disclosure and forward-looking disclosure. First, I control for firm size, measured as the natural logarithm of total assets (*TotalAssets*), given the positive relation between firm size and sustainability disclosure (e.g., Dhaliwal et al. 2011; Cheng et al. 2014; Grewal et al. 2018) and forward-looking disclosure (e.g., Li 2010; Muslu et al. 2015). Firms with better sustainability performance have higher incentive to disclose (Dye 1985; Dhaliwal et al. 2012), so I control for sustainability performance using the ratings which take into account firms' environmental, social, and governance (ESG) performance, policies, and implementation practices (*ESGPerf*). I also include a control for the quantity of ESG disclosure (*ESGDisc*). I control for financial leverage (*Leverage*) and profitability (*ROA*) because prior research suggests that firms with higher leverage and profitability are more likely to issue sustainability reports (e.g., Dhaliwal et al. 2012). I include market-to-book ratio (*PTB*) because Li (2010) and Muslu et al. (2015) report that growth firms disclose more forward-looking information. I control for uncertainty (*RetVol*) given that uncertainty could either make firms less likely to issue forward-looking information if they fear the costs of unattained projections (e.g., Bozanic et al. 2017; Waymire 1985), or could induce managers to disclose more forward-looking information to reduce information asymmetry (e.g., Muslu et al. 2015). I control for whether the MD&A contains forward-looking disclosure (*10KFwdLooking*) given that this could be related to firms' propensity to disclose green opportunities. Since firm characteristics could affect green product revenues, I include the

following controls in my regressions: the ratio of research and development expenditures to total revenues (*R&D*), year-over-year sales growth (*SalesYrGrowth*) and annual returns (*AnnualRet*).

Panel B of Table 4 shows the univariate pairwise correlations between these variables. The highest correlation at 0.30 is between *SustGreenOpp* and *GreenRevenues*. *10KGreenOpp* and *GreenRevenues* are also highly correlated at 0.28. As expected, *10KGreenOpp* and *SustGreenOpp* are positively correlated with *ESGDisc*, *ESGPerf* and *10KFwdLooking*, consistent with green opportunity disclosures being related to ESG disclosure and performance, as well as to forward-looking information. However, the correlations are in the range of 0.19 to 0.24, suggesting my constructs are distinct from these measures. I note that the correlations between the control variables are relatively consistent with prior literature.

4.2 Timing of green opportunity disclosures

I first examine whether there is a timing difference between when firms disclose green opportunities in the 10-K and the sustainability report. For the 351 firms from Table 3 Panel B that disclose green opportunities in both reports, I subtract the year of the first sustainability report green opportunity disclosure from the year of the first 10-K green opportunity disclosure:

$$10\text{-}K\text{ Delay} =$$

$$Year\ of\ First\ 10K\ Green\ Opp\ Disc_i - Year\ of\ First\ Sust.\ Report\ Green\ Opp\ Disc_i\ (1)$$

I focus on the first disclosure year because I observe that the decision to start disclosing green opportunities (in either report) is ‘sticky’, consistent with voluntary disclosure representing a disclosure commitment (Graham et al. 2005).²⁴ Figure 2 plots the distribution of the timing difference (in years) between when firms first report in the sustainability report versus the 10-K. I name this timing difference *10-K Delay* because the frequencies of this variable suggest that firms typically start to disclose green opportunities in the 10-K *after* disclosing green opportunities in the sustainability report. In particular, fewer than 5% of the firms disclose green opportunities in the 10-K before disclosing in the sustainability report and 5.4% start disclosing in both reports in the same year. The remaining approximately 90% start disclosing in the 10-K after having already

²⁴ There are a small number of exceptions. Three firms stop disclosing (one in the sustainability report and two in the 10-K) and four firms go back and forth between disclosing and not disclosing throughout the sample period. I use the first disclosure year in both reports for these firms, but the results are virtually unchanged if I omit these seven firms from the analysis.

begun to disclose in the sustainability report. The average (median) *10-K Delay* is 2.5 (3) years, suggesting that firms wait on average 2.5 years after first disclosing green opportunities in the sustainability report to start disclosing green opportunities in the 10-K.

4.3 Reliability of green opportunity disclosures

Given this descriptive finding of a disclosure delay between the 10-K and the sustainability report, it is plausible that managers make disclosure channel decisions based on the reliability of green opportunity disclosures. According to the Financial Accounting Standards Board (FASB), reliability is the extent to which information is unbiased, free from error, and representationally faithful (FASB 1980). Maines and Wahlen (2006) assert that it is difficult for researchers, practitioners and standard-setters to examine and identify reliability precisely. In this study, I adopt the view that green opportunity disclosures are reliable if they relate positively to future green revenues. My reasoning is that a positive association between green opportunity disclosure and future green revenues suggests that disclosure reliably predicts future green revenues.

If managers delay disclosure of green opportunities in the 10-K until they can reliably predict future green revenues or use sustainability reports to misrepresent their efforts, green opportunity disclosures in the 10-K will be a reliable indicator of future green revenue, while green opportunity disclosures in the sustainability report only will *not* be a reliable indicator of future green revenues. However, if managers use sustainability reports alone to reliably and truthfully predict green revenues in earlier years, reliability will not influence the reporting channel used to report green opportunities. To test this, I estimate the following regression model using OLS:

$$\begin{aligned}
 &GreenRevenues_{i,t+n} \\
 &= \alpha_0 + \beta_1 SustOnly_{i,t} + \beta_2 Sust\&10K_{i,t} + \beta_3 ESGDisc_{i,t} + \beta_4 ESGPerf_{i,t} \\
 &+ \beta_5 10KFwdLooking_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 PTB_{i,t} \\
 &+ \beta_9 RetVol_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} Sales1YrGrowth_{i,t} + \beta_{12} AnnualRet_{i,t} \\
 &+ \beta_{13} TotalAssets_{i,t} + \alpha_i + \delta_t \\
 &+ \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

where $n=1, 2, 3$ or 4 , α_i represents firm fixed effects that absorb all observed and unobserved time-invariant firm characteristics and δ_t represents year fixed effects that control for common macroeconomic shocks that affect all firms. There are two main variables of interest. The first, *SustOnly*, is an indicator equal to one in firm-years when a green opportunity disclosure is made in the sustainability report only (i.e., not accompanied by a green opportunity disclosure in the 10-K). The second variable, *Sust&10K*, is an indicator equal to one in firm-years when a green opportunity disclosure is made in both the 10-K and in the sustainability report. Given the few firm-years when green opportunities are disclosed only in the 10-K (56 observations, per Table 3 Panel A), I remove these observations. Thus, a positive β_1 (β_2) suggests that disclosing green opportunities in the sustainability report only (in the sustainability report and in the 10-K) is associated with future green revenues, relative to when no green opportunities are disclosed.

The results are presented in Table 5. Table 5 Panel A uses the green revenues percentage in years $t+1$ to $t+4$ as dependent variables, while Panel B uses year-over-year changes in the green revenues percentage as dependent variables. In Panel A, the coefficient on *SustOnly* is positive and significant in all specifications at 5% or better. This suggests that disclosing green opportunities in the sustainability report only is a reliable indicator of average future (i.e., 1-year to 4-year ahead) green revenues. The coefficient estimates indicate that disclosing in the sustainability report alone is associated with green revenues that are 3.8 to 5.2 percentage points higher, on average, than firm-years where no green opportunities are disclosed. The coefficient estimates on *Sust&10K* are also positive and significant across all specifications. However, the estimates on *SustOnly* and *Sust&10K* are statistically indistinguishable, suggesting that disclosing green opportunities in the 10-K does not, on average, convey incrementally reliable information about the magnitude of future green revenues relative to disclosing only in the sustainability report.

Similar inferences are drawn from Panel B which use year-over-year changes in the green revenues percentage as the dependent variable. I use this alternative dependent variable because year-over-year changes in green revenues are more likely to be independent over time relative to levels of green revenues. The coefficient on *SustOnly* is positive and significant except for the specification in Column 4 which uses the change in green revenues from $t+3$ to $t+4$ as the dependent variable. This suggests that disclosing green opportunities in the sustainability report alone is associated with positive changes (i.e., growth) in green revenues over multiple years. Again, the coefficients on *Sust&10K* are positive and significant but statistically equivalent to that

of the coefficients on *SustOnly*, suggesting that green opportunity disclosures in the 10-K are not incrementally reliable predictors of the magnitude of green revenue growth relative to green opportunity disclosures provided only in the sustainability report.

4.4 Capital market effects of green opportunity disclosures

4.4.1 Earnings announcements

Given the evidence suggesting that green opportunity disclosures in sustainability reports are reliable, I examine whether analysts use these disclosures in forming forecasts of revenues and earnings. There is substantial evidence that analysts respond to information that managers provide about future earnings (e.g., Waymire 1986; Jennings 1987; Cotter et al., 2006). However, analysts may be less willing to rely on information that they view as being as less credible (e.g., Bamber and Cheon 1998). Analysts may also be unaware of forward-looking information in sustainability reports. If, on average, analysts do not incorporate green opportunity disclosures, forecasts will not include the ‘green’ component of revenues and earnings.

I study whether green opportunity disclosures are associated with earnings and revenue surprises by regressing the one- or two-year earnings and revenue surprise on two green opportunity disclosure variables and controls. The first disclosure variable is *SustOnly*, an indicator equal to 1 for firm-years where green opportunities are disclosed in the sustainability report only. The second disclosure variable is *Sust&10K*, an indicator equal to 1 for firm-years where green opportunities are disclosed in the sustainability report and in the 10-K. The one-year earnings (revenues) surprise is the actual earnings (revenues) per share minus the median Institutional Brokers Estimate System (I/B/E/S) analyst forecast, deflated by the stock price at fiscal year-end. I/B/E/S consensus forecast is taken eight months prior to the end of the forecast period, i.e., four months after the previous fiscal year-end. Since most annual reports are filed within three months of the fiscal year-end, this helps to ensure that analysts have prior earnings and revenue information when forming forecasts. The two-year earnings and revenues surprises are calculated similarly, with the consensus forecast taken 20 months prior to year-end. Consistent with model (2), I remove the 56 observations where green opportunity disclosure is made in the 10-K but not in the sustainability report.

The results are shown in Table 6, Panel A. The coefficient estimates on *SustOnly* are positive and significant across all specifications at the 5% level or better, while the coefficients on

Sust&10K are insignificant. This suggests that green opportunities disclosed in the sustainability report only are associated with significantly more positive 1- and 2-year earnings and revenue surprises relative to when no green opportunity disclosure is made. Moreover, disclosing green opportunities in both the 10-K and the sustainability report is not associated with earnings and revenue surprises relative to when no green opportunity disclosure is made.²⁵ A plausible explanation for these results is that the larger positive EPS and revenue surprises arise in part because analysts miss information in the sustainability report. As a result, analysts' forecasts do not include the 'green' component of revenues and earnings when green opportunity disclosure is made only in the sustainability report.

I examine stock price consequences of such surprises by calculating the abnormal returns to earnings announcements. I obtain the earnings announcement dates for my sample firms from I/B/E/S and calculate three-day (-1, +1) returns in excess of a market model that is estimated using up to 255 trading days and ending 46 days before the event date. Panel B of Table 6 presents the results of univariate comparisons which show that firms disclosing green opportunities in the sustainability report alone exhibit abnormal announcement returns of 0.42%, significantly different from the 0.10% enjoyed by firms disclosing in both the 10-K and the sustainability report. As will be shown in Section 4.4.2.2., these announcement responses explain a meaningful proportion of the abnormal returns earned by a portfolio of firms disclosing green opportunities in the sustainability report alone.

