Essays on the Role of Accounting Information and Governance in Emerging Institutions

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Abstract

In these essays, I explore the role of accounting information and governance in emerging institutions. In the first essay, "Credibility of Disclosures in Weak Enforcement Institutions: Evidence from Shanghai-Hong Kong Connect," I study whether voluntary disclosure can be credible when the enforcement institutions to deter managers from engaging in cheap-talk are weak. Using the case of China, I examine the effect of a market liberalization pilot program's announcement, which increased foreign investors' future ability to invest in select Shanghai stocks, on affected firms' disclosure policies. I find that affected firms did not change public disclosure (press releases and management forecasts), but significantly increased private disclosure (corporate access and private dial-ins) in anticipation of the program's implementation. Private disclosure increases were concentrated among firms in need of capital and these firms experienced an increase in foreign institutional holdings after the implementation. Further, their stock prices suffered less during a subsequent market crash and they retained more foreign institutional investors. Overall, the results suggest that voluntary disclosure supports investor confidence even in weak environments, albeit through private (instead of public) channels.

In the second essay, "Corporate Sustainability: First Evidence on Materiality," co-authored with Mozaffar Khan and George Serafeim, we develop a novel dataset by hand-mapping sustainability investments classified as material for each industry into firm-specific sustainability ratings using newly available materiality classifications of sustainability topics. This allows us to present new evidence on the value implications of sustainability investments. Using both calendar-

time portfolio stock return regressions and firm-level panel regressions, we find that firms with good ratings on material sustainability issues significantly outperform firms with poor ratings on these issues. In contrast, firms with good ratings on immaterial sustainability issues do not significantly outperform firms with poor ratings on the same issues. These results are confirmed when we analyze future changes in accounting performance. The results have implications for asset managers who have committed to the integration of sustainability factors in their capital allocation decisions.

In the third essay, "Shareholder Activism on Sustainability Issues," co-authored with Jody Grewal and George Serafeim, we examine shareholder activism on sustainability issues which has become increasingly prevalent over the years, with the number of proposals filed doubling from 1999 to 2013. We use recent innovations in accounting standard setting to classify 2,665 shareholder proposals that address environmental and social issues as financially material or immaterial, and we analyze how proposals on material versus immaterial issues are related to firms' subsequent environmental or social performance and market valuation. We find that 42 percent of the shareholder proposals in our sample are filed on financially material issues. We document that filing shareholder proposals are related to subsequent improvements in the performance of the company on the focal environmental or social issue, even though such proposals nearly never received majority support. Improvements occur across both material and immaterial issues. Proposals on immaterial issues are associated with subsequent declines in firm valuation while proposals on material issues are associated with subsequent increases in firm value. We show that managers increase performance on immaterial issues in companies with agency problems, low awareness of the materiality of sustainability issues, or poor performance on material issues.

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Dedication

With much love, I dedicate this thesis to my beautiful wife Young Kyung Lee, my adorable son Peter Sangwoo Yoon, my loving parents Sungho Yoon and Eunkyung Song, and my dear sister Saeyoung Yoon.

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1 Credibility of Disclosures in Weak Enforcement Institutions: Evidence from Shanghai-Hong Kong Connect

1.1 Introduction

Prior literature found that in developed markets, institutional investors demand disclosure and firms voluntarily provide information to manage reputation and enhance investor confidence (Healy and Palepu, 2001; Rogers and Stocken, 2005; Beyer and Dye, 2012). One reason for such a relationship is that in economies like the U.S., there are strong enforcement institutions to ensure credible communication between managers and investors (Bushman, Piotroski, and Smith, 2004). However, it is less clear whether voluntary disclosure will be perceived as credible when firms operate in markets without such controls. For example, evidence from existing papers suggests that voluntary disclosures in regimes with weak legal enforcement have little effect on the cost of capital and investor confidence, because shareholders lack confidence in firm initiated information and managers have difficulty in finding ways to credibly commit to higher-quality governance and transparency (Black, 2001; Doidge, Karolyi, and Stulz, 2007; Ke and Zhang, 2017).

In this paper, I study whether voluntary disclosure can be credible in markets with weak enforcement institutions where managers have incentives to engage in cheap-talk. I use China as the research setting, because the regulations in place to require fair and timely distribution of accurate information are not strictly enforced (Piotroski and Wong, 2009). For instance, only a handful of companies has been sanctioned for failing to comply with the country's management forecast regulation and the penalty only amounted to issuing a public apology in government newspapers (Song 2009; Song, Li, and Ji, 2011). Not surprisingly, the equity market suffered from periodic failures and volatility spikes due to information related issues such as insider trading.[1]

[1] Wall Street Journal: Why China's Market Fell So Much. Jan 4, 2016.

In order to identify the effect of voluntary disclosure on investor confidence, I use a market liberalization pilot program announced on April 10, 2014, the Shanghai-Hong Kong Connect (henceforth "SHK Connect"), as a shock to firm disclosure policies. It granted an aggregate quota of $48 billion to foreign investors to trade any of the 568 eligible Shanghai listed firms, which were selected based on a combination of market cap, industry, and turnover. It was implemented seven months after the announcement on November 17, 2014. I take advantage of this lagged adoption and conduct four analyses across different time periods around SHK Connect.

First, I examine whether firms change disclosure in anticipation of a potential increase in foreign ownership (i.e., after SHK Connect's announcement but before the implementation). Second, I examine firm characteristics prior to SHK Connect's announcement to understand what motivates any changes in disclosure. Third, I examine foreign institutional ownership after SHK Connect's implementation to understand whether the disclosure change during the prior period is associated with SHK Connect's outcome. Finally, I examine the market crash period that happened between July and December 2015 (i.e., seven months after the implementation) and test for additional manifestations of investor confidence associated with the disclosure change.

One important feature of my paper is that I use two forms of disclosure: private and public. Private disclosure is facilitated by brokers and operationalized using two proxies: corporate access events and private dial-ins. Corporate access events are private meetings for Chinese companies and foreign institutional investors (e.g., Fidelity) that are hosted by, and available only to the top tier client investors of foreign brokers (e.g., Goldman Sachs).[2] Private dial-ins are password protected conference calls in English-language for Chinese companies and foreign investors. While also facilitated by foreign brokers, this channel is less restrictive than corporate access and

[2] Brokers always use research sales reports to feature corporate access events, which are one of their most profitable events. I exploit these reports to collect meeting location and time, participating companies, and hosting brokers.

allows wider group of investors to take part. Public disclosure is operationalized through two proxies: English-language press releases and management forecasts.

Ex-ante, it is unclear whether firms will respond to a potential increase in foreign institutional ownership (i.e., to SHK Connect's announcement). Chinese managers may want to discourage developed world investors that demand stronger governance and reduce management power from holding their stock (Dyck and Zingales, 2004). Even if managers are willing to encourage such investors, they may choose to wait until foreigners become actual shareholders before expanding disclosure. Further, the total foreign liquidity after SHK Connect ($59 billion) was less than 2% of Shanghai Exchange's market cap and there were plenty of other sources of liquidity: 85-90% of the daily trading flow was dominated by retail investors and 60% of the listed firms were state-owned. Finally, even if Chinese managers viewed foreigners as an alternative source of capital, it is unclear whether disclosure could be effective for foreigners in distinguishing truthful managers from those engaging in cheap-talk.

On the other hand, there are strong reasons to expect firms to increase disclosure after SHK Connect's announcement. For example, the new quota granted through SHK Connect ($48 billion) was four times greater than the total foreign investment in Shanghai prior to the announcement ($11 billion). In addition, the government called SHK Connect the "first of a new round," making it clear that there could be additional interactions with foreign investors in the near future.[3] As a result, firms may use SHK Connect to signal their interest in attracting foreign institutional investors, alleviate foreign investors' adverse selection problem, and decrease the cost of capital (Akerlof, 1970; Diamond and Verrecchia, 1991). If so, I argue that private disclosures, facilitated

[3] Quoted from Premier Li's speech at the opening ceremony of Boao Forum (April 10, 2014). On that day, exact details of subsequent liberalizations (Shenzhen-Hong Kong Stock Connect, MSCI A-Share inclusion, and Shanghai-Hong Kong Bond/Futures Connect, all of which were launched after 2016) were not announced. But, the market was aware of China's deep commitment towards opening up. (Goldman Sachs Research Report, September 2014).

by third-party investment banks with reputations for attracting foreigners and enhancing accountability and authentication, are likely to be more effective than public disclosures. Attracting international investors is expected to be valued most by eligible Chinese firms with future capital raising plans abroad, because they will likely have to reengage the same set of foreign investors and brokers. Brokers have a strong incentive to conduct due diligence of Chinese companies to protect established reputations with international investors and to attract high quality Chinese issuers (e.g., IPO, Follow-on). Finally, foreign investors are likely to view private disclosures as enabling them to make attractive investments, exploit retail investors, and potentially level the information gap vis-à-vis domestic institutional investors (Choe, Kho, and Stulz, 2005).

In my first analysis, I find that eligible Chinese firms responded to SHK Connect's announcement by increasing private disclosure targeting foreign institutional investors. In contrast, they made no increase in public disclosure. Specifically, the firms quadrupled the frequency of corporate access events and doubled the frequency of private dial-ins. In my second analysis that examines the determinants of disclosure change, I find the private disclosure increase was concentrated among firms in need of capital. In my third analysis, I examine the regulation outcome and find that foreign institutional investors gravitated towards those firms that improved private disclosure. Specifically, one additional corporate access event (private dial-in) in anticipation of SHK Connect was associated with a 20% (10%) increase in foreign ownership. This set of results suggests that private disclosure was a credible signal that enabled firms in need of capital to communicate with, and attract, foreign institutional investors.

Finally, I examine the subsequent market crash period (July to December 2015) to explore how the crash affected investor confidence in disclosing firms. The crash was preceded by a seven-

month market run-up that started in December 2014, which was partly due to optimistic forecasts by the government that encouraged retail investors to rotate into the stock market from the overheated property market.[4] However, China failed to meet its expected GDP numbers and forecasted an even worse outlook.[5] The stock market started to correct, leading to margin calls that overleveraged retail investors were unable to repay. The ensuing panic ultimately led to a 40% market downturn ($5 trillion) and there were reports of numerous suicides by retail investors who lost their life savings.[6] As observed by Balakrishnan, Watts, and Zuo (2016), this market crash can be viewed as an exogenous shock for research purposes. At the very least, the magnitude of the crash could not have been predicted. It therefore provides an attractive setting to further examine the impact of increased disclosure that was made in response to SHK Connect's announcement. I find that the firms that increased private disclosure in response to SHK Connect exhibited higher stock returns and lower return volatility during the stock market crash, in addition to retaining more foreign institutional investors. This reinforces the view that the observed increase in private disclosure was perceived by foreign investors as a signal of firm quality and highlights the benefits of disclosure during times of low trust.

Before I proceed, there are some caveats. The first is that SHK Connect was not a randomized experiment and operated under a set of eligibility conditions. I conduct entropy balanced and propensity score matching to control for the observed differences and minimize the selection bias. Results using the two techniques are similar in economic and statistical significance to that using the unmatched ineligible firms as the control group. However, it is difficult to rule out that some of the findings could reflect fundamental differences between the eligible test firms

[4] NPR: Beijing Government Spurred Ordinary Investors to Make Risky Margin Bets. Aug 27, 2015.
[5] Wall Street Journal: China's Economic Growth in 2015 is Slowest in 25 Years. Jan 19, 2016.
[6] The Guardian: Margin Calls Fuel China's Dramatic Stock Market Collapse. July 3, 2015.

and the control sample. The second caveat relates to the difficulty in precisely identifying the source of the private disclosure increase. As discussed, the increased disclosure enables investors to enhance investment decisions (i.e., the demand effect), Chinese firms to send a signal to foreign investors and to attract foreign capital (i.e., the supply effect), and brokers to generate incremental commissions (i.e., the intermediation effect). All three effects are likely to underlie the increase in disclosure, but I cannot distinguish which is more economically important.

These caveats notwithstanding, my main contribution is to increase our understanding of the specific voluntary disclosure mechanism (i.e., the *form* of disclosure) that can be credible when institutions and enforcement are weak. The findings of my paper regarding public disclosure are similar to those reported in existing papers that found little effect of voluntary disclosure on credibility and the cost of capital (Wang, O, and Claiborne, 2008; Ke and Zhang, 2017). However, my paper shows that private disclosures, supported by the reputation of established intermediaries, can be a channel for firms to credibly communicate with institutional investors in a weak enforcement setting.

My second contribution is on highlighting the intertemporal dynamics of disclosure and institutional ownership. Recent papers such as Boone and White (2015) used the Russell 1000/2000 index reconstitution as a shock to institutional ownership and found that firms showed higher levels of management forecasting after they entered the index, implying that *public* disclosure increases *after* quasi-index institutional investors enter the shareholder base. In my paper, I show changes in disclosure even before investors enter the shareholder base. Specifically, I find an increase in *private* disclosure, made *in anticipation* of a potential increase in institutional investors, is accompanied by an increase in those investors during the subsequent period.

My last contribution is on the literature that examined private communication. One challenge in this area has been data availability and researchers attempted to overcome this issue through proprietary data, survey data, or regimes that mandated certain details about private engagements to be disclosed (Soltes, 2014; Brown, Call, Clement, and Sharp, 2015; Cheng, Du, Wang, and Wang, 2016). I contribute to this literature by directly identifying actual private meetings through exploiting information on how sell side brokers market their efforts in research sales reports. Because this institutional feature is universal across brokers and regions, researchers may adopt the approach in this paper to collect corporate access data in their market of interest.

The rest of the paper is as follows. Section 2 provides the literature review and institutional background. Section 3 describes the research design and data. Section 4 presents the results. Section 5 concludes.

1.2 Literature Review and Institutional Setting

1.2.1 Literature Review

My paper is related to at least three different streams of literature. First, it is related to prior studies that examined the relation between institutional ownership and disclosure. For example, Healy, Hutton, and Palepu (1999) found that increases in voluntary disclosure were accompanied by increases in stock returns, institutional ownership, analyst following, and stock liquidity. Ajinkya, Bhojraj, and Sengupta (2005) found that firms with more outside directors and greater institutional ownership issued more frequent forecasts. However, these papers do not identify the direction of causality. Recent papers have attempted to overcome this limitation. For example, Boone and White (2015) and Bird and Karolyi (2016) used the Russell 1000/2000 reconstitution as an exogenous shock to institutional ownership and found better management forecasts and analyst coverage among firms that are held by more quasi-indexers. They argued that these passive

mutual funds cause better disclosure environment. However, a potential drawback with this setting is that disclosure change can only be observed when investors are already in the shareholder base.

My paper is also related to the literature on foreign institutional investors. Prior studies identified an association between foreign institutional investors and stronger governance. For example, Aggarwal, Erel, Ferreria, and Matos (2011) found that international portfolio investment by institutional investors promoted good corporate governance practices around the world, and Leuz, Lins, and Warnock (2009) found that foreign investors exited firms that did not improve governance. However, there has been mixed evidence on the performance of foreign investors vis-à-vis domestic investors (Brennan and Cao, 1997). For example, Choe, Kho, and Stulz (2005) found that domestic investors in Korea outperformed foreign investors. One reason for this may be due to linguistic and cultural advantages (Grinblatt and Keloharju, 2001). In contrast, Seashole (2000) found that foreigners do better than local investors in Taiwan, because they possess significant amount of investment experience and expertise.

As for the case in China, most papers suggested that foreign institutional investors are at an information disadvantage. For example, Chan, Menkveld, and Yang (2008) and Tang (2011) exploited the A-share and B-share dual class system. This system, which started in 1992, allowed foreigners to trade only in B-shares that had identical voting and cash flow rights to the A-shares that could be traded only by domestic investors. These two papers found that disclosure disparity between the two share classes was associated with the cross-sectional variation in price. Chan and Yu (2003) and Tam, Li, Zhang, and Yu (2010) looked at the role of foreign investors in China but found minimal impact on the market and no improvements in the information environment.

Finally, my paper is related to the literature that examined private meetings. For example, Soltes (2014) used proprietary data compiled by a single firm to understand why analysts privately

met with firm managers. Soltes and Solomon (2015) used proprietary data of one-on-one meetings between investors and senior managers of a single firm and investigated the impact of private meetings on investor decisions. Brown, Call, Clement, and Sharp (2015) conducted a survey of 365 analysts and found that private communication with the management was more useful to analysts than their own primary research, recent earnings performance, and recent 10-K and 10-Q reports. Cheng, Du, Wang, and Wang (2016) exploited a setting in which it is mandatory to report corporate site visits and found that analysts who facilitated the visits had a greater increase in forecast accuracy than other analysts. Bushee, Gerakos, and Lee (2016) used corporate jet flight patterns to identify private meetings between managers and investors and found significantly greater abnormal stock market reactions and analyst forecast activities. I add to this stream of literature by presenting a method to build a panel dataset of actual private meetings.

1.2.2 The Setting

It is important to note that SHK Connect was not the first liberalization that allowed foreigners to acquire A-shares stocks, which is a share class initially created for trading by domestic investors (see Table 1.1.A). Since November 2002, the Qualified Foreign Institutional Investor Program (QFII) allowed an aggregate quota of $4bn to select foreign institutional investors that were selected based on years of experience, amount of paid-in-capital, and assets under management. They were required to designate a local bank as a custodian and execute trades through a local securities firm.[7] By SHK Connect's announcement, the QFII quota had expanded to $52bn and was distributed among 279 foreign institutional investors. These investors were allowed to invest not just in A-share equities but also in bonds, warrants, fixed income products, futures, IPO subscriptions, and convertible bonds. Not surprisingly given the magnitude of

[7] State Administration of Foreign Exchange's website

permitted foreign investment, papers found that QFII did not lower the cost of equity capital or risk premium and failed to make long term impact on the market (Chan and Yu, 2003; Tam, Li, Zhang, and Yu, 2010).

Table 1.1.A Classes of Shares in China

	A-Shares		B-Shares	
	Shanghai	Shenzhen	Shanghai	Shenzhen
Number of stocks	950	468	53	52
Settlement Currency	RMB		USD, HKD	
Existing Investors	1) Chinese Retail & Institutions 2) Qualified Foreign Institutions		USD/HKD Holders	
New Investors Allowed by SHK Connect	Foreign Institutions & Retail		None	

On April 10, 2014, Chinese Premier Li Keqiang attended the Boao Forum and announced SHK Connect as the "first of a new round" of liberalizations. This pilot program selected 568 stocks listed on Shanghai Stock Exchange and allowed foreign investors' access to eligible shares through the Hong Kong Stock Exchange. 560 stocks in the eligible group were included in the Shanghai Stock Exchange (SSE) 180 or SSE 380 indices, and some of these were cross-listed in Hong Kong. The remaining 8 stocks were cross-listed in Hong Kong but were not included in either of the two indices. SHK Connect was implemented on November 17, 2014.

Per China Securities Index Methodology Fact Book, SSE 180 stocks were selected by 1) ranking stocks based on a combination of the previous year's daily market cap and turnover, 2) allocating stocks to one of ten industries defined by the China Securities Regulation Commission (CSRC), and 3) selecting stocks from each industry by weighting each industry relative to the entire exchange. The selection of stocks in SSE 380 index was completed after excluding SSE 180 stocks. They were selected by 1) ranking stocks based on a combination of sales growth, return on assets, turnover, and market cap, 2) allocating stocks to one of ten industries defined by CSRC,

and 3) selecting stocks from each industry by weighting each industry relative to the entire stock exchange. In sum, the key drivers of eligibility were industry, market cap, and turnover.

Under SHK Connect, foreigners would be permitted to trade any of the eligible stocks as long as they did not collectively exceed the aggregate quota ($48 bn) and the daily quota ($2 bn). The aggregate quota balance was calculated on a netting basis at the end of each trading day as $Aggregate\ Quota_{t-1} - Buy\ Trades_t + Sell\ Trades_t$. For example, if the aggregate net buy of day t was $10 million and that of day $t+1$ was -$2 million, then the aggregate quota usage at the end of $t+1$ would be $8 million. The daily quota balance was calculated similarly but in real time as *Buy Trades – Sell Trades.* If trading exceeded the quota at any time during regular trading hours, new buy orders were rejected until sell orders freed up the quota.

Interviews of a variety of different market participants suggest that the magnitude and timing of the SHK Connect regulation was surprising and unanticipated. For example, the assistant director of the Stock Exchange's Capital Markets Institute noted:

> *"The list of eligible firms and size of the liberalization was a surprise. Even our team that oversaw the facilitation of SHK Connect was notified of the regulation details on the day of Premier Li's speech." (May 15, 2017)*

A senior research analyst at a bulge bracket investment bank stated:

> *"Talks of a potential liberalization were in the rumor mills before SHK Connect. But, China has always talked about the opening up, especially because QFII quota had been near its limits for a while. I only saw the details of SHK Connect on the day of April 10th." (March 5, 2017)*

Finally, a portfolio manager that participated very actively in SHK Connect observed:

> *"HKEx Chairman talked about some mutual market access back in January 2014, however everything was very vague. It didn't draw much attention because people didn't even know which asset class would be included. The announcement in April was a very pleasant surprise." (February 22, 2017)*

1.3 Data and Research Design

1.3.1 Data

To examine changes in disclosure surrounding the announcement of SHK Connect, I collect data on a variety of private and public disclosures: *Corporate Access, Private Dial-ins*, *Press Release,* and *Management Forecast*.

Corporate Access. Corporate access events are private meetings for Chinese companies and foreign institutional investors (e.g., Fidelity) that are hosted by, and available only to the top tier client investors of, foreign brokers (e.g., Goldman Sachs). Just like elsewhere, foreign brokers that cover firms listed in Shanghai publicize the list of companies whose meetings they host in their research sales (not analyst) reports to increase interest from client investors and provide extensive reports to recap the events. I exploit this industry practice to collect the data.

Specifically, I use a three-step approach. First, I obtain the names of corporate access events from brokers and run a keyword search in Thomson.[8] I collect data for Credit Suisse, Deutsche Bank, HSBC, and JP Morgan through this approach. Second, for the broker reports that are not available through Thomson, I contact the broker directly for the list. I obtain data for Macquarie and Morgan Stanley through this approach. Third, for the events of other major corporate access providers, I obtain data from two investment managers who are top tier clients of most investment banks: Fidelity and Schroders Plc. I obtain the event data for Citi, Goldman Sachs, and UBS through this approach. It is worth noting that my approach does not cover all corporate access events attended by Chinese companies (e.g., events hosted by Daiwa Securities). However,

[8] In most cases, brokers have a separate website to feature their corporate access events, which contains names of the events. Ex: (https://www.credit-suisse.com/us/en/investment-banking/client-offering/corporate-access.html)

the data should be representative of the firms' use of corporate access, because the nine brokers were the main participants of SHK Connect and dominated nearly all of the events in Hong Kong.[9]

Private Dial-Ins. Private dial-in data is collected from two sources. The first is Factset, which I use to collect password protected private dial-ins from: 1) conferences by participants (e.g., JPMorgan China Conference), 2) meetings with select analysts and investors (e.g., China Eastern Air Roadshow-Hong Kong-Day 1), and 3) earnings calls conducted in English. The second source is data from Schroders Plc, which contains the times of in-house analyst dial-ins that were facilitated by foreign brokers.

Press Release. I use Factset to collect English-language press releases from major data providers such as Business Wire, Globe Newswire, and PR News Wire.

Management Forecast. I use Tonghuaxun Database (http://data.10jqka.com.cn/), a publicly available database, to collect quarterly management forecasts. China has a unique mandatory management forecast regime. For example, firms are required to issue a *qualitative* guidance on *full-year* results when they expect 1) a negative net profit, 2) a significant YoY change in net profit, or 3) last year's loss to reverse to a profit.[10] All other forecasts are voluntary (i.e., full year guidance with a *numerical* estimate & any guidance on *quarterly* results). This allows me to identify voluntary forecasts as well as forecasts issued to comply with the mandatory disclosure rules. I follow Bamber and Cheon (1998) to capture how much additional information managers provide in addition to the mandated disclosure and define *Specificity* as follows. When it is mandatory for firms to issue a qualitative forecast (i.e., when they expect 1), 2), or 3)), *Specificity* is calculated

[9] Top Shanghai Connect Trading Award. Hong Kong Exchange Website.

[10] The 2014 Shanghai Exchange Listing Rules. Firms were exempt from guiding "a significant YoY change in net profit" if they experienced one of the three cases: 1) absolute value of previous year's EPS was lower than or equal to 0.05, 2) absolute value of previous year's 1H EPS was lower than or equal to 0.03, or 3) absolute value of previous year's 1Q or 3Q EPS was lower than or equal to 0.04.

as 3 x point estimate + 2 x range estimate + 1 x open ended estimate + 0 x qualitative estimates. When it is not mandatory for firms to issue a qualitative forecast, *Specificity* is calculated as 4 x point estimate + 3 x range estimate + 2 x open ended estimate + 1 x qualitative estimates + 0 x no estimates. I also consider different facets of management forecast (forecast frequency and error), but omit most of them for brevity because the obtained results are similar to that using *Specificity.*

Other Data I collect quarterly foreign institutional ownership data from Factset Ownership Database and state-owned/family status data from Bloomberg. Stock price and analyst coverage data is from Factset, and all other company financials are from China Stock Market & Accounting Research (CSMAR) database.

1.3.2 Research Design

1.3.2.1 Disclosure Responses to SHK Connect

To examine disclosure responses to the SHK Connect's announcement (i.e., in anticipation of a potential increase in foreign holdings) by firms eligible to participate, I estimate the following cross-sectional model:

$$\Delta Disclosure_i = \alpha + \beta_1 Treat_i + \beta_2 \Delta Volatility_i + \beta_3 \Delta Analyst\ Following_i + \beta_4 \Delta Size_i + \varepsilon_i \qquad (1)$$[11]

ΔDisclosure is the magnitude of the disclosure change after SHK Connect's announcement. It is measured as the frequency (or specificity) of private and public disclosures after SHK Connect's announcement (April to November 2014) minus that before the announcement (April to November 2013). I use April to November 2013 as the pre-period to account for cyclical trends in disclosure variables (e.g., Macquarie always holds its Greater China Conference in May). *Treat* indicates eligible firms.

[11] This model is identical to the difference-in-differences model: $Disclosure_{i,t} = \alpha + \beta_1 Treat_i \ X \ Post\_Annc_t + Controls_{i,t} + Firm\ F.E. + Time\ F.E. + \varepsilon_{i,t}$. However, I use equation (1) as my main model to maintain consistency with subsequent research designs (equation 2,3, and 4) that use $\Delta Disclosure_i$ as the main explanatory variable.

In addition to using the unmatched ineligible firms as the control group, I conduct two matching techniques to form comparable control groups. The first technique is entropy balanced matching, which assigns weights to ineligible firms to make the moments of distribution of the matching variables (*Size*, *Turnover*, and *Industry)* similar to those of eligible firms (Hainmueller, 2012; McMullin and Schonberger, 2015). *Size* is the average market capitalization, *Turnover* is the average shares traded divided by the shares outstanding, and *Industry* is classified according to CSRC 10 industry classification. The second technique is propensity score matching, which identifies ineligible firms that are observably similar to eligible firms. I estimate a logit regression with *Treat* indicator as the dependent variable on *Size*, *Turnover*, and *Industry* and use one-to-one nearest neighbor matching without replacement method to obtain propensity scores to form a comparable control group (Heckman, Ichimura, and Todd, 1997).

As for the other control variables, *Volatility* is the standard deviation of daily returns, and *Analyst Following* is the average number of analysts following the stock. I measure the control variables for the year prior to SHK Connect to remain consistent with the literature that found these prior period characteristics to be associated with disclosure (Daske, Hail, Leuz, and Verdi, 2008; Balakrishnan, Billings, Kelly, and Ljungqvist, 2014).

1.3.2.2 Firms Motives for Changing Disclosure

I next examine pre-SHK Connect firm characteristics associated with the disclosure change. Prior research suggests that firms will increase disclosure to attract capital or to signal their good performance (Diamond and Verrecchia, 1991; Botosan, 1997; Healy, Hutton, and Palepu, 1999; Healy and Palepu, 2001; Miller, 2002). Other papers suggest that firms will decrease disclosure to protect private benefits of control (Dyck and Zingales, 2004; Doidge, Karolyi, Lins, and Miller,

2009). To test for the effect of these motives on disclosure change, I estimate the following specification:

$$\Delta Disclosure_i = \alpha + \beta_1 Treat_i + \beta_2 Treat_i X Sales\ Growth_i + \beta_3 Sales\ Growth_i + \beta_4 Treat_i X Family\text{-}Owned_i + \beta_5 Family\text{-}Owned_i + \beta_6 Treat_i X ROE_i + \beta_7 ROE_i + \beta_8 Foreign\text{-}Owned_i + \beta_9 State\text{-}Owned_i + \beta_{10} Size_i + \beta_{11} Leverage_i + \varepsilon_i \quad (2)$$

ΔDisclosure and *Treat* are the same as in equation (1). All other firm-level variables are measured before SHK Connect's announcement (at the last quarter of 2013). *Sales Growth* is the change in sales during the current quarter over that during the previous quarter and is a proxy for growing firms that are in need of capital. *Family-Owned* indicates family-owned firms and is a proxy for the manager incentives to protect private benefits of control. *ROE* is calculated as net income over average shareholders' equity during the current and previous quarters and is a proxy for firms' incentives to signal their strong performance to the market. The interaction between these proxies and *Treat* indicates the incremental effect of those constructs for eligible firms vis-à-vis ineligible firms. As for the control variables, *Foreign-Owned (SOE*) indicates foreign-owned (state-owned) firms. *Size* is the log of average market capitalization. *Leverage* is calculated as the sum of short-term borrowings and long-term debt over total assets.

1.3.2.3 Ownership Changes Following SHK Connect

To examine whether changes in disclosure after SHK Connect's announcement are associated with the changes in foreign institutional investor ownership after the implementation, I build a firm-quarter panel to estimate the following triple interactions model around SHK Connect's implementation:

$$Foreign\ Institutional\ Holdings_{i,t} = \alpha + \beta_1 Treat_i X Post\_Impl_t X \Delta Disclosure_i + \beta_2 Post\_Impl_t X \Delta Disclosure_i + \beta_3 Treat_i X Post\_Impl_t + \beta_4 Volatility_{i,t-1} + \beta_5 Analyst\ Following_{i,t-1} + \beta_6 Size_{i,t-1} + Firm\ F.E + Time\ F.E + \varepsilon_{i,t} \quad (3)$$

Foreign Institutional Holdings is the number of shares held by foreign institutional investors over the total shares outstanding during the current quarter. *ΔDisclosure* and *Treat* are as in equation

(1). *Post_Impl* takes the value of one (zero) during the two quarters after (prior) SHK Connect's implementation. This model is used to understand how foreign ownerships change after foreigners are allowed in through SHK Connect and how much it varies among eligible firms with different disclosure changes. I use a set of firm-quarter control variables (*Volatility, Size,* and *Analyst Following*) from the previous period and firm (time) fixed effects to mitigate firm-specific and time-invariant omitted variables (time-specific and firm-invariant omitted variables).

1.3.2.4 Impact of Disclosure on Subsequent Market Crash

Finally, I use the market crash, a six-month period from July to December 2015, to examine any additional manifestation of investor confidence associated with the disclosure change after SHK Connect's announcement. I estimate the following specification:

$$Y_i = \alpha + \beta_1 Treat_i \, X \, \Delta Disclosure_i + \beta_2 \Delta Disclosure_i + \beta_3 Treat_i + \beta_4 Volatility_i + \beta_5 Analyst\ Following_i + \beta_6 Size_i + \varepsilon_i \quad (4)$$

I use three dependent variables. *Return* is the stock returns during the period. *Return Volatility* is the standard deviation of daily returns during the period. *Foreign Institutional Holdings* is the average number of shares held by foreign institutional investors over the total shares outstanding during the period. *ΔDisclosure* and *Treat* are as in equation (1). The control variables are *Volatility, Size,* and *Analyst Following,* all of which are defined during the period prior to the market crash (January to June 2015).

1.4 Results

1.4.1 Descriptive Statistics

The sample consists of 950 firms that are listed on the Shanghai Stock Exchange (see Table 1.1.1) across different time periods around SHK Connect's announcement (April 2014), implementation (November 2014), and the subsequent market crash (July to December 2015).

As shown in Table 1.1.B and 1.1.C, the 950 firms are distributed across 10 different industries: 39 firms in Energy, 162 firms in Materials, 240 firms in Industrials, 152 firms in Consumer Discretionary, 69 firms in Consumer Staples, 54 firms in Healthcare, 108 firms in Financials, 61 firms in Information Technology, 14 firms in Telecommunications, and 51 firms in Utilities.

Table 1.1.B Frequency Table by Industry

	Entire Sample
Eligible Firms (Treated Group)	568
Ineligible Firms (Control Group)	382
Total Shanghai A-Share	950

Table 1.1.C Frequency Table by Industry

	# of Firms	**%**
Energy	**39**	*4%*
Materials	**162**	*17%*
Industrials	**240**	*25%*
Consumer Discretionary	**152**	*16%*
Consumer Staples	**69**	*7%*
Health Care	**54**	*6%*
Financials	**108**	*11%*
Information Technology	**61**	*6%*
Telecommunications	**14**	*1%*
Utilities	**51**	*5%*
Total	**950**	*100%*

Table 1.2.A is a naïve comparison of eligible and ineligible firms. It is clear that the covariates that determined eligibility to SHK Connect are significantly different across the two groups: average *Size* (*Turnover)* is 22.97 (0.71) for eligible group and 21.69 (0.84) for ineligible group. According to the correlation table, Table 1.2.3, *Size* is positively correlated with *Corporate Access* (0.42), *Foreign Holdings* (0.41), and *Analyst Following* (0.74). Here, bigger firms may have better disclosure because they have better governance, an unobservable factor which may be correlated with more analyst following and foreign institutional ownership. To control for such a

selection bias, I conduct matching and present summary statistics in Table 1.2.2. When I conduct propensity score matching, average *Size* (*Turnover)* is 22.97 (0.71) for eligible group and is 21.69 (0.84) for ineligible group. When I conduct entropy balanced matching, *Size* for eligible (ineligible) group has a mean of 0.71 (0.71) and a variance of 0.25 (0.25). *Turnover* for eligible (ineligible) group has a mean of 22.97 (22.97) and a variance of 1.17 (1.17).

Eligible firms on average increase the frequency of corporate access events (private dial-ins) from 0.10 to 0.33 (0.18 to 0.38), while ineligible firms make only a small change from 0.00 to 0.01 (0.00 to 0.01) after the announcement of SHK Connect. The parallel trends of the two private disclosure measures are provided in Figure 1.1 and Table 1.2.B. As for public disclosure, eligible firms on average decrease the frequency of press releases from 14.10 to 12.96 while ineligible firms do so from 6.65 to 6.17. Eligible firms increase management forecast specificity from 1.00 to 1.04, while ineligible firms increase it from 1.35 to 1.39. The level of management forecast specificity suggests that firms on average do not provide much information over the required qualitative disclosure. In addition, eligible firms are followed by more research analysts (3.49) than ineligible group (1.29) and have 0.39% foreign institutional investors in the shareholder base, while ineligible firms have 0.10%.

