

ESG Shareholder Engagement and Downside Risk

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Abstract

We show that shareholder engagement on environmental, social and governance (ESG) issues creates value by reducing downside risk, measured using lower partial moments and value at risk. We document this effect by exploiting proprietary access to the complete engagement database of one of the world's largest institutional shareholder activist. The risk effect of ESG engagement varies across engagement themes. It is effective when governance or strategy topics are addressed, and if changes in firms' environmental policies (especially on climate risk) are coupled with governance improvements.

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1. Introduction

Direct institutional investor engagement on environmental, social and governance (ESG) issues has become increasingly important. Several factors have contributed to this trend, including the increased public interest in corporate social responsibility (CSR), the growing size and importance of institutional shareholdings, and the relatively low success of shareholder resolutions on ESG issues (Gillan and Starks, 2000, 2007).

Reducing downside risks related to ESG factors is considered to be one of the major drivers of direct firm engagement by institutional shareholders (e.g., Blackrock and Ceres, 2015). The reason is that negative ESG exposures can imply substantial legal, reputational, operational, and financial risks for firms. For example, BP's Deepwater Horizon oil spill in 2010, a typical example of a tail risk event, reminded many investors of the importance of having robust environmental policies in place (Dyck et al., 2017). An increasing number of institutions therefore actively engage with their constituent firms through direct intervention with management or the board, in order to reduce risks from ESG exposures. The underlying rationale is that higher standards of corporate ESG practice serve as an insurance mechanism against harmful, risk-inducing events. Hence, improved ESG standards at portfolio firms can reduce downside risk via mitigating the likelihood of regulatory, legislative or consumer actions taken against firms. Large institutional investors—also called “universal owners” due to their highly diversified and long-term portfolios—are exposed to ESG risk not just because of events caused by individual portfolio firms, but also because of externalities from economy-wide factors, such as climate change or social unrest.

This paper provides *direct* evidence that shareholder engagement on ESG topics reduces downside risk at portfolio firms. We document this effect based on proprietary engagement data provided by a large institutional investor with more than \$200 billion in assets under management. The investor is considered to be one of the most influential activists when it comes to promoting and developing ESG standards at portfolio firms. Our data contain 682 engagements across 296 targeted firms worldwide, covering the years

2005 through 2014. The investor provided us with full access to its engagement database, including its all its engagement activities and action reports, and measures of success.

In the first part of the paper, we provide a detailed descriptive analysis of the institutional processes behind the investor's ESG engagement. We show that the investor most commonly engages over corporate governance issues, accounting for about half of all engagements. This is followed by social engagements (21%), environmental engagements (18%), and strategy engagements (13%). Within the broader area of governance, the investor most frequently intervenes over concerns about board structure and remuneration. In terms of social themes, the investor engages mostly over health and safety issues, supply chain topics, and bribery and corruption. The primary theme in the area of environmental engagement is climate risk, which has become a first-order topic for engagement among many major institutional investors. Blackrock, for example, has announced that portfolio firm disclosure on climate risk will be a focus area for their future engagement (Blackrock (2017)). The number of engagements on climate risk by our investor is already more than half the number of engagements on executive pay, which has traditionally been in the focus of many engagement campaigns. These numbers reflect a more general trend, namely that many institutional investors find climate risk difficult to price and hedge, making direct engagement on climate risk an important risk management tool.¹ Engagements on strategy topics are mostly driven by concerns over a firm's business strategy and corporate risk management.

The investor uses four milestones to track the success of each intervention. These milestones reflect (i) whether the investor raises a concern with a target company (Milestone 1); (ii) whether the company acknowledges the concern that was raised (Milestone 2); (iii) whether the company takes actions to address the concern (Milestone 3); and (iv) whether investor successfully completed the engagement (Milestone 4). In total, 28% of all engagements successfully achieve all four milestones, 23% achieve Milestone 3, 34% achieve Milestone 2, and 15% remain at the stage of raising a concern. The investor needs, on average, four

¹ Given their prominent position as large shareholders in publicly-listed firms, institutional investors are also increasingly viewed as potent catalysts driving firms to reduce carbon emissions (Andersson, Bolton, and Samama (2016)).

months to complete Milestone 1. It takes eleven months until a firm acknowledges an ESG issue (Milestone 2), 24 months until a target also takes actions and develops a strategy to address an issue (Milestone 3), and 34 months until an entire engagement is successfully completed.