4.4.2 Calendar-Time Portfolio Returns

I examine whether withholding disclosure of green opportunities from the 10-K has aggregate capital market consequences. Frictions (e.g., search costs and investor inattention) could prevent investors from using all information sources (Gow et al. 2018; Dellavigna and Pollet 2009). For instance, investors may face search costs associated with identifying value-relevant information in sustainability reports. Prior research suggests that sustainability reports contain both financially-material and immaterial disclosures and investors have the burden of distinguishing between the two (Khan et al. 2016). Alternatively, absent any frictions, investors may rationally disregard green opportunity disclosures in sustainability reports owing to concerns about the credibility of these unaudited reports where firms have incentives to greenwash.

²⁵ The null hypothesis that the coefficients are equivalent is rejected across all specifications.

Any of these explanations could result in green opportunity disclosures in sustainability reports being associated with future stock returns. Returns could be positive, negative, or zero; though my findings suggest that green opportunity disclosures are associated with average future green revenues and green revenue growth, the expenses and foregone opportunities are unobservable. Investing in green opportunities could therefore increase shareholder value, decrease shareholder value, or be neither value-creating nor value-destroying.

To test the market's incorporation of green opportunity disclosures and the future performance implications (if any) of green opportunities, I form value-weighted and equal-weighted portfolios of firms that disclose green opportunities and estimate abnormal stock return performance of the portfolios (i.e., alpha) from Fama and French (1993) monthly calendar-time regressions that include the market, size and book-to-market factors. Since annual reports are available for almost all firms by the end of March, I construct portfolios at the end of March and use the most recent sustainability report information available at that time to allow an implementable trading strategy. Portfolios are held from the beginning of April until the end of March of the following year. Portfolios are rebalanced at the end of March each year by removing firms that reach the end of their holding period and adding firms that have made a green opportunity disclosure.

Results are reported in Table 7. Panel A reports results for the value-weighted portfolios and Panel B reports results for the equal-weighted portfolios. Column 1 reports results for Portfolio A, the portfolio composed of all green opportunity disclosers in the sample regardless of where green opportunity disclosure is made. The results suggest that this portfolio does not earn abnormal returns. The intercept (alpha) estimate from the value-weighted portfolio is 0.03% (t -stat=0.78) or 0.33% annualized, and is not significantly different from zero. The alpha estimate from the equal-weighted portfolio is 0.04% (t -stat=0.54) or 0.44% annualized, and is not significant.

I divide disclosers into two subgroups according to the disclosure channel used to report green opportunities and form the portfolios separately for these groups. Column 2 reports results for Portfolio B, the portfolio composed of firms that disclose green opportunities in the sustainability report only. Column 3 reports results for Portfolio C, the portfolio composed of firms that disclose green opportunities in the 10-K.

The alpha estimates for Portfolio B in Column 2 suggest that value- and equal-weighted portfolios of firms disclosing green opportunities only in sustainability reports earns significantly

positive abnormal returns. The alpha estimate from the value-weighted portfolio is 0.26% (t -stat=2.84) or 3.09% annualized, and is significant at the 1% level. The estimate from the equal-weighted portfolio is 0.25% (t -stat=2.77) or 2.99% on an annual basis, and is also significant at the 1% level. By comparison, the alpha estimates for Portfolio C in Column 3 do not suggest outperformance of the value-weighted or the equally-weighted portfolios of firms that disclose green opportunities in the 10-K.²⁶ This suggests that investors can earn as high as 3.09% annual abnormal returns on a value-weighted portfolio of firms disclosing green opportunities only in their sustainability reports.

4.4.2.1 Robustness

I present a series of robustness tests below the annualized alphas from the Fama and French (1993) three-factor model. First, I assess robustness of the results to different factor models. I estimate alphas using a four-factor model that includes the Carhart (1997) momentum factor, a five-factor model that includes the investment and profitability factors from Fama and French (2015), and a five-factor model that includes momentum and liquidity factors (Pastor and Stambaugh 2003). The results are unchanged using these alternative factor models. I find a 3.02%, 2.85% and 3.41% outperformance (significant at the 5% level or better) of the sustainability report-only value-weighted portfolio on a four-factor model, a Fama and French (2015) five-factor model, and a five-factor model that includes momentum and liquidity, respectively (2.79%, 3.04% and 2.63% using equal-weighted portfolios). The estimates from these alternative factor models continue to show that the portfolio of firms disclosing in any report (Portfolio A in Column 1) and in the 10-K (Portfolio C in Column 3) does not exhibit significant abnormal returns.

The second robustness test in Table 7 analyzes different time periods. I split the analysis period to before and after 2011 (the midpoint of my full period of examination). I analyze performance over different time periods to assess whether investors impound information more efficiently after learning about the financial implications or credibility of green opportunity disclosures in the sustainability report. For instance, if investors are initially skeptical of green opportunity disclosures but learn over time that disclosures provide reliable information about future green revenues, disclosures may be associated with stock returns in the earlier period (i.e., before 2011) but not in the later period (i.e., after 2011). My results for all green opportunity

²⁶ The alphas are statistically different between Portfolio B and Portfolios A and C, respectively.

disclosers (Portfolio A in Column 1) and green opportunity disclosers in the 10-K (Portfolio C in Column 3) suggest that there is no outperformance in any of the sub-periods. In contrast, the alpha estimates for Portfolio B in Column 2 suggest that the portfolio of firms disclosing only in sustainability reports earns significantly positive abnormal returns in both time periods analyzed. Thus, learning does not appear to help investors impound green opportunity disclosures in sustainability reports more efficiently into stock price over time.

The third robustness test in Table 7 uses a subset of green opportunity disclosers that have above sample-median green revenues at the time of disclosure. A possible explanation for the outperformance of firms disclosing only in the sustainability report is that investors delay incorporating green opportunity news into stock price until green revenues are financially material. Thus, it is not inattention to, or disbelief of, the sustainability report but rather materiality of green revenues that affects whether investors impound green opportunities into valuation decisions. If this is the case, firms that disclose green opportunities in the sustainability report when green revenues are higher – which I define as being above the median of green revenues of the sample – should not earn significant abnormal returns. However, I continue to find outperformance of a portfolio of firms disclosing green opportunities only in the sustainability report and having above-median green revenues. The annualized alpha is 2.99% for the value-weighted portfolio and 2.75% for the equal-weighted portfolio; both estimates are significant at the 1% level.

Next, I investigate whether attributes of green opportunity disclosures explain the outperformance. If firms provide lower quality disclosure in the sustainability report, analysts and investors will be less capable of incorporating green opportunity news provided in the sustainability report. This would suggest that the content of the disclosures, rather than the reporting channel used, explains the excess returns of firms that disclose only in the sustainability report. To assess this possibility, I compare across 10-Ks and sustainability reports: (1) the quantitative intensity of green opportunity disclosures (i.e., the percentage of green opportunity disclosures that contain quantitative information), (2) the quantity of green opportunity disclosures (i.e., the percentage of total sentences that are green opportunity sentences), and (3) the readability of green opportunity disclosures (i.e., the *ReadIndex* from Guay, Samuels and Taylor (2018)).

Results are presented in Table 8. Panel A shows univariate comparisons of the three disclosure attributes examined. Column 1 presents averages of the disclosure attributes in the sustainability report, Column 2 presents averages in the 10-K, and Column 3 presents the

differences. On average, 33% of green opportunity disclosures in the sustainability report are quantitative, compared to 36% in the 10-K; the difference is insignificant (t -stat=0.82). Of the reports that disclose green opportunities, 6% of the sustainability-report sentences include green opportunity disclosures, whereas 1% of MD&A sentences include green opportunity disclosures. This difference is statistically different at the 1% level (diff=5.02; t -stat=3.84). The slightly higher *ReadIndex* for green opportunity disclosures in the 10-K suggests that green opportunity disclosures in the 10-K are slightly *less* readable than green opportunity disclosures in the sustainability report (diff= -0.19, t -stat=1.73). These univariate results suggest that on average, firms devote a greater fraction of the sustainability report to green opportunities than they do in the MD&A. Moreover, green opportunity disclosures in the sustainability report are on average slightly less complex and more readable than those in the 10-K. Overall, these findings suggest that it is unlikely that lower quality disclosure explains outperformance of the firms that only disclose green opportunities in the sustainability report.

Another possibility is that, after starting to disclose green opportunities in the 10-K, firms improve green opportunity disclosures in the sustainability report. If firms provide higher quality disclosure in the 10-K, reporting practices may improve in the sustainability report to match practices in the 10-K. Outperformance of the sustainability report-only portfolio could reflect disclosures being less usable until disclosure begins in the 10-K, and be unrelated to the reporting channel where disclosure is provided. I assess this by comparing attributes of green opportunity disclosures in the sustainability report in the year *before* the firm starts disclosing green opportunities in the 10-K, to attributes of green opportunity disclosures in the sustainability report in the year *after* the firm starts disclosing in the 10-K. Results are shown in Panel B of Table 8. I do not find that any of the three disclosure attributes (i.e., quantity, quantitative intensity and readability) change significantly from before to after the firm starts disclosing in the 10-K, suggesting that this is not a likely explanation for the outperformance.

4.4.2.2 Synthesis of the capital market effects of green opportunity disclosures

My findings suggest that green opportunities disclosed in sustainability reports were not immediately capitalized by investors. Note that market inefficiencies or frictions (e.g., investor inattention, search costs, etc.) are not the only explanation for these results. In the past, returns from early-stage clean energy investments were poor (Gaddy et al. 2016; Golden, 2018). As a

result, it may be rational for investors to discount green opportunity news in the sustainability report until disclosure is provided in a credible reporting channel such as the 10-K, where managers are more likely to disclose new product investments that will be beneficial to shareholders.

Since profits are persistent and affect stock returns only to the extent that they are unexpected, the forecast and earnings announcement surprises shown in Table 6 suggest that green opportunities disclosed in sustainability reports were not fully and immediately impounded, but generated superior future accounting performance. With four quarterly announcements per year, the average quarterly surprise of 0.42% for firms disclosing only in the sustainability report (shown in Panel B of Table 6) implies that earnings surprises account for over 1.68% of the firms' outperformance. This is a meaningful portion of the 3.09% value-weighted alpha (2.99% equal-weighted alpha) shown in Table 7. Given post-earnings announcement drift (e.g., Bernard and Thomas, 1989), earnings surprises may account for an even greater proportion of the total excess returns. This short event-study window suggests that the calculation of abnormal returns is less sensitive to the asset pricing model used and addresses the concern that the abnormal returns stem from a yet-to-be-discovered risk factor. These results are also consistent with prior studies (e.g., La Porta, Lakonishok, Shleifer, and Vishny 1997; Edmans 2011) which document that positive earnings surprises account for a meaning proportion of the outperformance results in their settings.

4.5 Why do firms delay disclosure of green opportunities in the 10-K? Exploratory analysis

My results suggest that withholding disclosure from the 10-K, relative to the sustainability report, affects price discovery and information intermediation. Although there are a number of possible reasons for managers to delay 10-K disclosure, I test two hypotheses in exploratory analysis; I leave further investigation and the broader question of how firms choose among various reporting channels to future research.