Figure 1.1 Sustained Increase in Corporate Access Post-SHK Connect

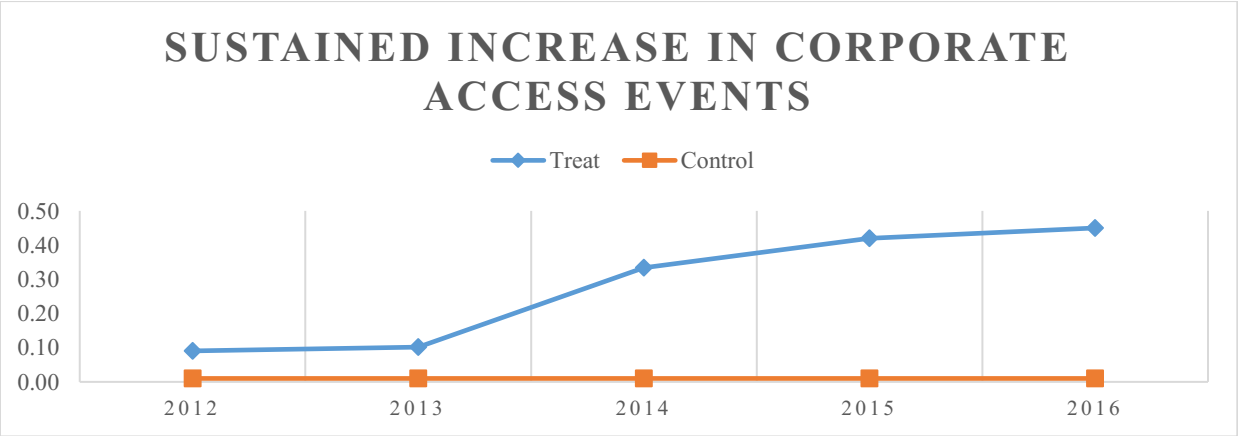


Table 1.2.A Summary Statistics

This table presents the key firm-level variables used in this paper. *Corporate Access* (*Private Dial-in* and *Press Release*) is the frequency of corporate access events (English-language private conference calls and press releases) that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Post Ann* indicates the eight-month period between SHK Connect's announcement and its implementation (2014/4-2014/11). *Pre Ann* indicates the same eight-months during the year before SHK Connect's announcement (2013/4-2013/11). All other variables are measured in 2013. *Turnover* is the average shares traded divided by the shares outstanding. *Size* is the log of market cap. *ROE* is net income divided by average equity. *Sales Growth* is the change in sales during the current period over the sales of the previous period. *Leverage* is short-term borrowing plus long-term debt over total assets. *Analyst Following* is the number of analysts covering the stock. *Return* is the stock returns during the period. *Volatility* is the standard deviation of daily returns. *Foreign (%)* is the shares owned by foreign institutional investors divided by the total shares outstanding. *State-Owned* (*Family-Owned*) indicates state-owned (family-owned) firms.

	Treat				**Control**				***Difference***	
	N	**Mean**	**Min**	**Max**	***N***	**Mean**	**Min**	**Max**	***in Means***	
Matching Variables										
Industry										
Turnover	*563*	0.71	0.05	2.61	*362*	0.84	0.05	2.61	*-0.13*	***
Size	*563*	22.97	20.96	27.92	*362*	21.69	20.53	24.38	*1.28*	***
Disclosure Variables										
Corp Access_Pre Ann	*568*	0.10	0.00	5.00	*382*	0.00	0.00	0.00	*0.10*	***
Corp Access_Post Ann	*568*	0.33	0.00	8.00	*382*	0.01	0.00	1.00	*0.32*	***
ΔCorp Access_Ann	*568*	0.23	-1.00	6.00	*382*	0.01	0.00	1.00	*0.22*	***
Pvt Dial-in_Pre Ann	*568*	0.18	0.00	7.00	*382*	0.00	0.00	0.00	*0.18*	***
Pvt Dial-in_Post Ann	*568*	0.38	0.00	12.00	*382*	0.01	0.00	1.00	*0.37*	***
ΔPvt Dial-in_Ann	*568*	0.20	-3.00	6.00	*382*	0.01	0.00	1.00	*0.19*	***
Press Release_Pre Ann	*568*	14.19	0.00	174.00	*382*	9.69	0.00	62.00	*4.50*	***
Press Release_Post Ann	*568*	12.97	0.00	146.00	*382*	9.60	0.00	80.00	*3.37*	***
ΔPress Release_Ann	*568*	-1.22	-45.00	69.00	*382*	-0.09	-31.00	44.00	*-1.13*	*
Specificity_Pre Ann	*568*	0.95	0.00	12.00	*382*	1.05	0.00	12.00	*-0.10*	
Specificity_Post Ann	*568*	0.95	0.00	12.00	*382*	1.18	0.00	12.00	*-0.23*	*
ΔSpecificity_Ann	*568*	0.00	-8.00	12.00	*382*	0.13	-9.00	8.00	*-0.13*	
Firm Characteristic										
ROE	*568*	0.06	-0.60	0.25	*382*	-0.01	-0.60	0.25	*0.07*	***
Sales Growth	*568*	0.47	0.19	12.28	*382*	0.84	0.19	12.28	*-0.37*	***
Leverage	*568*	0.18	0.00	0.55	*382*	0.22	0.00	0.55	*-0.04*	***
Analyst Following	*563*	3.49	0.00	27.83	*362*	0.28	0.00	4.58	*3.21*	***
Return	*563*	0.01	-0.05	0.12	*362*	0.02	-0.05	0.12	*-0.01*	
Volatility	*563*	0.02	0.01	0.04	*360*	0.02	0.01	0.04	*0.00*	
Foreign (%)	*537*	0.39	0.00	4.11	*216*	0.06	0.00	2.56	*0.33*	***
State-Owned (i)	*568*	0.66	0.00	1.00	*382*	0.52	0.00	1.00	*0.14*	***
Family-Owned (i)	*568*	0.25	0.00	1.00	*382*	0.27	0.00	1.00	*-0.02*	

Table 1.2.B Covariate Balance – Matching

This table presents the key firm-level variables used in this paper. *Corporate Access* (*Private Dial-in* and *Press Release*) is the frequency of corporate access events (English-language private conference calls and press releases) that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Post Ann* indicates the eight-month period between SHK Connect's announcement and its implementation (2014/4-2014/11). *Pre Ann* indicates the same eight-months during the year before SHK Connect's announcement (2013/4-2013/11). *Pre Ann-1* indicates the same eight-month period in 2012 to establish a parallel trend (2012/4-2012/11). All other variables are measured in 2013. *Turnover* is the average shares traded divided by the shares outstanding. *Size* is the log of market cap. *ROE* is net income divided by average equity. *Sales Growth* is the change in sales during the current period over the sales of the previous period. *Leverage* is short-term borrowing plus long-term debt over total assets. *Analyst Following* is the number of analysts covering the stockf. *Return* is the stock returns during the period. *Volatility* is the standard deviation of daily returns. *Foreign (%)* is the shares owned by foreign institutional investors divided by the total shares outstanding. *State-Owned* (*Family-Owned*) indicates state-owned (family-owned) firms.

	Entropy Balance Matching						**Propensity Score Matching**			
	Treat			**Control**			**Treat**	**Control**	**Diff**	
	Mean	Var	Skew	Mean	Var	Skew	Mean	Mean		
Matching Variables										
Industry										
Turnover	0.71	0.25	1.43	0.71	0.25	1.49	0.71	0.71	0.00	
Size	22.97	1.17	1.27	22.97	1.17	-0.01	22.98	22.91	0.07	
Disclosure Variables										
Corp Acc_Pre Ann-1	0.09	0.15	4.89	0.00	0.00	0.00	0.03	0.00	0.03	***
Corp Acc_Pre Ann	0.10	0.18	5.77	0.00	0.00	0.00	0.03	0.00	0.03	***
Corp Acc_Post Ann	0.33	1.14	4.18	0.01	0.01	8.57	0.14	0.02	0.12	***
Pvt Dial-in_ Pre Ann-1	0.18	0.48	4.89	0.00	0.00	69.29	0.07	0.00	0.07	***
Pvt Dial-in_Pre Ann	0.18	0.53	5.71	0.00	0.00	69.29	0.07	0.00	0.07	***
Pvt Dial-in_Post Ann	0.38	1.60	4.57	0.01	0.01	8.57	0.15	0.02	0.13	***
Press Rel_ Pre Ann-1	14.18	397.18	2.41	8.25	199.05	1.68	13.88	9.61	4.27	***
Press Rel_Pre Ann	14.10	483.43	3.00	6.65	147.57	2.01	13.71	9.02	4.69	***
Press Rel_Post Ann	12.96	419.46	2.94	6.17	127.77	2.53	12.48	8.43	4.05	***
Specificity_ Pre Ann-1	0.91	3.06	2.23	1.20	4.16	2.22	0.89	1.37	-0.48	***
Specificity_Pre Ann	1.00	3.41	2.07	1.35	2.93	1.85	1.01	1.33	-0.32	***
Specificity_Post Ann	1.04	4.07	2.23	1.39	3.18	2.51	1.01	1.80	-0.79	***
Firm Characteristic										
ROE	0.06	0.00	-5.46	0.01	0.02	-2.84	0.06	0.02	0.04	***
Sales Growth	0.47	0.67	11.91	0.84	4.97	4.84	0.47	1.01	-0.54	***
Leverage	0.18	0.02	0.48	0.16	0.02	0.54	0.18	0.18	0.00	
Analyst Following	3.49	24.28	2.52	1.29	2.18	0.72	3.54	1.09	2.45	***
Return	0.01	0.00	1.24	0.00	0.00	0.89	0.02	0.01	0.00	
Volatility	0.02	0.00	0.16	0.03	0.00	0.14	0.02	0.03	0.00	***
Foreign (%)	0.39	0.61	2.94	0.10	0.03	4.04	0.40	0.04	0.36	***
State-Owned (i)	0.66	0.22	-0.68	0.67	0.22	-0.71	0.66	0.58	0.08	**
Family-Owned (i)	0.25	0.19	1.16	0.26	0.19	1.12	0.25	0.28	-0.03	

Table 1.2.C Correlation Table

This table presents the key firm-level variables used in this paper. *Corporate Access* (*Private Dial-in* and *Press Release*) is the frequency of corporate access events (English-language private conference calls and press releases) that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Pre Ann* indicates the same eight-months during the year before SHK Connect's announcement (2013/4-2013/11). All other variables are measured in 2013. *Turnover* is the average shares traded divided by the shares outstanding. *Size* is the log of market cap. *ROE* is net income divided by average equity. *Sales Growth* is the change in sales during the current period over the sales of the previous period. *Leverage* is short-term borrowing plus long-term debt over total assets. *Analyst Following* is the number of analysts covering the stock. *Return* is the stock returns during the period. *Volatility* is the standard deviation of daily returns. *Foreign (%)* is the shares owned by foreign institutional investors divided by the total shares outstanding. *State-Owned* (*Family-Owned*) indicates state-owned (family-owned) firms. * denotes statistical significance at the 5% level.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	Corp Acc Pre_Ann	1.00														
(2)	Pvt Dial-in Pre_Ann	0.79*	1.00													
(3)	Press Rel Pre_Ann	0.12*	0.14*	1.00												
(4)	Specificity Pre_Ann	-0.05	-0.05	0.05	1.00											
(5)	Turnover	-0.16*	-0.19*	0.00	0.03	1.00										
(6)	Size	0.42*	0.44*	0.14*	-0.06	-0.38*	1.00									
(7)	ROE	0.08*	0.08*	0.05	-0.07*	-0.07*	0.31*	1.00								
(8)	Sales Growth	-0.04	-0.04	-0.03	-0.02	0.01	-0.08*	0.00	1.00							
(9)	Leverage	-0.09*	-0.09*	0.08*	0.08*	0.01	-0.19*	-0.25*	-0.01	1.00						
(10)	Analyst Following	0.53*	0.59*	0.19*	-0.05	-0.32*	0.74*	0.23*	-0.08*	-0.19*	1.00					
(11)	Return	-0.10*	-0.11*	-0.01	-0.01	0.33*	-0.10*	0.00	0.00	-0.09*	-0.14*	1.00				
(12)	Volatility	-0.14*	-0.19*	0.01	0.06	0.57*	-0.13*	-0.05	0.06	-0.07*	-0.21*	0.59*	1.00			
(13)	Foreign (%)	0.25*	0.22*	0.11*	-0.08*	-0.11*	0.41*	0.22*	-0.06	-0.20*	0.45*	-0.03	-0.09*	1.00		
(14)	State-Owned	0.06*	0.09*	-0.01	-0.05	-0.14*	0.19*	0.02	-0.05	0.01	0.16*	-0.12*	-0.09*	0.04	1.00	
(15)	Family-Owned	-0.08*	-0.09*	-0.02	0.03	0.02	-0.04	0.02	0.05	0.05	-0.06	0.12*	0.13*	-0.05	-0.22*	1.00

1.4.2 Disclosure Responses to SHK Connect

Table 1.3 presents the estimates from eq (1) that examines the changes in disclosure that was made in anticipation of a potential increase in foreign institutional ownership (i.e., after SHK Connect's announcement). In Table 1.3.A, I use private disclosure as the dependent variable. In Columns 1 and 4, which use unmatched ineligible firms as the control, the coefficient estimates on *Treat* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 0.214 (t-stat: 6.25) and 0.206 (t-stat: 6.16). In Columns 2 and 5, which use entropy balanced matching to form the control, the coefficient estimates on *Treat* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 0.273 (t-stat: 5.25) and 0.266 (t-stat: 5.17). In Columns 3 and 6, which use propensity score matching to form the control, the coefficient estimates on *Treat* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 0.097 (t-stat: 2.63) and 0.092 (t-stat: 2.48). Taken together with the average number of private disclosure events offered before SHK Connect (see Table 1.2.A & 1.2.B: *Disclosure_Pre Ann*), these findings suggest that eligible firms increased corporate access (private dial-ins) by a fourfold (twofold).

In Table 1.3.B, I use public disclosure as the dependent variable. In Columns 1 and 4, which use unmatched ineligible firms, the coefficient estimates on *Treat* for *ΔPress Release* and *ΔSpecificity* are -0.962 (t-stat: -1.55) and -0.105 (t-stat: -0.72). In Columns 2 and 5, which use entropy balanced matching, the coefficient estimates on *Treat* for *ΔPress Release* and *ΔSpecificity* are -0.597 (t-stat: -0.79) and 0.053 (t-stat: 0.27). In Columns 3 and 6, which use propensity score matching, the coefficient estimates on *Treat* for *ΔPress Release* and *ΔSpecificity* are -0.841 (t-stat: -0.95) and -0.253 (t-stat: -0.94). For comprehensiveness, I also consider other public disclosure variables as alternate dependent variables: *ΔForecast Frequency*, *ΔForecast Error*, and *ΔChinese-Language Press Release.* However, I do not find any evidence of a change in public disclosure (see Table 1.3.C).

Table 1.3.A Changes in the Private Disclosure Environment

This table presents the results from equation (1). *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). Control variables are created one year prior to the dependent variable. *Volatility* is the standard deviation of daily returns. *Analyst Following* is the number of analysts covering the stock. *Size* is the log of market cap. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔCorporate Access**						**ΔPrivate Dial-in**					
Matching	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat	0.214	6.25	0.273	5.25	0.097	2.63	0.206	6.16	0.266	5.17	0.092	2.48
ΔVolatility, t=-1	-0.103	-2.96	-0.040	-1.71	-0.027	-1.09	-0.105	-3.02	-0.041	-1.74	-0.026	-1.06
ΔAnalyst Following, t=-1	0.155	0.14	0.731	0.53	0.013	0.01	-0.030	-0.03	0.672	0.49	0.003	0.00
ΔSize, t=-1	-0.027	-0.39	0.017	0.36	0.050	1.21	-0.009	-0.13	0.026	0.53	0.059	1.29
Observations	903		900		608		903		900		608	
Adjusted R^2	0.08		0.05		0.02		0.07		0.04		0.02	

Table 1.3.B Changes in the Public Disclosure Environment

This table presents the results from equation (1). *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. Control variables are created one year prior to the dependent variable. *Volatility* is the standard deviation of daily returns. *Analyst Following* is the number of analysts covering the stock. *Size* is the log of market cap. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔPress Release**						**ΔSpecificity**					
Matching	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat	-0.962	-1.55	-0.597	-0.79	-0.841	-0.95	-0.105	-0.72	0.053	0.27	-0.253	-0.94
ΔVolatility, t=-1	-0.164	-0.73	-0.272	-1.55	-0.481	-1.75	0.040	0.69	0.213	3.37	0.218	2.31
ΔAnalyst Following, t=-1	5.592	0.22	-27.681	-0.53	1.141	0.02	0.484	0.11	-0.663	-0.09	-16.140	-1.14
ΔSize, t=-1	0.550	0.33	3.414	1.29	3.880	1.41	-0.819	-2.01	-1.409	-2.32	-1.272	-2.57
Observations	903		900		608		903		900		608	
Adjusted R^2	0.01		0.02		0.02		0.01		0.06		0.05	

Table 1.3.C Additional Evidence on Changes in the Disclosure

This table presents the results from equation (1). *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Forecast Frequency* is the frequency of management forecasts. *Forecast Error* is absolute value of the difference between management EPS and realized EPS, deflated by forecasting quarter's opening price. *Chinese Press Release* is the frequency of Chinese-language press releases that firms provide. Control variables are created one year prior to the dependent variable. *Volatility* is the standard deviation of daily returns. *Analyst Following* is the number of analysts covering the stock. *Size* is the log of market cap. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔForecast Freq**		**ΔForecast Error**		**ΔChinese PR**	
	(1)		(2)		(3)	
	Coeff	t	Coeff	t	Coeff	t
Treat	-0.074	-1.01	0.007	0.56	0.020	0.14
ΔVolatility, t=-1	0.026	1.00	-0.001	-0.23	0.037	0.43
ΔAnalyst Following, t=-1	0.848	0.39	0.466	0.99	-3.204	-0.56
ΔSize, t=-1	-0.342	-1.92	0.029	1.18	-0.544	-1.03
Observations	903		903		903	
Adjusted/Pseudo R^2	0.01		0.06		0.00	

1.4.3 Firms Motives for Changing Disclosure

Table 1.4 presents the estimates from the cross-sectional model in equation (2) that examines the determinants of the disclosure change. In Table 1.4.A, I use private disclosure as the dependent variable and find that firms in need of capital increased private disclosure. In Columns 1 and 4, which use unmatched ineligible firms, the coefficient estimates on *Treat X Sales Growth* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 1.005 (t-stat: 2.55) and 0.947 (t-stat: 2.18). In Columns 2 and 5, which use entropy balanced matching, the coefficient estimates on *Treat X Sales Growth* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 1.885 (t-stat: 3.76) and 1.650 (t-stat: 3.15). In Columns 3 and 6, which use propensity score matching, the coefficient estimates on *Treat X Sales Growth* for *ΔCorporate Access* and *ΔPrivate Dial-in* are 1.682 (t-stat: 2.88) and 0.583 (t-stat: 1.74). Taking the entropy balanced matched results for example, an eligible firm with a 10% higher sales growth will organize 0.06 (= 10%x{1.885-1.268}) more corporate access events and 0.06 (= 10%x{1.650-1.078}) more private dial-ins than a base eligible firm, given the estimated

coefficients on *Sales Growth* for *Corporate Access* and *Private Dial-in* are -1.268 (t-stat: -3.56) and -1.078 (t-stat -3.38). The magnitude is economically significant given that an average eligible firm organized 0.10 corporate access events and 0.18 private dial-ins before SHK Connect's announcement (see entropy balanced matched columns). Inferences using other controls groups are similar in economic magnitude and statistical significance.

I also observe some evidence that firms in need to protect private benefits of control decreased private disclosure. For example, the coefficient estimates on *Treat X Family-Owned* and *Treat X ROE* are both not different from zero, when using unmatched ineligible firms and propensity score matched ineligible firms as the control. However, in Columns 2 and 5, which use entropy balanced matching, the coefficient estimates on *Treat X Family-Owned* for *ΔCorporate Access* and *ΔPrivate Dial-in* are -0.202 (t-stat: -1.88) and -0.164 (t-stat: -1.67). This suggests that an eligible firm that are family-owned will organize 0.20 less corporate access events and 0.16 less private dial-ins than a base eligible firm, given the estimated coefficients on *Family-Owned* for *Corporate Access* and *Private Dial-in* are 0.091 (t-stat: 1.12) and 0.084 (t-stat 1.18).

Table 1.4.A Determinants of Private Disclosure Change

This table presents the results from equation (2), where I examine the determinants that motivated firms to change their disclosures after SHK Connect's announcement. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Treat* indicates eligible firms. All other firm-level variables are measured at the end of 2013. *Sales Growth* is the change in sales during the current period over the sales of the previous period. *Family-Owned* indicates family-owned firms. *ROE* is net income divided by average equity. Control variables include the following: *Foreign-Owned (SOE)* indicates foreign-owned (state-owned) firms. *Size* is the logarithm of average market capitalization. *Leverage* is calculated as the sum of short-term borrowings and long-term debt divided by total assets. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔCorp Access**						**ΔPrivate Dial-in**					
Matching	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat	0.725	2.25	1.712	4.00	1.403	2.92	0.600	1.73	1.470	3.33	0.580	2.03
Treat X Sales Growth	1.005	2.55	1.885	3.76	1.682	2.88	0.947	2.18	1.650	3.15	0.583	1.74
Sales Growth	-0.418	-2.23	-1.268	-3.56	-1.028	-2.19	-0.423	-2.42	-1.078	-3.38	-0.441	-1.22
Treat X Family-Owned	0.045	0.78	-0.202	-1.88	-0.129	-1.53	0.056	0.96	-0.164	-1.67	-0.071	-1.07
Family-Owned	-0.106	-2.85	0.091	1.12	0.054	0.84	-0.100	-2.96	0.084	1.18	0.019	0.42
Treat X ROE	-0.323	-0.28	-0.359	-0.29	-1.561	-1.21	0.405	0.31	0.802	0.58	-1.424	-1.26
ROE	-0.903	-3.60	0.159	0.39	0.610	1.14	-0.735	-3.24	0.125	0.35	-0.121	-0.46
Controls	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	903		900		608		903		900		608	
Adjusted R^2	0.30		0.27		0.28		0.24		0.22		0.24	

In Table 1.4.B Columns 1-3, I use *ΔPress Release* as the dependent variable and find that firms in need to protect private benefits of control (with strong performance) decreased (increased) English press releases. In Column 1, which uses unmatched ineligible firms, the coefficient estimates on *Treat X Family-Owned* and *Treat X ROE* are -3.525 (t-stat: -2.49) and 41.815 (t-stat: 2.33). In Column 2, which uses entropy balanced matching, the coefficient estimates on *Treat X Family-Owned* and *Treat X ROE* are -3.726 (t-stat: -2.38) and 42.944 (t-stat: 1.74). In Column 3, which uses propensity score matching, the coefficient estimates on *Treat X Family-Owned* and *Treat X ROE* are -2.962 (t-stat: -1.91) and 50.898 (t-stat: 2.23). Taking the entropy balanced matched results for example, an eligible firm with 10% higher ROE will issue 4.3 (= 10%x{42.944-0}) more press releases than a base eligible firm, given that the coefficient estimate on *ROE* is not different from zero. Similarly, an eligible firm that is family-owned will issue 3.726 less press releases than a base eligible firm, given that the coefficient estimate on *Family-Owned* is not different from zero. Inferences using other controls groups are similar in economic magnitude and statistical significance.

In Columns 4-6, I use *ΔSpecificity* as the dependent variable and find that the three factors (desire to attract capital, protect private benefits of control, and show strong performance) are not related to changes in management forecasts. Specifically, the coefficient estimates on *Treat* interacted with *Sales Growth, Family-Owned* and *ROE* are all not different from zero, regardless of the control group used. Further, I also consider *ΔForecast Frequency*, *ΔForecast Error*, and *ΔChinese-Language Press Release* as alternate dependent variables, find similar results to that using *ΔSpecificity*, and omit this set of results for brevity.

Table 1.4.B Determinants of Public Disclosure Change

This table presents the results from equation (2), where I examine the determinants that motivated firms to change their disclosures after SHK Connect's announcement. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus that during the eight months prior to the SHK's announcement (2013/4-2013/11). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Treat* indicates eligible firms. All other firm-level variables are measured at the end of 2013. *Sales Growth* is the change in sales during the current period over the sales of the previous period. *Family-Owned* indicates family-owned firms. *ROE* is net income divided by average equity. Control variables include the following: *Foreign-Owned (SOE)* indicates foreign-owned (state-owned) firms. *Size* is the logarithm of average market capitalization. *Leverage* is calculated as the sum of short-term borrowings and long-term debt divided by total assets. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔPress Release**						**ΔSpecificity**					
Matching	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat	-3.301	-0.47	-5.178	-0.52	-0.529	-0.05	2.330	1.36	4.094	1.96	2.476	1.19
Treat X Sales Growth	-4.569	-0.51	-6.380	-0.51	-3.601	-0.29	3.240	1.51	5.326	1.61	4.377	1.64
Sales Growth	-0.657	-0.10	1.762	0.16	-0.967	-0.09	-1.209	-0.73	-3.280	-1.42	-2.193	-0.95
Treat X Family-Owned	-3.525	-2.49	-3.726	-2.38	-2.962	-1.91	0.359	1.04	0.051	0.10	0.417	0.76
Family-Owned	0.045	0.04	0.038	0.03	-0.765	-0.62	-0.373	-1.38	-0.223	-0.45	-0.574	-1.08
Treat X ROE	41.815	2.33	42.944	1.74	50.898	2.23	-1.387	-0.32	-1.114	-0.15	-6.035	-0.81
ROE	-19.954	-2.12	-35.469	-1.56	-30.284	-1.89	0.950	0.48	2.137	0.38	4.505	0.78
Controls	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	903		900		608		903		900		608	
Adjusted R^2	0.03		0.06		0.04		0.02		0.06		0.07	

1.4.4 Ownership Changes Following SHK Connect

Table 1.5 presents the estimates for the triple interactions model in equation (3) that examines the changes in foreign institutional holdings after SHK Connect's implementation. In Table 1.5.A, I find that firms that increased private disclosure in response to SHK Connect's announcement attract foreign institutional investors after the implementation. In Columns 1-3, I report results using *Corporate Access* as the disclosure variable. When using unmatched ineligible firms (Column 1), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.097 (t-stat: 1.93) and -0.049 (t-stat: -1.88). This suggests that an eligible firm that issued one more corporate access exhibits 13% (0.048/0.39) higher foreign institutional ownership than a base eligible firm, because eligible firms on average had 0.390% foreigners before SHK Connect's implementation. When using entropy balanced matching (Column 2), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.137 (t-stat: 1.94) and -0.069 (t-stat: -1.76), suggesting that an eligible firm that issued one more corporate access exhibits 17% (0.068/0.39) higher foreign institutional ownership than a base eligible firm. When using propensity score matching (Column 3), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.067 (t-stat: 1.76) and -0.025 (t-stat: -0.62), suggesting that an eligible firm that issued one more corporate access exhibits 17% (0.067/0.39) higher foreign institutional ownership than a base eligible firm.

In Columns 4-6, I report results using *Private Dial-in* as the disclosure variable. When using unmatched ineligible firms (Column 4), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.078 (t-stat: 2.15) and -0.049 (t-stat: -1.88), suggesting that an eligible firm that issued one more private dial-in exhibits 7% (0.029/0.39) higher foreign institutional ownership than a base eligible firm. When using entropy balanced matching (Column

5), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.112 (t-stat: 2.29) and -0.070 (t-stat: -1.76), suggesting that an eligible firm that issued one more private dial-in exhibits 11% (0.042/0.39) higher foreign institutional ownership than a base eligible firm. When using propensity score matching (Column 6), the coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are 0.068 (t-stat: 1.79) and -0.025 (t-stat: -0.62), suggesting that an eligible firm that issued one more private dial-in exhibits 17% (0.068/0.39) higher foreign institutional ownership than a base eligible firm.

In Table 1.5.B, I report results using *Press Release* (Columns 1-3) and *Specificity* (Columns 4-6) as disclosure variables but find that firms that changed public disclosure in response to SHK Connect's announcement did not influence foreign institutional ownership after the implementation. The coefficient estimates on *Treat X Post X ΔDisclosure* and *Post X ΔDisclosure* are not different from zero, regardless of the control group. Along with the results in Tables 1.3 and 1.4, these findings demonstrate that public disclosure was not a credible signal towards foreign institutional investors. Rather, private disclosures focused on foreign institutional investors and intermediated by reputable brokers attracted additional capital from foreign institutional investors after the implementation.

Table 1.5.A Foreign Institutional Holdings Post Implementation (Private Disclosure)

This table presents the results from equation (3), which examines the change in foreign institutional holdings after SHK Connect's implementation. *Foreign (%)* is the shares owned by foreign institutional investors divided by the total shares outstanding. *Treat* indicates eligible firms. *Post Implementation* indicates the two quarters after SHK Connect's implementation. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time and firm fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Foreign Institutional Holdings**											
Disclosure Variable	**Corporate Access**						**Private Dial-in**					
	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X Post Impl X ΔDisclosure	0.097	1.93	0.137	1.94	0.067	1.76	0.078	2.15	0.112	2.29	0.068	1.79
Post Impl X ΔDisclosure	-0.049	-1.88	-0.069	-1.76	-0.025	-0.62	-0.049	-1.88	-0.070	-1.76	-0.025	-0.62
Treat X Post Impl	-0.029	-1.76	-0.090	-1.69	-0.077	-1.40	-0.025	-1.48	-0.083	-1.57	-0.076	-1.39
Volatility, t=-1	0.190	0.49	0.552	0.77	0.597	0.72	0.243	0.66	0.632	0.89	0.624	0.75
Analyst Following, t=-1	0.004	0.74	-0.017	-0.65	-0.034	-0.79	0.004	0.82	-0.017	-0.63	-0.034	-0.80
Size, t=-1	-0.004	-0.22	-0.134	-1.22	-0.139	-1.00	-0.013	-0.57	-0.147	-1.32	-0.139	-1.00
Firm F.E.	Yes		Yes		Yes		Yes		Yes		Yes	
Time F.E.	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	2966		2898		2208		2966		2898		2208	
Adjusted R^2	0.96		0.92		0.89		0.97		0.92		0.88	

Table 1.5.B Foreign Institutional Holdings Post Implementation (Public Disclosure)

This table presents the results from equation (3), which examines the change in foreign institutional holdings after SHK Connect's implementation. *Foreign (%)* is the shares owned by foreign institutional investors divided by the total shares outstanding. *Treat* indicates eligible firms. *Post Implementation* indicates the two quarters after SHK Connect's implementation. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to the SHK's announcement (2013/4-2013/11). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time and firm fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Foreign Institutional Holdings**											
Disclosure Variable	**Press Release**						**Specificity**					
	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X Post Impl X ΔDisclosure	-0.003	-0.59	-0.001	-0.10	-0.007	-1.08	-0.001	-0.79	0.000	-0.28	-0.002	-0.22
Post Impl X ΔDisclosure	-0.001	-0.84	-0.003	-0.58	0.002	0.93	0.000	0.61	0.000	-0.04	0.001	0.16
Treat X Post Impl	-0.019	-1.11	-0.050	-2.09	-0.081	-1.32	-0.020	-1.11	-0.051	-2.00	-0.071	-1.36
Volatility, t=-1	0.294	0.81	0.331	0.79	0.709	0.84	0.292	0.81	0.348	0.81	0.675	0.84
Analyst Following, t=-1	0.006	1.03	0.008	2.01	-0.034	-0.79	0.005	0.98	0.008	1.98	-0.033	-0.78
Size, t=-1	-0.023	-0.81	-0.055	-1.32	-0.144	-1.06	-0.024	-0.83	-0.058	-1.27	-0.147	-1.04
Firm F.E.	Yes		Yes		Yes		Yes		Yes		Yes	
Time F.E.	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	2966		2898		2208		2966		2898		2208	
Adjusted R^2	0.96		0.97		0.88		0.96		0.97		0.88	

1.4.5 Impact of Disclosure on Subsequent Market Crash

Table 1.6 presents the estimates for equation (4) that examines the market crash period. In Table 1.6.A, I report results using *Return* as the dependent variable and find that firms that improved private disclosure exhibit higher stock returns. In Columns 1-3, I use *Corporate Access* as my disclosure variable. When using unmatched ineligible firms (Column 1), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.165 (t-stat: 7.09), -0.135 (t-stat: -9.50), and -0.036 (t-stat: -2.38), suggesting that an eligible firm that increased corporate access by one unit exhibits stock returns of 0% (0.165-0.135-0.036) when a base eligible firm exhibits -3.6%. When using entropy balanced matching (Column 2), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.115 (t-stat: 4.46), -0.087 (t-stat: -5.70), and 0.08 (t-stat: 0.57), suggesting that an eligible firm that increased corporate access by one unit exhibits stock returns of 2.8% (0.115-0.087) when a base eligible firm exhibits 0%. When using propensity score matching (Column 3), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.114 (t-stat: 3.75), -0.061 (t-stat: -3.36), and 0.023 (t-stat: 1.40), suggesting that an eligible firm that increased corporate access by one unit exhibits stock returns of 5.5% (0.114-0.061) when a base eligible firm exhibits 0%.

In Columns 4-6, I use *Private Dial-in* as my disclosure variable. When using unmatched ineligible firms (Column 4), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.167 (t-stat: 9.11), -0.135 (t-stat: -9.52), and -0.036 (t-stat: -2.35), suggesting that an eligible firm that increased private dial-in by one unit exhibits stock returns of 0% (0.167-0.135-0.036) when a base eligible firm exhibits -3.6%. When using entropy balanced matching (Column 5), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.118 (t-stat: 5.65), -0.087 (t-stat: -5.71), and 0.007 (t-stat: 0.54), suggesting that an eligible firm that increased private

dial-in by one unit exhibits stock returns of 3.1 % (0.118-0.087) when a base eligible firm exhibits 0%. When using propensity score matching (Column 6), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.110 (t-stat: 4.50), -0.061 (t-stat: -3.36), and 0.023 (t-stat: 1.42), suggesting that an eligible firm that increased private dial-in by one unit exhibits stock returns of 4.9% (0.11-0.061) when a base eligible firm exhibits 0%. Regardless of the control group, an additional private dial-in among the eligible firms is also associated with 3-5% higher stock return.

In Table 1.6.B, I report results using *Return Volatility* as the dependent variable and find that firms that improved private disclosure exhibit lower stock turbulence. In Columns 1-3, I use *Corporate Access* as my disclosure variable. When using unmatched ineligible firms (Column 1), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are -0.003 (t-stat: -4.09), 0.002 (t-stat: 5.10), and -0.001 (t-stat: -1.68), suggesting that an eligible firm that increased corporate access by one unit exhibits return volatility of -0.002 (-0.003+0.002-0.001) when a base eligible firm exhibits -0.001. When using entropy balanced matching (Column 2), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are -0.003 (t-stat: -2.19), 0.001 (t-stat: 1.48), and -0.002 (t-stat: -2.76), suggesting that an eligible firm that increased corporate access by one unit exhibits return volatility of -0.005 (-0.003-0.002) when a base eligible firm exhibits -0.002. When using propensity score matching (Column 3), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are -0.003 (t-stat: -2.51), 0.002 (t-stat: 1.80), and -0.001 (t-stat: -1.65), suggesting that an eligible firm that increased corporate access by one unit exhibits return volatility of -0.002 (-0.003+0.002-0.001) when a base eligible firm exhibits -0.001.

In Columns 4-6, I use *Private Dial-in* as my disclosure variable. When using unmatched ineligible firms (Column 4), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and

Treat are -0.004 (t-stat: -5.42), 0.003 (t-stat: 5.08), and -0.001 (t-stat: -1.71), suggesting that an eligible firm that increased private dial-in by one unit exhibits return volatility of -0.002 (-0.004+0.003-0.001) when a base eligible firm exhibits -0.001. When using entropy balanced matching (Column 5), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are -0.003 (t-stat: -2.53), 0.002 (t-stat: 1.51), and -0.002 (t-stat: -2.73), suggesting that an eligible firm that increased private dial-in by one unit exhibits return volatility of -0.005 (-0.003+0.002-0.002) when a base eligible firm exhibits -0.002. When using propensity score matching (Column 6), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are -0.003 (t-stat: -2.58), 0.002 (t-stat: 1.80), and -0.001 (t-stat: -1.66), suggesting that an eligible firm that increased private dial-in by one unit exhibits return volatility of -0.002 (-0.003+0.002-0.001) when a base eligible firm exhibits -0.001. Regardless of the control group, an additional private disclosure among the eligible firms is also associated with significantly lower return volatility.