The investor primarily uses a private, non-public route to engage portfolio firms, consistent with the more general evidence on institutional engagement in McCahery, Sautner, and Starks (2016). Among the 2,927 interactions between the investor and its portfolio firms, more than 60% take the form of private meetings (1,778 interactions), followed by conference calls (606), emails (204), and letters (203). The strategy by the investor to prefer private negotiations to public engagement is consistent with recent theoretical reasoning in Levit (2014), who shows that if an activist's information becomes public, the activist loses credibility and the ability to influence the manager's actions. The investor needs on average one private meeting to complete Milestone 1, while it typically takes two additional meetings to achieve Milestone 2. Moving an engagement from Milestone 2 to 3 is generally the most difficult step, requiring as many as four further meetings. Once Milestone 3 is achieved, three additional meetings are usually needed to successfully complete an engagement. The duration and meeting frequency confirm that engagement is costly, in terms of both time and resources needed to successfully close an ESG engagement (Gantchev, 2013).

Our data allow us to describe the individuals and governance bodies at portfolio firms that are contacted by the investor to raise an ESG issue. Senior executives (1,004 contacts), the board of directors (805), and chairmen (471) are most frequently contacted by the investor. However, there is substantial heterogeneity, depending on the specific ESG topic. Dialogues over social and environmental issues are conducted mostly with senior executives, the CSR department, and investor relations, whereas governance as well as strategy issues tend to be raised directly with the board, the chairman or senior executives.

In the second part of the paper, we study whether and how ESG engagement reduces portfolio firm downside risk, which we measure using three variables. Our first two measures capture the distribution of returns that fall below the 0%-return-threshold. We calculate these measures as the lower partial moments (LPMs) of the second and third order, respectively (Bawa, 1975; Fishburn, 1977). Different from stock return

volatility, these measures capture *negative* return fluctuations, reflecting many long-term investors' perception of risk and the wealth-protection motive of ESG engagements (Harlow, 1991). As a third measure we calculate an investment's value at risk (VaR) (Duffie and Pan, 1997). Empirical evidence suggests that this tail-risk measure is closely related to ESG risk (Diemont, Moore, and Soppe, 2016), as firms with better ESG performance are less vulnerable to company specific negative events (e.g., Krüger, 2015).

We document across all three measures that ESG engagements creates value by significantly reducing downside risk. We establish this risk-reduction effect using two complementary methodologies. Our first approach uses an endogenous treatment-effects model that addresses potential selection in the engagement decision (Wooldridge, 2010). We use this approach to address the challenge that (unobserved) factors may affect both the investor's engagement decision and a target's downside risk. In addition, some ESG engagements may be triggered by public events, which may occur more frequently in industries where ESG issues are more important. We estimate this model using a set of matched control firms that were *not* targeted by the investor, but have similar characteristics in terms of their country origin, industry, and size (similar to Brav et al., 2008). The economic effects on risk that we attribute to ESG interventions are large. After controlling for selection, we find that engagement has an average treatment effect of 1.1% (1.4%) in terms of reducing the LPMs of the second (third) order. These treatment effects of engagement are economically meaningful, as both risk measures have mean values of 5.6% and 7.5% at control firms, respectively. We also find that engagement reduces value at risks (5%-VaR) by 2.7% compared to matched control firms. This is again a large number as the VaR averages 14% across control firms, so the reduction in VaR equals about 20% of this mean value.

The treatment effect of ESG engagement on downside risk is stronger for more successful engagements, which we define as those where at least Milestone 2 is achieved. Hence, the risk-reduction effect comes from engagements where portfolio firms acknowledge that they have a problem, or even responds with real actions to the investor's demands. The finding that results are concentrated among such

engagements corroborates that it is indeed the intervention by the investor, rather than a selection effect, that reduces downside risk.