My first hypothesis is that different disclosure-related costs and benefits across 10-Ks and sustainability reports affect when firms disclose green opportunities in these reports. I predict that in earlier years when green revenues are lower, managers perceive net costs (benefits) from disclosing green opportunities in the 10-K (sustainability report). Over time, as green revenues increase, the expected costs of disclosing in the 10-K fall and managers supplement disclosure in the sustainability report with disclosure in the 10-K. A number of costs could underlie this behavior. First, higher green revenues allow managers to assure investors that green products are

financially viable, helping to mitigate investor concerns about the pursuit of green opportunities. Widespread beliefs that sustainability efforts are driven by managers' private rent extraction (e.g., Benabou and Tirole 2010) and the significant losses borne by investors from clean energy technology start-ups (Gaddy et al. 2016; Golden 2018), could lead managers to expect adverse consequences if they disclose green opportunities in the 10-K.²⁷ Adverse consequences could include (1) a decrease in firm value if investors discount the firm owing to governance concerns, and (2) forced turnover if managers are perceived as making investments that are harmful to shareholder interests. These concerns are unlikely to transfer to sustainability reports because investors often ignore or dismiss these reports. Second, firms face potential legal sanctions from making misleading statements in financial reports (e.g., Francis, Philbrick, and Schipper 1994; Waymire 1985), whereas claims made in sustainability reports are rarely scrutinized (e.g., Eccles and Serafeim 2013). Higher green revenues therefore increase managers' confidence in their ability to deliver on stated green opportunities, which could lower the expected litigation and reputational costs from disclosing in the 10-K. Third, as firms become more established in the green products market and generate higher green revenues, managers will be less concerned about the proprietary costs associated with sharing information about green opportunities with competitors who may pay more attention to 10-Ks than to sustainability reports.

My second hypothesis is that firms require green revenues to be financially material in order to disclose green opportunities in the 10-K. A disclosure policy relating to financial materiality could apply to all voluntary disclosures in the 10-K and may be unrelated to the expected costs of disclosing green opportunities.

To test these hypotheses, I examine whether firms require higher realized revenues from the sale of green products before disclosing green opportunities in the 10-K. Table 9 presents the coefficient estimates from models that regress green revenues on time indicators relative to the year of the first green opportunity disclosure made in the sustainability report (Column 1) and the 10-K (Columns 2). In Column 1 (2), t is equal to 1 in the year that firm i first discloses green opportunities in the sustainability report (10-K) and zero otherwise; $t-1$ is equal to 1 in the year before firm i first discloses green opportunities in the sustainability report (10-K) and zero

²⁷ Prior research suggests that managers may pursue sustainability for private benefits (Brammer and Millington 2008; Cheng, Hong, and Shue 2014), or because doing so is consistent with their personal and political beliefs (Di Giuli and Kostovetsky 2014).

otherwise; $t-2$ is equal to 1 in the year that is two years before firm i first discloses green opportunities in the sustainability report (10-K) and zero otherwise; and so on. The coefficient on t in Column 1 is 1.54 (t -stat=1.89) suggesting that green revenues are, on average, 1.5% of total revenues in the year that firms start disclosing green opportunities in the sustainability report. In contrast, the coefficient on t in Column 2 is 4.49 (t -stat=2.65) suggesting that green revenues are, on average, 4.5% of total revenues in the year that firms start disclosing green opportunities in the 10-K. The difference between these coefficients is statistically significant ($p=0.0031$), consistent with green revenues being, on average, higher when firms start disclosing green opportunities in the 10-K relative to when firms start disclosing green opportunities in the sustainability report.

Comparisons of the coefficient estimates across Columns 1 and 2 indicate that green revenues are statistically significantly higher in the years leading up to (i.e., $tminus4$ to $tminus1$), and shortly after (i.e., $tplus1$ and $tplus2$), the first green opportunity disclosure in the 10-K, than in the same years before and after the first sustainability report disclosure. However, the difference between the coefficients is no longer statistically significant three and four years *after* firms start to disclose in either report (i.e., $tplus3$ and $tplus4$). For instance, green revenues are, on average, 4.6% of total revenues in $t+3$ (i.e., three years after firms start disclosing green opportunities in the sustainability report), and 5.5% of total revenues three years after firms start disclosing in the 10-K (difference is insignificant, $p=0.823$). Thus, green revenues are higher when firms start disclosing green opportunities in the 10-K relative to the sustainability report, but the *growth* in green revenues following the first sustainability report disclosure is steeper than the growth in green revenues following the first 10-K report disclosure, such that the difference in green revenues is no longer statistically significant three after disclosure is first made in both reports.

These results suggest that firms delay disclosing green opportunities in the 10-K until green revenues are higher, consistent with both the costly disclosure and materiality hypotheses. Follow-up tests regress the timing difference between when firms start disclosing green opportunities in the 10-K and sustainability report (i.e., *10-K Delay*) on measures for litigation risk, proprietary costs, shareholder preferences for climate change investments, and green revenues in the year that firms start to disclose green opportunities. Litigation risk and proprietary costs are predicted to be positively associated with *10-K Delay* and shareholder support for climate change investments is

expected to have a negative relation with *10-K Delay*. The financial materiality hypothesis predicts a negative relation between *10-K Delay* and green revenues.

Litigation risk is measured with an indicator variable equal to 1 for firms with membership in highly litigious industries (*Litigious*), following the approach in Francis, Philbrick and Schipper (1994a, 1994b). The proprietary cost variable is firm research and development expenditures scaled by total revenues in the year immediately prior to making the first green opportunity disclosure (*R&D*). I assume that it is more costly for firms with greater investment in research and development, which compete more on the basis of innovation, to reveal competitive information via disclosure of green opportunities in the 10-K. Shareholder support for climate change investments is measured with two variables. The first is the mean vote-for-percentage for climate change shareholder proposals at the sample firm across all years (with available data) before the first green opportunity disclosure (*ClimChgVoteSupport*). The second is the mean proportion of climate change shareholder proposals that were filed by mainstream investors (i.e., asset managers, public pension funds, and *not* socially responsible investors) at the sample firm across all years (with available data) prior to the first green opportunity disclosure (*ClimChgMainstreamSponsor*).²⁸

The dependent variable, *10-K Delay*, is regressed on the above measures of litigation risk, proprietary costs, shareholder support for climate change efforts and green revenues measured in the year that the firm first discloses green opportunities. Panel A of Table 4 reports descriptive statistics for these variables. *10-K Delay* is measured at the firm level and *Litigation* is measured at the industry-level, therefore my regression includes sector fixed effects to control for unobserved reporting practices at the sector level. I include the full set of control variables that could affect firms' green opportunity disclosures, as described in section 4.1. Table 10 presents the results. The coefficient on *GreenRevenues* is negative and significant (coefficient of -0.072, *t*-stat=-2.51), consistent with the financial materiality hypothesis. In terms of the disclosure cost

²⁸ I identify climate change shareholder proposals following the approach in Grewal et al. (2016). I download shareholder proposals from 1997 to 2016 from ISS and remove non-socially responsible investment proposals using the "Resolution Type" field. I use the one-line description of the proposal to identify climate change proposals. A proposal is classified as climate change-related if it describes: climate change risks, renewable energy alternatives, energy efficiency, greenhouse gas emissions, carbon principles, or energy efficiency plans. I note from my review that the majority of climate change shareholder proposals engage companies to report on, or improve, the firms' climate change impacts.

hypothesis, the coefficients on *Litigious* and *R&D* are positive but insignificant. However, the coefficients on *ClimChgVoteSupport* (-2.593, *t*-stat=-2.30) and *ClimChgMainstreamSponsor* (-1.437, *t*-stat=-2.06) are negative and significant, suggesting that higher (lower) investor support for climate change-related investments reduces (increases) the 10-K delay. A one-standard deviation increase in shareholder voting support for climate change-related proposals is associated with a 4-month shorter delay, on average, between when firms start disclosing green opportunities in the 10-K versus the sustainability report; a one-standard deviation increase in the proportion of climate change-related proposals that are sponsored by mainstream investors is associated with a 6-month shorter 10-K delay, on average.

These results suggest that shareholder pressure on firms to improve performance relating to climate change and report on climate change impacts lowers the expected costs of disclosing green opportunities in the 10-K, consistent with the costly disclosure hypothesis. One plausible explanation is that, in the absence of this active engagement and shareholder pressure, managers expect investors to draw adverse inferences from green opportunity news. This is because, in the past, returns from early-stage climate change investments were poor (Gaddy et al. 2016; Golden, 2018) and there are widespread concerns that sustainability-related efforts are driven by managers' private rent extraction and personal and political beliefs, rather than by shareholders' preferences (e.g., Brammer and Millington 2008; Cheng, Hong, and Shue 2014; Di Giuli and Kostovetsky 2014). Active pressure and engagement by shareholders mitigates managers' concerns that investors, upon learning about firms' pursuit of green opportunities, will discount the firm owing to governance concerns.

5. Conclusion

I use disclosure that firms provide about business opportunities that arise from climate change as the setting to study disclosure strategies of emerging trends and their consequences. Consistent with green opportunities being of interest to both equity and non-equity stakeholders of the firm, I find that firms disclose green opportunities in their 10-K and in their sustainability report. However, firms delay disclosing green opportunities in their 10-K relative to their sustainability report for, on average, 2.5 years.

Despite both disclosure channels providing reliable information about future revenues from the sale of low-carbon products, withholding disclosure of green opportunities from the 10-K appears to have real economic consequences. Stock prices respond promptly to green opportunity disclosures provided in the 10-K, but respond more slowly to disclosures provided only in the sustainability report, which generates positive subsequent returns. Green opportunity disclosures made only in the sustainability report also exhibit significantly more positive earnings and revenue forecast errors and earnings announcement returns. This suggests that the stock market does not fully value green opportunities disclosed in sustainability reports.

I perform exploratory analyses into the factors associated with delayed disclosure of green opportunities in the 10-K. I find that firms with higher green revenues have shorter 10-K delays, consistent with firms requiring green revenues to be financially material before disclosing green opportunities in financial reports. I also document that firms receiving greater shareholder support for climate change-related shareholder proposals (e.g., proposals for firms to reduce greenhouse gas emissions or increase transparency on climate change impacts) disclose green opportunities more promptly in the 10-K. A plausible explanation is that shareholder pressure and engagement mitigates managers' concerns that investors, upon learning about firms' pursuit of green opportunities, will draw adverse inferences owing to beliefs that sustainability efforts represent an agency problem.

It is important to note the limitations of my results. First, FTSE is my source for green product terms and green revenues. If FTSE overestimates the extent of green products, green revenues will also be overestimated, which could induce a mechanical relation between green opportunity disclosures and green revenues. This would affect the inferences of my reliability tests, but would not explain the positive earnings and revenue surprises or the abnormal returns. Second, since I do not have a natural experiment with random assignment of the variable of interest to firms, the data admit non-causal explanations. For instance, green opportunities may proxy for other variables that are positively related to stock returns and also misvalued by the market. However, the outperformance that I document is concentrated in firms that disclose green opportunities only in the sustainability report; later, when these same firms disclose green opportunities in the 10-K, outperformance disappears. This helps to alleviate concerns that time-invariant unobservables (such as good management) account for the majority of the results.

Nonetheless, I cannot rule-out time-varying unobservables (such as increases management quality subsequent to disclosure in the sustainability report, but not subsequent to disclosure in the 10-K).

I contribute to several strands of literature that examine disclosure and its consequences. I also innovate beyond prior disclosure research by studying a setting in which I can directly observe the withholding of disclosure in the 10-K relative to another reporting channel. My findings should be useful to academics, regulators, and practitioners who wish to better understand the use of newer and less-traditional reporting channels by firms and the possible capital market consequences. A promising area for future research is how firms choose among various reporting channels, including newer mediums such as social media. My study is also timely given recent calls for the SEC to mandate environmental, social and governance reporting for U.S. companies. Regulation of sustainability disclosures could potentially improve their credibility and alleviate search costs or inattention to sustainability reports suggested by my findings.