Table 1.6.A Return During the Market Crash

This table presents the results from equation (4), which examines the market crash period (2015/6-2016/2). *Return* is the stock returns during the period. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to the SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Treat* indicates eligible firms. All control variables are those of the previous quarters. *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Return**											
Disclosure Variable	**Corporate Access**						**Private Dial-in**					
	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X ΔDisclosure	0.165	7.09	0.115	4.46	0.114	3.75	0.167	9.11	0.118	5.65	0.110	4.50
ΔDisclosure	-0.135	-9.50	-0.087	-5.70	-0.061	-3.36	-0.135	-9.52	-0.087	-5.71	-0.061	-3.36
Treat	-0.036	-2.38	0.008	0.57	0.023	1.40	-0.036	-2.35	0.007	0.54	0.023	1.42
Volatility, t=-1	0.003	0.59	0.005	0.89	0.009	1.61	0.002	0.51	0.005	0.84	0.009	1.60
Analyst Following, t=-1	0.014	6.75	0.017	5.77	0.019	4.79	0.014	6.73	0.017	5.73	0.019	4.82
Size, t=-1	-0.072	-8.87	-0.088	-7.61	-0.103	-6.57	-0.073	-8.95	-0.088	-7.59	-0.103	-6.57
Observations	903		900		608		903		900		608	
Adjusted R^2	0.09		0.17		0.21		0.10		0.17		0.21	

Table 1.6.B. Return Volatility During the Market Crash

This table presents the results from equation (4), which examines the market crash period (2015/6-2016/2). *Return Volatility* is the standard deviation of daily returns during the quarter. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to the SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Treat* indicates eligible firms. All control variables are those of the previous quarters. *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Return Volatility**											
Disclosure Variable	**Corporate Access**						**Private Dial-in**					
	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X ΔDisclosure	-0.003	-4.09	-0.003	-2.19	-0.003	-2.51	-0.004	-5.42	-0.003	-2.53	-0.003	-2.58
ΔDisclosure	0.002	5.10	0.001	1.48	0.002	1.80	0.003	5.08	0.002	1.51	0.002	1.80
Treat	-0.001	-1.68	-0.002	-2.76	-0.001	-1.65	-0.001	-1.71	-0.002	-2.73	-0.001	-1.66
Volatility, t=-1	0.001	4.62	0.001	3.71	0.001	2.96	0.001	4.63	0.001	3.73	0.001	2.96
Analyst Following, t=-1	-0.001	-6.86	-0.001	-5.23	0.000	-3.66	-0.001	-6.81	-0.001	-5.17	0.000	-3.67
Size, t=-1	-0.002	-5.39	-0.001	-2.11	-0.001	-1.70	-0.002	-5.34	-0.001	-2.12	-0.001	-1.71
Observations	903		900		608		903		900		608	
Adjusted R^2	0.31		0.26		0.11		0.32		0.26		0.11	

In Table 1.6.C, I report results using *Foreign Institutional Holdings* as the dependent variable and find that firms that improved private disclosure retain more foreign investors. In Columns 1-3, I use *Corporate Access* as my disclosure variable. When using unmatched ineligible firms (Column 1), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.534 (t-stat: 3.61), -0.388 (t-stat: -5.35), and 0.123 (t-stat: 1.42), suggesting that an eligible firm that increased corporate access by one unit exhibits foreign holdings of 0.146% (0.534-0.388) when a base eligible firm exhibits 0%. When using entropy balanced matching (Column 2), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.366 (t-stat: 2.52), -0.175 (t-stat: -2.38), and 0.379 (t-stat: 3.81), suggesting that an eligible firm that increased corporate access by one unit exhibits foreign holdings of 0.570% (0.366-0.175+0.379) when a base eligible firm exhibits 0.379%. When using propensity score matching (Column 3), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.446 (t-stat: 2.78), -0.241 (t-stat: -3.07), and 0.266 (t-stat: 2.29), suggesting that an eligible firm that increased corporate access by one unit exhibits foreign holdings of 0.471% (0.446-0.241+0.266) when a base eligible firm exhibits 0.266%.

In Columns 4-6, I use *Private Dial-in* as my disclosure variable. When using unmatched ineligible firms (Column 4), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.513 (t-stat: 4.37), -0.388 (t-stat: -5.37), and 0.125 (t-stat: 1.44), suggesting that an eligible firm that increased private dial-in by one unit exhibits foreign holdings of 0.250% (0.513-0.388+0.125) when a base eligible firm exhibits 0.125%. When using entropy balanced matching (Column 5), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.347 (t-stat: 3.02), -0.177 (t-stat: -2.44), and 0.378 (t-stat: 3.82), suggesting that an eligible firm that increased private dial-in by one unit exhibits foreign holdings of 0.548% (0.347-0.177+0.378)

when a base eligible firm exhibits 0.378%. When using propensity score matching (Column 6), the coefficient estimates on *Treat X ΔDisclosure, ΔDisclosure,* and *Treat* are 0.468 (t-stat: 3.38), -0.241 (t-stat: -3.07), and 0.266 (t-stat: 2.29), suggesting that an eligible firm that increased private dial-in by one unit exhibits foreign holdings of 0.493% (0.468-0.241+0.266) when a base eligible firm exhibits 0.266%. Regardless of the control group, an additional private disclosure among the eligible firms is associated with significantly higher foreign institutional ownership.

Taken together, this set of results during the market crash suggests that private disclosure improvement is associated with firm quality and allowed firms to reap benefits even during a time characterized by low trust.

Table 1.6.C Foreign Institutional Holdings During the Market Crash

This table presents the results from equation (4), which examines the market crash period (2015/6-2016/2). *Foreign Institutional Holdings* is the number of shares held by foreign institutional investors over the total shares outstanding during the quarter. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to the SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Treat* indicates eligible firms. All control variables are those of the previous quarters. *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Foreign Institutional Holdings**											
Disclosure Variable	**Corporate Access**						**Private Dial-in**					
	None		Entropy		PSM		None		Entropy		PSM	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X ΔDisclosure	0.534	3.61	0.366	2.52	0.446	2.78	0.513	4.37	0.347	3.02	0.468	3.38
ΔDisclosure	-0.388	-5.35	-0.175	-2.38	-0.241	-3.07	-0.388	-5.37	-0.177	-2.44	-0.241	-3.07
Treat	0.123	1.42	0.379	3.81	0.266	2.29	0.125	1.44	0.378	3.82	0.266	2.29
Volatility, t=-1	0.139	2.55	0.124	2.45	0.137	1.53	0.137	2.55	0.122	2.45	0.137	1.53
Analyst Following, t=-1	0.064	4.42	0.066	4.64	0.061	3.10	0.064	4.22	0.065	4.44	0.061	3.10
Size, t=-1	-0.074	-1.27	-0.192	-3.10	-0.184	-2.61	-0.075	-1.29	-0.192	-3.10	-0.184	-2.60
Observations	903		900		608		903		900		608	
Adjusted R^2	0.06		0.08		0.06		0.06		0.08		0.07	

1.4.6 Robustness Test

Throughout the paper, I use the 382 ineligible Shanghai firms as the control group. One potential concern with this approach is that there are two stock exchanges in China: SHK Connect precluded 465 Shenzhen listed firms from the opportunity to attract foreign investors. However, using Shenzhen firms to perform matching is difficult because they are fundamentally different firms vis-à-vis Shanghai firms. Shanghai firms represent a diverse set of sectors and larger cap companies, whereas Shenzhen firms represent smaller firms that are mostly in the tech sector. As a result, it is not possible to identify a superior control group to ineligible Shanghai firms. Nonetheless in Table 1.7, I present results using unmatched Shenzhen firms as the control group. The results are similar in terms of economic magnitude and statistical significance to the main results in Table 1.3.

Table 1.7 Changes in the Disclosure Using Shenzhen Firms as the Control Group

This table presents the results from equation (1), using Shenzhen firms as the control group. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. Control variables are created one year prior to the dependent variable. *Volatility* is the standard deviation of daily returns. *Analyst Following* is the number of analysts covering the stock. *Size* is the log of market cap. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔCorp Access**		**ΔPrivate Dial-in**		**ΔPress Release**		**ΔSpecificity**	
	(1)		(2)		(3)		(4)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat	0.218	6.29	0.195	6.11	-0.841	-1.59	0.177	1.30
ΔVolatility, t=-1	-0.080	-2.79	-0.073	-2.63	-0.201	-0.88	0.014	0.30
ΔAnalyst Following, t=-1	0.422	0.28	0.265	0.18	17.449	0.68	5.808	0.92
ΔSize, t=-1	-0.045	-0.61	-0.059	-0.72	-0.691	-0.47	-0.492	-1.33
Observations	990		990		990		990	
Adjusted R^2	0.07		0.07		0.01		0.01	

In addition, I replicate the OLS findings for non-continuous dependent variables (e.g., *ΔDisclosure)* using an ordered logit model. The findings are similar in terms of economic magnitude and statistical significance (see Table 1.8) to those reported under OLS. The OLS

specification also assumes a linear relationship between the variables, and places heavy weight on extreme observations. To address these concerns, I also use an indicator variable (*Disclosure Increase*) to separate firms that increased disclosure. The results (see Table 1.9) are stronger in terms of economic magnitude and statistical significance than the results using *ΔDisclosure.*

Table 1.8 Changes in the Disclosure Using Ordered Logit Model

This table presents the results from equation (1), using ordered logit model. *ΔDisclosure* is the frequency of disclosures between SHK Connect's announcement and its implementation (2014/4-2014/11) minus the frequency during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. Control variables are created one year prior to the dependent variable. *Volatility* is the standard deviation of daily returns. *Analyst Following* is the number of analysts covering the stock. *Size* is the log of market cap. Standard errors are robust and clustered at the firm level.

Dependent Variable	**ΔCorp Access**		**ΔPrivate Dial-in**		**ΔPress Release**		**ΔSpecificity**	
	(1)		(2)		(3)		(4)	
	Coeff	z	Coeff	z	Coeff	z	Coeff	z
Treat	1.439	4.75	1.292	4.62	-0.119	-0.94	-0.190	-1.41
ΔVolatility, t=-1	-0.360	-3.48	-0.370	-3.58	-0.027	-0.70	0.053	1.17
ΔAnalyst Following, t=-1	-7.689	-0.92	-8.693	-1.13	3.393	0.77	3.180	0.75
ΔSize, t=-1	-0.161	-0.33	-0.156	-0.32	-0.005	-0.02	-0.560	-1.65
Observations	903		903		903		903	
Pseudo R^2	0.08		0.07		0.01		0.01	

Table 1.9 Replication of Table 1.5 Using Dichotomous Variable

This table replicates the results from Table 1.5. *Foreign Institutional Holdings* is the number of shares held by foreign institutional investors over the total shares outstanding. *Treat* indicates eligible firms. *Post Implementation* indicates the two quarters after SHK Connect's implementation. *Disclosure Increase* indicates firms that increased disclosure in SHK Connect's announcement and its implementation (2014/4-2014/11) vis-à-vis during the eight months prior to SHK's announcement (2013/4-2013/11). *Corporate Access* (*Private Dial-in*) is the frequency of corporate access events (English-language private conference calls). *Press Release* is the frequency of English-language press releases that firms provide. *Specificity* captures how much detail managers provide in their forecasts. *Volatility* is the standard deviation of daily returns, *Size* is the log of market capitalization, and *Analyst Following* is the number of analysts covering the stock. The models include time and firm fixed effects. Standard errors are robust and clustered at the firm level.

Dependent Variable	**Foreign Institutional Holdings**							
Disclosure Variable	**Corporate Access**		**Private Dial-in**		**Press Release**		**Specificity**	
	(1)		(2)		(3)		(4)	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Treat X Post Impl X Discl Increase	0.189	1.97	0.193	1.90	-0.002	-0.10	-0.027	-1.62
Post Impl X Discl Increase	-0.004	-0.08	-0.003	-0.07	-0.002	-0.12	-0.007	-0.92
Treat X Post Impl	-0.045	-1.25	-0.045	-1.25	-0.012	-1.08	-0.009	-1.05
Volatility, t=-1	0.012	0.02	0.009	0.02	0.619	2.09	0.382	1.62
Analyst Following, t=-1	-0.035	-0.86	-0.036	-0.87	0.005	0.77	0.002	0.46
Size, t=-1	-0.104	-0.90	-0.103	-0.90	-0.006	-0.36	0.008	0.69
Firm F.E.	Yes		Yes		Yes		Yes	
Time F.E.	Yes		Yes		Yes		Yes	
Observations	2966		2966		2966		2966	
Adjusted R^2	0.97		0.92		0.97		0.96	

1.5 Conclusion

In this paper, I used the announcement of SHK Connect, which provided a shock to foreign institutional investors' future ability to buy select stocks in the Shanghai Stock Exchange, to identify and examine whether voluntary disclosure can be credible in weak enforcement institutions. My findings can be summarized as follows. First, select eligible firms responded to a potential increase in foreign holdings by improving private disclosure even before the actual regime was implemented. Second, these firms showed faster sales growth, suggesting their need for further capital, and successfully attracted more foreign institutional investors after the implementation. Finally, firms that maintained higher disclosure levels experienced higher stock returns, as well as less stock turbulence and lower foreign institutional investor turnover during a subsequent market crash. In sum, the findings of my paper suggest that private disclosure is a credible channel for firms to signal their type and communicate with institutional investors when they operate in a weak institutional environment.

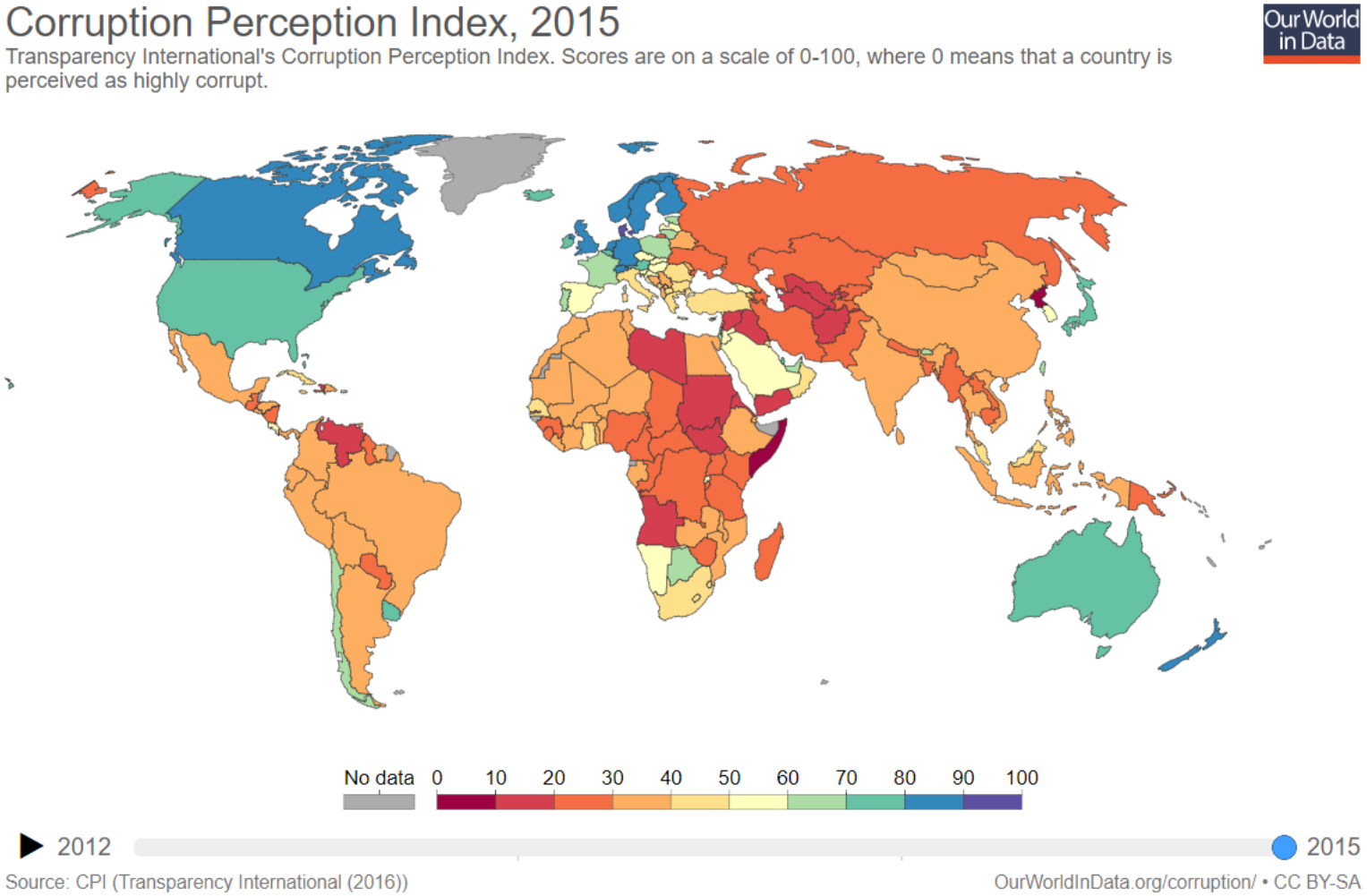
There has been an ongoing debate in the U.S. about the role of Securities Exchange Commission in protecting retail investors.[1] New regulations, such as Regulation Fair Disclosure, were created to ensure that retail investors would have access to the same information as institutional investors. My findings provide new evidence relevant to this debate. They show that in environments where regulations are not enforced, company disclosures are more likely to be private than public, presumably benefitting institutional investors at the expense of retail investors.

My findings also potentially inform policymakers in China and other countries with weak regulations and/or enforcement about the likely impact of market liberalizations (see Figure 1.2). China has been traditionally known to implement artificial measures (e.g., circuit breakers and

[1] The Economist: Over-regulated America. Feb 18, 2012

daily limits to stock price movements) to ensure market stability. But, many of these measures were reactive rather than preventive, and unsuccessful in protecting the market from extreme volatility and turmoil, especially the retail investors. In light of these issues, not only exposing Chinese companies to foreigners but also ensuring institutional framework for retail investors may be a necessary measure for China in developing a credible and mature financial market.

Figure 1.2 Implications to Other Countries with Weak Institutional Environments



2 Corporate Sustainability: First Evidence From Materiality

2.1 Introduction

Corporate investment policies are a key determinant of firm value. Multiple studies have investigated different types of investments and how these relate to future financial performance. A relatively newer class of corporate investments, broadly termed sustainability investments, has attracted the attention of firms, institutional investors, societal advocacy groups, and academics (e.g., Dhaliwal et al., 2011, 2012; Kim et al., 2012; Moser and Martin, 2012). A large number of firms identify sustainability issues as strategically important, and an increasing number of investors have committed to the integration of environmental, social, and governance (ESG) data in their capital allocation process.[13] Firms release a wealth of information in the form of ESG data, but the sheer number of sustainability issues that attract investment raises the question of which of these ESG data are more or less material.

The materiality of the different sustainability issues likely varies systematically across firms and industries (Eccles and Serafeim 2013).[14] As such, a new organization, the Sustainability Accounting Standards Board (SASB), adopts a shareholder viewpoint in defining materiality and develops standards for reporting of ESG issues concentrated on discriminating between material and immaterial issues. If the discrimination is meaningful, exploiting variation in materiality

[13] The terms "sustainability", "environmental, social and governance" (ESG), or "corporate social responsibility" (CSR) have been used interchangeably in the past, to describe a firm's voluntary actions to manage its environmental and social impact and increase its positive contribution to society. We use throughout this paper the word sustainability given that more firms around the world use this word rather than CSR to describe the strategic aspect of their efforts to improve performance on ESG issues. A manifestation of this phenomenon is the institutionalization of a new C-level position of the Chief Sustainability Officer (Miller and Serafeim 2015). Moreover, this term is consistent with the labeling of the Sustainability Accounting Standards Board that we use as the source of materiality guidance. The ESG label represents an effort to group all the issues that fall under the umbrella of sustainability.

[14] See for example United Nations Environment Program Finance Initiative and World Business Council for Sustainable Development. 2010. Translating environmental, social and governance factors into sustainable business value http://www.unepfi.org/fileadmin/documents/translatingESG.pdf.

across sustainability issues has the potential to improve the signal to noise ratio in testing the future performance implications of sustainability investments, and reduce the dimensionality of price-relevant investment signals used by the large number of institutional investors committed to ESG initiatives. In this paper we take a first step towards these objectives by examining the future performance implications of material versus immaterial sustainability investments.

We develop a novel data set to measure firm investments on material sustainability issues by hand-mapping recently-available industry-specific guidance on materiality from SASB to MSCI KLD that has firm-level ratings on an array of sustainability issues. SASB considers material issues to be those with evidence of wide interest from a variety of user groups and evidence of financial impact, the same evidence used by the SEC in determining the materiality of financial information (the SASB classification process is described in more detail in Section 3, Appendix I and Appendix II). From the merged data we construct a materiality (immateriality) score for each firm-year that measures performance on material (immaterial) sustainability issues.

To test the future shareholder value implications of sustainability investments we first orthogonalize a firm's change in the sustainability index of material issues with respect to *changes* in firm size, market-to-book ratio, leverage, profitability, R&D intensity, advertising intensity and institutional ownership and sector membership. Next, we form portfolios of firms in the top and bottom quintile of the unexplained portion of the sustainability index change (the residuals from the first step), and estimate Fama and French (1993) calendar-time regressions to test for one-year-ahead abnormal stock return performance of the portfolio. This procedure allows us to attribute the future performance of this portfolio more confidently to material sustainability investments, rather than to underlying firm characteristics of portfolio firms.

Although one would expect that if organizations, such as SASB, perform their standard setting process reasonably then materiality guidance should help return prediction, we view the relation between material investments and firm performance as a testable hypothesis rather than a tautology for multiple reasons. First, if the research process of organizations such as SASB is captured by special interests that seek to steer the output in preferred directions, then this would lead to no improvement in the informativeness of ESG ratings. For example, it could be that NGOs that support environmental causes influence SASB's standards to classify as material environmental issues when they are not material in a given industry, or that corporations influence SASB's standards to classify labor issues as immaterial when they are material in a given industry. Second, there has previously been a void in the materiality measurement space, in that classification of issues as material or immaterial has not previously been available. As such, it is helpful to validate any such classification efforts for use by future researchers. A naïve classification of sustainability issues as material is less likely to be associated with superior future performance. Consider for example if different materiality classifications were available from different sources, with each source using a different process to identify material issues. The relation between materiality classifications and future firm performance is unlikely to be tautological if there is variation across classifications in their relation with future performance. Rather, the relation between a particular classification and future firm performance is conducive to empirical testing. This is the spirit of our paper.

Results indicate that firms with high residual changes on material sustainability topics outperform firms with low residual changes on these topics. In contrast, firms with high residual changes on immaterial sustainability topics do not outperform firms with low residual changes on the same topics. Across all our specifications, we find that portfolios formed on the basis of the

residual materiality index outperform portfolios formed on the basis of the residual total KLD index or portfolios formed on the basis of the residual immaterial index. These findings are confirmed using firm-level panel regressions that account for a host of additional firm characteristics such as analyst coverage, investments in R&D, advertising and capital expenditures, and board characteristics and firm or industry fixed effects.

A series of additional tests indicate that the results are robust to alternative factor models, alternative methods to calculate firm-level sustainability indices, different subsamples or subperiods, and alternative portfolio construction rules. Finally, firms scoring high on the residual materiality index exhibit higher growth in accounting profitability compared to firms scoring low on the residual materiality index. Consistent, with the stock return analysis, we find that the residual materiality index has much higher predictive power both in economic and statistical sense over the residual total KLD index or the residual immaterial index for accounting performance.

Our interpretation of the significant alpha from a classification of materiality of sustainability investments is as follows: Since materiality classifications were not previously available, investors could not react to them as soon as ESG performance data became available (the sustainability performance data did not distinguish between material and immaterial investments). As such, the price change (or alpha) is realized over a longer horizon as the materiality investments begin to pay off through observable metrics such as higher accounting returns. There is no alpha (or future abnormal stock return) to immaterial investments because these do not appear to pay off through observable metrics over a longer horizon.

Collectively the tests mitigate concerns about endogeneity by using empirical approaches from the forefront of the return predictability literature: (i) The returns tests are predictive rather than contemporaneous regressions; (ii) The return prediction signal is the *change* in the materiality

index *orthogonalized* with respect to *changes* in a number of firm characteristics; (iii) The portfolio tests control for conventional risk factors, allowing attribution of the alpha to material investments. This inferential approach is standard in the asset pricing literature; (iv) The portfolio tests are supplemented by firm-level return prediction regressions saturated with controls for known return predictors, a host of firm characteristics, and time and firm fixed effects. The inclusion of both time and firm fixed effects in the panel regressions is a generalization of the difference-in-differences approach that allows a causal interpretation in a regression setting (as noted in Bertrand and Mullainathan, 2003; Angrist and Pischke, 2009; Armstrong et al., 2012). The fixed effects soak up unobserved firm-specific and economy-wide factors that could otherwise cloud identification.

Our results contribute to the literature on sustainability and corporate social responsibility (CSR) that has recently attracted interest from accounting scholars. Kim et al. (2012) examine the relation between sustainability scores and earnings quality. Dhaliwal et al. (2011, 2012) examine the relation between sustainability disclosures and firms' cost of equity as well as analyst forecast accuracy. Hoi et al. (2013) examine the relation between irresponsible sustainability activities and corporate tax avoidance. Moser and Martin (2012) provide an overview and call for further research on sustainability activities. This paper responds to the interest from accounting scholars, and adds to the evidence on the relation between sustainability or sustainability ratings and firm performance (e.g., Waddock and Graves 1997; Barnett and Salomon 2012; Margolis et al. 2009; Eccles et al. 2014). Past literature has not controlled for the differential importance of sustainability issues across industries therefore treating all sustainability issues as of equal importance across industries. While meta-analyses find an overall small positive relation between sustainability ratings and firm performance, our results suggest that this relation could be significantly more

robust if one considers the differential materiality of sustainability issues. Moreover, this paper makes a contribution to a literature that attempts to construct better measures of a firm's sustainability performance. To date however, the literature has not identified a ranking of importance for the various issues, as a guide for empirical work. The results of this paper suggest that innovations in accounting standard setting practice are useful in guiding researchers on constructing better measures of sustainability. Importantly, our results suggest that ESG performance measures that take into account materiality guidance are more likely to be able to clarify the relation between sustainability investments and financial performance.

The rest of the paper proceeds as follows. Section 2 describes the motivation and literature review. Section 3 presents our sample and data. Section 4 presents the empirical results from a variety of tests of future stock market performance. Section 5 presents analysis of future accounting performance. Section 6 concludes.

2.2 Motivation and Literature Review

An increasing number of investors have committed to integrating sustainability issues in their asset allocation decisions. As of 2014, the United Nations Principles for Responsible Investment (UNPRI) had 1,260 signatories with $45 trillion in assets under management who had committed to six principles 'recognizing the materiality of environmental, social, and governance (ESG) issues.'[15] At the same time an increasing number of companies have been disclosing sustainability information, growing from less than 30 in the early 1990s to more than 7,000 in 2014 (Serafeim 2014). Given this backdrop, understanding the value implications of sustainability issues has been of interest to a wide audience.

[15] See http://www.unpri.org/about-pri/about-pri/

The number of sustainability issues firms can potentially invest in is very large. For example KLD, a leading data provider, ranks firms' performance on more than fifty distinct sustainability issues.[16] In addition, an increasing number of investors recognize that a given sustainability issue is unlikely to be equally material for firms in distinct industries. For example, managing climate change risk can be strategically important for some firms, while employee health and safety issues are more likely to be strategically important for other firms. As such, exploiting variation in the materiality of sustainability issues across firms in testing the future performance implications of sustainability investments has the potential to increase the signal to noise ratio in the investment-performance relation and reduce the dimensionality of investment signals considered by institutional investors in the asset allocation decisions. Taking a first step toward these goals is the motivation for this paper.

The prior academic literature on the performance implications of sustainability investments has adopted a number of different viewpoints. One viewpoint is that such investments are efficient from shareholders' perspective. For example, enhanced sustainability performance could lead to obtaining better resources (Cochran and Wood, 1984; Waddock and Graves, 1997), higher quality employees (Turban and Greening, 1997), and better marketing of products and services (Moskowitz, 1972; Fombrun, 1996). It could also mitigate the likelihood of negative regulatory, legislative or fiscal action (Freeman, 1984; Berman et al., 1999; Hillman and Keim, 2001), while protecting and enhancing corporate reputation (Fombrun and Shanley, 1990; Fombrun, 2005; Freeman et al., 2007). A number of papers provide empirical evidence consistent with sustainability investments creating financial value. Eccles et al. (2014) identify a set of firms that adopted corporate policies related to environmental and social issues before the adoption of such

[16] For more information see the dataset list at https://goo.gl/qugXSI.

policies became widespread, and find that these firms outperform their peers in the future in terms of stock market and accounting performance. Borgers et al. (2013) find that firms with better sustainability performance have higher risk-adjusted returns in the future (but that this result has reversed in more recent years). Dimson, Karakas and Li (2014) show that after successful engagements, particularly on environmental/social issues, companies experience improved accounting performance.

A second viewpoint is that sustainability investments disproportionately raise a firm's costs, creating a competitive disadvantage in a competitive market (Friedman, 1970; Aupperle et al., 1985; McWilliams and Siegel, 1997; Jensen, 2002). One reason for making such inefficient investments could be that managers capture private benefits (Brammer and Millington, 2008; Cheng, Hong, and Shue, 2014). Another reason for making such inefficient investments could be managers' political beliefs (De Giuli and Kostovetsky, 2014).

There is mixed evidence in the prior literature on the relation between sustainability and performance (Barnett and Salomon, 2006; Margolis and Walsh, 2003; Orlitzky, Schmidt and Rynes, 2003; Hillman and Keim, 2001; McWilliams and Siegel, 2000). Importantly, prior papers have not accounted for the differential importance of the different sustainability issues across industries. This is not a criticism of the literature but rather a reflection of the lack of guidance on the materiality of the sustainability issues. While considerable progress has been made in the past twenty years in the quantity of sustainability disclosure no organization had provided materiality guidance through a standard setting process. SASB was the first to attempt to fill this gap and it provides a unique opportunity to clarify the relation between sustainability investments and future financial performance. Moreover, our results serve as a way to validate whether SASB's output has any meaningful predictive power over future financial performance. Finally, since

sustainability performance does not have the feature of aggregation that the financial statements have, materiality guidance could serve as a new aggregation procedure, which is more informative than aggregating all data items by assigning equal weights.

2.3 Data and Sample

2.3.1 Materiality Data

Our data collection is driven by the availability of materiality guidance from SASB, which is an independent 501(c)3 non-profit whose mission is to develop and disseminate sustainability accounting standards that help publicly-listed corporations disclose material factors in compliance with SEC requirements. SASB standards are designed for the disclosure of material sustainability issues in mandatory SEC filings, such as the Form 10-K and 20-F. SASB is accredited to establish sustainability accounting standards by the American National Standards Institute (ANSI), and such accreditation is intended to signify that SASB's procedures to develop sustainability accounting standards meet the Institute's requirements for openness, balance, consensus and due process. SASB's board comprises a mix of regulators, academics, lawyers, and investors, including two former Chairwomen of the SEC and a former Chairman of the FASB.

SASB adopts an investor viewpoint and as a result a topic might be classified as immaterial from an investor standpoint although such a topic could be important for other stakeholders. That being said, we expect that there will be overlap between materiality classifications for different stakeholders if sustainability investments affect financial performance by affecting customer satisfaction, loyalty, employee engagement, and regulatory risk, for example. SASB uses the SEC

definition of materiality as interpreted by the U.S. Supreme Court.[1718] The Public Company Accounting Oversight Board (PCAOB) also refers to the U.S. Supreme Court[19] interpretation of securities laws in its materiality guidance, that is, material information is defined as presenting a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the total mix of information made available. Like the PCAOB, SASB defines material information as information that represents a substantial likelihood that its disclosure will be viewed by the reasonable investor as significantly altering the total mix of information made available.

The investor focus of SASB is narrower compared to other organizations such as the Global Reporting Initiative (GRI), which has a multi-stakeholder focus. The GRI states that the information in a GRI-compliant report should cover Aspects[20] that: reflect the organization's significant economic, environmental, and social impacts; or substantively influence the assessments and decisions of stakeholders. Materiality is the threshold at which Aspects become sufficiently important that they should be reported.[21]

By February 2014, SASB had produced guidance for six sectors (out of a total of 10) that include 45 industries. These sectors were healthcare, financials, technology and communications,

[17] TSC Industries v. Northway, Inc., 426 U.S. 438, 449 (1976). See also Basic, Inc. v. Levinson, 485 U.S. 224 (1988).
[18] The Public Company Accounting Oversight Board is a nonprofit corporation established by the U.S. Congress to oversee the audits of public companies in order to protect investors and the public interest by promoting informative, accurate, and independent audit reports. http://pcaobus.org/About/Pages/default.aspx.
[19] TSC Industries v. Northway, Inc., 426 U.S. 438, 449 (1976). See also Basic, Inc. v. Levinson, 485 U.S. 224 (1988).
[20] The term "Aspect" is used in the GRI G4 Guidelines (Guidelines) to refer to the list of subjects for disclosure that are covered by the Guidelines. Aspects are set out into three Categories - Economic, Environmental and Social. The Social Category is further divided into four sub-Categories, which are Labor Practices and Decent Work, Human Rights, Society and Product Responsibility. See https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf.
[21] Global Reporting Initiative. *G4 Sustainability Reporting Guidelines, Reporting Principles and Standard Disclosures*, https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf.

non-renewable resources, transportation, and services. SASB's standards are developed via a multi-stakeholder process consisting of research supported by Bloomberg technology, data and analytical tools; balanced, multi-stakeholder industry working groups; a public comment period; and review by an independent Standards Council comprised of experts in standards development, securities law, environmental law, metrics and accounting. Appendix I illustrates each step of the standard setting process. SASB convenes balanced industry working groups—consisting of 1/3 corporations, 1/3 market participants, and 1/3 other stakeholders—to provide feedback on SASB's draft sustainability accounting standards. For the six sectors mentioned above, more than 2,100 experts representing $21.7 trillion in assets under management and $9.7 trillion in company market capitalization had participated in SASB's industry working groups.

For each topic, SASB conducts an evidence of materiality test, informed by staff research and industry working groups, the results of which ultimately are debated and reviewed by the Standards Council after industry working groups composed of industry experts have provided their input. The test has three components: evidence of interest, evidence of financial impact, and forward impact adjustment. We describe each one in more detail in Appendix II but the interested reader can find more information on the SASB website.

2.3.2 Sustainability Data

We use MSCI KLD as our source of sustainability data, the most widely used dataset by past studies. For the purposes of this paper, KLD has a number of advantages. First, it includes a large number of U.S. companies over a long period of time. In particular, between 1991 and 2000 it included approximately 650 companies, 2001-2002 1,100 companies, and 2003-2012 3,000 companies. Other databases with sustainability data (for example, Thomson Reuters ASSET4) have shorter time-series and cover fewer U.S. companies. Another advantage of the KLD data is

that it provides information about performance on a specific issue in a standardized format rather than the presence or absence of disclosure, as is the case for many data items in ASSET4 or Bloomberg.