We further find that the risk-reducing effect of ESG engagements varies across engagement themes. Our data suggest that ESG engagement is effective when governance or strategy topics are addressed. Engagement also substantially reduces environmental risks such as those stemming from climate change, but only if engagement over environmental topics is combined with improving governance. This finding supports the notion that changing a firm's sustainability agenda without addressing governance is unlikely to reduce downside risk. This mirrors findings in Monks et al. (2004), who show that shareholder proposals which combine CSR issues with traditional corporate governance gain more shareholder support than CSR issues alone. We cannot find any risk effects of engagement on social themes, neither individually nor in combination with governance engagements.

We complement the treatment-effects analysis with a second approach that establishes the effect of engagement from stock return loadings to a down-side risk factor. We use target firms' weekly returns to test whether engagement reduces firm exposure to a downside-risk factor (DOWN), which we construct as the difference in returns between portfolios of stocks with high minus low downside risk. This approach is motivated by work such as Ang et al. (2006) which also create a risk factor but use volatility instead of downside risk. We find that exposure to the downside-risk factor significantly decreases after Milestone 2 has been achieved. This indicates that the portfolio of firms that responded to the investor has become less tilted towards downside risk, confirming a risk-reduction effect due to ESG engagement.

Our paper contributes to the literature on shareholder engagement by showing that intervention over ESG topics reduces downside risk. This finding complements work that focused primarily on the effects of ESG engagements on first moments, i.e., firm values or returns (Smith, 1996; Becht et al., 2009; Dimson, Karakas, and Li, 2015; Carleton, Nelson, and Weisbach, 1998). We also complement studies that show that voluntary ESG or CSR efforts by firms decrease the probability that negative events occur (Kim, Li, and Li, 2014; Krüger, 2015), and also reduces firm risk more generally (Albuquerque, Durnev, and Koskinen, 2015;

Jo and Na, 2012; Godfrey, Merrill, and Hansen, 2009; Luo and Bhattacharya, 2009; Oikonomou, Brooks, and Pavelin, 2012). Our findings also complement Dyck et al. (2017), who show that institutional ownership is positively associated with firm-level environmental and social performance, and Liang and Renneboog (2016) who trace standards of corporate CSR back to the legal origins in a country.

2. Data, Engagement Process, and Downside-Risk Measures

2.1 Engagement Data

Our institutional engagement data is from one of the largest institutional asset managers in the United Kingdom. The investor has been actively engaging with companies for over 20 years. The proprietary database provided by the investor contains 682 engagements across 296 targeted firms worldwide, and covers the period 2005 to 2014. The investor is considered to be one of the most influential activists when it comes to promoting and developing ESG standards at portfolio firms. By engaging with portfolio firms, the investor aims to incorporate long-term sustainability and risk management into business operations and corporate policies. The investor believes that companies with informed and involved shareholders are better able to manage risk and minimize the occurrence of tail risk events.

The investor provided us with full access to its online engagement database, including its engagement reports, action reports, and success milestones. The investor engages predominantly via a constructive, confidential dialogue, and prefers not to take a public route when seeking to promote change in companies, consistent with recent survey evidence on engagement by institutional investors in McCahery, Sautner, and Starks (2016).

2.2 ESG Engagement Process

Figure 1 illustrates the distribution of engagements by geography. The investor engages firms across 31 different countries, with the United Kingdom seeing the largest number of engagements (154 engagements or 23% of the sample). This is followed by the United States, for which our sample includes 137 engagements, and France, Japan, and Canada.

Figure 2 shows that most interventions, 426 in total, occur among firms in the financial, oil & gas, basic materials, and consumer goods sectors (about two-thirds of all engagements). Several engagements also take place in the industrial, consumer services, and utilities sector, while relatively few engagements occur in health care, telecommunications, and technology.