References

- Amel-Zadeh, A. and George Serafeim. Why and How Investors Use ESG Information: Evidence from a Global Survey. *Financial Analysts Journal* 74(3), 87–103.
- American Leadership in Emerging Technology. 2017. Report on Preparing for the Future of Artificial Intelligence. Retrieved on August 29, 2018 from the White House Statements and Releases archives: <https://www.whitehouse.gov/briefings-statements/>
- Bamber, L.S. and Y.S. Cheon. 1998. Discretionary Management Earnings Forecast Disclosures: Antecedents and Outcomes Associated with Forecast Venue and Forecast Specificity Choices. *Journal of Accounting Research* 36(2),167-190.
- Barber, B. M. and T. Odean 2008. All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies* 21(2).
- Bénabou, Roland, and Jean Tirole. 2006. Incentives and Prosocial Behavior. *American Economic Review*, 96 (5): 1652-1678.
- Beyer, A., Cohen, D.A., Lys, T.Z., Walther, B.R. 2010. The financial reporting environment: review of the recent literature. *Journal of Accounting and Economics*. 50 (2–3), 296–343.
- Berger, P.G., and Rebecca Hann. 2003. The Impact of SFAS No. 131 on Information and Monitoring, *Journal of Accounting Research* 41, 163-223.
- Bernard, V., Thomas, J., 1989. Post-earnings-announcement drift: delayed price response or risk premium? *Journal of Accounting Research* 27, 1–36.
- Berkman, H., Jona, J. and Soderstrom, N. 2018. Measurement and Market Valuation of Climate Risk. Workingpaper.

- Billings, M.B., Jennings, R., Lev, B., 2015. On guidance and volatility. *Journal of Accounting and Economics* 60 (2–3), 161–180.
- Bowen, R., A. Davis, and D. Matsumoto. 2005. “Emphasis on Pro Forma versus GAAP Earnings in Quarterly Press Releases: Determinants, SEC Intervention, and Market Reactions.” *The Accounting Review* 80: 1011-1038.
- Bozanic, Z., Dietrich, J.R., and Johnson, B.A. 2017. SEC comment letters and firm disclosure. *Journal of Accounting and Public Policy* 36, 337-357.
- Bozanic, Z., Roulstone, D. and Van Buskirk, A. 2018. Management earnings forecasts and other forward-looking statements. *Journal of Accounting and Economics* 65 (2018) 1-20.
- Brammer, S., and A. Millington. 2008. Does it pay to be different? An analysis of the relationship between corporate social and financial performance. *Strategic Management Journal* 29 (12): 1325–1343.
- Brown-Liburd, H. and Zamora, V.L. (2015) The Role of Corporate Social Responsibility (CSR) Assurance in Investors' Judgments When Managerial Pay is Explicitly Tied to CSR Performance. *Auditing: A Journal of Practice & Theory*, 34(1), 75-96.
- Burbano, V. 2016. Social Responsibility Messages and Worker Wage Requirements: Field Experimental Evidence from Online Labor Marketplaces. *Organization Science*.
- Carhart, M. M. 1997. On persistence in mutual fund performance. *Journal of Finance* 52 (1): 57-82.
- Centre for Sustainability and Excellence. 2017. Sustainability Reporting Trends in North America. Accessed on September 12, 2018 from: https://www.cse-net.org/wp-content/uploads/documents/Sustainability-Reporting-Trends-in-North%20America%20_RS.pdf
- Cheng, I. H., H. Hong, and K. Shue. 2014. Do Managers Do Good with Other People’s Money? Working paper no. w19432, National Bureau of Economic Research.
- Christensen, H., Floyd, E., Liu L. & Maffett, M. February 2017. The Real Effects of Mandated Information on Social Responsibility in Financial Reports: Evidence from Mine-Safety Records. *Journal of Accounting and Economics Volume* 64(2–3), 284-304
- Cotter, J., Tuna, I. , Wysocki, P.D., 2006. Expectations management and beatable targets: how do analysts react to explicit earnings guidance. *Contemporary Accounting Research*. 23(3), 593–624 .
- Crowley, R. 2018. Voluntary Disclosure with Multiple Channels and Investor Sophistication. Workingpaper.
- Dhaliwal, D., O. Li, A. Tsang, and Y. Yang. 2011. Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting. *The Accounting Review* 86 (1): 59-100.
- Dhaliwal, D., Radhakrishnan, S., Tsang, A., and Yong George Yang. 2012. Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility Disclosure. *The Accounting Review*, 87 (3) p. 723-759.

- Dellavigna, S. and J. M. Pollet 2009. Investor inattention and Friday earnings announcements. *The Journal of Finance* 64(2), 709–749.
- Delmas, M.A. and Burbano, V. 2011. The Drivers of Greenwashing. *California Management Review*.
- Diffenbaugh, N.S., Singh, D., Mankin, J.S., Horton, D.E., Swain, D.L., Touma, D., Charland, A., Liu, Y., Haugen, M., Tsiang, M., Rajaratnam, B. 2017. Quantifying the influence of global warming on unprecedented extreme climate events. *Proceedings of the National Academy of Sciences of the United States of America*. Accessed on September 25, 2018 from <http://www.pnas.org/content/pnas/114/19/4881.full.pdf>
- Di Giuli, A., and L. Kostovetsky. 2014. Are red or blue companies more likely to go green? Politics and corporate social responsibility. *Journal of Financial Economics* 111(1):158–180.
- Dye, R. A., 1985. Disclosure of Nonproprietary Information. *Journal of Accounting Research* 23(1),123-45.
- Easley, D., and M. O’Hara. 2004. Information and the cost of capital. *Journal of Finance* 59: 1553-1583.
- Eccles, Robert G., and George Serafeim. A Tale of Two Stories: Sustainability and the Quarterly Earnings Call. *Journal of Applied Corporate Finance* 25(3): 66–77.
- Eccles, R. G., Michael P. Krzus, and George Serafeim. Market Interest in Nonfinancial Information. *Journal of Applied Corporate Finance* 23, no. 4 (Fall 2011): 113–127.
- Edmans, A. 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics* 101: 621-640.
- Elliot, W.B., Hodge, F.D. and Sedor, L.M. Using Online Video to Announce a Restatement: Influences on Investment Decisions and the Mediating Role of Trust. *The Accounting Review* 87(2), 513-535.
- Fama, E. F., and K. R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1): 3–56.
- Fama, E. F., and K. R. French. 2015. A five-factor asset pricing model. *Journal of Financial Economics* 116: 1–22.
- Financial Accounting Standards Board (FASB). 1980. Statement of Financial Accounting Concepts No. 2: Qualitative Characteristics of Accounting Information. Norwalk, CT: FASB.
- Fombrun, C. J., and M. Shanley. 1990. What’s in a name? Reputation building and corporate strategy. *Academy of Management Journal* 33 (2): 233–258.
- Francis, J., Philbrick, D. and Schipper, K. 1994. Shareholder Litigation and Corporate Disclosures. *Journal of Accounting Research* 32(2), 137-164
- Gaddy, B., Sivaram, V. and Francis O’Sullivan. 2016. Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation. *MIT Energy Initiative Working Paper*.

- Golden, M. 2018. Proscriptions and prescriptions for the next wave of cleantech investments, new Stanford-led analysis finds. Accessed on October 12, 2018 from: <https://news.stanford.edu/2018/08/24/lessons-learned-future-cleantech-investments/>
- Gow, Ian D. and Wahid, Aida Sijamic and Yu, Gwen, Managing Reputation: Evidence from Biographies of Corporate Directors (August 5, 2018). *Journal of Accounting & Economics* 66(2-3).
- Graham, J., Harvey, C. and Rajgopal, S. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40(1-2), 3-73.
- Grewal, J., Serafeim, G. and Aaron Yoon, 2016. Shareholder Activism on Sustainability Issues. Harvard Business School Working paper.
- Guay, Wayne R. and Samuels, Delphine and Taylor, Daniel, Guiding Through the Fog: Financial Statement Complexity and Voluntary Disclosure. *Journal of Accounting & Economics*, Forthcoming.
- Healy, P.M., Krishna G. Palepu. 2001. Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics* 31, 405-440.
- Heitzman, S., Wasley, C., and Zimmerman, J.L. 2009. The joint effects of materiality thresholds and voluntary disclosure incentives on firms' disclosure decisions. *Journal of Accounting and Economics* 49 (1-2), 109-132.
- Henisz, W. 2014. Corporate Diplomacy: Building Reputations and Relationships with External Stakeholders. Greenleaf.
- Hirst, E., and P. Hopkins. 1998. Comprehensive Income Reporting and Analysts' Valuation Judgments. *Journal of Accounting Research* 36 (Supplement): 47-75.
- Hirshleifer, D., S. S. Lim, and S. H. Teoh 2011. Limited investor attention and stock market misreactions to accounting information. *Review of Asset Pricing Studies* 1, 35–73.
- Hirshleifer, D. and S. H. Teoh 2003. Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics* 36(1).
- Hutton, A.P., Miller, G.S., Skinner, D.J., 2003. The role of supplementary statements with management earnings forecasts. *Journal of Accounting Research*. 41 (5), 867–890.
- Ioannou, I. and Serafeim, G., 2017. The consequences of mandatory corporate sustainability reporting: evidence from four countries. *Oxford Handbook of Corporate Social Responsibility*, Oxford University Press.
- Illanes, P., Lund, S., Moushed, M., Rutherford, S. and Magnus Tyreman. 2018. Retraining and reskilling workers in the age of automation. *McKinsey Global Institute*. Accessed on October 1, 2018 from: <https://www.mckinsey.com/featured-insights/future-of-work/retraining-and-reskilling-workers-in-the-age-of-automation>
- Jennings, R. 1987. Unsystematic security price movements, management earnings forecasts, and revisions in consensus analyst earnings forecasts. *Journal of Accounting Research* 25 (1), 90–110.