KLD data have been widely used in the literature by researchers examining the relation between social responsibility and financial performance (e.g., Graves and Waddock, 1994; Turban and Greening, 1997; Fisman, Heal, and Nair, 2005; Mattingly and Berman, 2006; Godfrey, Merrill, and Hansen, 2009; Ioannou and Serafeim 2014). Researchers at KLD review the company's public documents, including the annual report, the company website, corporate social responsibility reporting, and other stakeholders' and data sources. Company ratings represent a snapshot of the firm's profile at calendar year end. KLD researchers also monitor media sources for developing issues on a daily basis. The KLD dataset is compiled around the beginning of every year (i.e. January) and it is typically available in spreadsheets for distribution at the latest by late February.

The KLD historical ratings data set is designed as a binary system and comprises both strengths and concerns. Strengths represent policies, procedures, and outcomes that enable a firm to have a positive impact on the focal issue. Concerns represent policies, procedures, and outcomes that tend to have a negative impact on the focal issue. For each strength or concern rating applied to a company, KLD includes a "1" indicating the presence of that screen/criterion and a "0" indicating its absence. In total, seven issue areas are included: a) Community, b) Corporate Governance, c) Diversity, d) Employee Relations, e) Product, f) Environment, and g) Human Rights. Within each issue area, multiple topics and respective data items exist. For example, under the Environment issue area, KLD tracks performance on waste management, packaging materials and waste, environmental opportunities, climate change, and water stress, among other issues. Under the Social issues area, KLD tracks performance on community engagement, human rights,

union relations, workforce diversity, and access to finance, among other issues. Under Governance issues area, KLD tracks performance on issues including reporting quality, corruption and political instability, financial system instability, governance structure, and business ethics.

Table 2.1 Panel A shows how we arrive at the final sample from the original KLD dataset. Panel B shows the number of unique firms and unique firm-years that are covered by KLD and included in the sample. The sample comprises 670 firms from the financial, 554 from the healthcare, 359 from the nonrenewable resources, 302 from the services, 388 from the technology and communications, and 120 from the transportation sector. In total there are 2,396 unique firms and 14,388 unique firm-years included in our sample. Firms are allocated to sectors and industries according to the Bloomberg Industrial Classification System (BICS) and the Sustainability Industrial Classification System (SICS).[22] We mapped every industry in BICS to every industry in SICS in order to merge financial data with sustainability data. BICS is the standard system used by investments banks and money management firms.[23] Panel C shows the frequency of firms in our sample by year, which, as expected, increases over time.

Table 2.1.A Sample Construction

	# of firms	# of firm-years
KLD Data (From 1991 to 2013)	6,397	40,518
Less: not covered by SASB	(3,420)	(22,353)
Less: missing firm fundamentals (COMPUSTAT/CRSP items)	(52)	(315)
Less: deletion from changes spec	(529)	(3,462)
Total	2,396	14,388

[22] For more information see http://www.sasb.org/sics/

[23] SASB's industrial classification system is powered by the Bloomberg Industry Classification System. SASB leverages the Bloomberg Industry Classification System to identify which industry companies are assigned to.

Table 2.1.B Frequency by Sector

Sector	# unique firms	# of firm-years
Financial	670	4,166
Healthcare	554	3,135
Non-renewable Resources	359	2,324
Services	302	1,814
Technology and Communication	388	2,063
Transportation	123	886
Total	2,396	14,388

Table 2.1.C Frequency by Year

Year	# of firms
1992	194
1993	196
1994	193
1995	156
1996	183
1997	180
1998	183
1999	193
2000	189
2001	211
2002	376
2003	462
2004	1,107
2005	1,151
2006	1,136
2007	1,111
2008	1,185
2009	1,237
2010	1,211
2011	1,285
2012	1,205
2013	1,044
Sum	14,388

2.3.3 Construction of the Materiality and Immateriality Index

To classify each KLD data item as material or immaterial, we follow guidance from SASB for each one of the 45 industries in our sample. Specifically, we download each industry standard

that identifies material sustainability issues for companies within an industry. To classify topics, one researcher takes the lead in one sector and all the industries included in that sector. For each industry, KLD data items that are mapped to material SASB items are classified as material for a given industry, and all remaining KLD items are classified immaterial for the same industry. After having a complete mapping, another researcher follows the same process. The two mappings are then compared by a third researcher, who assesses any differences. In our case, differences in mappings across researchers were minimal.[24]

Appendix III shows the materiality map of SASB at the sector level. A more granular view at the industry level can be obtained by visiting the SASB website. Industries within a sector generally had similar issues classified as material but differences could be found. Appendix IV provides a mapping of the SASB material topics to the KLD data items across sectors. Approximately 55 percent of all possible sector-SASB issue pairs were either material or immaterial for all industries within the sector. The largest variability across industries within a sector is in the services sector where only 20 percent of the issues were either material or immaterial across all industries. The lowest variability is within the financials and technology and communication sectors with more than 67 percent. The total number of material items identified is small compared to the total number of KLD data items, which is 124, consistent with SASB claims that their guidance narrows significantly the number of issues that a firm needs to disclose. The number of material data items ranges from 13 for the healthcare sector to 32 for services sector while the financials, transportation, and the nonrenewable resources sector have 22 and the technology and communications sector has 19 data items that are material. Broadly speaking, environmental issues tend to be more material for the nonrenewable resources and transportation

[24] The two researchers disagreed on 2% of the total number of mappings. These differences were resolved by consultation with the third researcher.

sectors, governance and product related issues tend to be more material for the financial sector, and social issues tend to be more material for the healthcare, services, and the technology and communications sectors. Appendix III provides more detailed information, and for industry mappings the interested reader can visit the SASB website.

To construct a materiality and immateriality index for firm *i* in year *t,* we follow the practice, common in the literature, of subtracting the concerns from the strengths to arrive at a single net index (e.g., Graves and Waddock, 1994; Griffin and Mahon, 1997; Waddock and Graves, 1997; Johnson and Greening, 1999; Ruf et al., 2001; Ioannou and Serafeim, 2014):

$$Material_{it} = \sum KLD\ STRENGTH_{it,SASB} - \sum KLD\ CONCERN_{it,SASB} \quad (5)$$

$$Immaterial_{it} = \sum KLD\ STRENGTH_{it,SASB} - \sum KLD\ CONCERN_{it,SASB} \quad (6)$$

Panel B of Table 2.1 shows the number of firms each year with a materiality index number and an immateriality index number. These are the firms available each year to form portfolios as described next.

2.3.4 Portfolio Formation and Estimation

To test the future performance implications of firms' sustainability performance, we begin by orthogonalizing changes in the materiality index with respect to changes in firm size, market-to-book ratio (MTB), profitability (ROA), financial leverage, amount spent on R&D and advertising, institutional ownership, and sector fixed effects (f_s). We estimate these models cross-sectionally for each year as follows:[25, 26]

[25] We regress on those variables because they are fundamental characteristics of a firm in terms of size, growth opportunities and valuation, financial structure, investment profile, ownership, and profitability. In untabulated results, we added past stock return and earnings volatility, accruals, and dividend yield, but the explanatory power of the model was unchanged. Moreover, in later analysis we control for more firm characteristics and our results remain unchanged.

[26] Substituting sector for industry fixed effects produces very similar results and does not raise the explanatory power of the model. While sustainability investments seem to vary across sectors it varies to a less significant extent across industries within a sector. Moreover, in the early period of the sample, the number of industries is large enough that the average number of companies within an industry is small.

$$\Delta Material_{it} = b_1 + b_2\Delta Size_{it} + b_3\,\Delta MTB_{it} + b_4\Delta ROA_{it} + b_5\Delta Leverage_{it} + b_6\Delta R\&D_{it} + b_7\Delta Advertising_{it} + b_8\Delta InstitutionalOnwership_{it} + f_s + e_{i,t} \quad (7)$$

$$\Delta Immaterial_{it} = \alpha_1 + \alpha_2\Delta Size_{it} + \alpha_3\,\Delta MTB_{it} + \alpha_4\Delta ROA_{it} + \alpha_5\Delta Leverage_{it} + \alpha_6\Delta R\&D_{it} + \alpha_7\Delta Advertising_{it} + \alpha_8\Delta InstitutionalOnwership_{it} + f_s + u_{i,t} \quad (8)$$

The signals used to construct portfolios are the residuals from equations (7) and (8), which are unexplained changes in the materiality and immateriality indices (hereafter "Materiality" and "Immateriality"). This procedure is intended to mitigate concerns about correlated firm characteristics potentially confounding inferences about the future performance implications of the materiality index. Moreover, by using for each firm the residual change in the material or immateriality index, we attempt to isolate the unexpected level of sustainability investments.

The Materiality portfolios are constructed each year by assigning firms with a residual materiality index at the top (bottom) quintile in that year to the top (bottom) portfolio. Results are robust to constructing the top and bottom portfolios as the top and bottom deciles. The Immateriality portfolios are constructed in the same manner.

The KLD data are released by the end of February each year, and financial statement data needed for estimation of equation (3) are available for almost all firms by the end of March, so we construct portfolios at the end of March to allow an implementable trading strategy. Value-weighted and equal-weighted portfolios are held from the beginning of April until the end of March of the following year. Abnormal stock return performance of the portfolios (i.e. alpha) is estimated from Fama and French (1993) monthly calendar-time regressions that include the market, size, book-to-market, momentum (Carhart, 1997), and liquidity (Pastor and Stambaugh, 2003) factors.

Our research design examines the correlation between changes in sustainability investments to changes in stock prices. Within this research design, alphas capture unexpected performance that cannot be attributed to the five systematic risk factors of the model. As a result, if ESG data are informative about a firm's future performance that is not attributed to its correlation

with the market, size, value or growth characteristics, momentum and liquidity then this informativeness will be captured in a significant alpha estimate. Our research design draws on the return predictability literature which examines whether a given firm characteristic (for example, accruals, investment, sustainability scores in our case, among others) is associated with future stock returns. The approach adopted in that literature is to control for standard risk factors and then test whether a portfolio long and short scoring high or low in the focal characteristic yields alpha. The alpha indicates the future stock returns associated with the relevant firm characteristic and unexplained by the firm's exposure to conventional risk factors.

The return predictability literature offers alternative interpretations of alphas. One interpretation is that the alpha likely captures omitted risk factors and is therefore spurious in some sense. This is not the interpretation we adopt in the present paper. Another interpretation, which we adopt, is that the alpha truly captures return predictability unassociated with risk factors and that the stock price did not fully impound immediately. Our specific interpretation of the materiality alpha we document is as follows: since materiality classifications were not previously available, investors could not react to them as soon as ESG performance data became available (the sustainability data did not distinguish between material and immaterial investments). As such, the price change (or alpha) was realized over a longer horizon as the materiality investments began to pay off through observable metrics, such as higher accounting returns, or as investors better understood the financial implications of sustainability investments through their own analysis.

Table 2.2, Panels A and B, present summary statistics for our sample and the Compustat universe, respectively. As expected and consistent with prior studies using KLD data our sample includes larger firms, with higher price to book ratios and profitability margins, and higher institutional ownership. Panel C presents summary statistics for the level of the materiality and

immateriality indices as well as for all the variables used to estimate models (7) and (8). Panel D presents the results of estimation of models (7) and (8), as well as the same model for the total KLD index that takes into account both material and immaterial items. We obtain similar results mean-adjusting the raw changes in the indices using either the sector or industry mean raw index. The advantage of the multivariate regression models is that they create a more continuous distribution of residual values therefore allowing us to be more precise in our portfolio allocation rules (i.e. including exactly 10 percent of the firms in a portfolio when we use decile portfolios or 20 percent when we use quintiles). Using the alternative method where we simply mean adjust by sector or industry we are facing the challenge of lumpy distributions where multiple firms receive exactly the same score leading us to include either much lower (if we do not include the last cutoff point) or much higher (if we do include the last cutoff point) percentages of the sample in the portfolio. However, we report results using this alternative specification as well.

Table 2.2.A Summary Statistics for the Sample in this Study

	Mean	Median	St Dev.	Q1	Q3	N
ROA	0.02	0.03	0.12	0.01	0.07	14,388
Leverage	0.19	0.16	0.18	0.04	0.29	14,388
MTB	1.19	1.09	0.53	0.80	1.46	14,388
Size	7.37	7.20	1.62	6.16	8.37	14,388
Market Cap	6993.17	1354.77	17664.86	459.89	4429.96	14,388
R&D	0.12	0.00	0.53	0.00	0.06	14,388
Advertising Intensity	0.01	0.00	0.02	0.00	0.01	14,388
Institutional Ownership	0.68	0.71	0.25	0.51	0.87	14,388
Capex	0.11	0.09	0.10	0.03	0.15	14,388
SG&A	0.24	0.19	0.24	0.04	0.36	14,388

Table 2.2.B Summary Statistics for the Compustat universe

	Mean	Median	St Dev.	Q1	Q3	N
ROA	-0.17	0.01	0.74	-0.09	0.06	224,312
Leverage	0.31	0.19	0.51	0.03	0.39	224,312
MTB	0.93	0.86	0.74	0.47	1.30	224,312
Size	4.39	4.46	2.78	2.46	6.38	224,312
Market Cap	1708.17	86.62	5924.78	11.74	588.41	224,312
R&D	0.19	0.00	0.98	0.00	0.02	224,312
Advertising Intensity	0.01	0.00	0.03	0.00	0.00	224,312
Institutional Ownership	0.19	0.00	0.29	0.00	0.32	224,312
Capex	0.13	0.08	0.16	0.02	0.16	224,312
SG&A	0.43	0.18	1.24	0.00	0.36	224,312

Table 2.2.C Summary Statistics for Sustainability Scores and Firm Characteristics

Panel C reports summary statistics for the variables used to estimate models (7) and (8) in Panel D.

	Mean	Median	St Dev.	Q1	Q3	N
KLD Index	-0.2240	0.0000	2.4212	-2.0000	1.0000	14,388
Material Index	-0.0954	0.0000	0.9413	-1.0000	0.0000	14,388
Immaterial Index	-0.1286	0.0000	1.9652	-1.0000	1.0000	14,388
ΔKLD Index	0.0306	0.0000	1.5518	-1.0000	1.0000	14,388
ΔMaterial Index	0.0003	0.0000	0.6912	0.0000	0.0000	14,388
ΔImmaterial Index	0.0303	0.0000	1.2880	-1.0000	1.0000	14,388
ΔSize	0.0550	0.0867	0.4927	-0.1556	0.3107	14,388
ΔMTB	-0.0199	-0.0021	0.3209	-0.1550	0.1293	14,388
ΔROA	-0.0015	0.0000	0.0988	-0.0175	0.0154	14,388
ΔLeverage	0.0036	0.0000	0.0783	-0.0229	0.0160	14,388
ΔR&D	-0.0138	0.0000	1.2213	0.0000	0.0000	14,388
ΔAdvertising Intensity	-0.0002	0.0000	0.0067	0.0000	0.0000	14,388
ΔInstitutional Ownership	0.0318	0.0214	0.1122	-0.0166	0.0704	14,388

Table 2.2.D Changes in Sustainability Investments

Panel D reports the time-series average of estimated coefficients from yearly cross-sectional regressions. The first column uses the change in the total KLD index as the dependent variable. The second column uses the change in the materiality index as the dependent variable. The third column uses the change in the immateriality index as the dependent variable. The materiality index is calculated as can be seen in equation (5) and the immateriality index according to (6). ROA is income before extraordinary items over the average of total assets of the current and previous year. Leverage is long-term debt plus current debt over the average of total assets of the current and previous year. MTB is market value of equity over book value of equity. Size is the natural logarithm of calendar year end market capitalization. Market cap is calendar year end market capitalization. R&D is research and development expenditures over sales. Advertising intensity is advertising expenses over sales. Institutional ownership is the percentage of shares held by institutional investors. Capex is capital expenditures over property, plant and equipment. SG&A is sales, general and administrative expenses over sales.

	ΔKLD Index		ΔMaterial Index		ΔImmaterial Index	
Parameter	Estimate	t	Estimate	t	Estimate	t
Intercept	0.0869	0.14	0.0118	0.27	0.0752	0.15
ΔSize	0.0659	-0.11	-0.0075	-0.18	0.0734	-0.11
ΔMTB	-0.0768	0.25	0.0214	0.40	-0.0982	0.26
ΔROA	0.2858	0.34	0.0833	0.74	0.2025	0.43
ΔLeverage	0.1955	0.62	0.1806	1.74	0.0149	0.77
ΔR&D	0.3748	0.06	0.0678	0.12	0.3070	0.05
ΔAdvertising Intensity	7.6956	0.52	2.5531	1.92	5.1425	0.58
ΔInstitutional Ownership	-0.1108	0.04	0.0077	0.07	-0.1185	0.05
Sector f.e.	Yes		Yes		Yes	
N	22		22		22	
Adj R-squared	5.23%		7.35%		6.03%	

Table 2.3 presents univariate correlations between the variables used in the analysis. The correlation between the materiality and immateriality indices is positive and moderate (0.3). This suggests that different types of investments are related but are sufficiently different to allow us to differentiate firms. The materiality index exhibits small positive correlations with both MTB (0.08) and size (0.03) and a small negative correlation with leverage (-0.02). The immateriality index exhibits small positive correlations with both MTB (0.05) and ROA (0.08) and a moderate correlation with size (0.28). The residuals derived from models (7) and (8) exhibit much lower correlation between them (0.13), compared to the 0.30 of the raw indices, and they have nearly zero correlation with all MTB, ROA, size, R&D and advertising intensity, and leverage.

Table 2.3 Correlation Table

The table presents a univariate correlation matrix. KLD index is calculated by summing all KLD strengths and subtracting all KLD concerns. Material and immaterial indices calculated as in models (5) and (6). The residuals for all indices are calculated as in models (7) and (8). ROA is income before extraordinary items over the average of total assets of the current and previous year. Leverage is long-term debt plus current debt over the average of total assets of the current and previous year. MTB is market value of equity over book value of equity. Size is the natural logarithm of calendar year end market capitalization. Market cap is calendar year end market capitalization. R&D is research and development expenditures over sales. Advertising intensity is advertising expenses over sales. Institutional ownership is the percentage of shares held by institutional investors. Capex is capital expenditures over property, plant and equipment. SG&A is sales, general and administrative expenses over sales.

	KLD Index	KLD Index (Residual)	Material Index	Material Index (Residual)	Immaterial Index	Immaterial Index (Residual)	MTB	Size	ROA	Leverage	R&D	Advertising Intensity
KLD Index (Residual)	0.35251	1										
	<.0001											
Material Index	0.63328	0.20318	1									
	<.0001	<.0001										
Material Index (Residual)	0.24955	0.55274	0.42068	1								
	<.0001	<.0001	<.0001									
Immaterial Index	0.92875	0.337	0.30126	0.10597	1							
	<.0001	<.0001	<.0001	<.0001								
Immaterial Index (Residual)	0.2878	0.89828	0.01995	0.13032	0.34504	1						
	<.0001	<.0001	0.0167	<.0001	<.0001							
MTB	0.06674	0.01772	0.08362	0.01207	0.04218	0.01464	1					
	<.0001	0.0335	<.0001	0.1477	<.0001	0.0791						
Size	0.27088	0.11108	0.06914	0.08914	0.30063	0.08516	0.24624	1				
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001					
ROA	0.06554	0.031	-0.00491	0.02254	0.0831	0.02506	0.01973	0.29318	1			
	<.0001	0.0002	0.5562	0.0069	<.0001	0.0026	0.018	<.0001				
Leverage	-0.00961	0.01042	-0.02277	0.00372	-0.00093	0.01042	-0.04258	0.07134	-0.08941	1		
	0.249	0.2115	0.0063	0.6554	0.9109	0.2114	<.0001	<.0001	<.0001			
R&D	-0.02321	-0.01133	0.03504	-0.01122	-0.04226	-0.00798	0.11429	-0.1263	-0.49103	-0.01587	1	
	0.0666	0.3705	0.0056	0.3752	0.0008	0.5282	<.0001	<.0001	<.0001	0.2099		
Advertising Intensity	0.03185	0.00977	-0.00808	0.00794	0.04289	0.00751	0.14828	0.09524	-0.0856	0.03848	0.19638	1
	0.0132	0.447	0.5296	0.5365	0.0008	0.5587	<.0001	<.0001	<.0001	0.0027	<.0001	
Institutional Ownership	-0.01957	0.02301	0.01454	0.02444	-0.03108	0.01446	0.07656	0.18385	0.12964	0.08006	-0.11333	0.01274
	0.0197	0.0061	0.0831	0.0036	0.0002	0.0847	<.0001	<.0001	<.0001	<.0001	<.0001	0.3237

We also discuss some observations from analyzing the different indices at the sector level (untabulated data). The means of the total KLD, materiality and immateriality indices represent the differences between strengths and concerns, so that a positive mean indicates more strengths than concerns. In three of the six sectors we currently examine (Financial, Healthcare, Technology and Communication), the signs of total KLD and materiality indices differ. This suggests, for the average firm in these sectors, the total KLD index misrepresents the strengths and concerns on material issues alone. This highlights the relevance for investors of materiality classifications.

Moreover, even in sectors where the means of total KLD and materiality indices have the same sign (Nonrenewable resources, Services, Transportation) the ratio of strengths to concerns for the total KLD index is not necessarily representative of the same ratio for the materiality index. This too suggests some loss of relevant information if an investor uses the total KLD index rather than the materiality index.

In every sector, the standard deviation of the total KLD index is more than twice that of the materiality index. This suggests most of the variability in sustainability indices (the total KLD index) across firms comes from their performance on immaterial issues. If an investor uses the total KLD index to rank firms in a sector on their sustainability score, in order to take a position in higher ranked firms, this ranking on the total index will likely misrepresent firms' rankings on material issues.

Finally, the correlations in every sector suggest that the total KLD index is much more highly correlated with the immaterial index than with the material index (correlations close to 0.8 versus 0.4). This suggests much of the information in the total KLD index is about immaterial issues.

2.4 Results

2.4.1 Calendar Time Portfolio Returns

Table 2.4 presents the estimated coefficients of a five-factor model for the bottom quintile and decile portfolios and top quintile and decile portfolios of performance on all, *material,* and *immaterial* sustainability issues. Panel A presents results using the residual total KLD index, Panel B using the residual material index, and Panel C using the residual immaterial index. We present results using both equal- and value-weighted.

In Panel A, using the residual total KLD index that aggregates both material and immaterial issues, we find mostly insignificant alphas. Specifically, the only alphas that are statistically different between the top and bottom portfolio is for the quintile value-weighted portfolios. The annualized outperformance of the top portfolio is equal to 2.93 percent. The decile value-weighted portfolios yield an outperformance of 2.29 percent that is not statistically significant. The quintile and decile equal-weighted portfolios yield a differential performance of -0.22 percent and 0.11 percent respectively. None of these estimates are statistically significant.

Panel B uses the residual material index and yields stronger results. The estimated alpha for the top portfolio is significant (p-value<0.05), ranging from about 3 percent to about 5 percent annualized. The differential alphas between the bottom and top portfolios are always larger than the ones reported in Panel A. These range from 2.69 percent to 7.47 percent. We find stronger results as we construct portfolios that maximize the difference in residual material index, with the decile results producing a larger difference in alphas compared to the quintile portfolios. The value-weighted alphas are slightly higher than equal-weighted alphas for equivalent specifications.

Panel C uses the residual immaterial index. We find that this index does not consistently predict future stock returns. Using quintiles value-weighted portfolios yields an annualized

outperformance of 3.37 percent that is statistically significant. However, this result does not hold when we use deciles portfolios or equal weights. Using equal-weighted portfolios the top portfolios underperforms the bottom portfolio by -0.49 percent and -2.73 percent using quintile or decile allocation rules respectively.

Table 2.4.A Investments in *All* Sustainability Issues

Table 2.4 reports alphas, factor loadings, and t-statistics from monthly calendar-time Fama-French regressions. The regressions are estimated from April 1993 to March 2014. Mkt-Rf is the market excess return; SMB and HML are the Fama and French (1993) size and book-to-market factors; UMD is the Carhart (1997) momentum factor; LIQ is the liquidity factor from Pastor and Stambaugh (2003). ***, **, and * indicate one-tailed p-value less than 1, 2.5, and 5%, respectively. Panel A reports results for value-weighted and equal-weighted portfolios of firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual total KLD index.

	Value-Weighted								Equal-Weighted							
	Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment	
	Quintile				Decile				Quintile				Decile			
Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	-0.0003	-0.19	0.0021	1.78	-0.0002	-0.11	0.0017	1.15	0.0021	1.78	0.0019	1.55	0.0020	1.42	0.0021	1.58
Market	0.9903	22.25	0.9647	32.88	1.0363	17.66	1.0215	26.71	1.0589	36.35	1.0623	37.06	1.0717	33.03	1.1285	34.22
SMB	-0.0674	-0.97	-0.1396	-3.21	0.0295	0.34	-0.2074	-4.26	0.2067	4.46	0.2351	5.39	0.2741	4.96	0.1583	2.98
HML	0.0546	0.74	0.1527	3.62	0.0494	0.51	0.1634	2.56	0.4699	9.78	0.5002	11.15	0.4239	7.71	0.4885	9.61
UMD	-0.0979	-1.60	-0.0129	-0.39	-0.1847	-2.30	-0.0074	-0.17	-0.1471	-5.68	-0.1866	-4.70	-0.1486	-4.04	-0.2114	-4.72
LIQ	0.1048	2.42	-0.0145	-0.44	0.1313	2.46	-0.0181	-0.41	0.0924	3.28	0.0191	0.61	0.0683	1.90	0.0468	1.37
N	261		261		261		261		261		261		261		261	
Annualized Alpha	-0.38%		2.55%		-0.29%		2.00%		2.54%		2.32%		2.38%		2.49%	
Difference Alphas			2.93%*				2.29%				-0.22%				0.11%	

Table 2.4.B Investments in *Material* Sustainability Issues

Panel B reports results for value-weighted and equal-weighted portfolios of firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual material index.

	Value Weighted								Equal Weighted							
	Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment	
	Quintile				Decile				Quintile				Decile			
Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	-0.0011	-0.63	0.0024	1.85	-0.0019	-1.04	0.0043	2.63	0.0016	1.44	0.0038	2.34	0.0014	0.90	0.0036	2.17
Market	1.0812	22.31	0.9344	28.23	1.0913	20.91	0.9532	23.46	1.0636	38.25	1.0636	25.92	1.0741	29.87	1.0567	24.10
SMB	-0.2158	-2.52	-0.2342	-4.26	-0.2631	-2.93	-0.1902	-3.15	0.1430	2.90	0.2418	4.08	0.1484	2.21	0.1700	2.83
HML	-0.0962	-1.13	0.1051	1.94	0.0231	0.20	0.0683	1.17	0.3819	8.25	0.6367	8.66	0.5659	9.76	0.5580	7.69
UMD	-0.0231	-0.39	-0.0186	-0.45	-0.0506	-0.82	-0.1153	-2.24	-0.1167	-4.09	-0.1875	-2.90	-0.1243	-2.58	-0.1686	-3.43
LIQ	0.1279	2.72	0.0818	1.96	0.1505	2.65	0.0830	1.86	0.1055	3.70	0.1258	2.19	0.1888	4.83	0.1150	2.11
N	261		261		261		261		261		261		261		261	
Annualized Alpha	-1.27%		2.91%		-2.23%		5.24%		1.96%		4.65%		1.63%		4.38%	
Difference in Alphas			4.18%**				7.47%***				2.69%*				2.75%*	

Table 2.4.C Investments in *Immaterial* Sustainability Issues

Panel C reports results for value-weighted and equal-weighted portfolios of firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual material index.

	Value Weighted								Equal Weighted							
	Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment		Low Investment		High Investment	
	Quintile				Decile				Quintile				Decile			
Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	-0.0001	-0.08	0.0026	2.11	-0.0004	-0.27	0.0019	1.23	0.0029	2.25	0.0025	2.08	0.0032	2.35	0.0010	0.73
Market	0.9564	23.46	0.9979	31.24	0.9668	26.03	1.0805	21.55	1.0456	34.54	1.0620	33.59	1.0590	32.53	1.0139	22.99
SMB	-0.1083	-1.63	-0.1497	-3.14	-0.1705	-3.30	-0.1333	-1.92	0.2235	4.51	0.2195	3.92	0.1569	2.96	0.1990	3.24
HML	0.0409	0.57	0.1021	1.98	0.1548	2.63	0.4842	7.06	0.4554	9.40	0.4667	9.39	0.3975	6.42	0.5780	7.87
UMD	-0.0681	-1.14	0.0235	0.61	-0.0259	-0.82	0.1114	1.89	-0.1492	-4.65	-0.1772	-4.17	-0.1298	-4.08	-0.0606	-1.03
LIQ	0.0775	1.93	-0.0791	-2.22	0.0985	2.73	0.0371	0.76	0.0390	1.20	0.0136	0.42	0.0657	2.00	0.0369	0.77
N	261		261		261		261		261		261		261		261	
Annualized Alpha	-0.15%		3.22%		-0.45%		2.27%		3.49%		3.01%		3.92%		1.18%	
Difference in Alphas			3.37%**				2.72%				-0.49%				-2.73%*	

Table 2.5 presents a series of robustness tests. Panel A uses the residual material index, and Panel B uses the residual immaterial index. For the sake of brevity we discuss mostly the results of Panel A on the residual material index. As in Table 2.4 the results in Panel B of Table 2.5 are mostly insignificant. We mention in parenthesis the estimates for the residual immateriality index. First we assess the robustness of results to different factor models. We estimate alphas using the Fama-French (1993) three-factor model that excludes the momentum and liquidity factors, or a four-factor model that excludes the liquidity factor (Carhart 1997). The results are unchanged using these alternative factor models. We find a 3.91 percent and 3.88 percent outperformance on a three- and four-factor model respectively using value-weighted portfolios (1.34 percent and 1.21 percent using the residual immaterial index). The outperformance is 2.18 percent and 2.86 percent on a three- and four-factor model respectively using equal-weighted portfolios (-1.50 percent and -1.28 percent using the residual immaterial index). Raw returns (i.e. no risk adjustment) show an outperformance of 3.47 percent and 3.67 percent using value and equal-weighted portfolios respectively (1.54 percent and -1.34 percent using the residual immaterial index).

Table 2.5.A Robustness Tests-Investments in *Material* Sustainability Issues

The table reports alphas from Fama-French (1993) and Carhart (1997) calendar-time regressions of monthly returns. Under 'Alternative Factor Models' we report estimates and differences in raw returns and in alphas from 3 and 4-factor models. Under 'Alternative Residual Index' we report estimates and differences in alphas from 5-factor models using a residual index that adjusts changes in indices from models (5) and (6) with changes in sector mean indices (not using models (7) and (8)). Under 'Subset of Firms' we report estimates and differences in alphas from 5-factor models after excluding firms that have fiscal year-end other than December or companies involved in 'sin' business. Under 'Subperiods' we report estimates and differences in alphas from 5-factor models separately for the period from 1991-2002 and 2003-2013. Under 'Subrankings' we construct the residual materiality and immateriality index by taking into account only the KLD strengths or concerns. Panel A reports results using the residual materiality index while panel B reports results using the residual immateriality index. Firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual index are included in the portfolios. ***, **, and * indicate one-tailed p-value less than 1, 2.5, and 5%, respectively.

	Low Investment	High Investment			Low Investment	High Investment		
	Value-weighted				Equal-weighted			
	Annualized Alpha		Difference		Annualized Alpha		Difference	
Alternative Factor Models								
Raw return	7.18%	10.64%	3.47%	**	12.05%	15.72%	3.67%	**
3-factor alpha	-0.56%	3.35%	3.91%	**	1.67%	3.85%	2.18%	*
4-factor alpha	-0.37%	3.51%	3.88%	**	2.73%	5.59%	2.86%	*
Alternative Residual Index								
Mean-adjusted	-2.01%	3.58%	5.59%	***	2.30%	5.33%	3.03%	**
Subset of Firms								
Excluding non-December year-end firms	-2.36%	2.57%	4.93%	***	1.29%	2.83%	1.54%	
Excluding 'sin' firms	-0.79%	3.74%	4.53%	**	2.54%	5.94%	3.41%	**
Subperiods								
Analysis Period: 1991-2002	0.18%	4.44%	4.27%	**	3.10%	5.09%	1.99%	
Analysis Period: 2003-2013	0.17%	2.92%	2.75%	*	2.29%	5.68%	3.39%	**
Subrankings								
Ranking only on strengths	1.43%	2.80%	1.37%		2.43%	5.34%	2.91%	*
Ranking only on concerns	1.03%	-1.19%	-2.22%		1.52%	1.80%	0.29%	

Table 2.5.B Robustness Tests-Investments in *Immaterial* Sustainability Issues

The table reports alphas from Fama-French (1993) and Carhart (1997) calendar-time regressions of monthly returns. Under 'Alternative Factor Models' we report estimates and differences in raw returns and in alphas from 3 and 4-factor models. Under 'Alternative Residual Index' we report estimates and differences in alphas from 5-factor models using a residual index that adjusts changes in indices from models (5) and (6) with changes in sector mean indices (not using models (7) and (8)). Under 'Subset of Firms' we report estimates and differences in alphas from 5-factor models after excluding firms that have fiscal year-end other than December or companies involved in 'sin' business. Under 'Subperiods' we report estimates and differences in alphas from 5-factor models separately for the period from 1991-2002 and 2003-2013. Under 'Subrankings' we construct the residual materiality and immateriality index by taking into account only the KLD strengths or concerns. Panel A reports results using the residual materiality index while panel B reports results using the residual immateriality index. Firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual index are included in the portfolios. ***, **, and * indicate one-tailed p-value less than 1, 2.5, and 5%, respectively.

	Low Investment	High Investment			Low Investment	High Investment	
	Value-weighted				Equal-weighted		
	Annualized Alpha		Difference		Annualized Alpha		Difference
Alternative Factor Models							
Raw Return	7.11%	8.65%	1.54%		13.11%	11.77%	-1.34%
3-factor alpha	-0.33%	1.01%	1.34%		2.31%	0.81%	-1.50%
4-factor alpha	-0.37%	0.84%	1.21%		3.71%	2.43%	-1.28%
Alternative Residual Index							
Mean-adjusted	-0.29%	1.11%	1.40%		3.91%	2.89%	-1.02%
Subset of Firms							
Excluding non-December year-end firms	-0.44%	2.99%	3.44%	**	2.63%	2.11%	-0.52%
Excluding 'sin' firms	0.42%	1.45%	1.03%		4.35%	3.07%	-1.28%
Subperiods							
Analysis Period: 1991-2002	1.03%	5.22%	4.19%	**	4.70%	2.75%	-1.95%
Analysis Period: 2003-2013	-1.03%	1.58%	2.61%	*	2.74%	3.70%	0.96%
Subrankings							
Ranking only on strengths	1.20%	1.95%	0.75%		3.55%	2.91%	-0.64%
Ranking only on concerns	4.47%	0.91%	-3.56%		3.53%	3.35%	-0.18%

The second robustness test relates to the alternative residual index. Instead of using models (7) and (8) and given the relative modest explanatory power of the firm–level variables and the fact that sector fixed effects provide most of the explanatory power, we construct residual indices by calculating the change in material (immaterial) index for a firm between years t+1 and t and then adjusting this by the change in material (immaterial) index for the focal firm's sector mean between years t+1 and t. We find outperformance of 5.59 percent and 3.03 percent using value and equal-weighted portfolios respectively (1.40 percent and -1.02 percent using the residual immaterial index). Therefore, simply mean-adjusting the indices leave our results unchanged.