The number of engagements gradually increases since the beginning of our sample period in 2004, reaching a spike with 155 engagements in 2010 (Figure 3). While the number of engagements per year decreases since then, it still remains above 50 per year till the end of our sample in 2014.

The investor categorizes the reasons for engagements into four themes: (i) corporate governance; (ii) social; (iii) environmental; and (iv) strategy. Table 1 reports how frequently portfolio firms are engaged over these themes, and also lists the sub-themes that are within each of these broader areas. Overall, the investor most commonly engages portfolio firms over governance issues, accounting for about half of all engagements. This is followed by engagements over social (21%), environmental (18%), and strategy issues (13%). This distribution generally mirrors the numbers in Dimson, Karakas, and Li (2015), who also document that corporate governance engagements traditionally outpace those on environmental and social topics.

Within the broader area of governance, the investor most frequently intervenes because of concerns over board structure (37%), remuneration (31%), succession planning (9%), and the separation of the chairman/CEO role (6%). In terms of social themes, the investor engages mostly because of concerns over health and safety issues (19%), supply chain topics (25%), and bribery and corruption (13%). Community relations, operations in troubled regions and employee relations are also frequently on the engagement agenda.

Among environmental topics, the investor focuses primarily on issues related to climate change (45%). The total number of engagements on this topic equals 54, more than half the number of engagements on executive pay (103). This reflects that climate risk has become an important engagement topic among many institutions, reflecting that climate risk has the potential to adversely affect the values of assets

managed by institutional investors, especially long-term investors. Additionally, many institutional investors find climate risk difficult to price and hedge, making direct engagement to reduce the carbon footprint of portfolio firms or the impact of climate risk on business models an important risk management tool.

The primary intervention motives over strategy topics are improving firms' business strategy (47%) and risk management (40%).

In terms of measuring engagement success, the investor uses four milestones to track each intervention: (i) investor raises concern with the target company (Milestone 1); (ii) company acknowledges the concern that is raised (Milestone 2); (iii) company takes actions to address the concern (Milestone 3); and (iv) investor successfully completes the engagement (Milestone 4).

Table 2 shows that across all engagements 28% successfully achieve all four milestones, 23% achieve Milestone 3, 34% achieve Milestone 2, and 15% are at the stage of raising a concern (Milestone 1). As in Dimson, Karakas, and Li (2015), the engagement success rate in our sample is lower than that of activist hedge funds. These success rates are 60% in Brav et al. (2008); 60% in Klein and Zur (2011), and 56% in Smith (1996). One reason might be that it is harder to persuade top management and the board to install ESG themes, compared to more financial topics such as capital structure or dividend policy. Second, ESG engagements by our investor might be less aggressive and less influential on target firms because ownership positions are lower compared to those of activist hedge funds that typically take concentrated positions,

Table 2 also displays descriptive statistics on engagement durations, reported by milestone and theme. The table illustrates that it takes on average four months to complete Milestone 1, eleven months until a portfolio firm also acknowledges an issues raised by the investor (Milestone 2), 24 months until the engagement target has also taken actions or developed a strategy to improve an issue (Milestone 3), and 34 months in total until all milestones are successfully completed.² The minimum time needed to achieve one

² Becht et al. (2010) suggest that, in general, collaborative corporate governance engagements take 16 months, whereas confrontational ones take 43 months. Brav et al. (2008) find that the average duration of an engagement undertaken by a hedge fund is 12 months.

milestone is between one and two months, regardless of the stage of the engagement.

Regarding the length of engagement by theme, the table shows that environmental engagements take the least time for targets to acknowledge an issue of concern (Milestone 2), and to implement an action in response to the investor's demands (Milestone 3). In contrast, corporate governance engagements take the longest time when it comes to completing Milestones 1 and 2. The difference may reflect that boards and executives are most directly affected by corporate governance topic, making them more hesitant to acknowledge problems in this area. Strategy engagement require the longest duration for Milestone 3, probably as larger organizational changes are required, and social issues take most time for eventually accomplishing an engagement success (Milestone 4).