- Khan, M., Serafeim, G. and Aaron Yoon. 2016. Corporate Sustainability: First Evidence on Materiality. *The Accounting Review* 91(6), 1697-1724.
- Lansford, B., Lee, J. and Tucker, J.W. 2009. Disclosure of Management Guidance in Conference Calls: Materiality, Determinants and Consequences. Workingpaper.
- La Porta, R., Lakonishok, J., Shleifer, A., Vishny, R., 1997. Good news for value stocks: further evidence on market efficiency. *Journal of Finance* 52, 859–874.
- LeBlanc, B. and John DeRose. 2013. Value of sustainability reporting. Center for Corporate Citizenship. Accessed on October 12, 2018 from: [https://www.ey.com/Publication/vwLUAssets/EY_Value_of_sustainability_reporting/\\$FILE/EY-Value-of-Sustainability-Reporting.pdf](https://www.ey.com/Publication/vwLUAssets/EY_Value_of_sustainability_reporting/$FILE/EY-Value-of-Sustainability-Reporting.pdf)
- Li, F. 2010. The information content of forward-looking statements in corporate filings—a naïve Bayesian machine learning approach. *Journal of Accounting Research* 48(5), 1049–1102.
- Ma, P. 2012. Information or Spin? Evidence from language differences between 8-Ks and press releases. Workingpaper.
- Maines, L. and Wahlen, J.M. 2006. The Nature of Accounting Information Reliability: Inferences from Archival and Experimental Research. *Accounting Horizons* 20(4), 399-425.
- Martin, R. 2014. Adaptive Strategy is a Cop-Out. *Harvard Business Review*. Accessed on September 14, 2018 from: <https://hbr.org/2014/05/adaptive-strategy-is-a-cop-out>
- Marquis, Christopher, Michael W. Toffel, and Yanhua Zhou. Scrutiny, Norms, and Selective Disclosure: A Global Study of Greenwashing. *Organization Science* 27(2), 483–504.
- Matsumura, E.M., Prakash, R. and Vera-Muñoz, S.C. 2014. Firm-Value Effects of Carbon Emissions and Carbon Disclosures. *The Accounting Review*, 89 (2) p. 695-724.
- Matsumura, E.M., Prakash, R. and Vera-Muñoz, S.C. 2017. To Disclose or Not to Disclose Climate-Change Risk in Form 10-K: Does Materiality Lie in the Eyes of the Beholder? Workingpaper.
- Matsumoto, D., Pronk, M., Roelofsen, E. 2011. What makes conference calls useful? The information content of managers' presentations and analysts' discussion sessions. *The Accounting Review*, 86 (4), 1383–1414.
- McKinsey & Company (McKinsey). 2017. Trends and Global Forces. Accessed on October 3, 2018 from: https://www.mckinsey.com/~/_media/McKinsey/Business%20Functions/Strategy%20and%20Corporate%20Finance/Our%20Insights/Strategy%20and%20corporate%20finance%20special%20collection/Final%20PDFs/McKinsey-Special-Collections_Trends-and-global-forces.ashx
- McVay, S.E. 2006. Earnings Management Using Classification Shifting: An Examination of Core Earnings and Special Items. *The Accounting Review* 81 (3) p. 501-531.
- Merkley, K.J. 2014. Narrative Disclosure and Earnings Performance: Evidence from R&D Disclosures. *The Accounting Review*, 89(2), 725-757.
- Merton, R.C. 1987. A Simple Model of Capital Market Equilibrium with Incomplete Information. *Journal of Finance* 42 (3), 483-510.

Muslu, V., Radhakrishnan, S., Subramanyam, K.R., Lim, D., 2015. Forward-looking MD&A disclosures and the information environment. *Management Science* 61 (5), 931–948.

Office of the Federal Register, National Archives and Records Administration. 1997. Parts 400-1902.

Pastor, L., and R. F. Stambaugh. 2003. Liquidity risk and expected stock returns. *Journal of Political Economy* 111 (3): 642–685.

Patell, J.M. 1976. Corporate forecasts of earnings per share and stock price behavior: empirical test. *Journal of Accounting Research* 14 (2), 246–276.

Penman, S.H. 1980. An empirical investigation of the voluntary disclosure of corporate earnings forecasts. *Journal of Accounting Research* 18 (1), 132–160.

Pindyck, R. S. (2013). Climate change policy: What do the models tell us? *Journal of Economic Literature*, 51(3), 860-872.

Plumlee, M. and Yohn, T.L. 2010. Do Companies Attempt to Strategically Hide Restatements? An Examination of Companies' Regulatory Filing Choices. Workingpaper.

Ramus, C. A., & Montiel, I. (2005). When Are Corporate Environmental Policies a Form of Greenwashing? *Business & Society*, 44(4), 377–414.

Reeves, M. and Deimler, M. 2011. Adaptability: the new competitive advantage. Boston Consulting Group.

Riedl, E.J. and Suraj Srinivasan. Signaling Firm Performance Through Financial Statement Presentation: An Analysis Using Special Items. *Contemporary Accounting Research* 26, (1).

Rogers, J.L., Stocken, P.C., 2005. Credibility of management forecasts. *The Accounting Review*. 80 (4), 1233–1260.

Schrand, K. and J. Elliott. 1998. Commentary on risk and financial reporting: A summary of the discussion at the 1997 AAA/FASB conference. *Accounting Horizons* 12 (3): 271-282.

Schrand, C., and B. Walther. 2000. Strategic Benchmarks in Earnings Announcements: The Selective Disclosure of Prior-Period Earnings Components. *The Accounting Review* 75(April): 151-177

Securities and Exchange Commission (SEC) (1989) Management's Discussion and Analysis of Financial Condition and Results of Operations; Certain Investment Company Disclosures. Securities Act Release 33-6835, U.S. Securities and Exchange Commission, Washington, DC.

Securities and Exchange Commission (SEC) (2003) Commission Guidance Regarding Management's Discussion and Analysis for Financial Condition and Results of Operations. Securities Act Release 33-8350, U.S. Securities and Exchange Commission, Washington, DC.

Securities and Exchange Commission (SEC) (2010) Commission Guidance Regarding Disclosure Related to Climate Change. Securities Act Release 33-9106, U.S. Securities and Exchange Commission.

Securities and Exchange Commission (SEC) (2013) SEC says social media OK for company announcements if investors are alerted. Press Release.

Skinner, D. (1994). Why Firms Voluntarily Disclose Bad News. *Journal of Accounting Research*, 32(1), 38-60.

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

Unerman, J. 2008. Strategic reputation risk management and corporate social responsibility reporting. *Accounting, Auditing & Accountability Journal*, 21, 362-364.

Waymire, G. 1985. Earnings Volatility and Voluntary Management Forecast Disclosure. *Journal of Accounting Research*, 23,(1) 268-295

Wells, John R. Strategic IQ: Creating Smarter Corporations. San Francisco, CA: Jossey Bass, 2012.

Appendix A: Variable Definitions

Variable	Definition
<i>GreenRevenues</i>	Percentage of total revenues that are generated from low-carbon goods, products and services, for firm <i>i</i> in year <i>t</i> . Ranges from 0 to 100%. Obtained from FTSE Russell's Green Revenues data model.
<i>GreenOppDisc</i>	A sentence containing a forward-looking term (e.g., "next year", "company expects" or "firm plans to") and a Green Product term (e.g., "3M Glass Bubbles", "Accenture's Green Technology Suite", "Hydratight wind power solutions", "solar inverters", "LED Lighting Solutions", "electric vehicle", etc.). Green Product terms are obtained from FTSE Russell's Low Carbon Economy (LCE) data module. The full list of forward-looking terms are provided in the Internet Appendix.
<i>10KGreenOpp</i>	Indicator equal to 1 if the MD&A section of the annual report (10-K) contains a green opportunity sentence for firm <i>i</i> in year <i>t</i> .
<i>SustGreenOpp</i>	Indicator equal to 1 if the sustainability disclosure (ie. sustainability report and/or Carbon Disclosure Project survey response) contains a green opportunity sentence for firm <i>i</i> in year <i>t</i> .
<i>ESGDisc</i>	A Bloomberg variable that scores from 0–100 and measures the quantity of ESG disclosures made by firm <i>i</i> in year <i>t</i> .
<i>ESGPerf</i>	The average of three MSCI (Morgan Stanley Capital International) variables: Environmental Score (measures the performance of firm <i>i</i> in relation to energy and climate change, natural resource consumption and waste management issues in year <i>t</i>), Social Score (measures the performance of firm <i>i</i> in relation to human capital, health and safety, products and services, and supply chain issues in year <i>t</i>), and Governance Score (measures the quality of firm <i>i</i> 's governance processes and structure in year <i>t</i>).
<i>10KFwdLooking</i>	Indicator equal to 1 if the MD&A section of the 10-K contains a forward-looking sentence for firm <i>i</i> in year <i>t</i> .
<i>10KDelay</i>	Difference between the year of the first 10-K green opportunity disclosure for firm <i>i</i> and the year of the first sustainability report green opportunity disclosure for firm <i>i</i> .
<i>Leverage</i>	Total debt divided by total shareholders' equity for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>R&D</i>	Total research and development expenditures scaled by total revenues for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>PTB</i>	Ratio of the stock price to the book value per share for firm <i>i</i> in year <i>t</i> , from Worldscope.
<i>RetVol</i>	Standard deviation of day to day logarithmic historical price changes over the year for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>ROA</i>	Return on assets for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>Sales1YrGrowth</i>	The percent increase or decrease of sales revenue by comparing current year with prior year for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>AnnualRet</i>	Annual stock price return for firm <i>i</i> in year <i>t</i> , obtained from Worldscope.
<i>TotalAssets</i>	Natural logarithm of total assets as reported on the Balance Sheet for firm <i>i</i> in year <i>t</i> , from Worldscope.

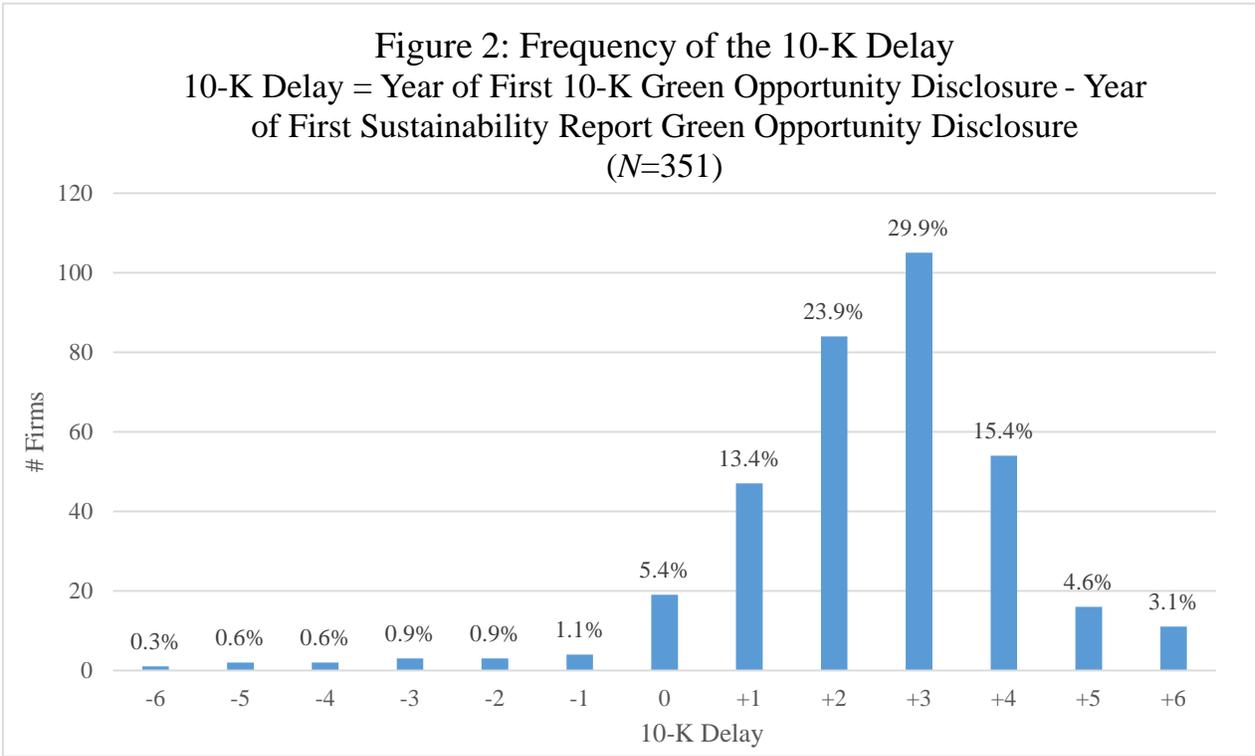
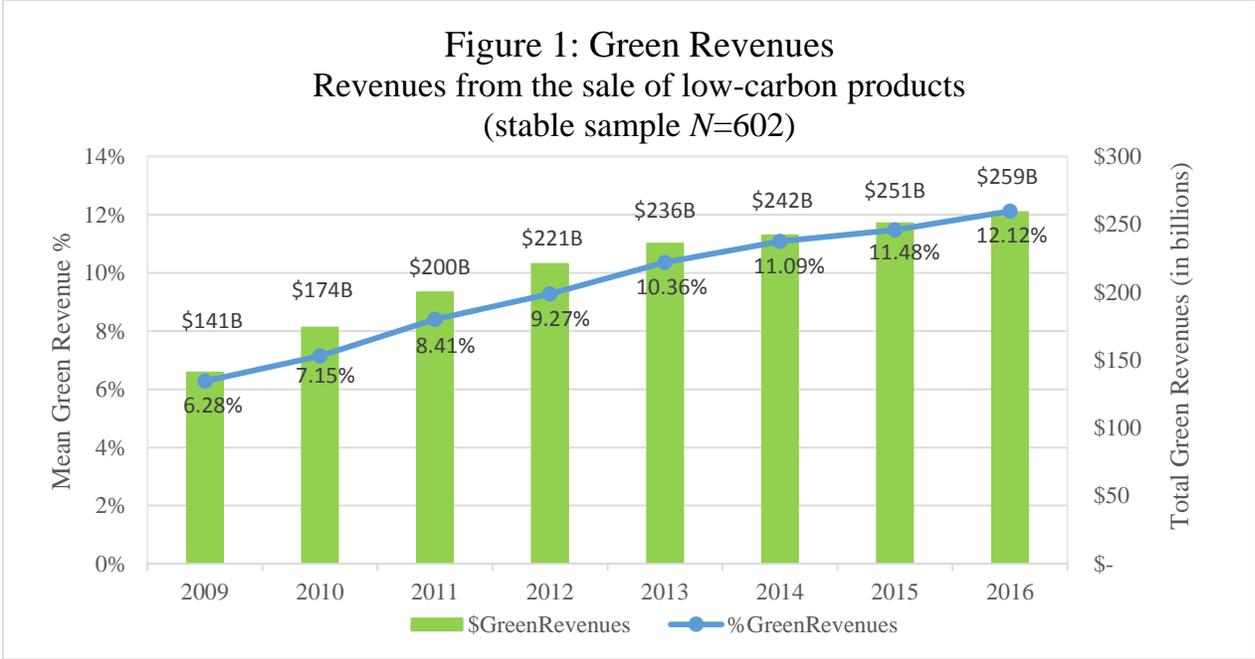