The third series of robustness tests includes a subset of the original sample. First, we exclude any companies with non-December end fiscal year-end. We exclude those firms since their financial information has been reported well before the portfolio construction process therefore potentially influencing our estimates in models (7) and (8) and the risk-adjustment process. We find outperformance of 4.93 percent and 1.54 percent using value and equal-weighted portfolios respectively (3.44 percent and -0.52 percent using the residual immaterial index). Second, we exclude firms with business involvement in controversial businesses. Past literature documents that 'sin' stocks outperform in the future because they have been neglected by the market (Hong and Kacperczyk 2009). Because the involvement in 'sin' business could be directly related to sustainability indices, we assess the robustness of our results excluding firms that participate in such lines of business. Although the industries included in our sample do not involve 'sin' businesses, some of the companies might still have ties to 'sin' businesses through equity ownerships or alliances. KLD provides data on business involvement in the alcohol, firearms, gambling, military, and tobacco businesses. These stocks are just 4 percent of the entire sample and we exclude them from our portfolios. As expected, for the industries in our sample, relatively

fewer companies are involved in sin businesses. Therefore, the main results remain robust with outperformance of 4.53 percent and 3.41 percent on a value- and equal-weighted basis respectively (1.03 percent and -1.28 percent using the residual immaterial index).

The fourth series of robustness tests analyzes performance over different time periods. We split the analysis period to before and after 2003. This is the time that KLD increased its coverage as it was documented in Table 2.1 and it is also the midpoint of our total period of examination. We find outperformance of 4.27 percent and 1.99 percent using value and equal-weighted portfolios respectively for the period 1991-2002 (4.19 percent and -1.95 percent using the residual immaterial index). We find outperformance of 2.75 percent and 3.39 percent using value and equal-weighted portfolios respectively for the period 2003-2013 (2.61 percent and 0.96 percent using the residual immaterial index).

The fifth series of robustness tests separates the KLD ranking based on strengths and concerns. Since strengths are more likely to reflect actual investments we isolate these data items and replicate our analysis. However, it has been empirically shown that strengths and concerns are positively correlated (Kotchen and Moon 2012; Ioannou and Serafeim 2015). Therefore, ranking firms based on only one or the other is likely to ignore information from the other component (Ioannou and Serafeim 2015). Indeed, we find weaker results when we screen only on strengths or only on concerns. The outperformance on a value-weighted base is 1.37 percent and on an equal-weighted base is 2.91 percent using strengths (0.75 percent and -0.64 percent using the immaterial index).[27]

[27] We also attempted to perform our analysis within each sector separately. This approach is problematic using our sample though because of the small sample that is available to us within each sector. This makes the portfolio approach difficult to implement as especially in the early years we have only 50-70 firms or so within a sector and allocating firms to quintiles leads to very thin portfolios. While we find still significant results for 4 out of the six sectors (financials, healthcare, services, technology) we are careful not to place much confidence to results generated from thin portfolios. An alternative approach would be to run the panel regressions interacting the materiality indicator

Across almost all specifications estimated, we find a larger difference in performance across the two groups of firms for value-weighted portfolios, consistent with studies that document sustainability issues to have a larger impact on larger firms. For example, Eccles, Ioannou and Serafeim (2014) show that firms adopting sustainability policies in the early 1990s, before adoption of such policies became common, outperformed their matched peers by 2.4 percent on an equal-weighted basis but by 4.7 percent on a value-weighted basis.[28]

2.4.2 Firm-level Panel Regressions

In Table 2.6 we estimate firm-level panel regressions of future monthly stock returns on a number of firm characteristics. This specification allows us to control for a host of potential return predictors not captured in the Fama and French (1993) calendar time regression specification above. We control for past stock returns, firm size, book-to-market, share turnover, ROE, analyst coverage, R&D intensity, advertising intensity, SG&A intensity, capital expenditures, and leverage. We include year-month fixed effects and industry or firm fixed effects. Including industry fixed effects in Panel A allows us to estimate estimates across firms. Panel B allows us to estimate within-firm variation in stock returns as a function of a firm's sustainability investments. We also report specifications that control for a host of observable governance characteristics that might be correlated with our residual materiality index. Specifically, we control for the number of institutional blockholders, the number of directors failing to attend the minimum number of board

variable with the sector fixed effects. When we do so we find that across all sectors there is a return premium for firms in the top quintile of the materiality index.

[28] Material issues do not appear to relate predominantly to those that involve technical stakeholders such as employees and customers with whom the firm exchanges resources, while immaterial issues do not relate predominantly to those that involve institutional stakeholders such as communities, environmental groups, and minorities who might impose normative expectations on firms. Prior research has suggested that benefits that accrue to the firm from attending to institutional stakeholders are more uncertain and difficult to assess relative to benefits from attending to employees and customers (Atkinson and Galaskiewicz; Hart 1995; Shrivastava 1995; Delery and Doty 1996). There is variability across industries in whether material sustainability issues fall within the realm of resource exchange stakeholders versus institutional stakeholders, and on average material issues fall roughly equally into the two stakeholder groups. Therefore, our results are unlikely to be explained by the difference between technical and institutional stakeholders.

meetings, and the number of directors that are busy (sitting at four or more boards. The variables of interest are indicator variables for firms that score at the top quintile of the residual total KLD, materiality, and immateriality index.

The results are very similar to the results from the time-series portfolio analysis. In Panel A column (1) we find that firms scoring at the top quintile of the residual total KLD index have a 2.16 percent higher annualized stock return that is marginally significant. Column (2) shows that this outperformance is driven only by firms that score high on the residual materiality index. The estimated coefficient on the indicator for firms that score at the top quintile of the residual materiality index suggests that these firms outperform by 6.47 percent annually. In contrast, the estimated coefficient on the indicator variable for firms in the top quintile of the residual immateriality index is insignificant. Columns (3) and (4) also include governance variables as a control. Our sample decreases by close to 32 percent as a result of missing observations for the governance controls. However, our results remain qualitatively unchanged. Firms scoring at the top quintile of the residual total KLD index have a 1.92 percent higher annualized stock return but it is not significant. The estimated coefficient on the indicator for firms that score at the top quintile of the residual materiality index suggests that these firms outperform by 4.90 percent annually. In contrast, the estimated coefficient on the indicator variable for firms in the top quintile of the residual immateriality index is again negative but insignificant.

Table 2.6.A Firm-level Panel Regressions (Cross-Sectional Estimates)

Dependent variable is the monthly stock return for each firm measured as in the calendar-time portfolios for every month beginning in April of the year after a KLD index is calculated (year t+1) until March of the year after (year t+2). High Residual KLD Index in an indicator variable for firms scoring at the top quintile of the residual total KLD index. High Residual Materiality Index in an indicator variable for firms scoring at the top quintile of the residual material index. High Residual Immateriality Index in an indicator variable for firms scoring at the top quintile of the residual immaterial index. Lag Return is the 12-month stock return of the firm between April in year t-1 and March in year t. Size is the natural logarithm of the market capitalization of the firm in the end of the previous month. BTM is shareholders equity in the last fiscal year over market capitalization at the end of the previous month. Turnover is shares traded over shares outstanding calculated each month. ROE is net income over beginning shareholders equity in the previous fiscal year. Analyst coverage is calculated as the number of analysts making EPS forecasts for a firm over the previous fiscal year. Leverage is total liabilities over total assets calculated over the previous calendar year. R&D is research and development expenditures divided by sales. Advertising Intensity is advertising expenditures over sales. SG&A is sales, general and administrative expenditures over sales. Capital Expenditure is capital expenditures over sales. Institutional Blockholders is the natural logarithm of one plus the number of institutions that own 5% or more of the outstanding shares. Directors Failing is the number of directors that failed to attend the minimum number of board meetings. Busy Directors is the number of directors that sit on four or more boards. Standard errors are robust and clustered at the firm-level.

Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	0.0322	4.35	0.0323	4.36	0.0411	3.07	0.0407	3.03
High All Sustainability Issues	0.0018	1.86			0.0016	1.58		
High Material Sustainability Issues			0.0052	6.60			0.0040	3.83
High Immaterial Sustainability Issues			-0.0002	-0.31			-0.0005	-0.50
Last Year's Return	-0.0319	-2.47	-0.0313	-2.42	-0.0710	-4.68	-0.0691	-4.55
Size	-0.0009	-4.26	-0.0009	-4.79	-0.0017	-5.71	-0.0017	-5.80
BTM	0.0008	1.34	0.0007	1.22	0.0020	2.93	0.0019	2.89
Turnover	-0.0007	-2.24	-0.0007	-2.31	-0.0002	-0.64	-0.0002	-0.65
ROE	-0.0076	-3.29	-0.0076	-3.32	-0.0051	-2.11	-0.0051	-2.10
Analyst Coverage	-0.0030	-1.05	-0.0030	-1.04	-0.0055	-1.07	-0.0055	-1.07
Leverage	0.0003	0.17	0.0001	0.05	0.0026	1.03	0.0023	0.93
R&D	0.0000	6.51	0.0000	6.36	0.0000	14.74	0.0000	14.42
Advertising Intensity	-0.0140	-6.11	-0.0139	-6.14	-0.0107	-1.26	-0.0104	-1.25
SG&A	-0.0001	-0.70	-0.0001	-0.70	0.0000	-0.32	0.0000	-0.32
Capital Expenditure	-0.0014	-0.31	-0.0015	-0.34	-0.0025	-0.52	-0.0025	-0.54
Institutional Blockholders					-0.0011	-4.06	-0.0011	-4.05
Directors Failing					0.0130	1.38	0.0135	1.43
Busy Directors					0.0120	2.81	0.0120	2.83
Year-Month F.E.	Yes		Yes		Yes		Yes	
Industry F.E.	Yes		Yes		Yes		Yes	
N	154,786		154,786		105,674		105,674	
Adj R -squared	17.41%		17.43%		20.72%		20.73%	
Annualized abnormal performance	2.16%		6.47%		1.92%		4.90%	

Panel B shows estimates after including firm fixed effects. The results are very similar. In column (1) we find that firms scoring at the top quintile of the residual total KLD index have a 2.34 percent higher annualized stock return that is marginally significant. Column (2) shows that this outperformance is driven only by firms that score high on the residual materiality index. The estimated coefficient on the indicator for firms that score at the top quintile of the residual materiality index suggests that these firms outperform by 4.78 percent annually. In contrast, the estimated coefficient on the indicator variable for firms in the top quintile of the residual immateriality index is insignificant. After controlling for the governance variables, firms scoring at the top quintile of the residual total KLD index have a 2.08 percent higher annualized stock return but it is not significant. The estimated coefficient on the indicator for firms that score at the top quintile of the residual materiality index suggests that these firms outperform by 4.01 percent annually. In contrast, the estimated coefficient on the indicator variable for firms in the top quintile of the residual immateriality index is negative but insignificant.

In untabulated analysis we replicate the analysis in Table 2.6 using the continuous indices rather than an indicator variable for the firms that score at the top quintile. The indicator variable approach is consistent with our main portfolio-level research design and investment management practice in the responsible investing space that use best-in-class screens, which seek to identify and include in the portfolio the firms that score at the top quintile or decile of the distribution. An advantage of the continuous variable approach is that it can provide evidence of the value of sustainability investments for the full continuum of firms by differentiating not only between firms investing the most and all the rest. A disadvantage of this approach is that it requires relatively high confidence in the ability of the index to differentiate between firms across the whole distribution of values.

Table 2.6.B Firm-level Panel Regressions (Within-Firm Estimates)

Dependent variable is the monthly stock return for each firm measured as in the calendar-time portfolios for every month beginning in April of the year after a KLD index is calculated (year t+1) until March of the year after (year t+2). High Residual KLD Index in an indicator variable for firms scoring at the top quintile of the residual total KLD index. High Residual Materiality Index in an indicator variable for firms scoring at the top quintile of the residual material index. High Residual Immateriality Index in an indicator variable for firms scoring at the top quintile of the residual immaterial index. Lag Return is the 12-month stock return of the firm between April in year t-1 and March in year t. Size is the natural logarithm of the market capitalization of the firm in the end of the previous month. BTM is shareholders equity in the last fiscal year over market capitalization at the end of the previous month. Turnover is shares traded over shares outstanding calculated each month. ROE is net income over beginning shareholders equity in the previous fiscal year. Analyst coverage is calculated as the number of analysts making EPS forecasts for a firm over the previous fiscal year. Leverage is total liabilities over total assets calculated over the previous calendar year. R&D is research and development expenditures divided by sales. Advertising Intensity is advertising expenditures over sales. SG&A is sales, general and administrative expenditures over sales. Capital Expenditure is capital expenditures over sales. Institutional Blockholders is the natural logarithm of one plus the number of institutions that own 5% or more of the outstanding shares. Directors Failing is the number of directors that failed to attend the minimum number of board meetings. Busy Directors is the number of directors that sit on four or more boards. Standard errors are robust and clustered at the firm-level.

Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	0.2728	16.39	0.2710	15.65	0.2748	9.98	0.2730	12.55
High Residual KLD index	0.0019	2.24			0.0017	1.75		
High Residual Materiality Index			0.0039	4.50			0.0033	3.10
High Residual Immateriality Index			0.0000	0.01			-0.0003	-0.27
Last Year's Return	-0.0427	-2.65	-0.0418	-3.42	-0.0796	-4.48	-0.0777	-5.40
Size	-0.0319	-23.08	-0.0319	-32.95	-0.0418	-20.19	-0.0418	-32.34
BTM	-0.0011	-0.64	-0.0011	-1.16	-0.0003	-0.17	-0.0003	-0.25
Turnover	-0.0027	-5.68	-0.0027	-9.23	-0.0024	-5.04	-0.0024	-7.22
ROE	-0.0027	-0.98	-0.0027	-1.42	-0.0033	-0.99	-0.0033	-1.45
Analyst Coverage	-0.0232	-5.52	-0.0231	-7.71	-0.0140	-1.64	-0.0140	-2.63
Leverage	-0.0021	-0.41	-0.0018	-0.42	0.0068	1.02	0.0067	1.22
R&D	0.0000	1.39	0.0000	2.27	0.0000	1.28	0.0000	2.17
Advertising Intensity	-0.0157	-3.05	-0.0157	-3.37	-0.0097	-0.68	-0.0095	-0.72
SG&A	-0.0002	-1.52	-0.0002	-1.98	-0.0001	-1.01	-0.0001	-1.41
Capital Expenditure	-0.0136	-2.18	-0.0137	-2.67	-0.0138	-1.75	-0.0137	-2.22
Institutional Blockholders					-0.0024	-5.62	-0.0024	-6.41
Directors Failing					0.0165	1.45	0.0171	1.52
Busy Directors					-0.0031	-0.55	-0.0030	-0.46
Year-Month F.E.	Yes		Yes		Yes		Yes	
Firm F.E.	Yes		Yes		Yes		Yes	
N	154,786		154,786		105,674		105,674	
Adj R -squared	20.38%		20.38%		24.02%		24.02%	
Annualized abnormal performance	2.34%		4.78%		2.08%		4.01%	

We find weaker results using the continuous indices. Although the estimated coefficients are directionally consistent with the analysis so far they do not attain significance or at best attain modest significance. This is consistent with the financial implications from sustainability investments having a non-linear profile. Estimating coefficients on indicator variables that take the value of one for each quintile of firms according to the residual materiality index (omitted category is the bottom quintile) we find that the third quintile is the cause of the weakened results using the continuous residual materiality index. Firms in the third quintile have lower stock returns compared to the first quintile (bottom portfolio). The estimated coefficient on an indicator variable for firms in the third quintile is -0.0020 (t-stat=-1.84) and -0.0017 (t-stat=-1.42) using the second or fourth model as in Table 2.6, panel B. The highest returns are for the fifth quintile (top portfolio) as expected. The estimated coefficient on an indicator variable for firms in the fifth quintile is 0.0038 (t-stat=3.65) and 0.0035 (t-stat=2.76) using the second or fourth model as in Table 2.6, panel B. Another explanation for these results is that the ability of the index to differentiate between firms within more narrow range of differences is more limited therefore increasing noise in the estimation and biasing the coefficients towards zero.

2.4.3 Materiality Index, Immateriality Index and Stock Returns

To shed more light on the differential return on investment from material versus immaterial sustainability issues, we compare firms that score high on the residual materiality index and low on the residual immateriality index ('Material investment firms') versus firms that score low on the residual materiality index and high on the residual immateriality index('Immaterial investment firms'). This allows us to provide sharper evidence on the shareholder value implications of sustainability investments.

We use quartile portfolios as cutoff values both for bad and good performance as quintile and decile portfolios are too thin due to the positive univariate correlation between material and immaterial indices. However, quartile portfolio cutoffs yield weaker results overall so the results in this section should be benchmarked against that backdrop. Imposing a quartile cutoff for the portfolio results in approximately 35 stocks on average every year in each one of the portfolios for Material and Immaterial investment firms. The number of stocks in the All and No investment firms is closer to on average 50 every year. This is likely due to the positive correlation between the residual material and the immaterial index. The number of firms that exhibit high performance on one index and low performance on the other is lower compared to firms that perform good or bad on both. As before, we use the residuals of the indices to construct the portfolios.

Table 2.7 presents the estimated coefficients of a five-factor model for value-weighted portfolios. The estimated alpha for the portfolio of Material investment firms is larger in magnitude and statistically different from zero. We find estimated annualized alphas of 4.83 and -0.38 percent for top performers on material issues and immaterial issues, respectively, for a difference of 5.20 percent which is statistically significant at the 1 percent level. Material investment firms also outperform All investment firms by 3.32 percent. This result shows the importance of firms distinguishing between the types of investments they make. Grouping both material and immaterial investments together yields lower performance. Firms that make no investments have the worst performance across all groups of firms with an estimated alpha of -2.20 percent. The results are similar using equal-weighted instead of value-weighted portfolios. Comparing the alphas on the set of firms with good performance on material sustainability suggests that the positive effect from investments in material sustainability issues are larger for firms that make investments only in material sustainability issues versus firms that make investments on both material and immaterial

issues. Firms that invest only in material issues are likely to have concentrated their efforts only the material issues after undertaking a careful materiality analysis. Indeed, in the last ten years the number of firms that perform a materiality assessment through stakeholder engagement has been increasing (Eccles and Krzus 2014). One potential interpretation therefore is that while two firms could both score at the top quartile of the residual material index, their relative score on the residual immaterial index provides information about the extent of commitment of resources on the material sustainability issues. We are careful not to over-emphasize the results of this analysis though since the two portfolios that require high scores on one index and low scores on the other index are somewhat thin.

Table 2.7 Performance on *Material and Immaterial* Sustainability Issues

The table reports alphas, factor loadings, and t-statistics from monthly calendar-time Fama-French regressions for value-weighted portfolios. Classifications are based on the residual materiality and immateriality indices as calculated in models (7) and (8). The intersections of quartile portfolios are formed to estimate the regressions. Firms scoring at the bottom (Low Investment) and top (High Investment) quintiles of the residual index are included in the portfolios. The regressions are estimated from April 1993 to March 2013. Mkt-Rf is the market excess return; SMB and HML are the Fama and French (1993) size and book-to-market factors; UMD is the Carhart (1997) momentum factor; LIQ is the liquidity factor from Pastor and Stambaugh (2003). ***, **, and * indicate one-tailed p-value less than 1, 2.5, and 5%, respectively.

	Low Investment on Immaterial Issues & High Investment on Material		High Investment on Immaterial Issues & High Investment on Material		High Investment on Immaterial Issues & Low Investment on Material		Low Investment on Immaterial Issues & Low Investment on Material	
Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	0.0039	1.96	0.0012	0.57	-0.0003	-0.15	-0.0019	-0.78
Market	0.8882	17.99	0.9358	17.96	1.0641	19.24	1.0242	16.22
SMB	-0.2222	-3.13	-0.0557	-0.73	-0.2448	-2.70	-0.0181	-0.14
HML	0.3145	4.47	-0.0846	-0.82	-0.1508	-1.34	0.0310	0.28
UMD	0.0214	0.46	-0.1994	-2.78	-0.0438	-0.73	-0.1633	-1.79
LIQ	0.0514	0.93	0.0287	0.39	0.0383	0.59	0.2554	3.94
N	261		261		261		261	
Annualized Alpha	4.83%		1.50%		-0.38%		-2.20%	
Difference Alphas - Column 1 is the benchmark			3.32%*		5.20%**		7.03%***	

2.4.4 Future Accounting Performance

Until this point we have examined future stock market performance to understand the value implications of sustainability investments. We complement this analysis by examining future changes in accounting performance. The number of investors integrating ESG data in investment decisions has grown considerably over the period of study potentially putting price pressure on the stocks of firms with good ESG performance and contributing to the positive alphas found earlier for firms with good sustainability performance. If firms investing in material sustainability issues exhibit superior future accounting performance, this would suggest that price pressure alone cannot explain the superior future stock price performance.

Table 2.8 shows future changes in accounting performance (return-on-sales or ROS) of firms scoring high and low on the residual materiality index for quintile portfolios. In untabulated analysis, we find similar patterns when we examine changes in return-on-assets, and return-on-equity. We tabulate changes in ROS up to five years in the future. Panel A presents results using the residual total KLD index, the residual material index, and the residual immaterial index. We do not find a consistent outperformance for firms scoring in the top quintile of the residual total KLD index relative to firms scoring at the bottom.

In contrast, firms scoring high on the residual material index s experience relatively more positive changes in profitability margins. Specifically, we find that changes in ROS are more positive for the portfolio of firms performing better on material issues. Across all time horizons the difference in future changes in profitability margins is positive. Starting from the second year in the future and until the fifth year in the future we find significant difference in ROS growth of 6.89 percent to 9.20 percent. While the top portfolio experiences increases in ROS, the bottom portfolio experiences declines. The residual immaterial index fails to predict future changes in

profitability margins. We find no difference in future accounting performance between firms scoring at the top or bottom quintile of the residual immaterial index.

Panel B presents panel-level regressions, similar to the analysis in Table 2.6. Columns (1) and (2) include industry fixed effects while columns (3) and (4) use firm fixed effects. Columns (2) and (4) also control for the governance variables. We use as dependent variable the two year ahead change in ROS. Using three, four or five year changes leads to similar results. We find that all else equal firms scoring at the top quintile of the residual material index have higher future ROS growth. In contrast, the coefficient on the indicator variable for firms scoring at the top quintile of the residual immaterial index is insignificant. Overall, the results from the analysis of the accounting performance complement the analysis of stock returns and suggest that the materiality guidance helps construct measures of sustainability investments that are better predictors of future financial performance.

Consistent with the profitability margin analysis in Table 2.8, in untabulated analysis we find that investors incorporate in stock prices the financial implications from sustainability investments in the future. Specifically, we replicate the analysis in Table 2.4 now constructing the portfolios starting in April of year t+2 and holding the stocks until March of t+3 (sustainability data are for year t). We find insignificant differences in alphas across the top and bottom portfolios when we use the residual materiality index. Using value-weighted (equal-weighted) portfolios we find a statistically insignificant difference of -0.2 percent (-2.0 percent). As the impact from sustainability investments flows through a company's financial numbers, investors are incorporating this information in stock prices and as a result the differential alpha across portfolio disappears.

Table 2.8.A Future Accounting Performance (Portfolio Results)

Panel A reports changes in return-on-sales (ROS) between the year of portfolio formation and future years. ROS is net income over average sales. t=x to t=y represents a change between year x and year y. Low Investment is firms that score at the bottom quintile of the residual index. High Investment is firms that score at the top quintile of the residual index. Firms are allocated for all three indices: residual total KLD, materiality and immateriality.

All Sustainability Issues	t=0 to t=1	t=0 to t=2	t=0 to t=3	t=0 to t=4	t=0 to t=5
Low Investment	-0.58%	-0.41%	-0.70%	-3.48%	-7.52%
High Investment	-0.56%	4.18%	-1.13%	-0.13%	-2.15%
Difference	0.02%	4.59%	-0.44%	3.36%	5.37%
t-stat	0.01	2.08	-0.17	1.25	1.90

Material Sustainability Issues	t=0 to t=1	t=0 to t=2	t=0 to t=3	t=0 to t=4	t=0 to t=5
Low Investment	0.71%	-0.97%	-2.51%	-4.69%	-5.61%
High Investment	0.99%	5.91%	4.74%	3.04%	3.59%
Difference	0.28%	6.89%	7.26%	7.74%	9.20%
t-stat	0.14	2.93	2.73	2.69	3.10

Immaterial Sustainability Issues	t=0 to t=1	t=0 to t=2	t=0 to t=3	t=0 to t=4	t=0 to t=5
Low Investment	-0.69%	-0.70%	-0.27%	-3.23%	-8.23%
High Investment	-2.44%	-0.08%	-3.68%	-1.98%	-4.36%
Difference	-1.75%	0.63%	-3.41%	1.25%	3.88%
t-stat	-0.93	0.28	-1.34	0.45	1.36

Table 2.8.B Future Accounting Performance (Panel Regressions)

In Panel B dependent variable is two year ahead change in ROS. High Residual Materiality Index in an indicator variable for firms scoring at the top quintile of the residual materiality index. High Residual Immateriality Index in an indicator variable for firms scoring at the top quintile of the residual immateriality index. Lag Return is the 12-month stock return of the firm between April in year t-1 and March in year t. Size is the natural logarithm of the market capitalization of the firm in the end of the previous month. BTM is shareholders equity in the last fiscal year over market capitalization at the end of the previous month. Turnover is shares traded over shares outstanding calculated each month. ROE is net income over beginning shareholders equity in the previous fiscal year. Analyst coverage is calculated as the number of analysts making EPS forecasts for a firm over the previous fiscal year. Leverage is total liabilities over total assets calculated over the previous calendar year. R&D is research and development expenditures divided by sales. Advertising Intensity is advertising expenditures over sales. SG&A is sales, general and administrative expenditures over sales. Capital Expenditure is capital expenditures over sales. Institutional Blockholders is the natural logarithm of one plus the number of institutions that own 5% or more of the outstanding shares. Directors Failing is the number of directors that failed to attend the minimum number of board meetings. Busy Directors is the number of directors that sit on four or more boards. Standard errors are robust and clustered at the firm-level.

Parameter	Estimate	t	Estimate	t	Estimate	t	Estimate	t
Intercept	-0.4268	-2.77	-0.3644	-0.97	-0.1362	-0.43	-0.5829	-0.83
High Residual Materiality Index	0.0802	3.79	0.0695	2.58	0.0823	3.76	0.0894	3.20
High Residual Immateriality Index	0.0066	0.35	0.0136	0.62	-0.0042	-0.21	-0.0147	-0.61
Last Year's Return	1.6287	4.71	1.7241	4.07	0.6388	1.57	0.5003	0.98
Size	0.0181	3.75	0.0226	3.29	-0.0355	-1.09	-0.0372	-0.80
BTM	-0.0563	-4.22	-0.0575	-3.50	-0.1992	-6.13	-0.2436	-5.57
Turnover	0.0033	0.54	0.0069	0.95	0.0062	0.62	0.0110	0.93
ROE	0.1608	3.24	0.2232	3.81	0.1278	1.42	0.2738	2.52
Analyst Coverage	0.0854	1.94	-0.0791	-0.75	0.0968	1.94	-0.0075	-0.05
Leverage	-0.1068	-2.25	-0.0999	-1.68	-0.5343	-4.03	-0.4227	-2.33
R&D	0.0001	15.97	0.0001	20.48	0.0018	1.38	0.0019	1.01
Advertising Intensity	-1.0689	-2.92	-1.3902	-3.26	0.8854	1.14	0.0515	0.04
SG&A	-0.0021	-1.06	-0.0015	-0.70	-0.0009	-0.40	0.0005	0.36
Capital Expenditure	-0.6284	-6.14	-0.5824	-4.72	-0.7178	-4.64	-0.8152	-4.16
Institutional Blockholders			-0.0031	-0.46			-0.0186	-1.81
Directors Failing			0.2600	0.98			0.3918	1.27
Busy Directors			0.0890	0.83			-0.0818	-0.50
Year F.E.	Yes		Yes		Yes		Yes	
Industry F.E.	Yes		Yes		No		No	
Firm F.E.	No		No		Yes		Yes	
N	9,385		6,439		9,385		6,439	
Adj R -squared	5.39%		6.67%		27.17%		33.12%	

Collectively the results are unlikely to be driven by stock demand by sustainability-conscious investors whose buying exerts upward stock price pressure, because the price pressure story: (i) Does not explain the better future accounting performance of firms with strong material sustainability ratings, as we document; (ii) Requires that investors were able to discriminate between material and immaterial investments in the absence of publicly-available materiality classifications, and increase demand only for firms with investments in material sustainability issues. However, as described earlier, this appears to conflict with the expressed demand of institutional investors for better investment signals in the form of materiality classifications.

2.5 Conclusion

We use recent guidance by SASB to classify sustainability issues as material or immaterial according to industry membership. Exploiting variation in materiality across the large number of sustainability issues has the potential to improve the signal to noise ratio in testing the future performance implications of sustainability investments and reduce the dimensionality of price-relevant investment signals used by the large number of institutional investors committed to ESG initiatives. In this paper we take a first step towards these objectives by examining the future performance implications of material versus immaterial sustainability investments.

We find that firms with strong ratings on material sustainability issues have better future performance than firms with inferior ratings on the same issues. In contrast, firms with strong ratings on immaterial issues do not outperform firms with poor ratings on these issues. Finally, firms with strong ratings on material issues and concurrently poor ratings on immaterial issues have the best future performance. Collectively these results are consistent with materiality guidance being helpful in improving the informativeness of ESG data for investors. As in any

study that uses archival data our results can be attributed to sustainability investments to the extent that we have adequately controlled for other factors in our models.

Our paper leaves many questions unanswered and opens up avenues for future research. Given the robust relation between investments on material sustainability issues and future financial performance, it would be important to examine the structural relations that lead to this association. How do investments on material issues influence customer loyalty and satisfaction, employee engagement, brand and reputation, or access to finance? Another fruitful area for future research would be examining why firms choose to make different types of investments as well as why and how firms choose to make different types of disclosures around those investments. Finally, it would be helpful to extend our work using different ESG data since past research has shown that social ratings from different raters do not converge (Chatterji, Durand, Levine, and Touboul 2015).

3 Shareholder Activism on Sustainability Issues

3.1 Introduction

A growing number of investors are now engaging companies on environmental, social and governance (ESG) issues, in addition to traditional executive compensation, shareholder rights, and board of directors' topics.[29] In line with increasing engagement, shareholder proposals on ESG topics have more than doubled in the last two decades. The purpose of this paper is to test the relation between filing ESG proposals and firms' subsequent ESG performance and market valuation. Critically, we use recent innovations in accounting standard setting to classify shareholder proposals that address ESG issues as financially material or immaterial, and we analyze how proposals on material versus immaterial issues are related to firms' subsequent performance on the focal ESG issue and market valuation.

Past research has shown that shareholder proposals on traditional corporate governance issues, such as executive compensation, takeover provisions and board of directors' composition, have in recent years been effective at changing corporate governance, although their impact on firm valuation is unclear (Ertimur, Ferri and Muslu, 2011). These proposals, although not binding, increasingly receive majority support by voting investors and as a result proxy access is being considered an important corporate governance mechanism. In contrast, there is little that is known about the efficacy of ESG shareholder proposals. Almost all of those proposals have failed to receive majority support and in most of the cases, votes in support of the proposal are below 20 percent. However, anecdotal evidence and industry practitioners suggest that ESG proposals have

[29] For the rest of the paper we refer to ESG issues as all shareholder proposals on environmental, social and governance issues excluding issues that relate to shareholder rights, executive compensation and board of directors that have traditionally been the subject of analysis in the literature on shareholder activism. The governance issues in our sample comprise primarily political lobbying and corruption.

been important catalysts of action inside companies (Blackrock and Ceres, 2015). For example, the US Sustainable Investment Forum claims that, "often, a shareholder resolution will fail to win a majority of the shares voted, but still succeeds in persuading management to adopt some or all of the requested changes because the resolution was favored by a significant number of shareholders."[30] Moreover, while there seems to be consensus on the shareholder desirability of adopting corporate governance practices, such as increasing shareholder rights, decreasing takeover provisions, and appointing more independent directors, no such consensus within the investment community exists around ESG practices. Past research has found mixed results on the financial implications of these practices and many investors still do not take into account ESG issues in investment decisions (Kotsantonis, Pinney and Serafeim, 2016).

However, the financial materiality of different sustainability issues likely varies systematically across industries (Eccles and Serafeim, 2013).[31] A new organization, the Sustainability Accounting Standards Board (SASB), adopts a shareholder viewpoint in defining materiality and develops standards for reporting ESG issues that distinguishes between material and immaterial issues.[32] We develop a novel data set to measure the materiality of ESG proposals in ISS (formerly RiskMetrics), by hand-mapping recently-available industry-specific guidance on materiality from SASB to ISS, and then to MSCI KLD that has firm-level ratings on an array of sustainability issues. SASB considers evidence of investor interest and financial impact when determining the materiality of ESG issues, criteria also used by the SEC in determining the

[30] See http://www.ussif.org/resolutions

[31] See for example United Nations Environment Program Finance Initiative and World Business Council for Sustainable Development. 2010. Translating environmental, social and governance factors into sustainable business value http://www.unepfi.org/fileadmin/documents/translatingESG.pdf.

[32] Specifically, SASB considers the information needs of the "reasonable investor" in defining materiality http://www.sasb.org/materiality/materiality-assessment/

materiality of financial information (the SASB classification process is described in more detail in Appendix I and Appendix II).

Consistent with prior literature on shareholder activism (Bebchuk, Brav and Chiang, 2015), we use the standard methodology and track the industry-adjusted market valuation (i.e. Tobin's Q), and in our case performance on the focal ESG topic, over time for firms that are the subject of a shareholder proposal. We assess for the validity of a parallel trend assumption between engaged firms and the industry median and complement this research design with a propensity score matched sample of non-engaged firms that exhibit identical pre-engagement performance level and trend on the focal ESG issue and identical level and trend on Tobin's Q to that of engaged firms. Although our research design seeks to mitigate the likelihood of reverse causality and correlated omitted variables, we are careful in inferring causality from the evidence we present and we describe our results as associations. Nonetheless, our results could provide insights into the implications of activism on sustainability issues on firms' subsequent financial and nonfinancial performance.

We find that 42 percent of the shareholder proposals in our sample are filed on material issues and that both material and immaterial proposals are accompanied by increases in firms' performance on the ESG issue that the proposal identifies. The high percentage of proposals on immaterial issues might not be surprising given the prosocial objectives of a large number of sponsors of such proposals. In other words, sponsors do not file proposals only with financial objectives in mind; rather they seek to improve environmental and social outcomes. Overall, we observe that filing shareholder proposals is related to improvements in the performance of the company on the focal ESG issue across both material and immaterial issues. Thus, even though

such proposals have rarely received majority support, they have still had an effect on corporate management.

We also find that subsequent to filing ESG shareholder proposals, targeted firms experience changes in Tobin's Q. However, proposals have a substantially different relation to market valuation depending on whether they relate to immaterial versus material issues. Proposals on immaterial issues are associated with modest subsequent declines in Tobin's Q. In contrast, proposals on material issues are associated with subsequent increases in Tobin's Q. Some policy experts have argued that environmental and social issues divert the attention of senior management and directors away from more important work thereby destroying value.[33] However, our results suggest that one should be careful about overgeneralizing since a significant number of ESG proposals are financially material and associated with subsequent increases in market valuation.

One question that our results generate is why managers would improve performance on immaterial issues if doing so is associated with lower financial value. We test different explanations as to why managers seemingly respond to proposals on immaterial issues. We find evidence of agency problems, the inability to differentiate between material and immaterial sustainability issues, and an attempt to divert attention away from poor performance on material issues, as explaining this response. We find no evidence suggesting that firms with more valuable brands are more responsive to shareholder proposals on immaterial issues because they might worry about reputational risk if they are seen as unresponsive and as a result insensitive to an environmental or social issue.