Table 1
Sample Construction

	Firms	Firm-Years
FTSE Green Revenues Data	3,042	23,553
Less: Non-US firms	2,233	17,613
Less: Missing control variables	62	149
Sample	747	5,791

Table 2: Frequencies

Panel A: Frequency by Year

Year	Frequency	Percent	Green Revenue %
2009	691	11.93	6.0%
2010	700	12.09	7.0%
2011	715	12.35	8.1%
2012	723	12.48	9.0%
2013	733	12.66	10.1%
2014	738	12.74	11.0%
2015	744	12.85	11.7%
2016	747	12.90	12.1%
Total	5,791	100	

Panel B: Frequency by Sector

Sector	Frequency	Percent	Green Revenue %	Green Product Examples
Consumer Discretionary	915	15.80	4.9%	Electric or hybrid vehicles.
Consumer Staples	587	10.14	10.1%	Residential energy efficient heat pumps; LED lighting products.
Energy	267	4.60	7.6%	Solar inversion systems; geothermal power equipment.
Financials	965	16.67	0.9%	Debt and equity financing services to renewable energy projects.
Health Care	367	6.35	4.9%	Microecologies that reduce CO2 emissions in food production; carbon sequestration chemicals.
Industrials	830	14.34	10.5%	Solar photovoltaic modules; energy recovery technology; energy management systems.
Information Technology	373	6.44	8.6%	Products with green saving options; smart grid and metering; low energy IT processes; low consumption data storage solutions.
Materials	678	11.70	9.8%	Thermoplastic composites, which are lighter and make vehicles more fuel-efficient; photovoltaic paste that increases the power output of solar panels.
Real Estate	349	6.03	5.2%	Eco-efficient building design and development.
Telecommunication Services	161	2.78	1.4%	Video conferencing solutions; sale of cables and connection materials for photovoltaic power plants.
Utilities	299	5.16	12.4%	Electricity generated from renewable energy sources (wind, solar, hydro, biofuels).
Total	5,791	100		

Table 3 Panel A: Frequencies of Green Opportunity Disclosure by Firm-Year

		10-K		
		Disclosure	No Disclosure	
Sustainability Report	Disclosure	1,110 (19%)	1,322 (23%)	2,432 (42%)
	No Disclosure	56 (1%)	3,303 (57%)	3,359 (58%)
		1,166 (20%)	4,625 (80%)	5,791 (100%)

Table 3 Panel B: Frequencies of Green Opportunity Disclosure by Firm

		10-K		
		Disclosure	No Disclosure	
Sustainability Report	Disclosure	351 (47%)	15 (2%)	366 (49%)
	No Disclosure	2 (0.003%)	379 (51%)	381 (51%)
		353 (47%)	394 (53%)	747 (100%)

Table 4: Descriptive Statistics

Panel A: Summary Statistics						
Variable	N	Mean	25th Pctile	Median	75th Pctile	Std. Dev.
GreenRevenues (%)	5,791	9.443	0	1.03	14.390	16.068
10KGreenOpp	5,791	0.201	0	0	0	0.448
SustGreenOpp	5,791	0.420	0	0	1	0.636
ESGDisc	5,791	33.019	9.239	30.994	56.033	15.023
ESGPerf	5,791	16.028	8.273	16.503	21.449	2.185
10KFwdLooking	5,791	0.783	1	1	1	0.405
10KDelay	351	2.540	1	3	4	2.981
Leverage	5,791	0.781	0.129	0.480	1.003	1.864
R&D	5,791	0.052	0	0.003	0.038	0.147
PTB	5,791	2.707	1.331	1.974	3.074	3.747
RetVol	5,791	31.760	22.687	29.747	39.248	12.210
ROA	5,791	0.032	0.020	0.049	0.081	0.122
Sales1YrGrowth	5,791	0.076	-0.043	0.045	0.147	0.277
AnnualRet	5,791	0.183	-0.084	0.126	0.347	0.498
TotalAssets	5,791	21.335	19.968	21.427	22.654	1.998
Litigation	5,791	0.173	0	0	1	0.293
ClimChgVoteSupport	5,791	0.138	0.050	0.083	0.212	0.128
ClimChgMainstreamSponsor	5,791	0.190	0	0.051	0.255	0.340

Panel B: Pearson Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 GreenRevenues%	1.00													
2 10KGreenOpp	0.28	1.00												
3 SustGreenOpp	0.30	0.23	1.00											
4 ESGDisc	0.16	0.21	0.24	1.00										
5 ESEGPf	0.18	0.19	0.22	0.19	1.00									
6 10KFwdLooking%	0.04	0.21	0.19	0.10	0.18	1.00								
7 10KDelay	0.05	0.11	0.05	-0.04	-0.06	0.06	1.00							
8 Leverage	0.06	0.04	0.06	0.03	-0.02	-0.13	0.00	1.00						
9 R&D	0.18	0.14	0.03	0.06	0.24	-0.16	-0.12	-0.02	1.00					
10 PTB	-0.01	-0.02	0.00	0.05	0.08	0.20	-0.02	0.07	0.19	1.00				
11 RetVol	0.08	-0.05	-0.07	-0.22	-0.15	-0.02	0.00	0.00	0.02	0.04	1.00			
12 ROA	-0.10	0.00	0.00	0.05	0.09	0.07	0.08	0.05	-0.18	-0.10	0.25	1.00		
13 Sales1YrGrowth	0.06	-0.01	0.03	-0.04	0.04	0.11	0.06	0.04	-0.02	-0.03	0.12	0.10	1.00	
14 AnnualRet	-0.03	-0.03	0.01	-0.04	0.00	0.08	0.00	0.02	-0.06	0.00	0.22	0.12	0.19	1.00
15 TotalAssets	-0.11	0.08	0.10	0.41	0.34	-0.03	-0.05	0.04	0.27	-0.02	-0.05	-0.30	0.00	-0.05

This table presents descriptive statistics. Panel A presents descriptive data. Panel B presents Pearson correlations; boldface numbers represent significance at 5% level or higher. All variables are winsorized at the 1- and 99-percent levels, and defined in Appendix A.

Table 5: Relationship between green opportunity disclosure and future green revenues

Panel A: Green revenues in levels				
OLS models	(1)	(2)	(3)	(4)
	GreenRevenues	GreenRevenues	GreenRevenues	GreenRevenues
Dependent variable	t+1	t+2	t+3	t+4
SustOnly	3.791*** (2.62)	4.145** (2.30)	4.883*** (2.70)	5.218** (2.43)
Sust&10K	4.208** (2.19)	4.817** (2.20)	5.410*** (2.74)	5.812** (2.57)
ESGDisc	0.331* (1.78)	0.550* (1.89)	0.623** (2.01)	0.167* (1.77)
ESGPerf	0.401** (2.19)	0.412** (2.11)	0.449* (1.86)	0.422* (1.70)
10KFwdLookingDisc	0.219 (1.12)	0.232 (1.18)	0.189 (1.22)	0.139 (0.35)
Leverage	0.002 (0.51)	0.004 (0.89)	0.004 (0.83)	0.004 (0.90)
R&D	0.003*** (2.88)	0.004*** (3.16)	0.004*** (3.40)	0.004*** (3.09)
PTB	0.003 (1.29)	0.002 (0.95)	0.002 (0.94)	0.001 (0.52)
RetVol	0.003*** (3.92)	0.002*** (3.72)	0.002*** (3.35)	0.002*** (2.78)
ROA	-0.003*** (-3.00)	-0.002*** (-2.73)	-0.003*** (-2.81)	-0.002** (-2.35)
Sales1YrGrowth	0.001 (3.80)***	0.000*** (2.95)	0.001 (3.42)	0.001*** (3.83)
AnnualRet	0.000 (-2.41)**	0.000 (-1.58)	0.000** (-2.26)	0.000* (-1.90)
TotalAssets	-0.019 (-5.17)***	-0.019*** (-5.19)	-0.019*** (-5.01)	-0.019*** (-4.90)
Constant	-0.012 (-0.17)	-0.014 (-0.15)	0.021 (0.17)	0.127 (1.26)
N	5030	4286	3548	2815
Adj R2	66.0%	65.8%	66.1%	66.3%
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Comparison of coef. on <i>SustOnly</i> and <i>Sust&10K</i> . Test for $\beta_1 \neq \beta_2$ Null: $\beta_1 = \beta_2$	p-value=0.134	p-value=0.179	p-value=0.129	p-value=0.138