We conduct a series of robustness tests and additional analyses to provide further evidence on the consequences of shareholder proposals. Specifically, we test the relation of shareholder

[33] See http://www.bna.com/us-chamber-calls-n57982063976/

proposals with subsequent ESG performance or market valuation for firms with ex-ante high versus low ESG performance, only voted (excluding withdrawn) proposals, above and below median votes for the proposal, and early versus more recent proposals. Moreover, we use proprietary data from one of the largest socially responsible funds and sponsor of ESG proposals and analyze whether private engagements focus more or less on material issues compared to public engagements (i.e. shareholder proposals).

Our results contribute to the literature on the antecedents of corporate sustainability performance. Past literature has documented the importance of firm, industry and country level variables (McWilliams and Siegel, 2001; Campbell, 2007; Ioannou and Serafeim, 2012). This paper contributes evidence that shareholder activism could be an important mechanism to improve firms' performance on the focal issue of the activism. Our paper provides first evidence, to our knowledge, of systematic increases in firms' ESG performance after shareholder activism. Flammer (2015) provides intriguing evidence of increases in overall ESG performance subsequent to close call passages of about 50 ESG proposals. However, the sample includes only a small number of proposals that received majority support, thereby leaving open for future research the question of whether the broader set of activism has impacted corporate performance on ESG issues. Further, the paper does not differentiate between material and immaterial issues, which is the focus of our paper, and studies overall ESG performance, instead of proposal-specific ESG performance (e.g. environmental performance following engagement on an environmental issue) to more directly assess the consequences of ESG activism. Importantly, this study sheds light on why managers appear to respond to shareholder proposals on immaterial issues and suggests that agency problems, the inability to identify material issues and "goodwashing" incentives contribute to this phenomenon.

Moreover, our paper contributes to a large literature that analyzes the effectiveness of shareholder proposals and activism (Gillian and Starks, 2007; Bebchuk et al., 2015; Ertimur et al., 2011). In contrast to proposals on compensation and board composition issues that were ineffective in the absence of majority vote, we find management to be responsive in our sample of non-majority vote ESG proposals.

In addition, our study provides evidence on how investor induced changes in corporate ESG performance is associated with future market valuation. While prior research suggests that changes in performance on material ESG issues are positively related to changes in future financial performance, while changes in performance on immaterial ESG issues are not correlated with future financial performance (Khan, Serafeim, and Yoon, 2016), it is not clear that these results generalize to a setting where changes in ESG performance are the result of investor activism. As Eccles et al. (2014) note, even for material sustainability issues, there is a level of performance after which financial performance will start declining, absent of changes in the institutional context and/or firm innovation. In other words, for a utility firm, it might be financially beneficial to have twenty percent of its energy for electricity generation coming from renewable resources but not forty percent. Similarly, for a mining firm, it might be financially beneficial to spend two percent of profits on robust anticorruption systems but not five percent. It is not clear whether investors pressure firms to improve their ESG performance by overinvesting thereby leading to decreases in financial performance, or if firms underinvest, even on material issues. Our evidence is consistent with investor activism leading to changes in ESG performance on material issues in a way that is on average value enhancing, suggesting that the sample of engaged firms is underinvesting. Moreover, we find that differentiating between proposals that relate to financially material versus immaterial issues yields very different results, thereby adding to the evidence on the importance

of recent accounting standard innovations for reporting sustainability information (Khan et al., 2016). In contrast to Khan et al. (2016), we document that immaterial sustainability issues are associated with decreases in financial value. As a result, our study highlights how investor induced changes in ESG performance, on immaterial issues, might be fundamentally different than changes in ESG performance that are initiated by management.

3.2 Motivation and Literature Review

An increasing number of shareholder proposals are being filed on ESG issues, in addition to traditional corporate governance issues. In 2013, nearly 40 percent of all shareholder proposals submitted to Russell 3000 companies related to ESG issues, representing a 60 percent increase since 2003 (Proxy Voting Analytics, 2014). The topics of ESG proposals are diverse, ranging from disclosure of political contributions and compliance with human rights policies, to the adoption of a climate change policy. Average support for ESG proposals has more than doubled from 10 percent in 2003 to 21 percent in 2013, but the low levels of support relative to corporate governance proposals, which on average garnered 42 percent voting support in 2013, is suggestive of shareholders' skepticism about the financial materiality of ESG issues.

3.2.1 Shareholder Activism

Prior research has largely focused on shareholder activism on corporate governance issues. Proposals relating to board independence and executive pay, along with efforts by shareholders to remove poison pills, classified boards and supermajority antitakeover amendments from corporate charters, have been the main focus of prior studies (Gillian and Starks, 2007).

At the heart of activism is the quest for value, yet the empirical evidence is mixed regarding the effects of shareholder proposals relating to corporate governance. Shareholder proposals might be unsuccessful because their voting outcomes are very low and because they are non-binding such

that the board can still refuse to adopt the proposal's recommendations even when votes in support exceed 50 percent (Bauer et al., 2015). Studies from the 1990s mostly fail to find evidence that shareholder proposals improve operating performance or influence firm policies, and document insignificant or negative stock market reactions to governance proposals (Black, 1998; Karpoff, 2001; Gillian and Starks, 2007). One notable exception is Bizjak and Marquette (1998) who find that a poison pill is three times as likely to be restructured and seven times more likely to be removed when there has been a shareholder proposal, and also documents positive abnormal stock returns associated with pill restructuring following a shareholder proposal.

In the post-Enron period, there is increasing evidence that shareholder proposals affect changes in target firms' governance structures and, in some cases, enhance firm value. For example, Guo, Kruse and Noehl (2008) document that shareholder activism in the form of shareholder proposals is an important catalyst in prompting firms to drop their staggered boards, which elicits positive abnormal stock price reactions. Ertimur et al. (2011) finds that the rate of implementation for compensation-related proposals is only 5 percent but increases to 32 percent when the proposal receives a majority vote, and documents that firms with excess CEO pay before being engaged decrease total CEO pay on average by 38 percent. Thomas and Cotter (2007) and Ertimur et al. (2010) document that after 2002 boards have become significantly more responsive to shareholder proposals winning majority votes, resulting in directors being increasingly willing to remove important anti-takeover defenses, such as the classified board and poison pill, in response to shareholders' requests. However, despite the increase in support for shareholder proposals and board action in response, these studies find little evidence of any effect on firm value.

3.2.2 Sustainability and Financial Performance

The prior academic literature on the financial performance implications of sustainability investments has adopted a number of different viewpoints. One viewpoint is that such investments are efficient from shareholders' perspective. For example, enhanced sustainability performance could lead to obtaining better resources (Cochran and Wood, 1984; Waddock and Graves, 1997), higher quality employees (Turban and Greening, 1997), and better marketing of products and services (Moskowitz, 1972; Fombrun, 1996). It could also mitigate the likelihood of negative regulatory, legislative or fiscal action (Freeman, 1984; Berman et al., 1999; Hillman and Keim, 2001), while protecting and enhancing corporate reputation (Fombrun and Shanley, 1990; Fombrun, 2005; Freeman et al., 2007). A number of papers provide empirical evidence consistent with sustainability investments creating financial value. Eccles et al. (2014) identify a set of firms that adopted corporate policies related to environmental and social issues before the adoption of such policies became widespread, and find that these firms outperform their peers in the future in terms of stock market and accounting performance. Borgers et al. (2013) find that firms with better sustainability performance have higher risk-adjusted returns in the future (but that this result has reversed in more recent years).

A second viewpoint is that sustainability investments disproportionately raise a firm's costs, creating a competitive disadvantage in a competitive market (Friedman, 1970; Aupperle et al., 1985; McWilliams and Siegel, 1997; Jensen, 2002). One reason for making such inefficient investments could be that managers capture private benefits (Brammer and Millington, 2008; Cheng, Hong, and Shue, 2014). Another reason for making such inefficient investments could be managers' political beliefs (De Giuli and Kostovetsky, 2014).

There is mixed evidence in the prior literature on the relation between sustainability and financial performance (Barnett and Salomon, 2006; Margolis and Walsh, 2003; Orlitzky, Schmidt and Rynes, 2003; Hillman and Keim, 2001; McWilliams and Siegel, 2000). However, a more recent study finds that differentiating among sustainability issues based on SASB's designated materiality of each issue yields much clearer results (Khan, et al., 2016). Firms with good ratings on material sustainability issues significantly outperform firms with poor ratings on these issues. In contrast, firms with good ratings on immaterial sustainability issues do not significantly outperform firms with poor ratings on the same issues. These results are confirmed when analyzing future changes in accounting performance. In this paper, we follow the materiality analysis and methodology in Khan et al. (2016) to classify shareholder proposals that address ESG issues as financially material or immaterial. We also extend their procedure by mapping material issues for all ten SASB sectors and 79 industries.

3.2.3 Shareholder Activism on Sustainability Issues

Several papers have analyzed investor activism on ESG issues. One study analyzed shareholder proposals regarding human rights and labor standard issues and found that proposals submitted between 1970 and 2003 asked for the adoption of codes of conduct rather than changes in practice in specific regions (Proffitt and Spicer, 2006). Moreover, the same study found that half of the proposals were sponsored or co-sponsored by religious groups with the second most frequent sponsor being public pension funds. Religious groups as the major drivers of ESG activism was later confirmed by another study that analyzed proposals to 81 US companies between 2000-2003 (Monks et al., 2004). Another early study analyzed shareholder activism on social and environmental issues and found that they became increasingly frequent between 1970 and 1982 and that this increased frequency related to political and ideological processes and sentiments

(Vogel, 1983). Overall, many of these early descriptive studies found that average support for ESG proposals was low and ranged between 6 and 8 percent (Campbell et al., 1999; Monks et al., 2004; Tkac, 2006).

The results on the effect of this activism are mixed. One study concluded that shareholder proposals on environmental issues had a negligible or even negative effect on firms' environmental performance (Clark et al., 2006). The same conclusion was reached by another study that investigated the effect of environmental and social proposals on firms' environmental and social performance (David et al., 2007). The authors justified this effect by arguing that companies spend resources to resist the proposals taking resources away from improving their sustainability performance and that any changes that management agrees to make are symbolic rather than substantive. Similarly, a study of social activism by the public pension fund CalPERS failed to find any effect on shareholder value after the activism (Barber, 2006).

More recent research provides some evidence that investor activism on ESG issues affects corporate behavior and/or shareholder value. One study found that shareholder proposals on ESG reporting issues lead to increases in transparency on ESG issues and the practice of more integrated reporting (Serafeim, 2015).[34] Another study analyzed 2,152 engagements from a large asset manager and found that 382 of them were designated as successful (i.e. achieving the objective of the engagement) by the asset manager (Dimson, Karakas and Li, 2015). For the subset of successful engagements, the authors found significant increases in stock price and operating performance, consistent with such engagements improving the financial performance of the company. Another recent study examined a small number of ESG proposals that received majority

[34] "An integrated report is a concise communication about how an organization's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value in the short, medium and long term." See http://integratedreporting.org/what-the-tool-for-better-reporting/

support, which represented less than one percent of all proposals, and compared the stock price reactions around the passage of the proposals with those of proposals that failed by a small margin to receive majority support (Flammer, 2015). The stock returns were significantly positive for close call passage proposals and the study concluded that these ESG proposals were value enhancing.

3.2.4 Materiality of Sustainability Issues and Shareholder Activism

The number of sustainability issues a single firm can potentially invest in is very large. MSCI KLD, a leading data provider, ranks firms' performance on more than fifty distinct sustainability issues.[35] An increasing number of managers recognize that a given sustainability issue is unlikely to be equally material for firms across industries. For example, managing climate change risk may be strategically important for some firms, while employee health and safety issues are more likely to be strategically important for other firms. Activism in the area of ESG issues has not been driven traditionally by an assessment of materiality, though. Activism has primarily been driven by an approach where investors choose one topic, such as climate change or diversity, and then engage with a wide range of companies across industries (i.e. campaign) based on financial holdings, performance on the focal issue by the target companies, and/or the size of the target companies (Blackrock and Ceres, 2015). For example, an investor could target many large companies with poor performance on diversity issues, as part of the diversity campaign. Therefore, because a given issue can be immaterial for one industry and material for another (see Appendix III), one would expect that some of the proposals will be submitted on material and some on immaterial issues, where the exact percentage falling in either category being ex ante unclear. Based on interviews with the senior leadership of twelve of the most frequent sponsors in our

[35] For more information see the dataset list at https://goo.gl/qugXSI.

dataset we learned that other reasons for investors submitting proposals on immaterial sustainability issues include the objective function of the engagement team not being strictly financial but pursuing other objectives, along with an imperfect and incomplete understanding of what is material in each industry. For example, the CEO of a prominent responsible investing asset management firm that we interviewed discussed how the head of the engagement efforts, who had a human rights background, was placing emphasis on human rights issues in submitting shareholder proposals without applying an investment lens on whether, how and under what conditions human right issues could affect the financial performance of a company.

3.2.4.1 Implications for ESG Performace

Given the early literature that shows the ineffectiveness of investor activism on ESG issues and that proposals on ESG topics almost never receive majority support, one might expect no change in firms' ESG performance following engagement. However, the literature on social activism and organizational change provides a theory on why changes in organizational practices might be observed in this setting (den Hond and de Bakker, 2007). Social activists can elicit organizational change by challenging company actions' legitimacy on the basis of moral principles or pragmatic concerns, such as "a business case for sustainability." Ferraro and Beunza (2014) conducted a qualitative study following a religious organization that filed shareholder proposals on a number of ESG issues for three years, and found that the investor used both financial and moral arguments to persuade corporate management and were sometimes successful. Firms presented with these challenges are motivated to take the activist group seriously, and reexamine the premise and content of the challenged frames in terms of the new arguments presented by the activists (Greenwood, Suddaby, and Hinings, 2002). Firms sufficiently threatened by the challenge are likely to generate new frames more consistent with the views espoused by the activists, which

as a result change the set of organizational practices and beliefs these firms perceive as legitimate (den Hond and de Bakker, 2007; Lounsbury et al., 2003). A study that examined 94 shareholder proposals on environmental issues found an increased propensity of firms adopting the requests of the sponsor organization (Reid and Toffel, 2009).

To the extent that the null hypothesis of no change in ESG performance is rejected, one might expect larger increases in ESG performance following proposals on immaterial issues. This is because immaterial sustainability issues tend to be easier to address and they do not involve fundamental changes in the business model, processes and products of a company. In most cases they are under the direct supervision of a CSR manager or a Chief Sustainability Officer, who has the capacity to address such an issue in a short period of time, and has the responsibility and authority to invest resources without company-wide coordination and involvement (Miller and Serafeim, 2014). In contrast, material sustainability issues frequently require large investments, long-time horizons and fundamental changes in products, processes and business models that will affect multiple corporate functions (Eccles and Serafeim 2013; Miller and Serafeim, 2014). Addressing immaterial sustainability issues might be easier and requires spending relatively fewer resources, whereas addressing material sustainability issues requires structural changes in terms of how the firm makes money. This distinction coupled with the finding in previous studies that companies tend to resist shareholder proposals, leads to a prediction that proposals on immaterial issues might be more effective at increasing the performance of the company on the focal issue.

On the other hand, ESG performance might improve more on material issues if companies ignore proposals on immaterial issues, since such issues are not connected to a company's business model and strategy. Under the assumptions that managers have complete and perfect knowledge of the materiality of ESG issues and no agency problems exist between managers and shareholders,

one would expect managers to improve ESG performance to a greater degree following shareholder proposals on material issues.

3.2.4.2 Implications for Market Valuation

If proposals have a negligible effect on a company's ESG performance then one might expect no effect on the firm's market valuation. In contrast, if the proposals lead to a change in a firm's ESG performance then this could affect the market valuation of a firm. Past research has shown that firms with good performance on material sustainability issues outperform firms with poor performance on those same issues (Khan et al., 2016). In contrast, firms' performance on immaterial issues is not predictive of future financial performance. One might then predict that after engagement on material sustainability issues, the market value of the company would increase while after engagement on immaterial issues, the market value of the company would be unaffected.

There are, however, a number of reasons why these predictions might not hold in the setting of activist-driven changes in corporate behavior relating to ESG. For instance, in the case of material sustainability issues, it is not clear whether investors pressure firms to improve their performance beyond the point that is optimal. Improving ESG performance in a way that is neutral to or synergistically improves financial performance is difficult. Quite often, companies find that critical trade-offs are involved, at least in the short term. At a certain point, higher ESG performance could come at a cost to shareholders (Eccles, Ioannou and Serafeim, 2014). This suggests that there could be an optimal degree of adoption of such practices, beyond which point a commitment to it becomes value-destroying, at least in the short term (Eccles et al., 2014). While firms might be improving their performance on an ESG issue in a way and pace that make financial sense, this might not be true when they are faced with investor pressure. For example, moving

towards renewable energy and achieving a target supply of 20 percent in ten years might be accomplished in a financially beneficial manner while the same target within three years might be accomplished by sacrificing financial returns and adopting technologies that might be less commercially advantaged.

Similarly, in the case of immaterial sustainability issues, firms might be forced to improve their performance and spend more resources than they would otherwise make in the absence of investor pressure. To the extent that this is true, then one might expect investments in immaterial sustainability issues being value decreasing, rather than value neutral, as was found in Khan et al. (2016). These proposals could be even more value destroying if they divert the attention of senior management and directors away from the most pressing business issues, leading to loss of customers and decreased competitiveness (Simons, 2013). For example, in an interview with a board member of one of the largest financial institutions, we learned how, following a shareholder proposal, the board of directors and management had spent significant time setting carbon emission reduction targets for the organization but neglected assessing carbon risk in the loan portfolio, leading to significant losses after the collapse of many coal companies. Overall, the value implications from investor induced changes in ESG performance may be fundamentally different from the value implications of changes in ESG performance initiated by management.

3.3 Data and Sample

3.3.1 Materiality Data

Our data collection is driven by the availability of materiality guidance from SASB, which is an independent 501(c)3 non-profit whose mission is to develop and disseminate sustainability accounting standards that help publicly-listed corporations disclose material factors in compliance with SEC requirements. SASB standards are designed for the disclosure of material sustainability

issues in mandatory SEC filings, such as the Form 10-K and 20-F. SASB is accredited to establish sustainability accounting standards by the American National Standards Institute (ANSI), and such accreditation is intended to signify that SASB's procedures to develop sustainability accounting standards meet the Institute's requirements for openness, balance, consensus and due process. SASB's board comprises a mix of regulators, academics, lawyers, and investors, including two former Chairwomen of the SEC and a former Chairman of the FASB.

SASB adopts an investor viewpoint and, as a result, a topic might be classified as immaterial from an investor standpoint although such a topic could be important for other stakeholders. That being said, we expect that there will be an overlap between materiality classifications for different stakeholders if sustainability investments affect financial performance via their effect on, for example, customer satisfaction, loyalty, employee engagement, and regulatory risk. SASB uses the SEC definition of materiality as interpreted by the U.S. Supreme Court.[36,37] The Public Company Accounting Oversight Board (PCAOB) also refers to the U.S. Supreme Court[38] interpretation of securities laws in its materiality guidance, that is, material information is defined as presenting a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the total mix of information made available. Like the PCAOB, SASB defines material information as information that represents a substantial likelihood that its disclosure will be viewed by the reasonable investor as significantly altering the total mix of information made available.

[36] TSC Industries v. Northway, Inc., 426 U.S. 438, 449 (1976). See also Basic, Inc. v. Levinson, 485 U.S. 224 (1988).
[37] The Public Company Accounting Oversight Board is a nonprofit corporation established by the U.S. Congress to oversee the audits of public companies in order to protect investors and the public interest by promoting informative, accurate, and independent audit reports. http://pcaobus.org/About/Pages/default.aspx.
[38] TSC Industries v. Northway, Inc., 426 U.S. 438, 449 (1976). See also Basic, Inc. v. Levinson, 485 U.S. 224 (1988).

The investor focus of SASB is narrower compared to other organizations such as the Global Reporting Initiative (GRI), which has a multi-stakeholder focus. The GRI states that the information in a GRI-compliant report should cover Aspects[39] that: reflect the organization's significant economic, environmental, and social impacts; or substantively influence the assessments and decisions of stakeholders. Materiality for the GRI is the threshold at which Aspects become sufficiently important that they should be reported.[40]

SASB's standards are developed via a multi-stakeholder process consisting of research supported by Bloomberg technology, data and analytical tools; balanced, multi-stakeholder industry working groups; a public comment period; and review by an independent Standards Council comprised of experts in standards development, securities law, environmental law, metrics and accounting.[41] Appendix I illustrates each step of the standard setting process. SASB convenes balanced industry working groups—consisting of 1/3 corporations, 1/3 market participants, and 1/3 other stakeholders—to provide feedback on SASB's draft sustainability accounting standards. More than 3,000 experts representing more than $30 trillion in assets under management and $15 trillion in company market capitalization participated in SASB's industry working groups between 2013 and 2016.

For each topic, SASB conducts an evidence of materiality test, informed by staff research and industry working groups, the results of which ultimately are debated and reviewed by the Standards Council after industry working groups composed of industry experts have provided their

[39] The term "Aspect" is used in the GRI G4 Guidelines (Guidelines) to refer to the list of subjects for disclosure that are covered by the Guidelines. Aspects are set out into three Categories - Economic, Environmental and Social. The Social Category is further divided into four sub-Categories, which are Labor Practices and Decent Work, Human Rights, Society and Product Responsibility. See https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf.

[40] Global Reporting Initiative. *G4 Sustainability Reporting Guidelines, Reporting Principles and Standard Disclosures*, https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf.

[41] See www.sasb.org

input. The test has three components: evidence of interest, evidence of financial impact, and forward impact adjustment. We describe each one in more detail in Appendix II but the interested reader can find more information on the SASB website.

3.3.2 Sustainability Data

We use MSCI KLD as our source of sustainability data, the most widely used dataset in past studies. For the purposes of this paper, KLD has a number of advantages. First, it includes a large number of U.S. companies over a long period of time. In particular, between 1991 and 2000 it included approximately 650 companies, 2001-2002 1,100 companies, and 2003-2012 3,000 companies. Other databases with sustainability data (for example, Thomson Reuters ASSET4) have shorter time-series and cover fewer U.S. companies. Another advantage of the KLD data is that it provides information about performance on a specific issue in a standardized format rather than the presence or absence of disclosure, as is the case for many data items in ASSET4 or Bloomberg.

KLD data have been widely used in the literature by researchers examining the relation between social responsibility and financial performance (e.g., Graves and Waddock, 1994; Turban and Greening, 1997; Mattingly and Berman, 2006; Godfrey, Merrill and Hansen, 2009; Ioannou and Serafeim, 2014). Researchers at KLD review the company's public documents, including the annual report, the company website, corporate social responsibility reporting, and other stakeholders' and data sources. Company ratings represent a snapshot of the firm's profile at calendar year end. KLD researchers also monitor media sources for developing issues on a daily basis. The KLD dataset is compiled around the beginning of every year (i.e. January) and it is typically available in spreadsheets for distribution by end of February at the latest.

The KLD historical ratings data set is designed as a binary system and comprises both strengths and concerns. Strengths represent policies, procedures, and outcomes that enable a firm to have a positive impact on the focal issue. Concerns represent policies, procedures, and outcomes that tend to have a negative impact on the focal issue. For each strength or concern rating applied to a company, KLD includes a "1" indicating the presence of that screen/criterion and a "0" indicating its absence. In total, seven issue areas are included: a) Community, b) Corporate Governance, c) Diversity, d) Employee Relations, e) Product, f) Environment, and g) Human Rights. Within each issue area, multiple topics and respective data items exist. For example, under the Environment issue area, KLD tracks performance on waste management, packaging materials and waste, environmental opportunities, climate change, and water stress, among other issues. Under the Social issues area, KLD tracks performance on community engagement, human rights, union relations, workforce diversity, and access to finance, among other issues. Under Governance issues area, KLD tracks performance on issues including reporting quality, corruption and political instability, financial system instability, governance structure, and business ethics.

Table 3.1 shows how we arrive at the final sample from the original ISS dataset for years between 1997 and 2012. We do not include years 2013 and 2014 because MSCI has made significant changes to KLD indicator classification since the 2013 data. Starting from 4,796 SRI proposals, we remove omitted proposals, sustainability reporting related resolutions and observations with missing data to arrive at the final sample of 2,665 proposals. We exclude sustainability reporting proposals because they are a request to increase transparency across a range of ESG issues and therefore we cannot classify them as material or immaterial. Table 3.2 shows the number of total proposals and the proportion of material proposals by year, sector, and sponsor type. Panel A shows that the percentage of material proposals range from 29 to 52 percent

during the years 1997 to 2012. On average, 42 percent of the proposals were on material issues. Panel B shows the distribution of proposals across sectors. Forty-nine percent of the proposals were material for the energy, 42 for the materials, 32 for the industrials, 44 for the consumer discretionary, 46 for the consumer staples, 26 for the healthcare, 55 for the financials, 32 for the information technology, 45 for the telecommunication services, and 42 for the utilities sector, respectively. Panel C shows the sample by sponsor type. The sample comprises of 240 proposals from individuals, 466 from public pension funds, 663 from religious groups, 604 from SRI funds, 250 from special interest groups, 195 from union funds, and 224 from coalitions. Firms are allocated to sectors and industries according to the Bloomberg Industrial Classification System (BICS) and the Sustainability Industrial Classification System (SICS).[42] We mapped every industry in BICS to every industry in SICS in order to merge financial data with sustainability data. BICS is the standard system used by investments banks and money management firms.[43]

Table 3.1 Sample Selection

	# of Proposals
ISS Shareholder Proposal Data (1997-2012)	**14,986**
Less: corporate governance proposals	-10,190
ESG Proposals	**4,796**
Less: omitted proposals	-816
ESG Proposals Voted or Withdrawn	**3,980**
Less: sustainability reporting related resolutions	-305
Less: missing firm identifiers	-62
Less: missing proposal issues	-122
Less: missing GICS industry information	-379
Less: missing KLD data	-381
Less: missing required financial information	-66
Total	**2,665**

Table 3.2.A Sample Composition Frequencies (By Year)

Year	# of Proposals	# of Material Proposals	% Material Proposals

[42] For more information see http://www.sasb.org/sics/

[43] SASB's industrial classification system is powered by the Bloomberg Industry Classification System. SASB leverages the Bloomberg Industry Classification System to identify which industry companies are assigned to.

1997	109	44	40%
1998	110	47	43%
1999	101	47	47%
2000	115	58	50%
2001	152	77	51%
2002	173	88	51%
2003	164	85	52%
2004	194	82	42%
2005	186	79	42%
2006	182	72	40%
2007	196	74	38%
2008	217	87	40%
2009	205	83	40%
2010	211	97	46%
2011	187	55	29%
2012	163	47	29%
Total	**2,665**	**1,122**	**42%**

Table 3.2.B Sample Composition Frequencies (By Sector)

GICS Sector	# of Proposals	# of Material Proposals	% Material Proposals
Energy	357	175	49%
Materials	155	65	42%
Industrials	392	127	32%
Consumer Discretionary	475	208	44%
Consumer Staples	387	177	46%
Health Care	208	54	26%
Financials	315	173	55%
Information Technology	159	51	32%
Telecommunication Services	51	23	45%
Utilities	166	69	42%
Total	**2,665**	**1,122**	**42%**

3.3.3 Identification of the Materiality and Immateriality Proposals

In order to classify ISS proposals as material or immaterial, we first attach KLD data items to each unique proposal in our data, using the 'resolution' data field from ISS which contains a one-line description of the proposal. Then, we follow guidance from SASB for each one of the more than 80 SICS industries in our sample to classify each KLD data item as material or

immaterial. Specifically, we download each industry standard that identifies material sustainability issues for companies within an industry. To identify KLD topics to ISS proposals and classify the topics' materiality, one researcher takes the lead in one sector and all the industries included in that sector. For each industry, KLD data items that are mapped to material SASB items are classified as material for a given industry, and all remaining KLD items are classified immaterial for the same industry. After having a complete mapping, another researcher follows the same process. The two mappings are then compared by a third researcher, who assesses any differences. In our case, differences in mappings across researchers were minimal.[44]

Appendix III shows the materiality map of SASB at the sector level and Appendix V presents examples of shareholder proposals and how they were coded. A more granular view at the industry level can be obtained by visiting the SASB website. Industries within a sector generally had similar issues classified as material but differences could be found. Approximately 50 percent of all possible sector-SASB issue pairs were either material or immaterial for all industries within the sector. The largest variability across industries within a sector is in the services sector where only 20 percent of the issues were either material or immaterial across all industries. The lowest variability is within the financials and technology and communication sectors with more than 67 percent. The total number of material items identified is small compared to the total number of KLD data items, which is 124, consistent with SASB claims that their guidance narrows significantly the number of issues that a firm needs to disclose. The number of material data items ranges from 13 for the healthcare sector to 32 for the services sector while the financials, transportation, and the nonrenewable resources sector have 22, infrastructure has 25, consumption 1 has 21, consumption 2 has 31, resource transformation has 20, and the technology

[44] The two researchers disagreed on 1% of the total number of mappings. These differences were resolved by consultation with the third researcher.

and communications sector has 19 data items that are material. Broadly speaking, environmental issues tend to be more material for the nonrenewable resources and transportation sectors, governance and product related issues tend to be more material for the financial sector, and social issues tend to be more material for the healthcare, services, and the technology and communications sectors.

To construct an index that measures a firm's performance on a KLD category topic *j* that a shareholder proposal relates to (i.e. diversity, employee relations, product safety, environment etc.) for firm *i* in year *t,* we follow the practice, common in prior literature, of subtracting the concerns from the strengths to arrive at a single net index (e.g., Graves and Waddock, 1994; Griffin and Mahon, 1997; Waddock and Graves, 1997; Johnson and Greening, 1999; Ruf et al., 2001; Ioannou and Serafeim, 2014):

$$\textit{Category Index}_{ijt} = \sum \boldsymbol{STRENGTH}_{ijt} - \sum \boldsymbol{CONCERN}_{ijt} \quad (9)$$

Table 3, Panels A-C present summary statistics and univariate correlations between the variables used in our analysis. We adjust both category index and Tobin's Q for each firm-year using the median level within industry. We also report measures adjusted for the level of a matched control firm, using a process we discuss below. The average value of the industry-adjusted category index is negative suggesting that investors target firms with relatively weak performance on the focal ESG issue. The average industry-adjusted Tobin's Q is positive consistent with the firms being targeted in our sample being large and profitable firms.

It is worth noting that if a shareholder proposal on one firm motivates action in other firms in the same industry and same topic (e.g. filing a water related proposal for PepsiCo leads to Coca Cola taking action on water related issues), then adjusting for the median level of the industry effectively biases the coefficients towards zero and against finding any results. Therefore, our

research design could be a conservative test of the effectiveness of shareholder proposals in the presence of industry spillover effects.[45]

Table 3.3.A Summary Statistics

Industry adjusted Category Index is the KLD score relating to the KLD category in the ESG proposal that the firm is engaged on, adjusted by the industry median. Matched adjusted Category Index is the KLD score relating to the KLD category in the ESG proposal that the firm is engaged on, adjusted by the same KLD category KLD score for a propensity scored matched control firm. Post is a dummy variable that indicates the year and years after a firm is engaged on an ESG related issue. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Post is an interaction between Material and Post. Industry adjusted Tobin's Q is (market value of equity - book value of equity + total assets)/total assets, adjusted by the industry median. Match adjusted Tobin's Q, which is (market value of equity-book value of equity +total assets)/total assets adjusted by the Tobin's Q of the propensity score matched control firm. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, etc.), and zero otherwise.

Variable	N	Mean	Std Dev	Q1	Q3
Ind. Adj. Category Index	26,423	-0.1229	1.2575	-0.8444	0.3448
Match Adj. Category Index	22,426	0.1096	1.0120	0.0000	1.0000
Ind. Adj. Tobin's Q	26,423	0.5254	1.1104	-0.0740	0.7458
Match Adj. Tobin's Q	22,426	0.0117	0.3944	-0.0197	0.1161
Log(Assets)	26,423	10.1054	1.6540	8.9849	11.1220
Capex/Assets	26,423	0.0533	0.0420	0.0227	0.0749
R&D/Assets	26,423	0.0176	0.0310	0.0000	0.0228
Leverage	26,423	0.2570	0.1528	0.1473	0.3530
Governance Proposal	26,423	0.7269	0.4456	0.0000	1.0000

Table 3.3.B Summary Statistics by Materiality

	Material		Immaterial	
Variable	Mean	Std Dev	Mean	Std Dev
Ind. Adj. Category Index	-0.2285	1.3784	-0.0468	1.1568
Match Adj. Category Index	0.0694	1.1096	0.1383	0.9323
Ind. Adj. Tobin's Q	0.5212	1.1313	0.5284	1.0952
Match Adj. Tobin's Q	0.1083	0.3492	-0.0573	0.4503
Log(Assets)	10.1766	1.7232	10.0541	1.6004
Capex/Assets	0.0543	0.0444	0.0526	0.0401
R&D/Assets	0.0136	0.0276	0.0205	0.0329
Leverage	0.2743	0.1579	0.2446	0.1479
Governance Proposal	0.7075	0.4549	0.7409	0.4382

[45] Testing for spillover effects is inherently difficult due to the difficulty in identifying an unaffected control group. Using firms having the highest quintile of category index score on the issue of the proposal within the same industry-year as the benchmark (under the assumption that the best performers will be less likely to be worried about being the target of shareholder activism) we found no evidence of a spillover effect.

Table 3.3.C Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Ind. Adj. Category Index	1							
(2) Ind. Adj. Tobin's Q	-0.0236*	1						
(3) Match Adj. Category index	0.2132*	-0.0102*	1					
(4) Match Adj. Tobin's Q	-0.0111*	0.1701*	0.0013*	1				
(5) Log(Assets)	0.0191*	-0.2097*	0.0235*	-0.1493*	1			
(6) Capex/Assets	0.0445*	0.1474*	0.0382*	0.0934*	-0.1885*	1		
(7) R&D/Assets	0.0943*	0.2175*	0.1328*	0.1802*	-0.0348*	-0.1185*	1	
(8) Leverage	0.0128*	-0.1638*	0.0390*	-0.0883*	0.0502*	-0.0912*	-0.1964*	1
(7) Gov. Proposal	-0.0048	-0.0755*	-0.0012*	-0.1283*	0.4286*	-0.0885*	0.0046	0.011

3.3.4 Research Design

We construct a panel dataset that consists of 26,423 firm-year-proposals and use the following specification as a base to conduct our analyses. We include five years before the year of the proposal and five years after the year of the proposal in addition to the year of the proposal in our sample. Our research design is similar to the one used by studies that test for the long-term effect of hedge fund activism (e.g. Bebchuk, et al., 2015):

$$Dep\ Var_{ijt} = \alpha + \beta^{*}\sum_{t} Event\ Time\ Indicator_{ijt} + \gamma^{*}\sum_{t} Material_{it}\ X\ Event\ Time\ Indicator_{ijt} + Controls_{it} + year\ f.e. + firm\text{-}proposal\ f.e. \quad (10)$$

The dependent variables are Category Index and Tobin's Q, both of which are adjusted by the industry median for firm i, in year t and proposal j.[46] Adjusting for industry median effectively controls for time-varying changes in industry ESG performance and market valuation. Tobin's Q, named after Noble-prize-winner James Tobin, is "a measure that reflects the effectiveness with which a company turns a given book value into market value accrued to investors" (Bebchuk, et al., 2015). Tobin's Q has been used extensively in studies that seek to measure the efficiency of

[46] We use GICS industries as the level of industry adjustment. Adjusting at the sub-industry or at the sector level yields similar results. We include all firms with available data in Compustat as the sample for calculating the median value for each industry-year.

corporate practices or institutions, such as governance arrangements, ownership structures, or investor protection rules (Morck, Shleifer and Vishny, 1988; Bebchuk, et al., 2015).

Event-time indicators are T through T+5, where T indicates the year that a sponsor submits a proposal, T+1 indicates the year after a sponsor submitted a proposal, T+2 indicates two years after a sponsor submitted a proposal, and etc. Material is an indicator variable equal to one if the shareholder proposal is material, zero otherwise. We interact Material and the series of Event Time Indicators to denote each year with respect to the base year with a material engagement. For example, Material X T is an indicator equal to one for material proposals in the year of engagement, and zero for every year before and after the engagement; Material X T+1 is an indicator equal to one for material proposals one year after the engagement and zero for every year before and after T+1; and Material X T+2 is an indicator equal to one for material proposals two years after the engagement and zero for every year before and after T+2, and so on.

We include a series of firm-level time-varying controls that are identified to be correlated with firm value and firm ESG performance in the prior literature. Log of Assets is defined as the natural logarithm of total assets. Capex/Assets is defined as the ratio of capital expenditure and total assets and R&D/Assets is defined as the ratio of research and development expense and total assets. Leverage is defined as the sum of long-term debt and current debt divided by total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, etc.), and zero otherwise.[47] We also include year fixed effects to mitigate the effect of any year-specific and firm invariant omitted variables, and firm-proposal fixed effects to

[47] In unreported results, we included an indicator variable only for governance proposals that received majority support. The results were very similar to the ones we document here.

mitigate the effect of any firm-proposal specific but time invariant omitted variables (e.g. Rio Tinto and community relations versus Rio Tinto and water consumption). The inclusion of firm-proposal fixed effects and year fixed effects automatically subsumes heterogeneity at the firm, proposal and time period levels, such that our identification relies on variation within the same proposal for the same firm, over time.

3.3.5 Unobservable Factors and Selection Bias

First, we note that adjusting for industry median potentially downward biases the coefficients of interest if some of the industry members are also experiencing shareholder activism that we do not observe (i.e. private engagement). If these private engagements lead to changes in firms' ESG and financial performance in the same way that public engagements do, then our tests will fail to find any effect from shareholder activism. We attempt to provide evidence later in the paper on whether private engagements are more or less focused on material ESG issues using proprietary data from one of the largest socially responsible investors.

Second, a phenomenon that might bias against finding an effect from shareholder activism is if the firm that the sponsor files a proposal for has been improving its ESG performance before the year of the shareholder proposal through private engagements with investors. In this case, our coefficients of interest will be biased towards zero as they effectively model performance relative to the period prior to the year in which the shareholder proposal is filed. In contrast, if engaged firms were making changes without shareholder activism and following the shareholder proposal these management-initiated changes are generating performance differences, this will lead us to incorrectly reject the null hypothesis of no effect although the changes in observed ESG performance and firm valuation are not the result of shareholder activism.

It is nearly impossible to completely mitigate the first effect. Therefore, readers should interpret our results as potentially providing a lower bound of the effectiveness of shareholder proposals. To the extent that private engagements are happening at the same rate and have similar effectiveness across material and immaterial issues, this will not affect the implications from shareholder proposals filed on material or immaterial issues. However, if private engagements are more focused on and are more effective for immaterial issues, then we would find a stronger effect on ESG performance from proposals filed on material issues. Similarly, if private engagements are more focused on and are more effective for material issues, then we would find a stronger effect on ESG performance from proposals filed on immaterial issues.

The second and third effect suggests that there could be a pre-shareholder proposal trend in ESG performance. We formally test for this possibility by plotting in Figures 3.1.A and 3.1.B the evolution over time of our dependent variables: industry-adjusted category index and Tobin's Q. We find that for the five years prior to engagement, industry-adjusted category index is flat for immaterial issues and declining for material issues suggesting that, at least for material issues, investors engage with firm with deteriorating material ESG performance. Across both material and immaterial engagements, firms have negative industry-adjusted category index suggesting that investors target firms with poor ESG performance. For both material and immaterial issues, Tobin's Q is declining over time suggesting that investors engage with firms with declining financial performance. However, we do note that the industry-adjusted Tobin's Q is positive suggesting that these are profitable firms relative to their industry peers. We note these trends as they might affect inferences drawn in our main results.

Figure 3.1.A Industry-adjusted ESG Category Index Before Activism

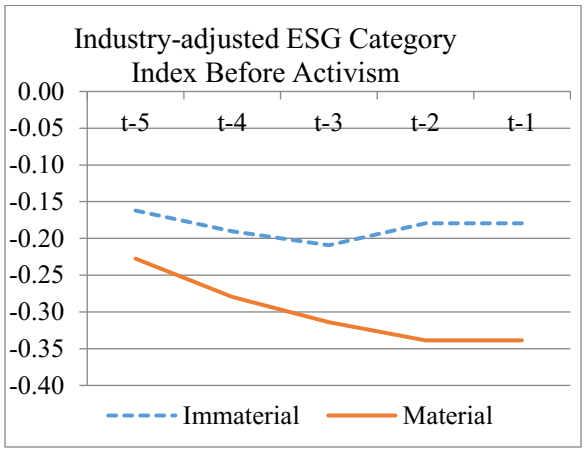
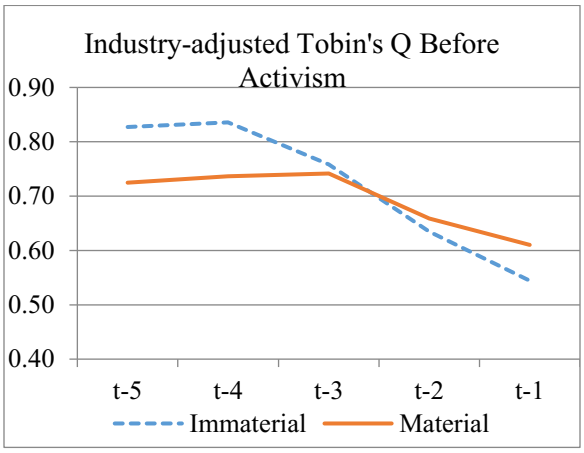


Figure 3.1.B Industry-adjusted Tobin's Q Before Activism



To address concerns that pre-shareholder proposal trends might affect subsequent trends in category index or Tobin's Q, we implement a nearest-neighbor propensity score matching process with replacement. We use exact matching for the year of the engagement from a pool of firms that have not been subject to engagement. Then we propensity score match using the following model:

$$\textit{Engagement}_{it} = f(\textit{Firm size}_{it-1}, \textit{Tobin's Q}_{it-1}, \textit{Tobin's Q}_{it-2}, \textit{Tobin's Q}_{it-3}, \textit{Tobin's Q}_{it-4}, \textit{Tobin's Q}_{it-5}, \textit{Category Index}_{ijt-1}, \textit{Category Index}_{ijt-2}, \textit{Category Index}_{ijt-3}, \textit{Category Index}_{ijt-4}, \textit{Category Index}_{ijt-5}, \textit{Industry Effects}) \quad (11)$$

Effectively, model (11) matches 'treatment' firms that experienced activism to 'control' firms that did not experience activism and have very similar levels of both Tobin's Q and Category Index for the five years before the activism. Therefore, both the levels and the trends should be very similar across the two groups. We then estimate model (10) but instead of industry-adjusting the outcome variable (i.e. Category Index or Tobin's Q), we adjust for the level of the matched control firm. Out of the 2,665 proposals we find a suitable match for 2,336 (88%). This leaves us with 22,246 firm-year-proposal observations for the matched sample. Figures 3.2.A and 3.2.B show no differential trends over time for the matched sample relative to the control sample suggesting that the matching procedure worked effectively. This is the case both for material and

immaterial proposals. Moreover, treatment and control firms exhibit very similar levels of category index and Tobin's Q across all years before the engagement. Table 3.4 presents the average values for all matching covariates for both treatment and control groups. None of the differences is statistically significant.

Figure 3.2.A ESG Category Index Before Activism- Matched Sample

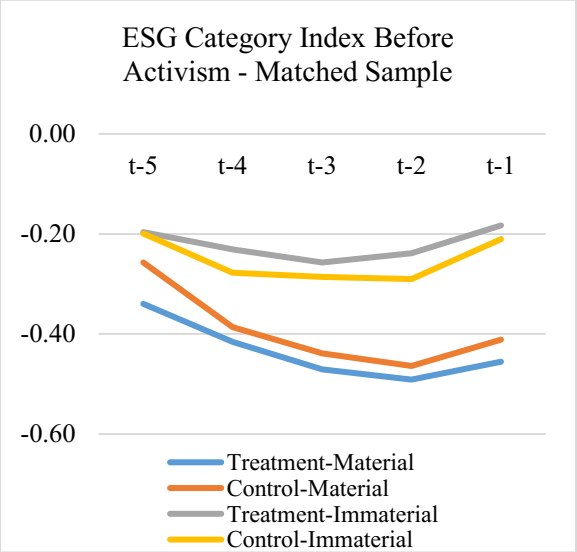


Figure 3.2.B Tobins'Q Before Activism-Matched Sample

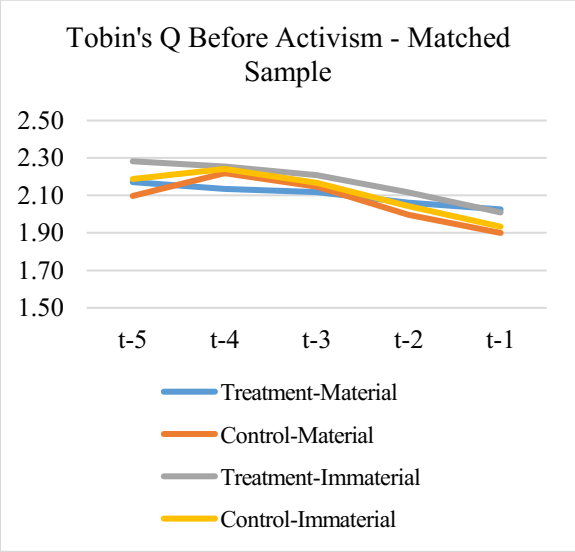


Table 3.4 Levels of Matching Variables for Samples of Engaged and Control Firms

Table shows average values for matched treated and control firms. We implement a nearest-neighbor propensity score matching process with replacement. We use exact matching for the year of the engagement *t* from a pool of firms that have not been subject to engagement. Then we propensity score match using the following model: $Engagement_{it} = f$ *(Firm size*$_{it-1}$*, Tobin's Q*$_{it-1}$*, Tobin's Q*$_{it-2}$*, Tobin's Q*$_{it-3}$*, Tobin's Q*$_{it-4}$*, Tobin's Q*$_{it-5}$*, Category Index*$_{ijt-1}$*, Category Index*$_{ijt-2}$*, Category Index*$_{ijt-3}$*, Category Index*$_{ijt-4}$*, Category Index*$_{ijt-5}$*, Industry Effects)*

	Matched Treated (engaged)	Matched Control (not engaged)		
	Mean	Mean	Diff	t-stat
ln(totalassets) for T-1	10.04	9.47	0.57	1.19
Categoryindex for T-1	-0.296	-0.294	0.00	0.07
Categoryindex for T-2	-0.343	-0.362	0.02	0.58
Categoryindex for T-3	-0.346	-0.349	0.00	0.11
Categoryindex for T-4	-0.307	-0.323	0.02	0.51
Categoryindex for T-5	-0.256	-0.223	-0.03	0.62
Tobin's Q for T-1	2.016	1.920	0.10	0.96
Tobin's Q for T-2	2.093	2.023	0.07	0.74
Tobin's Q for T-3	2.171	2.159	0.01	0.31
Tobin's Q for T-4	2.204	2.232	-0.03	0.44
Tobin's Q for T-5	2.236	2.150	0.09	0.89

3.4 Results

3.4.1 Sustainability Performance

Table 3.5.A presents evidence on the association between shareholder proposals and subsequent ESG performance. We implement a panel-level specification using industry-adjusted category index score as the dependent variable. Recall that this dependent variable measures the firm's performance, over time, on the focal ESG topic identified by the shareholder proposal. In Column 1, we regress the dependent variable on event-time indicators (T through T+5) where T is the year that a sponsor submits a proposal, interactions of event-time dummies with the "Material" indicator that takes the value of one if the proposal is on a material ESG issue, year fixed effects, and firm-proposal fixed effects. This basic specification enables us to understand the difference in relation between shareholder proposals filed on material and immaterial sustainability issues and firm ESG performance over time, controlling for firm- year- and proposal- invariant factors. In Column 2, we add firm size, capital expenditure, R&D expense, and leverage to the original specification to control for time-varying firm financial characteristics that could affect a firm's ESG performance. In Column 3, we add an indicator for corporate governance proposals, which is equal to one if in any of the previous five years a governance proposal has been submitted for this firm. This is to prevent us from potentially attributing the increase in category index score to ESG engagements as opposed to governance engagements. In all three specifications, we find that proposals filed on immaterial issues are accompanied by larger and faster increases in a firm's performance on the ESG issue that the proposal identifies, relative to proposals on material issues. The coefficients on the interactions of event-time indicators with the Material indicator are negative but barely significant, suggesting that, statistically, proposals on material issues have no differential effect on ESG performance compared to proposals on immaterial issues.

Table 3.5.A Industry Adjusted Sustainability Performance

Dependent variable is the Industry adjusted Category Index. Industry adjusted Category Index is the KLD score relating to the KLD category in the ESG proposal that the firm is engaged on, adjusted by the industry median. T through T+5 are event-time dummies indicating the base year of the engagement to five years after the engagement. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Ts are interactions of event-time dummies with the "Material" indicator. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, and etc.), and zero otherwise. Standard errors are robust and clustered at the firm-level.

Dep Variable	*Industry Adj. Category Index*					
	(1)		(2)		(3)	
	Coefficient	t	Coefficient	t	Coefficient	t
T	0.0578	2.06	0.0619	2.22	0.0553	2.02
T+1	0.1285	3.47	0.1353	3.61	0.1200	3.26
T+2	0.1741	3.93	0.1827	3.99	0.1563	3.53
T+3	0.2039	4.05	0.2142	4.08	0.1774	3.56
T+4	0.2549	4.01	0.2674	4.05	0.2195	3.47
T+5	0.2236	3.17	0.2380	3.22	0.1763	2.49
Material X T	-0.0337	-0.55	-0.0384	-0.63	-0.0363	-0.61
Material X T+1	-0.1105	-1.51	-0.1166	-1.61	-0.1093	-1.53
Material X T+2	-0.1002	-1.34	-0.1061	-1.44	-0.0960	-1.32
Material X T+3	-0.0958	-1.33	-0.1008	-1.42	-0.0933	-1.34
Material X T+4	-0.1024	-1.27	-0.1085	-1.36	-0.1026	-1.30
Material X T+5	-0.0758	-0.86	-0.0822	-0.95	-0.0775	-0.90
Log(Assets)			0.0379	0.44	0.0565	0.67
Capex/Assets			1.4629	1.52	1.4466	1.56
R&D/Assets			1.0322	0.46	1.0447	0.47
Leverage			-0.0031	-0.02	-0.0074	-0.04
Governance Proposals					-0.3038	-4.13
Number of Obs	26423		26423		26423	
Adjusted R-Squared	0.5695		0.5695		0.5731	
Year F.E.	Yes		Yes		Yes	
Firm-Proposal F.E.	Yes		Yes		Yes	

These results are confirmed in Table 3.5.B which uses the propensity score matched sample. The coefficients are similar and again we find sharper increases after activism on immaterial ESG issues. Similar to Table 3.5.A, performance on the focal ESG issues increases after activism on material and immaterial issues. Figures 3.3.A and 3.4.A provide a graphical illustration that corroborates our panel results: engagement via shareholder proposals is associated with improved subsequent performance of the company on the focal ESG issue across both material and immaterial issues.

Figure 3.3.A Industry-adjusted ESG Category Index After Activism

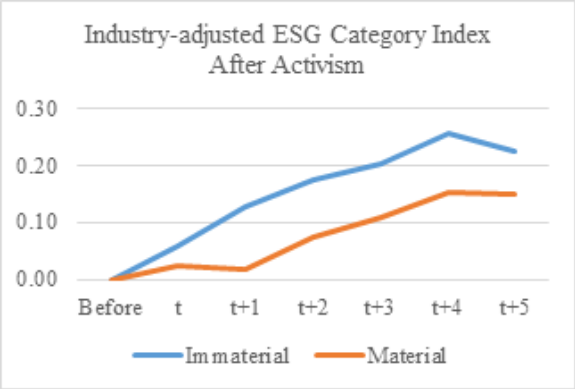


Figure 3.4.A Matched Control-adjusted ESG Category Index After Activism

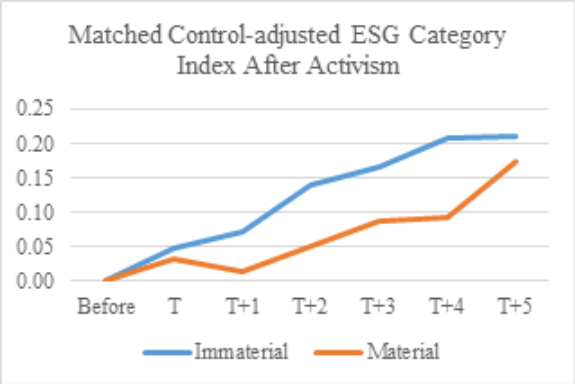


Table 3.5.B Matched Control Adjusted Performance

Dependent variable is the Matched adjusted Category Index. Matched adjusted Category Index is the KLD score relating to the KLD category in the ESG proposal that the firm is engaged on, adjusted by the same KLD category KLD score for a propensity scored matched control firm. All other variables are as in Table 3.5.A. Standard errors are robust and clustered at the firm-level.

Dep Variable	*Match Adj. Category Index*					
	(1)		(2)		(3)	
	Coefficient	t	Coefficient	t	Coefficient	t
T	0.0483	1.64	0.0522	1.76	0.0435	1.51
T+1	0.0710	1.66	0.0772	1.77	0.0594	1.41
T+2	0.1393	2.65	0.1467	2.68	0.1121	2.15
T+3	0.1667	2.87	0.1758	2.91	0.1322	2.31
T+4	0.2089	2.73	0.2199	2.78	0.1624	2.14
T+5	0.2100	2.44	0.2224	2.48	0.1500	1.76
Material X T	-0.0166	-0.26	-0.0206	-0.33	-0.0203	-0.34
Material X T+1	-0.0569	-0.70	-0.0616	-0.76	-0.0575	-0.72
Material X T+2	-0.0898	-1.06	-0.0946	-1.13	-0.0860	-1.05
Material X T+3	-0.0807	-0.93	-0.0847	-0.99	-0.0789	-0.95
Material X T+4	-0.1153	-1.23	-0.1212	-1.31	-0.1170	-1.29
Material X T+5	-0.0353	-0.31	-0.0417	-0.37	-0.0360	-0.32
Log(Assets)			0.0368	0.42	0.0612	0.70
Capex/Assets			1.2334	1.24	1.2151	1.27
R&D/Assets			1.1972	0.59	1.1236	0.56
Leverage			0.0303	0.13	0.0289	0.13
Governance Proposals					-0.3365	-4.92
Number of Obs	22426		22426		22426	
Adjusted R-Squared	0.6026		0.603		0.6069	
Year F.E.	Yes		Yes		Yes	
Firm-Proposal F.E.	Yes		Yes		Yes	

3.4.2 Firm Value

Table 3.6.A presents evidence on the impact of shareholder proposals on firm value. Similar to Table 3.5.A, we implement a panel-level specification. In Column 1, we regress industry-adjusted Tobin's Q on event-time dummies (T through T+5), interactions of event-time indicators with the "Material" indicator, year fixed effects, and firm-proposal fixed effects. This enables us to understand the difference in relation between shareholder proposals filed on material and immaterial sustainability issues and firm valuation over time. In Column 2, we control for time-varying firm financial characteristics and, in Column 3, we again include the corporate governance proposal indicator to prevent us from potentially attributing the increase in firm value to ESG engagements as opposed to governance engagements. In Column 4, we exclude observations of firms that experienced both a material and immaterial proposal within a same 2-year span from column 3 to ensure that we are able to differentiate the effect of proposals relating to material versus immaterial topics.

In all four specifications, we find that subsequent to filing shareholder proposals, targeted firms experience changes in Tobin's Q over time. However, proposals have a substantially different association to firm valuation depending on whether they relate to immaterial versus material issues. Proposals on immaterial issues are associated with subsequent declines in Tobin's Q. In contrast, proposals on material issues are associated with subsequent and steady increases in Tobin's Q. These results are confirmed in Table 3.6.B using the propensity score matched sample. Figures 3.3.B and 3.4.B are graphical illustrations that corroborate our panel results: pressure on companies to address ESG issues that are not financially material for the firm but are relevant to other stakeholders is associated with subsequent declines in market valuation, while the opposite is true for proposals on material issues.

Table 3.6.A Industry Adjusted Performance

Dependent variable is the Industry adjusted Tobin's Q, which is (market value of equity-book value of equity +total assets)/total assets adjusted by the industry median. T through T+5 are event-time dummies indicating the base year of the engagement to five years after the engagement. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Ts are interactions of event-time dummies with the "Material" indicator. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, and etc.), and zero otherwise. Standard errors are robust and clustered at the firm-level.

Sample	*All*						*Excluding firms with both material & immaterial proposals within the same 2 year*	
Dep Variable	*Industry Adj. Tobin's Q*							
	(1)		(2)		(3)		(4)	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
T	-0.0430	-2.02	-0.0468	-2.39	-0.0461	-2.32	-0.0507	-1.79
T+1	-0.0592	-2.04	-0.0753	-2.73	-0.0737	-2.63	-0.0884	-2.35
T+2	-0.0432	-1.13	-0.0719	-2.05	-0.0692	-1.93	-0.0855	-1.75
T+3	-0.0234	-0.48	-0.0616	-1.42	-0.0577	-1.31	-0.0594	-0.91
T+4	-0.0247	-0.42	-0.0667	-1.27	-0.0616	-1.19	-0.0830	-1.14
T+5	-0.0248	-0.37	-0.0738	-1.21	-0.0673	-1.13	-0.0664	-0.78
Material X T	0.0962	2.40	0.0722	2.17	0.0720	2.17	0.1118	2.22
Material X T+1	0.1167	2.65	0.0968	2.55	0.0960	2.54	0.1614	2.86
Material X T+2	0.1085	2.22	0.0975	2.31	0.0964	2.31	0.1650	2.44
Material X T+3	0.1022	1.77	0.0996	2.03	0.0988	2.03	0.1737	2.18
Material X T+4	0.1208	1.75	0.1039	1.79	0.1032	1.79	0.2249	2.44
Material X T+5	0.1348	1.69	0.1018	1.50	0.1013	1.51	0.2418	2.21
Log(Assets)			-0.5754	-7.58	-0.5774	-7.70	-0.5499	-6.38
Capex/Assets			3.8313	4.16	3.8330	4.17	3.8314	4.46
R&D/Assets			12.7390	2.65	12.7377	2.63	12.3261	2.45
Leverage			-1.5549	-4.07	-1.5545	-4.08	-1.1814	-4.04
Governance Proposals					0.0321	0.37	-0.0265	-0.33
Number of Obs	26423		26423		26423		14297	
Adjusted R-Squared	0.6915		0.7385		0.7386		0.7374	
Year F.E.	Yes		Yes		Yes		Yes	
Firm-Proposal F.E.	Yes		Yes		Yes		Yes	

Table 3.6.B Matched Control Adjusted Performance

Dependent variable is the Matched Control adjusted Tobin's Q, which is (market value of equity-book value of equity +total assets)/total assets adjusted by the Tobin's Q of the propensity score matched control firm. T through T+5 are event-time dummies indicating the base year of the engagement to five years after the engagement. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Ts are interactions of event-time dummies with the "Material" indicator. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, and etc.), and zero otherwise. Standard errors are robust and clustered at the firm-level.

Sample	*All*						*Excluding firms with both material & immaterial proposals within the same 2 year*	
Dep Var	*Match Adj. Tobin's Q*							
	(1)		*(2)*		*(3)*		*(4)*	
	Coefficient	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*
T	*-0.0371*	*-2.25*	*-0.0382*	*-2.45*	*-0.0375*	*-2.38*	*-0.0479*	*-2.15*
T+1	*-0.0548*	*-2.51*	*-0.0646*	*-3.03*	*-0.0633*	*-2.96*	*-0.0803*	*-2.60*
T+2	*-0.0366*	*-1.27*	*-0.0573*	*-2.10*	*-0.0547*	*-1.98*	*-0.0723*	*-1.83*
T+3	*-0.0331*	*-0.92*	*-0.0611*	*-1.88*	*-0.0578*	*-1.81*	*-0.0581*	*-1.97*
T+4	*-0.0322*	*-0.71*	*-0.0637*	*-1.60*	*-0.0594*	*-1.57*	*-0.0745*	*-2.40*
T+5	*-0.0592*	*-1.08*	*-0.0900*	*-1.88*	*-0.0846*	*-1.89*	*-0.0904*	*-1.88*
Material X T	*0.0776*	*2.40*	*0.0590*	*2.10*	*0.0590*	*2.11*	*0.0802*	*1.97*
Material X T+1	*0.0974*	*2.58*	*0.0803*	*2.36*	*0.0800*	*2.37*	*0.1255*	*2.45*
Material X T+2	*0.0821*	*1.82*	*0.0728*	*1.79*	*0.0722*	*1.79*	*0.1202*	*1.83*
Material X T+3	*0.0847*	*1.58*	*0.0802*	*1.73*	*0.0797*	*1.74*	*0.1315*	*2.62*
Material X T+4	*0.1013*	*1.59*	*0.0796*	*1.44*	*0.0793*	*1.45*	*0.1664*	*2.21*
Material X T+5	*0.1337*	*1.82*	*0.0985*	*1.52*	*0.0981*	*1.53*	*0.2038*	*1.98*
Log(Assets)			*-0.442*	*-9.01*	*-0.4438*	*-9.15*	*-0.3815*	*-7.68*
Capex/Assets			*3.1432*	*4.95*	*3.1446*	*4.96*	*3.0464*	*5.05*
R&D/Assets			*7.2423*	*2.35*	*7.2478*	*2.35*	*6.8189*	*1.97*
Leverage			*-1.1767*	*-4.10*	*-1.1765*	*-4.11*	*-0.8144*	*-3.46*
Governance Proposals					*0.0252*	*0.42*	*0.0097*	*0.17*
Number of Obs	*22426*		*22426*		*22426*		*12006*	
Adjusted R-Squared	*0.7436*		*0.7864*		*0.7865*		*0.7739*	
Year F.E.	*Yes*		*Yes*		*Yes*		*Yes*	
Firm-Proposal F.E.	*Yes*		*Yes*		*Yes*		*Yes*	

Figure 3.3.B Industry-adjusted Tobin's Q After Activism

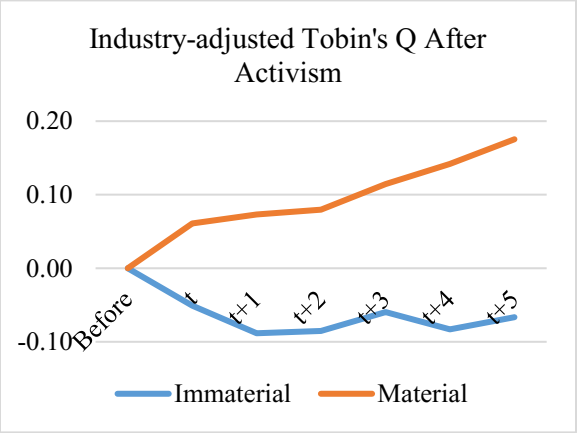
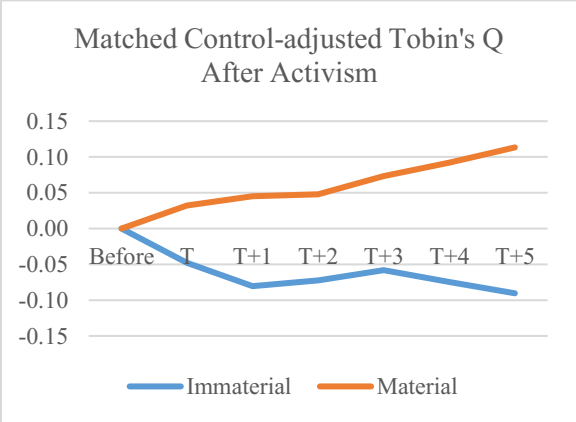


Figure 3.4.B Matched Control-adjusted Tobin's Q After Activism



3.4.3 Additional Analyses

3.4.3.1 Why Do Firms Increase Performance on Immaterial Issues

Our results suggest that firms increase their performance on immaterial issues following shareholder proposals on such issues and that their market valuation decreases subsequently. We consider and test potential reasons for why managers increase their organization's performance on immaterial issues. The first explanation that we consider is agency costs. Managers may not act in the best interests of shareholders but rather respond to engagement on immaterial proposals in order to satisfy the sponsoring shareholders and protect their reputations. We test this explanation by examining whether the increase in performance on immaterial issues is more pronounced for highly profitable firms, which may be prone to agency problems due to free cash flow (Jensen, 1986), and less pronounced for firms with less entrenched boards, which the literature suggests is a characteristic of better governance. We define an indicator variable for firms that have return-on-assets at the top quartile of their industry at the year of proposal. Similarly, we define an indicator variable taking the value of one for firms that score at the bottom quartile of the E-index constructed by Bebchuk, Cohen and Ferrell (2009). The results are presented in Panel A of Table

3.7 and are consistent with agency problems being part of the explanation for managers improving performance on immaterial issues. We find that the most profitable firms increase their performance on immaterial issues more than other firms, consistent with the agency costs of free cash flow. We also find that the firms that are most shareholder-friendly and that have the least entrenched boards increase their performance on immaterial issues significantly less.

A second explanation relates to firm reputation concerns. Firms with valuable brands might worry about reputational risk if they are seen as unresponsive and as a result insensitive to an environmental or social issue. As a result, firms with valuable brands might be more responsive to shareholder proposals on immaterial issues. We use three proxies for firms with large brands: high advertising expenditures, high gross margin, and large sales. All three are determinants of brand valuation and they have been used by previous research that investigated the value relevance of brand numbers (Barth et al., 1998). We also construct a proxy for brand value that takes into account all three proxies by taking the average after rescaling each one to follow a standard normal distribution in order to avoid scaling differences across the three variables. The results are presents in Panel B. Across all specifications we find no evidence supporting the explanation of firm reputation concerns driving improvements on immaterial ESG issues.

A third explanation is that firms did not know which sustainability issues were financially material, and thus responded similarly to material and immaterial ESG proposals. Indeed past research has found that many firms lack the capabilities and stakeholder engagement practices that enable the identification of material issues (Eccles, Ioannou and Serafeim, 2014) even among firms that have relatively advanced management and reporting sustainability practices (Miller and Serafeim, 2015). If managers are uninformed about materiality, then we would expect firms that have good performance on *both* material and immaterial issues before the proposal to respond

more to immaterial proposals compared to firms that had good performance on material issues but poor performance on immaterial issues. Khan et al., (2016) suggest that firms that invest only in material issues are likely to have concentrated their efforts only the material issues after undertaking a careful materiality analysis. In contrast, firms that performed well on all issues had failed to undertake a materiality analysis. In Table 3.7.C, the coefficients on *High on Immaterial & High on Material X T to T+5* shows supportive evidence that increases in performance on immaterial issues are partly driven by firms that do not know which issues are material.

Table 3.7.A Agency Explanations

Dependent variable is the Industry adjusted Category Index. Controls are defined as the previous tables. For Column 1, High ROA is an indicator variable equal to one if industry adjusted ROA is above the third quartile, zero if otherwise. For Column 2, Low E-index is an indicator variable equal to one if Entrenchment Index is below the first quartile, zero if otherwise. High ROA or Low E-index X Ts are interactions of event-time dummies with the "High ROA" or "Low E-index" indicator. Material X Ts and interactions of event-time dummies with the "Material" and "High ROA" or "Low E-index" indicator (e.g. High ROA X Material X Ts) are suppressed for brevity. Standard errors are robust and clustered at the firm-level.

Dep Variable	*Industry Adj. Category Index*			
Interaction Variable	ROA Above Q3 (1)		E-Index below Q1 (2)	
	Coefficient	t	Coefficient	t
T	0.0063	0.20	0.0574	2.15
T+1	0.0686	1.62	0.1229	3.44
T+2	0.1177	2.29	0.1558	3.64
T+3	0.1335	2.32	0.1841	3.80
T+4	0.1753	2.48	0.2167	3.57
T+5	0.1217	1.56	0.1671	2.47
(High ROA or Low E-index) X T	0.1807	3.15	-0.2049	-1.67
(High ROA or Low E-index) X T+1	0.1804	2.63	-0.3329	-2.39
(High ROA or Low E-index) X T+2	0.1205	1.61	-0.3316	-1.73
(High ROA or Low E-index) X T+3	0.1445	2.06	-0.6496	-4.46
(High ROA or Low E-index) X T+4	0.1205	1.55	-0.5765	-2.80
(High ROA or Low E-index) X T+5	0.1465	1.82	-0.4787	-3.02
Log(Assets)	0.0396	0.54	0.0551	0.72
Capex/Assets	1.2819	1.51	1.3189	1.42
R&D/Assets	0.8208	0.39	1.0057	0.46
Leverage	-0.0094	-0.05	-0.0145	-0.08
Governance Proposals	-0.2979	-4.22	-0.2954	-4.20
Number of Obs	26619		26619	
Adjusted R-Squared	0.570		0.5698	
(All Portfolios) X Material X Ts	Yes		Yes	
Year F.E.	Yes		Yes	
Firm-Proposal F.E.	Yes		Yes	

Table 3.7.B Reputation Explanations

Dependent variable is the Industry adjusted Category Index. Controls are defined as the previous tables and the three Brand Value proxies are advertising expense (advertising expense over total assets), gross margin (gross profit over sales), and size (logarithm of sales). For Column 1, High Brand Value is an indicator variable equal to one if advertising expense is above the third quartile, zero if otherwise. For Column 2, High Brand Value is an indicator variable equal to one if gross margin is above the third quartile, zero if otherwise. For Column 3, High Brand Value is an indicator variable equal to one if size is above the third quartile, zero if otherwise. For Column 4, High Brand Value is an indicator variable equal to one if the average z-score of the three Brand Value proxies is above the third quartile, zero if otherwise. Z-scores for each of the three proxies are calculated each year as Brand Value of company *i* minus average Brand Value during year *t* over the standard deviation of Brand Value during year *t*. High Brand Value X Ts are interactions of event-time dummies with the "Brand Value" indicator. Material X Ts and interactions of event-time dummies with the "Material" and "Brand Value" indicator (e.g. High Advertising Expense X Material X Ts) are suppressed for brevity. Standard errors are robust and clustered at the firm-level.