Panel B: Green revenues in year-over-year changes

OLS models	(1)	(2)	(3)	(4)
Dependent variable	$\Delta\text{GreenRevenues}$ t to t+1	$\Delta\text{GreenRevenues}$ t+1 to t+2	$\Delta\text{GreenRevenues}$ t+2 to t+3	$\Delta\text{GreenRevenues}$ t+3 to t+4
SustOnly	1.014*** (2.70)	1.195** (2.51)	1.352** (2.34)	0.604 (1.48)
Sust&10K	1.080*** (2.63)	1.358** (2.15)	1.414** (2.21)	0.623 (1.33)
$\Delta\text{ESGDisc}$	0.023* (1.83)	0.019* (1.82)	0.020* (1.74)	0.017 (1.19)
$\Delta\text{ESGPerf}$	0.019 (1.42)	0.013 (1.14)	0.026* (1.92)	0.022* (1.78)
$\Delta\text{10KFwdLookingDisc}$	0.002 (0.22)	0.001 (0.64)	0.002 (0.71)	0.003 (0.20)
$\Delta\text{Leverage}$	0.000 (0.51)	0.000 (0.27)	0.000 (0.28)	0.000 (0.22)
$\Delta\text{R\&D}$	0.000 (-1.01)	-0.001 (-0.97)	-0.001 (-1.32)	-0.001 (-1.25)
ΔPTB	0.000 (-0.45)	0.000 (-0.10)	0.000 (-0.58)	-0.001 (-0.63)
ΔRetVol	0.000 (0.56)	0.000 (0.89)	0.000 (0.71)	0.000 (0.84)
ΔROA	0.000 (-1.40)	0.000 (-1.89)	0.000 (-1.32)	-0.001 (-1.21)
ΔSales	0.002** (1.99)	0.003** (2.21)	0.003** (2.05)	0.005** (2.31)
$\Delta\text{AnnualRet}$	0.000 (-0.57)	0.000 (-0.03)	0.000 (0.05)	0.000 (0.31)
$\Delta\text{TotalAssets}$	-0.002*** (-3.37)	-0.003*** (-3.12)	-0.004 (-3.05)***	-0.005*** (-3.28)
Constant	-0.04 (-0.60)	-0.019 (-0.19)	0.035 (0.28)	0.141 (1.42)
N	5030	4286	3548	2815
Adj R2	54.6%	52.4%	51.3%	50.2%
Year fixed effects	Yes	Yes	Yes	Yes

Comparison of coef.

on *SustOnly* and

Sust&10K. Test for

$\beta_1 \neq \beta_2$ Null: $\beta_1 = \beta_2$ p-value=0.151 p-value=0.122 p-value=0.182 p-value=0.143

This table presents results of multivariate analyses of green revenues regressed on an indicator equal to 1 for firm-year observations where green opportunities are disclosed in the sustainability report only at time t (*SustOnly*), and an indicator equal to 1 for firm-year observations where green opportunities are disclosed in the sustainability report and in the 10-K at t (*Sust&10K*), and other control variables. Panel

A regresses disclosure variables on levels of green revenues (controls are measured at time t). Panel B regresses disclosure variables on changes in green revenues. All controls are winsorized at the 1- and 99-percent levels and are defined in Appendix A. t -statistics appear in parentheses and are based on standard errors clustered by firm. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels (two-tail), respectively.

Table 6: Earnings announcements

Panel A: Earnings and revenues surprises				
OLS Models	(1)	(2)	(3)	(4)
Dependent variable	1-year earnings surprise	2-year earnings surprise	1-year revenue surprise	2-year revenue surprise
SustOnly	0.0051*** (4.94)	0.0064*** (3.25)	0.0039*** (4.54)	0.0042** (2.33)
Sust&10K	0.0019 (1.26)	0.0017 (1.02)	0.0009 (0.98)	0.0007 (0.25)
GreenRevenues	0.0281 (1.27)	0.0321 (1.38)	0.0127 (1.24)	-0.0312 (-0.33)
ESGDisc	0.0012 (1.03)	0.0025 (1.52)	0.0037 (1.22)	0.0037 (1.00)
ESGPerf	0.0013 (1.43)	0.0025 (1.16)	0.0045 (1.52)	0.0023 (1.03)
10KFwdLookingDisc	0.0005 (0.42)	0.0003 (0.27)	0.0003 (0.72)	0.0004 (0.38)
Leverage	0.0003 (0.67)	0.0007 (0.42)	0.0006 (0.59)	-0.0004 (-1.03)
R&D	-0.0012 (-1.52)	-0.0000 (-0.32)	0.0004 (1.02)	0.0010 (1.32)
PTB	0.0020** (2.03)	0.0052*** (3.56)	0.0038** (2.44)	0.0017** (2.12)
RetVol	-0.0035 (-1.04)	0.0010 (1.21)	-0.0049 (-1.22)	-0.0008 (0.95)
ROA	0.0009 (0.31)	-0.0009 (-0.47)	0.0008 (0.92)	0.0006 (0.59)
Sales1YrGrowth	0.0006 (1.08)	0.0003 (0.78)	-0.0006 (-0.64)	0.0005 (1.02)
AnnualRet	0.0002 (1.36)	-0.0002 (-1.51)	-0.0002 (-1.42)	-0.0002 (-1.28)
TotalAssets	0.0045*** (28.94)	0.0034*** (31.24)	0.0027*** (12.12)	0.0023*** (11.67)
constant	-0.0429 (-34.53)	-0.0277*** (-18.23)	-0.0136*** (-10.01)	-0.0513*** (11.94)
N	5735	4991	5735	4991
Adj R2	21.20%	20.30%	16.20%	16.70%
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Comparison of coef. on <i>SustOnly</i> and <i>Sust&10K</i> . Test for $\beta_1 \neq \beta_2$ Null: $\beta_1 = \beta_2$	p-value=0.009	p-value=0.007	p-value=0.011	p-value=0.010

Panel B: Earnings announcement returns

	<u>SustOnly</u>	<u>Sust&10K</u>
CAR	0.42	0.10
N	1,322	1,110
t-stat (difference from 0)	(32.11)***	(6.47)***
t-stat (difference in means)	(3.22)***	

Panel A of this table presents results from estimating the association between earnings and revenue surprises on an indicator variable for whether a firm disclosed green opportunities in the most recent sustainability report only (*SustOnly*), and an indicator variable for whether a firm disclosed in both the most recent 10-K and sustainability report (*Sust&10K*). The 1- (2-) year earnings or revenue surprise is the actual earnings-per-share or revenue-per-share minus the I/B/E/S median analyst forecast 8 (20) months prior to the end of the forecast period, deflated by the stock price 20 days before the earnings announcement. Controls are calculated at the previous year-end, are winsorized at the 1- and 99- percent levels and are defined in Appendix A. *t*-statistics appear in parentheses and are based on standard errors clustered by firm. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels (two-tail), respectively. Panel B of this table reports (-1, +1) abnormal returns to quarterly earnings announcements. Abnormal returns are calculated above a market model where coefficients are estimated over a 255-day period ending 46 days before the earnings announcement. Average announcement returns to firms disclosing green opportunities only in the sustainability report (*SustOnly*) are compared to firms that disclose in both the 10-K and in the sustainability report (*Sust&10K*).

Table 7: Calendar-time portfolio analysis of abnormal stock returns

	Panel A: Value-weighted portfolios			t-stat (difference in Alphas)	
	(1) Portfolio A: All green opportunity disclosers	(2) Portfolio B: Firms disclosing green opportunities <u>only</u> in sustainability reports	(3) Portfolio C: Firms disclosing in 10-Ks & sustainability reports	Portfolio B vs. Portfolio A	Portfolio B vs. Portfolio C
Market	0.9759*** (18.16)	1.0324*** (17.33)	0.9831*** (16.15)		
SMB	-0.1078** (-2.35)	-0.0812* (-1.67)	-0.1284** (-2.35)		
HML	0.0812* (1.99)	0.1024** (2.05)	0.1522** (2.41)		
Intercept	0.0003 (0.78)	0.0026*** (2.84)	0.0004 (0.54)		
Annualized Alpha from Fama and French (1993) 3-factor model	0.33% not sig	3.09% sig at 1%	0.42% not sig	(2.34)**	(2.21)**
Annualized Alpha from 3-factor model + momentum (Carhart 1997)	0.41% not sig	3.02% sig at 1%	0.21% not sig	(2.31)**	(3.02)***
Annualized Alpha from 5-factor model (Fama and French 2015)	0.10% not sig	2.85% sig at 5%	0.28% not sig	(2.26)**	(2.19)**
Annualized Alpha from 3-factor + momentum and liquidity (Pastor and Stambaugh 2003)	0.30% not sig	3.41% sig at 1%	0.46% not sig	(2.94)***	(2.55)**
Subperiods					
Analysis Period: 2005-2010	0.37% not sig	3.02% sig at 1%	0.25% not sig	(2.30)**	(2.39)**
Analysis Period: 2011-2016	0.25% not sig	2.89% sig at 5%	0.35% not sig	(2.22)**	(1.87)*
Subset of Firms					
High (above median) Green Revenues	1.04% not sig	2.99% sig at 1%	0.84% not sig	(1.86)*	(2.06)**

Panel B: Equal-weighted portfolios

	(1) Portfolio A: All green opportunity disclosers	(2) Portfolio B: Firms disclosing green opportunities <u>only</u> in sustainability reports	(3) Portfolio C: Firms disclosing in 10-Ks & sustainability reports	t-stat (difference in Alphas)	
				Portfolio B vs. Portfolio A	Portfolio B vs. Portfolio C
Market	0.9602*** (16.21)	1.0102*** (15.42)	0.9405*** (14.76)		
SMB	0.1012** (2.24)	0.0692* (1.74)	0.294** (2.15)		
HML	0.0847*** (2.81)	0.0748** (2.25)	0.1551** (2.21)		
Intercept	0.0004 (0.54)	0.0025*** (2.77)	0.0004 (0.32)		
Annualized Alpha from Fama and French (1993) 3-factor model	0.44% not sig	2.99% sig at 1%	0.43% not sig	(2.21)**	(2.31)**
Annualized Alpha from 3-factor model + momentum (Carhart 1997)	0.32% not sig	2.79% sig at 5%	0.25% not sig	(2.16)**	(2.65)**
Annualized Alpha from 5-factor model (Fama and French 2015)	0.27% not sig	3.04% sig at 1%	0.33% not sig	(2.34)**	(2.32)**
Annualized Alpha from 3-factor + momentum and liquidity (Pastor and Stambaugh 2003)	0.28% not sig	2.63% sig at 5%	0.42% not sig	(1.87)*	(1.86)*
Subperiods					
Analysis Period: 2005-2010	0.19% not sig	2.84% sig at 5%	0.26% not sig	(2.15)**	(2.22)**
Analysis Period: 2011-2016	0.23% not sig	3.11% sig at 1%	0.34% not sig	(2.76)***	(2.75)***
Subset of Firms					
High (above median) Green Revenues	1.12% not sig	2.75% sig at 1%	0.51% not sig	(1.85)*	(2.14)**

This table reports alphas and factor loadings from monthly calendar-time Fama-French (1993) regressions for value-weighted (Panel A) and equal-weighted (Panel B) portfolios of firms that disclose green opportunities. The first column reports the results for the portfolio composed of all green opportunity disclosers in the sample, regardless of where the disclosure is made; the second column report the results for the portfolio composed of firms that only disclose green opportunities in the sustainability report; and the third column reports the results for the portfolio composed of firms that disclose green opportunities in the 10-K and in the sustainability report. Portfolio abnormal performance is estimated as the intercept of the Fama-French (1993) time series regressions. SMB and HML are the Fama and French (1993) size and book-to-market factors, respectively. *t*-statistics appear in parentheses and recalculated using Newey and West (1987) which allows for the error terms to be heteroskedastic and serially correlated. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels (two-tail), respectively. Below these results, I report alphas using different factor models and subsets of the original sample.