Dep Variable	*Industry Adj. Category Index*							
Interaction Variable	Advertising Exp. (1)		Gross Margin (2)		Log(Sales) (3)		Z-Score (4)	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
T	0.0265	0.79	0.0422	1.38	0.0066	0.15	0.0398	1.03
T+1	0.0928	2.17	0.1233	3.06	0.0867	1.67	0.1038	2.23
T+2	0.1828	3.65	0.1757	3.61	0.1161	1.94	0.1707	3.21
T+3	0.1773	3.17	0.1855	3.50	0.1575	2.24	0.1947	3.23
T+4	0.1895	2.67	0.2049	3.14	0.1427	1.68	0.1874	2.62
T+5	0.1236	1.62	0.1486	2.08	0.1492	1.62	0.1311	1.62
(High Brand Value) X T	0.0783	1.31	0.0320	0.53	0.0727	1.42	0.0216	0.43
(High Brand Value) X T+1	0.0646	0.98	-0.0357	-0.46	0.0433	0.69	0.0199	0.33
(High Brand Value) X T+2	-0.0991	-1.40	-0.0959	-1.24	0.0532	0.77	-0.0386	-0.60
(High Brand Value) X T+3	-0.0122	-0.15	-0.0453	-0.60	0.0231	0.32	-0.0402	-0.59
(High Brand Value) X T+4	0.0466	0.49	-0.0007	-0.01	0.0977	1.18	0.0351	0.46
(High Brand Value) X T+5	0.1042	1.13	0.0328	0.36	0.0127	0.14	0.0526	0.64
Log(Asset)	0.0502	0.65	0.0525	0.69	0.0346	0.44	0.0428	0.57
Capex/Assets	1.3925	1.53	1.3558	1.46	1.2607	1.38	1.3780	1.48
R&D/Assets	0.9115	0.41	0.8788	0.40	0.8789	0.41	0.7969	0.37
Leverage	-0.0476	-0.26	-0.0231	-0.12	-0.0256	-0.14	-0.0384	-0.21
Governance Proposals	-0.2952	-4.16	-0.2954	-4.18	-0.2800	-3.98	-0.2869	-4.09
Number of Obs	26568		26568		26568		26568	
Adjusted R-Squared	0.5700		0.5698		0.5707		0.5702	
(All Portfolios) X Material X Ts	Yes		Yes		Yes		Yes	
Year F.E.	Yes		Yes		Yes		Yes	
Firm-Proposal F.E.	Yes		Yes		Yes		Yes	

A fourth explanation that we consider is the "goodwashing" hypothesis. Under this explanation, firms might increase their performance on immaterial issues to divert attention away from poor performance on material issues. Recall that material issues require significantly more investment of time and resources on the part of the firm than immaterial issues. If firms are engaging in this behavior, then we would expect firms that had good performance on immaterial issues but bad performance on material issues before the proposal, to improve their performance on immaterial issues more than firms that had good performance on material but bad performance on immaterial issues. In Table 3.7.C, the coefficients on *High on Immaterial & Low on Material X T to T+5* shows supportive evidence that increases in performance on immaterial issues may be driven in part by firms that are trying to divert attention from their poor performance on material issues.

In unreported results we test for which of the above groups of firms experienced declines in Tobin's Q following engagement on immaterial issues. We did not find evidence that the declines are driven by firms scoring high on the E-index. In contrast, we found strong results of declines in Tobin's Q both for firms that perform well on both immaterial and material issues and for firms that perform well on immaterial but not on material issues. We view these results as consistent, in the first case, with an overinvestment hypothesis, and in the second case, with a hypothesis stressing the negative consequences of bad performance on material issues.

Table 3.7.C Inability to Identify Materiality and "Goodwashing" Explanations

Dependent variable is the Industry adjusted Category Index. "High on Immaterial & High on Material" is an indicator variable equal to one for firms that have high performance on immaterial issues and high performance on material issues, zero if otherwise. "High on Immaterial & Low on Material" is an indicator variable equal one for a portfolio of firms who has high performance on immaterial issues and low performance on material issues, zero if otherwise. "Low on Immaterial & Low on Material" is an indicator variable equal to one for a portfolio of firms who has low performance on immaterial issues and low performance on material issues, zero if otherwise. Material X Ts and interactions of event-time dummies with the "Material" and portfolio indicators (e.g. High on Immaterial & High on Material X Material X Ts) are suppressed for brevity. The Table presents results when median materiality and immateriality scores are used to classify high and low firms. All interactions and control variables are defined consistent to previous tables. Standard errors are robust and clustered at the firm-level.

Dep Variable	*Industry Adj. Category Index*	
	Coefficient	t
T	-0.0609	-1.28
T+1	-0.0251	-0.31
T+2	-0.0282	-0.32
T+3	0.0200	0.23
T+4	0.0516	0.52
T+5	-0.0281	-0.24
(High on Immaterial & High on Material) X T	0.3248	5.55
(High on Immaterial & High on Material) X T+1	0.3405	3.56
(High on Immaterial & High on Material) X T+2	0.3201	2.98
(High on Immaterial & High on Material) X T+3	0.2914	2.48
(High on Immaterial & High on Material) X T+4	0.3229	2.71
(High on Immaterial & High on Material) X T+5	0.4208	3.08
(High on Immaterial & Low on Material) X T	0.1734	2.47
(High on Immaterial & Low on Material) X T+1	0.1596	1.64
(High on Immaterial & Low on Material) X T+2	0.1942	2.02
(High on Immaterial & Low on Material) X T+3	0.1280	1.25
(High on Immaterial & Low on Material) X T+4	0.1140	0.91
(High on Immaterial & Low on Material) X T+5	0.0245	0.19
Log(Assets)	0.0865	1.21
Capex/Assets	2.1481	2.08
R&D/Assets	1.9867	0.96
Leverage	-0.2138	-1.13
Governance Proposals	-0.1802	-3.26
Number of Obs	24288	
Adjusted R-Squared	0.6374	
(Low on Immaterial & Low on Material) X Ts	Yes	
(All Portfolios) X Material X Ts	Yes	
Year F.E.	Yes	
Firm-Proposal F.E.	Yes	

3.4.3.2 Do Private Engagements Focus More of Less on Material Issues?

As we discussed before, investors engage with companies privately. Those engagements might never lead to the filing of shareholder proposals and they never become public knowledge.

How can private engagements bias our results? It is not clear given that we do now know whether private engagements focus more or less on material issues relative to public engagements. For example, if private engagements are concentrated on immaterial (material) issues and they are effective at convincing companies to improve their ESG performance then our results might underestimate the strength of the relation between shareholder proposals and immaterial (material) issues. Of course, collecting data on all private engagements is not feasible. But we can provide some evidence on this issue by analyzing data on private engagements from one of the fund management companies that has been active in filing shareholder proposals on ESG issues. We were provided with proprietary access to the engagement database of one of the top five SRI funds and one of the most active sponsors of ESG proposals in our dataset. The dataset covers the period between 2003 and 2013 and included 840 unique engagements that we mapped to SASB topics. Of those engagements 752 were private engagements and included emails, letters, phone calls and in person meetings with company managers. The fund manager submitted shareholder proposals that were on material issues 41% of the time and on immaterial issues 59% of the time; frequencies that are very close to the average frequency in our sample of public engagements. Within the set of private engagements 56% were on immaterial issues while 44% were on material issues. The differences in the frequencies between public and private engagement on material versus immaterial issues are minor and not statistically significant. While we cannot generalize from this finding to how all investors privately engage, these results suggest that if the private engagements of this fund manager are representative, then private engagements seem to focus on material issues at similar rates to public engagements.

3.4.3.3 High versus Low ESG Performance Firms before Engagement

Table 3.8 presents additional tests on the impact of shareholder proposals on firm value and ESG performance. In the first two columns, we divide our sample into two groups based on the category index score at time T, the year that the proposal was filed, to conduct cross sectional tests. We do this after excluding firms that experienced both a material and immaterial proposal within a same 2-year span. In Column 1, we take firms with an above-median category index score ('Category Index High') and regress the industry adjusted Tobin's Q on event-time dummies (T through T+5), interactions of event-time indicator variables with the Material indicator, and all of the aforementioned controls and fixed effects. In Column 2, we take the firms with below-median category index score ('Category Index Low') and conduct the same regression.

We find that the positive effect of proposals on material issues is present for both companies that start from low or high levels of performance on the focal sustainability issue. For the former, the increase in Tobin's Q is faster and plateaus soon after the engagement, suggesting that firms starting from a low level of performance respond by addressing issues that can create value immediately (e.g. implementing processes that reduce environmental inefficiencies, adopting practices to manage the workforce more productively and to ensure product quality and safety). For the latter, the increase in Tobin's Q is realized more gradually over time and continues up to five years after the engagement, suggesting that firms starting at a high level respond by maintaining a position of leadership on the focal ESG issue and differentiating themselves over time, thereby creating a competitive advantage in product, labor and/or capital markets (e.g. offering products that enable environmental protection, providing economically-disadvantaged consumers with access to products, or becoming leaders by establishing a strong reputation for socially responsible procurement, production, and distribution).

Table 3.8.A Analyses by Category Index & Excluding Withdrawn Proposals

Dependent variable is the Industry adjusted Tobin's Q and Industry adjusted Category Index. T through T+5 are event-time dummies indicating the base year of the engagement to five years after the engagement. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Ts are interactions of event-time dummies with the "Material" indicator. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, and etc.), and zero otherwise. Standard errors are robust and clustered at the firm-level.

Sample	*Excluding firms with both material & immaterial proposals within the same 2 year*						*All*	
Dep Variable	*Industry Adj. Tobin's Q*				*Industry Adj. Tobin's Q*		*Industry Adj. Category Index*	
Cross Section	*Category Index High*		*Category Index Low*		*Withdraw=0*		*Withdraw=0*	
	(1)		(2)		(3)		(4)	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
T	-0.0345	-0.78	-0.0689	-1.69	-0.0705	-1.77	0.0750	2.09
T+1	-0.0777	-1.27	-0.0996	-1.80	-0.1284	-2.38	0.1262	2.66
T+2	-0.0787	-1.01	-0.0879	-1.19	-0.1460	-2.07	0.1348	2.49
T+3	-0.0505	-0.54	-0.0661	-0.70	-0.1492	-1.61	0.1541	2.33
T+4	-0.0688	-0.67	-0.0896	-0.84	-0.1552	-1.48	0.2090	2.49
T+5	-0.0461	-0.41	-0.0733	-0.56	-0.1259	-1.04	0.1596	1.62
Material X T	0.0922	1.42	0.1375	2.17	0.1226	1.77	-0.0759	-1.02
Material X T+1	0.1258	1.68	0.2028	2.95	0.2007	2.52	-0.1647	-1.94
Material X T+2	0.1466	1.88	0.1874	2.07	0.2173	2.17	-0.1232	-1.40
Material X T+3	0.2018	2.24	0.1568	1.44	0.2768	2.44	-0.0711	-0.85
Material X T+4	0.3007	2.87	0.1573	1.22	0.3163	2.46	-0.1004	-1.03
Material X T+5	0.3287	2.78	0.1576	0.98	0.3189	2.16	-0.0700	-0.66
Log(Assets)	-0.5013	-5.63	-0.5764	-4.96	-0.6297	-5.80	0.0879	0.83
Capex/Assets	3.8322	3.64	3.6625	3.67	3.8024	4.09	2.0520	1.86
R&D/Assets	13.0755	2.70	10.5385	1.51	11.3065	2.07	0.0436	0.01
Leverage	-1.4097	-3.78	-1.0053	-3.17	-1.3580	-3.88	-0.1637	-0.67
Governance Proposals	-0.0359	-0.40	-0.0139	-0.15	-0.0003	0.00	-0.3516	-3.80
Number of Obs	7159		7138		8552		17361	
Adjusted R-Squared	0.7234		0.7538		0.7526		0.5841	
Year F.E.	Yes		Yes		Yes		Yes	
Firm-Proposal F.E.	Yes		Yes		Yes		Yes	

Table 3.8.B Additional Analyses – By Voting Percentage for the Proposal

Dependent variable is the Industry adjusted Category Index. Vote PCT High (Low) includes observations where the proposal received votes in support above (below) the sample median. T through T+5 are event-time dummies indicating the base year of the engagement to five years after the engagement. Material is a dummy variable that equals to one if the engagement is material, zero otherwise. Material X Ts are interactions of event-time dummies with the "Material" indicator. Log of Assets is the natural logarithm of total assets. Capex/Assets is capital expenditure over total assets and R&D/Assets is research and development expense over total assets. Leverage is (long-term debt + current debt)/total assets. Governance proposal is a dummy variable equal to one if any of the ESG proposals were accompanied by a corporate governance proposal in each of the years, and subsequent years, that a given firm was engaged on a traditional governance topic (i.e. executive compensation, anti-takeover provision, and etc.), and zero otherwise. Standard errors are robust and clustered at the firm-level.

Dep Var	*Industry Adj. Category Index*			
Cross Section	*Vote PCT High*		*Vote PCT Low*	
	(1)		(2)	
	Coefficient	t	Coefficient	t
T	0.0777	1.82	0.0758	1.51
T+1	0.1527	2.59	0.1094	1.71
T+2	0.2320	3.35	0.0122	0.15
T+3	0.2437	2.62	0.0682	0.76
T+4	0.3390	3.01	0.0660	0.58
T+5	0.3553	2.79	-0.1041	-0.79
Material X T	-0.1241	-1.41	-0.0890	-0.89
Material X T+1	-0.2540	-2.29	-0.1172	-1.05
Material X T+2	-0.2200	-1.65	0.0062	0.06
Material X T+3	-0.1131	-0.76	-0.0353	-0.33
Material X T+4	-0.0862	-0.54	-0.0233	-0.19
Material X T+5	-0.0885	-0.50	0.1073	0.82
Log(Assets)	0.0092	0.10	0.1409	0.92
Capex/Assets	2.5252	2.06	1.4436	0.86
R&D/Assets	-2.4184	-0.82	1.9401	0.46
Leverage	-0.4572	-1.21	0.0421	0.14
Governance Proposals	-0.2958	-3.15	-0.4714	-2.96
Number of Obs	8010		7818	
Adjusted R-Squared	0.5558		0.6015	
Year F.E.	Yes		Yes	
Firm-Proposal F.E.	Yes		Yes	

3.4.3.4 Vote Only Proposals

Bauer et al. (2015) notes that ESG proposals are withdrawn relatively more often than corporate governance proposals, suggesting either an increased level of mutual understanding and/or specific action taken by the company, or symbolic actions taken to placate shareholders that

ultimately do not result in ESG performance changes. As such, we replicate the main results of Table 3.5 and 3.6 by excluding withdrawn proposals from our sample in Table 3.7, Columns 3 and 4. When examining the difference in impact of shareholder proposals on immaterial and material ESG issues on firm value and firm ESG performance, our results remain virtually unchanged. This suggests that even within a set of proposals that are not withdrawn and subsequently receive relatively low levels of voting support, firms experience improvements in ESG performance and deteriorations (improvements) in market valuation after proposals on immaterial (material) sustainability issues. This is consistent with anecdotal evidence and industry practitioners suggesting that, even with low levels of voting support, ESG proposals often still prompt management to adopt some or all of the requested changes as a result of significant shareholder interest in the issues.[48]

3.4.3.5 Variation in Votes Casted for the Proposal

Ertimur, Ferri and Muslu (2011) document that management is more likely to be responsive if the proposals get higher votes in support. In their setting the results are more pronounced for votes that get majority support. In our setting, we cannot conduct the same test as less than 1 percent of the proposals receive majority support. However, we analyze separately proposals that received lower or higher than the sample median votes in support of the proposal. The median in our sample is 8 percent. Table 3.7 shows that the relation between shareholder proposals and subsequent improvement in ESG performance is stronger for the sample with above median votes for the proposal. This is consistent with the management taking into account votes casted for the proposal, when considering the demands of the activist.

[48] See http://www.ussif.org/resolutions

3.4.3.6 Recent versus Early Proposals

ESG disclosures and practices have increased dramatically over the past decade, as has demand from rating agencies, investors and other stakeholders for firms to measure and disclose their ESG performance.[49] As a result, we expect that firm responses to ESG proposals are greater in the latter period of our sample relative to the earlier period, due to managers becoming more aware of ESG issues and facing increased pressure to remedy concerns in more recent times. In untabulated results, we find evidence consistent with this hypothesis. Firms engaged on ESG issues from 1997 to 2004 only marginally increased ESG performance following engagement on immaterial issues but not material issues, whereas firms engaged on ESG issues from 2005 to 2012 significantly increased ESG performance in response to both immaterial and material proposals.

3.5 Conclusion

The number of shareholder proposals relating to sustainability issues has increased over the years, and comprised 40 percent of all proposals filed in 2013. In addition, the share of votes in favor of ESG proposals has nearly tripled from 8 percent in 1999 to 21 percent in 2013. Despite this increase in shareholder pressure relating to ESG issues, there is limited evidence as to whether shareholder activism relating to ESG is associated with improved ESG performance and firm valuation. We fill this void by studying the ESG performance and firm value evolution following shareholder engagements relating to material and immaterial ESG issues. Using recent accounting standards innovations from the Sustainability Accounting Standards Board, which adopts the SEC's shareholder viewpoint in defining materiality and distinguishes between material and immaterial ESG issues by industry, we hand-map ESG resolutions in the ISS database from 1997-2012 to the recently-available industry-specific guidance on materiality from SASB. We find that

[49] See https://www.globalreporting.org/resourcelibrary/Sustainability-and-Reporting-Trends-in-2025-1.pdf

42 percent of shareholder proposals relating to sustainability topics are material, while the majority (58 percent) is immaterial. This suggests that a significant number of shareholders are unaware of materiality, or could be pursuing objectives other than enhancing firm value.

Next, we track the targeted firms' performance on the ESG issue that was the focus of the proposal. Overall, we observe that filing shareholder proposals is associated with improved performance of the company on the focal ESG issue across both material and immaterial issues. We find that proposals filed on immaterial ESG issues are accompanied by larger and faster increases in firms' performance on the ESG issue that the proposal identifies, relative to proposals on material issues. Firms appear to increase performance on immaterial issues post engagement for a number of reasons that include agency problems, a lack of understanding of which issues are material, and an attempt to divert attention from poor performance on material sustainability issues. Moreover, we examine whether targeted firms experience changes in firm value subsequent to shareholder proposals on material and immaterial ESG issues. We document that proposals on immaterial issues are associated with subsequent declines in Tobin's Q; in contrast, proposals on material issues are associated with subsequent increases.

Our results suggest that failing to distinguish between material and immaterial sustainability issues might lead to erroneous conclusions. It is critical to make this distinction, because arguments made by influential policy experts that shareholder proposals filed on environmental and social issues are value-destroying,[50] do not find support in our sample; we find that a considerable portion (42 percent) of such proposals are financially material, and associated with subsequent increases in firm value.

[50] See http://www.bna.com/us-chamber-calls-n57982063976/

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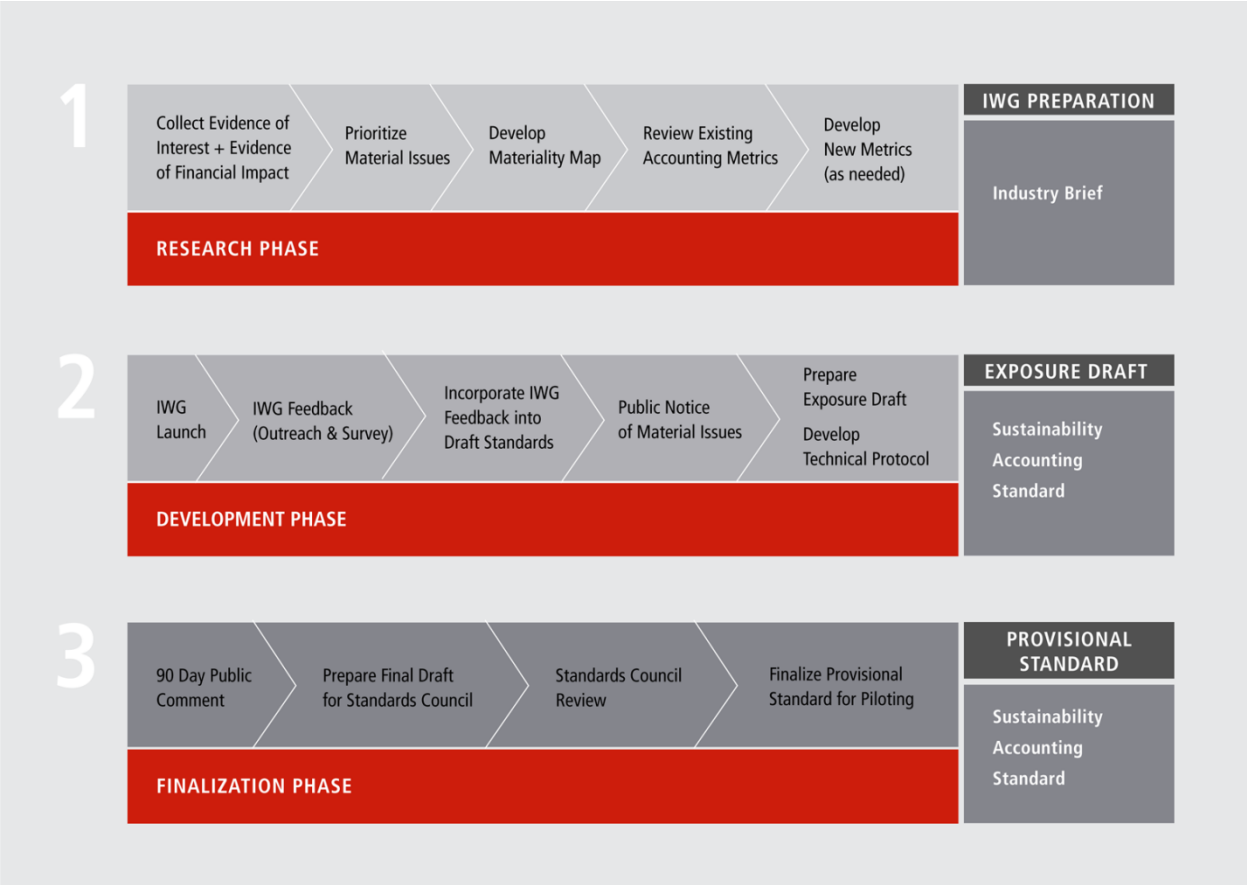
Appendix I SASB's Standard Setting Process



Source: Sustainability Accounting Standards Board. www.sasb.org

Appendix II SASB's Materiality Process

For each topic, SASB conducts an evidence of materiality test, the results of which ultimately are debated and reviewed by the Standards Council after industry working groups composed of industry experts have provided their input. The test has three components: evidence of interest, evidence of financial impact, and forward impact adjustment.

The interest test has two components, a heat map score and an industry working group score. The heat map score is derived from a search for relevant keywords in documents stored on Bloomberg servers and indicates the relative importance of the issue among SASB's initial list of 43 generic sustainability issues. Evidence of interest is gathered by searching tens of thousands of industry-related documents—Form 10-Ks, shareholder resolutions, CSR reports, media and SEC comment letters—for key words related to 30 general sustainability issues. The industry working group score signals the percentage of industry working group members that found the issue to be material. SASB convenes an industry working group to provide feedback on the disclosure items and accounting metrics identified in the initial research phase. The industry working groups are composed of balanced representation from corporations, market participants, and public interest intermediaries. Primary industry working group feedback is collected via an online survey. After the conclusion of online survey, SASB's research team conducts outreach to industry working group members to gain additional insight.

The financial impact test uses a value framework developed by McKinsey and seeks to identify evidence of financial impact on revenues/costs, assets/liabilities, or cost of capital from the focal issue in an industry. Evidence of financial impact is gathered by examining sell side research, investor call transcripts, third party case studies, anecdotal evidence, and news articles. After identifying a minimum set of disclosure topics for an industry, for which there is

solid evidence of both investor interest and financial impact, SASB identifies and documents existing metrics and practices used to account for performance on each disclosure topic. Any evidences found are publically disseminated through industry-specific industry briefs.

The forward-looking impact test assesses the future probability and magnitude of financial impact from the focal issue to capture issues that may fail the financial impact test but may still be relevant for investors. The forward-looking impact test also assesses whether the issue will generate significant externalities in the future. However, it should be noted that to date the forward looking impact adjustment has been rarely used by SASB to switch a topic from immaterial to material. After the consultation with the industry working group has finished, SASB prepares an Exposure Draft Standard with accounting metrics and technical protocols for each of the disclosure topics.

In the next phase, SASB releases the Exposure Draft Standard for a 90 day public comment period. At this time, any member of the public can download the Exposure Draft Standard from SASB's website and provide feedback via a letter. At the conclusion of the public comment period, SASB incorporates feedback received into the standard. The Standards Council then reviews the standard to ensure consistency, completeness and accuracy. With the Standards Council's final review, the Provisional Standard is considered complete. The Provisional Sustainability Accounting Standard is then published and made available to the public.

Appendix III Sector Level Materiality Map

Issues	Health Care	Financials	Technology and Communication	Non-Renewable Resources	Transportation	Services
Environment						
GHG emissions						
Air quality						
Energy management						
Fuel management						
Water and wastewater management						
Waste and hazardous materials management						
Biodiversity impacts						
Social Capital						
Human rights and community relations						
Access and affordability						
Customer welfare						
Data security and customer privacy						
Fair disclosure and labeling						
Fair marketing and advertising						
Human Capital						
Labor relations						
Fair labor practices						
Employee health, safety and wellbeing						
Diversity and inclusion						
Compensation and benefits						
Recruitment, development and retention						
Business Model and Innovation						
Lifecycle impacts of products and services						
Environmental, social impacts on core assets and operations						
Product packaging						
Product quality and safety						
Leadership and Governance						
Systemic risk management						
Accident and safety management						
Business ethics and transparency of payments						
Competitive behavior						
Regulatory capute and political influence						
Materials sourcing						
Supply chain management						

Source: Sustainability Accounting Standards Board. www.sasb.org
Note: Dark (light) grey color means that for more (less) than 50% of the industries within the sector the issue is material. White means that the issue is not material for any industry within the sector. To see materiality maps at the industry level visit www.sasb.org . The labels under each issue are generic. This means that the substance of the issue can differ dramatically from one industry to another. For example, supply chain management appears as material for both Pharmaceutical and iron ore steel producer firms. However, in the case of Pharmaceutical companies "Manufacturing and Supply Chain Quality Management" refers to "Description of FDA enforcement actions taken in response to violations of current good manufacturing practices (cGMP), including: product deemed adulterated, form 483s, suggested recall (Class I, II, III), Warning Letters, Border Alerts, license suspension or revocation, product seizure, Consent Decrees, criminal prosecution. Description of corrective actions implemented in response to actions" and to "Percentage of facilities and Tier I suppliers participating in the Rx-360 International Pharmaceutical Supply Chain Consortium audit program or equivalent third-party audit programs for integrity of supply chain and ingredients (e.g., APIs, chemical, raw material, excipients, etc.)." In contrast, for firms in the iron steel producers industry "Contractor and Supply Chain Management" refers to "Discussion of the process for managing iron ore and/or coking coal sourcing risks arising from environmental and social issues." The interested reader can access each industry standard on the SASB website

Appendix IV

Financials		Healthcare		Nonrenewables	
KLD Code	**SASB Topic**	**KLD Code**	**SASB Topic**	**KLD Code**	**SASB Topic**
CGOV_STR_G	Transparent Information & Fair Advice for Customers	DIV_STR_B	Employee Recruitment, Development, and Retention	CGOV_STR_G	Business Ethics & Payments Transparency
CGOV_STR_H	Systemic Risk Management	EMP_STR_G	Employee Health and Safety	COM_STR_C	Community Relations
COM_STR_D	Financial Inclusion & Capacity Building	EMP_STR_K	Employee Recruitment, Development, and Retention	COM_STR_D	Financial Inclusion & Capacity Building
DIV_STR_C	Employee Inclusion	EMP_STR_L	Employee Recruitment, Development, and Retention	COM_STR_H	Community Relations
DIV_STR_E	Employee Inclusion	ENV_STR_C	Product Lifecycle Management	EMP_STR_G	Health, Safety, and Emergency Management
DIV_STR_H	Employee Inclusion	ENV_STR_D	Climate Change Impacts on Human Health and Infrastructure	ENV_STR_B	Hazardous Materials Management
EMP_STR_I	Employee Incentives & Risk Taking	ENV_STR_H	Energy, Water, and Waste Efficiency	ENV_STR_D	Greenhouse Gas Emissions
EMP_STR_L	Employee Incentives & Risk Taking	PRO_STR_A	Drug Safety and Side Effects	HUM_STR_D	Community Relations
ENV_STR_D	Environmental Risk Exposure	PRO_STR_C	Access to Medicines	PRO_STR_A	Health, Safety, and Emergency Management
PRO_STR_A	Customer Privacy & Data Security				
PRO_STR_C	Financial Inclusion & Capacity Building				
PRO_STR_D	Financial Inclusion & Capacity Building				
CGOV_CON_B	Employee incentives & risk taking	CGOV_CON_M	Corruption and Bribery	CGOV_CON_M	Business Ethics & Payments Transparency
CGOV_CON_F	Environmental, social impacts on core assets and operations	ENV_CON_K	Energy, Water, and Waste Efficiency	EMP_CON_A	Labor Relations
CGOV_CON_K	Management of the Legal & Regulatory Environment	PRO_CON_A	Drug Safety and Side Effects	EMP_CON_B	Health, Safety, and Emergency Management
COM_CON_B	Management of the Legal & Regulatory Environment	PRO_CON_D	Ethical Marketing	EMP_CON_F	Supply Chain Management
DIV_CON_A	Management of the Legal & Regulatory Environment			ENV_CON_B	Competitive Behavior
DIV_CON_C	Employee Inclusion			ENV_CON_D	Air Quality
DIV_CON_D	Employee Inclusion			ENV_CON_F	Greenhouse Gas Emissions
PRO_CON_A	Management of the Legal & Regulatory Environment			ENV_CON_H	Biodiversity Impacts
PRO_CON_E	Management of the Legal & Regulatory Environment			ENV_CON_J	Supply Chain Management
PRO_CON_F	Management of the Legal & Regulatory Environment			ENV_CON_K	Water Management
				HUM_CON_C	Security, Human Rights, and Rights of Indigenous Peoples
				HUM_CON_J	Security, Human Rights, and Rights of Indigenous Peoples
				HUM_CON_K	Security, Human Rights, and Rights of Indigenous Peoples

Appendix IV (Continued)

Services		Technology		Transportation	
KLD Code	**SASB Topic**	**KLD Code**	**SASB Topic**	**KLD Code**	**SASB Topic**
CGOV_STR_G	Internal Controls on Money Laundering	CGOV_STR_G	Managing Systemic Risks from Technology Disruptions	EMP_STR_G	Accidents & Safety Management
DIV_STR_C	Workforce Diversity & Inclusion	DIV_STR_C	Recruiting & Managing a Global, Diverse Skilled Workforce	EMP_STR_H	Fair Labor Practices
DIV_STR_E	Workforce Diversity & Inclusion	DIV_STR_E	Recruiting & Managing a Global, Diverse Skilled Workforce	EMP_STR_J	Labor Relations
DIV_STR_H	Workforce Diversity & Inclusion	DIV_STR_H	Recruiting & Managing a Global, Diverse Skilled Workforce	EMP_STR_L	Driver Working Conditions
EMP_STR_G	Customer & Worker Safety	EMP_STR_G	Fair Labor Practices	ENV_STR_A	Product Lifecycle Management
EMP_STR_H	Fair Labor Practices	EMP_STR_J	Recruiting & Managing a Global, Diverse Skilled Workforce	ENV_STR_B	Materials Efficiency & Recycling
EMP_STR_I	Fair Labor Practices	EMP_STR_L	Fair Labor Practices	ENV_STR_D	Environmental Footprint of Fuel Use
EMP_STR_J	Workforce Diversity & Engagement	ENV_STR_B	Product Lifecycle Management	ENV_STR_I	Ecological Impacts
EMP_STR_L	Workforce Diversity & Engagement	ENV_STR_H	Water & Waste Management in Manufacturing	ENV_STR_J	Materials Sourcing
ENV_STR_B	Food & Packaging Waste Management	ENV_STR_J	Supply Chain Management & Materials Sourcing	PRO_STR_A	Product Safety
ENV_STR_C	Food & Packaging Waste Management	PRO_STR_A	Data Privacy & Freedom of Expression		
ENV_STR_D	Fuel Use & Air Emissions				
ENV_STR_H	Energy & Water Management				
ENV_STR_I	Ecosystem Protection & Climate Adaptation				
PRO_STR_A	Food Safety				
CGOV_CON_M	Professional Integrity	DIV_CON_A	Recruiting & Managing a Global, Diverse Skilled Workforce	CGOV_CON_M	Business Ethics
DIV_CON_A	Workforce Diversity & Inclusion	DIV_CON_C	Recruiting & Managing a Global, Diverse Skilled Workforce	EMP_CON_A	Labor Relations
DIV_CON_C	Workforce Diversity & Inclusion	DIV_CON_D	Recruiting & Managing a Global, Diverse Skilled Workforce	EMP_CON_B	Accidents & Safety Management
DIV_CON_D	Workforce Diversity & Inclusion	ENV_CON_J	Supply Chain Management & Materials Sourcing	EMP_CON_F	Fair Labor Practices
EMP_CON_B	Fair Labor Practices	ENV_CON_K	Water & Waste Management in Manufacturing	EMP_CON_G	Fair Labor Practices
EMP_CON_F	Fair Labor Practices	HUM_CON_C	Supply Chain Management & Materials Sourcing	ENV_CON_D	Environmental Footprint of Fuel Use
EMP_CON_G	Fair Labor Practices	HUM_CON_J	Data Privacy & Freedom of Expression	ENV_CON_F	Environmental Footprint of Fuel Use
ENV_CON_D	Fuel Use & Air Emissions	PRO_CON_E	Intellectual Property Protection & Competitive Behavior	ENV_CON_G	Fuel Economy & Use-phase Emissions
ENV_CON_F	Fuel Use & Air Emissions			ENV_CON_I	Materials Efficiency & Recycling
ENV_CON_G	Discharge Management & Ecological Impacts			ENV_CON_K	Ecological Impacts
ENV_CON_H	Ecosystem Protection & Climate Adaptation			PRO_CON_A	Product Safety
ENV_CON_I	Food & Packaging Waste Management			PRO_CON_E	Competitive Behavior
ENV_CON_K	Energy & Water Management				
PRO_CON_A	Food Safety				
PRO_CON_D	Marketing & Recruiting Practices				
PRO_CON_E	Discharge Management & Ecological Impacts				
PRO_CON_F	Shipboard Health & Safety Management				

Appendix V Examples of Material and Immaterial ESG Proposals

Material ESG proposal

- In 2011, McDonald's Corporation received a shareholder proposal regarding "Food Safety Concerns" (per the 'Resolution' data field in ISS).
- SASB's Sector-level Materiality Map identifies "Product quality/safety" as a material issue in the Consumption sector (to which McDonald's Corporation belongs).
- This proposal was coded as material.

Immaterial ESG proposal

- In 2007, Wells Fargo & Company, the multinational banking and financial services company, received a shareholder resolution to "Set GHG emissions reductions goals".
- SASB's Sector-level Materiality Map does not identify "GHG emissions" as a material issue for the Financials sector (to which Wells Fargo & Company belongs).
- This proposal was coded as immaterial.

Examples of coding shareholder proposals:

Company	GICS Industry	Proposal Topic	KLD data item	Material
The Coca-Cola Company	302010 - Beverages	Increase container recycling/recycled content	Packaging Materials & Waste	Yes
Dominion Resources Incorporated	551030 - Multi Utilities	Report on/reduce greenhouse gas emissions	Climate Change	Yes
The Goldman Sachs Group Incorporated	402030 - Capital Markets	Develop/report on policy against predatory lending	Product Concerns	Yes
McDonald's Corporation	253010 - Hotels, Restaurants & Leisure	Develop policy and report on gene-engineered foods	Product Quality & Safety	Yes
Henry Schein Incorporated	351020 - Health Care Providers & Services	Develop ethics policy and report on bribery	Business Ethics	Yes
Allegheny Technologies Incorporated	151040 - Metals & Mining	Adopt sexual orientation anti-bias policy	Workforce Diversity	No
Sprint	501020 - Wireless Telecommunication Services	Reduce greenhouse gas emissions	Climate Change	No
Oracle	451030 - Software	Develop human rights criteria for China operations	Human Rights Policies & Initiatives	No
Lowe's Companies Incorporated	255040 - Specialty Retail	Support national health care reform	Community Engagement	No
Intel	453010 - Semiconductors & Semiconductor Equipment	Adopt environmental certification	Environmental Management Systems	No