Table 8: Univariate comparisons of sustainability report and 10-K green opportunity disclosure attributes

Panel A: Comparing disclosure attributes across reports

Attribute	Definition	<i>SustGreenOppDisc</i> (<i>N</i> =2,432) (1)	<i>10KGreenOppDisc</i> (<i>N</i> =1,166) (2)	Difference (1)-(2)
% Quantitative	Number of green opportunity disclosures that contain quantitative information, as a percentage of all green opportunity disclosures. I follow Huang et al. (2014) and classify a green opportunity disclosure as quantitative if it: (1) includes words such as "dollars", "thoughts", or "millions", or numbers followed by scaled abbreviations (e.g., \$10M or \$5B) (2) includes numbers (3) includes any references to U.S. currency (i.e., "\$"), or (4) includes percentages (the word "percent" or the symbol "%").	0.331	0.361	-0.03 (0.82)
%GreenIntensity	Number of green opportunity sentences as a percentage of the total sustainability report or MD&A sentences	6.12	1.10	5.02 (3.54 ***)
<i>ReadIndex</i>	Readability of green opportunity disclosures using the approach in Guay, Samuels and Taylor (2018) which combines several established measures of readability. <i>ReadIndex</i> is the first principal component of the Flesch-Kincaid readability, LIX readability, RIX readability, Gunning Fog readability, ARI readability, and SMOG readability. Each of these measures is effectively a function of word complexity and sentence length, and higher values correspond to less readable text.	-0.081	-0.062	-0.019 (-1.73*)

Panel B: Univariate comparisons of green opportunity disclosure attributes in the sustainability report, before and after the firm starts disclosing green opportunities in the 10-K

Attribute	<i>SustGreenOppDisc</i> in year before first 10K GreenOppDisc for firm <i>i</i> (<i>N</i> =351) (1)	<i>SustGreenOppDisc</i> in year after first 10K GreenOppDisc for firm <i>i</i> (<i>N</i> =351) (2)	Difference (1)-(2)
% Quantitative	0.312	0.319	-0.007 (0.72)
%GreenIntensity	6.38	6.36	0.02 (0.43)
<i>ReadIndex</i>	-0.092	-0.093	0.001 (0.29)

This table presents univariate comparisons. Panel A presents means of the green opportunity disclosure attributes (defined in the table) in the sustainability report (Column 1) and in the 10-K (Column 2). Column 3 presents the differences. Panel B presents means of the disclosure attributes in the sustainability report in the year before the firm starts disclosing green opportunities in the 10-K (Column 1) and in the year after (Column 2). Column 3 presents the differences. ***, **, * represent significance for two-tailed tests of differences and *t*-statistics are shown in parentheses.

Table 9: Green Revenues Relative to First Green Opportunity Disclosure

OLS Models	(1) Dependent variable: Green Revenues t= year of first sustainability report green opportunity disclosure	(2) Dependent variable: Green Revenues t=year of first 10-K green opportunity disclosure	(3) Comparison of coefficients test for (2)>(1), Null: (2)=(1) P-value
t-4	0.87 (0.83)	1.67 (1.77)*	0.0052***
t-3	1.01 (0.61)	2.26** (2.12)	0.0046***
t-2	1.02 (0.88)	3.15** (2.22)	0.0022***
t-1	1.3 (1.70)	3.52** 2.41	0.0065***
t	1.54* (1.89)	4.49** (2.65)	0.0031***
t+1	2.38** (2.11)	4.90*** (2.85)	0.0016***
t+2	3.73*** (2.98)	5.33*** (2.72)	0.0232**
t+3	4.62*** (3.00)	5.54*** (3.01)	0.4491
t+4	5.52*** (3.08)	5.98*** (2.54)	0.823
N	2012	2012	
Adj R2	92.2%	93.5%	
Controls	Yes	Yes	
Year fixed effects	Yes	Yes	
Firm fixed effects	Yes	Yes	

This table presents results from estimating the association between green revenues and the years relative to the first green opportunity disclosure in the sustainability report (Column 1) and 10-K (Column 2). The dependent variable, *GreenRevenues*, is defined in Appendix A. *t*-statistics appear in parentheses and are based on standard errors clustered by firm. I report the statistical significance of the differences in coefficient estimates for the time indicators, based on a system of seemingly unrelated regressions that jointly estimates the models and takes into account correlations in residuals across the regressions (Zellner 1962). This procedure uses a common sample for the two regressions and allows to explicitly test whether the coefficients on the independent variables are different across the two models. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels (two-tail), respectively.

Table 10: Factors associated with the delay between disclosing green opportunities in the 10-K and the sustainability report

OLS	Dependent variable: 10-K Delay
Litigious	0.491 (1.22)
R&D	0.042 (0.31)
ClimChgVoteSupport	-2.593** (-2.30)
ClimChgMainstreamSponsor	-1.437** (-2.06)
GreenRevenues	-0.072** (-2.51)
ESGDisc	0.042 (1.32)
ESGPerf	0.021 (1.11)
10KFwdLookingDisc	0.059 (0.91)
Leverage	0.837*** (3.71)
PTB	-1.129*** (3.71)
RetVol	0.039 (1.56)
ROA	0.985 (2.23)**
Sales1YrGrowth	-0.016 (-1.11)
AnnualRet	0.009 (0.53)
TotalAssets	0.651** (1.99)
constant	0.217* (1.69)
N	351
Adj R2	61.3%
Sector fixed effects	Yes

This table estimates factors associated with the length of time between the first 10-K green opportunity disclosure and the first sustainability report green opportunity disclosure. 10-K Delay is the difference between the year of the first 10-K green opportunity disclosure and the year of the first sustainability report green opportunity disclosure for a given firm. *Litigious* is a dummy=1 for membership in highly litigious industries, defined in Francis, Philbrick and Schipper (1994a, 1994b). *R&D* is total research and development expenditures scaled by total revenues, a proxy for

proprietary cost concerns. *ClimChgVoteSupport* is the mean vote-for-percentage for all climate change-related shareholder proposals that went to vote for the firm in the years leading up to the first green opportunity disclosure. *ClimChgMainstreamSponsor* is the mean proportion of climate change-related shareholder proposals that were filed by mainstream investors (e.g., asset managers, public pension funds, activist funds) for the firm in the years leading up to the first green opportunity disclosure. Control variables are defined in Appendix A. *t*-statistics appear in parentheses and are based on standard errors clustered by industry. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels (two-tail), respectively.

Internet Appendix: List of Forward-Looking Terms

also aim	and forecast	are seeking	company believes
also aims	and forecasts	are sought	company commits
also anticipate	and foresee	are targeted	company estimates
also anticipates	and foresees	are targeting	company expects
also assume	and hope	are willing	company forecasts
also assumes	and hopes	assume	company foresees
also believe	and intend	assumes	company hopes
also believes	and intends	believe	company intends
also commit	and plan	believes	company plans
also commits	and plans	but aim	company projects
also estimate	and project	but aims	company seeks
also estimates	and projects	but anticipate	company targets
also expect	and seek	but anticipates	corporation aims
also expects	and seeks	but assume	corporation anticipates
also forecast	and target	but assumes	corporation assumes
also forecasts	and targets	but believe	corporation believes
also foresee	and will	but believes	corporation commits
also foresees	anticipate	but commit	corporation estimates
also hope	anticipates	but commits	corporation expects
also hopes	are aimed	but estimate	corporation forecasts
also intend	are aiming	but estimates	corporation foresees
also intends	are anticipated	but expect	corporation hopes
also plan	are anticipating	but expects	corporation intends
also plans	are assumed	but forecast	corporation plans
also project	are assuming	but forecasts	corporation projects
also projects	are believed	but foresee	corporation seeks
also seek	are believing	but foresees	corporation targets
also seeks	are committed	but hope	currently aim
also target	are committing	but hopes	currently aimed
also targets	are estimated	but intend	currently aiming
also will	are estimating	but intends	currently aims
and aim	are expected	but plan	currently anticipate
and aims	are expecting	but plans	currently anticipated
and anticipate	are forecasted	but project	currently anticipates
and anticipates	are forecasting	but projects	currently anticipating
and assume	are foreseeing	but seek	currently assume
and assumes	are foreseen	but seeks	currently assumed
and believe	are hoped	but target	currently assumes
and believes	are hoping	but targets	currently assuming
and commit	are intended	but will	currently believe
and commits	are intending	commit	currently believed
and estimate	are planed	commits	currently believes
and estimates	are planning	company aims	currently believing
and expect	are projected	company anticipates	currently commit
and expects	are projecting	company assumes	currently commits

currently committed	expect	firm projects	management forecasts
currently committing	expects	firm seeks	management foresees
currently estimate	firm aims	firm targets	management hopes
currently estimated	firm anticipates	foresee	management intends
currently estimates	firm assumes	foresees	management plans
currently estimating	firm believes	intend	management projects
currently expect	firm commits	intends	management seeks
currently expected	firm estimates	is aimed	management targets
currently expecting	firm expects	is aiming	normally aim
currently expects	firm forecasts	is anticipated	normally aims
currently forecast	firm foresees	is anticipating	normally anticipate
currently forecasted	firm hopes	is assumed	normally anticipates
currently forecasting	firm intends	is assuming	normally assume
currently forecasts	firm plans	is believed	normally assumes
currently foresee	now aim	is believing	normally believe
currently foreseeing	now aimed	is committed	normally believes
currently foreseen	now aiming	is committing	normally commit
currently foresees	now aims	is estimated	normally commits
currently hope	now anticipate	is estimating	normally estimate
currently hoped	now anticipated	is expected	normally estimates
currently hopes	now anticipates	is expecting	normally expect
currently hoping	now anticipating	is forecasted	normally expects
currently intend	now assume	is forecasting	normally forecast
currently intended	now assumed	is foreseeing	normally forecasts
currently intending	now assumes	is foreseen	normally foresee
currently intends	now assuming	is hoped	normally foresees
currently plan	now believe	is hoping	normally hope
currently planed	now believed	is intended	normally hopes
currently planning	now believes	is intending	normally intend
currently plans	now believing	is planed	normally intends
currently project	now commit	is planning	normally plan
currently projected	now commits	is projected	normally plans
currently projecting	now committed	is projecting	normally project
currently projects	now committing	is seeking	normally projects
currently seek	we expect	is sought	normally seek
currently seeking	we forecast	is targeted	normally seeks
currently seeks	we foresee	is targeting	normally target
currently sought	we hope	is willing	normally targets
currently target	we intend	management aims	normally will
currently targeted	we plan	management anticipates	we aim
currently targeting	we project	management assumes	we anticipate
currently targets	we seek	management believes	we assume
currently will	we target	management commits	we believe
currently willing	we will	management estimates	we commit
currently will	will	management expects	we estimate

now estimate	still aimed	still planning
now estimated	still aiming	still plans
now estimates	still aims	still project
now estimating	still anticipate	still projected
now expect	still anticipated	still projecting
now expected	still anticipates	still projects
now expecting	still anticipating	still seek
now expects	still assume	still seeking
now forecast	still assumed	still seeks
now forecasted	still assumes	still sought
now forecasting	still assuming	still target
now forecasts	still believe	still targeted
now foresee	still believed	still targeting
now foreseeing	still believes	still targets
now foreseen	still believing	still will
now foresees	still commit	still willing
now hope	still commits	also developing
now hoped	still committed	are developing
now hopes	still committing	is developing
now hoping	still estimate	currently developing
now intend	still estimated	now developing
now intended	still estimates	
now intending	still estimating	
now intends	still expect	
now plan	still expected	
now planed	still expecting	
now planning	still expects	
now plans	still forecast	
now project	still forecasted	
now projected	still forecasting	
now projecting	still forecasts	
now projects	still foresee	
now seek	still foreseeing	
now seeking	still foreseen	
now seeks	still foresees	
now sought	still hope	
now target	still hoped	
now targeted	still hopes	
now targeting	still hoping	
now targets	still intend	
now will	still intended	
now willing	still intending	
seek	still intends	
seeks	still plan	
still aim	still planed	