Table 3, Panel A presents engagement actions by theme and milestone. Apart from the absolute number of actions, we also report the number of actions per engagement. The table shows that, among the set of 2,927 actions, more than 60% take the form of meetings (1,778 actions), followed by conference calls (606), emails (204), and letters (203). The table further shows that Milestone 1 can be completed, on average, with one meeting per engagement, while it takes on average two meetings to achieve Milestone 2. Moving from Milestone 2 to Milestone 3 is the most difficult step, taking as many as four meetings. Once Milestone 3 is achieved, it requires on average three further meetings to successfully complete an engagement.

Table 3, Panel B presents data on the governance bodies or individuals at the portfolio firms that are contacted by the investor by means of their actions. The table shows that senior executives (1,004 contacts), boards of directors (805), and chairmen (471) are most frequently targeted. However, there is interesting heterogeneity depending on the specific engagement topic. Statistics classified by theme show that the investor has dialogues over social and environmental topics mostly with senior executives, CSR and investor relations, whereas it tends to directly communicate with the board of directors, chairmen, and senior executives over governance as well as strategy issues.

Actions classified by milestone further show that the investor usually raises issues of concern directly with senior management (Milestone 1). Senior management also acknowledges in Milestone 2 the issue that is raised. To ensure that firms take measures to address the concerns (Milestones 3 and 4), the investor then roughly doubles the number of cases where it intervenes directly with the board, chairmen and senior executives.

2.3 Downside-Risk Measures

We use three measures of downside risk. All measures are constructed from monthly return data over the period between the initial engagement and the end of the sample (“post-engagement period”). Our first two measures are the lower partial moments of the second ($LPM(0,2)$) and third order ($LPM(0,3)$), respectively. Both variables capture the distribution of returns that fall below a certain threshold value, which we set equal to 0% for our analysis. $LPM(0,2)$ and $LPM(0,3)$ are calculated as the square and cube root of the semi-variance below 0%, respectively (Bawa, 1975; Fishburn, 1977). More formally, $LPM(0,2)$ is defined as:

$$LPM(0,2) = \sqrt{\frac{1}{N_1-1} \sum_{i=1}^{N_1} (r_{n,i} - \bar{r}_{n,i})^2}$$

where $r_{n,i}$ indicates the negative monthly return of firm i and $\bar{r}_{n,i}$ is the mean value of $r_{n,i}$. N_1 is the number of observed *negative* monthly returns for firm i during the measurement period. $LPM(0,3)$ measures the extreme negative return dispersion and is defined as:

$$LPM(0,3) = \sqrt[3]{\left| \frac{1}{N_1-1} \sum_{i=1}^{N_1} (r_{n,i})^3 \right|}$$

where $r_{n,i}$; $\bar{r}_{n,i}$ and N_1 are defined as above. We use the absolute value of $LPM(0,3)$ in our analysis.

We use these two risk measures for several reasons. First, empirical evidence suggests that the distribution of stock returns is not normal, and instead characterized by skewness and heavy tails (Ang, Chen, and Xing, 2006; Singleton and Wingender, 1986). In this case, measures such as stock return volatility that do not distinguish between positive and negative events may produce biased results. Downside risk

measures reflect *negative* price fluctuations, thereby capturing many investors' perception of risk (Harlow, 1991). Second, long-term institutional investors often try to hedge against downside risk, especially during times of economic turbulence (Hebb, 2011). Hence, the wealth-protection purpose of ESG engagement should be captured reasonably well with these measures.

As a third measure, we calculate a portfolio firm's value at risk (*VaR*), by measuring the worst historical loss over the post-engagement period (Duffie and Pan, 1997; Jorion, 2002). The concept of VaR has gradually gained importance in risk management and is promoted by various industry regulations.³ More crucially, empirical evidence suggests that the tail-risk measure of VaR is closely related to ESG risk (Diemont, Moore, and Soppe, 2016). The intuition is that firms with better ESG performance are less vulnerable to company specific negative events. We measure the VaR by taking return outcomes ranked at the bottom fifth percentile (5%-VaR).

3. Empirical Tests I: Endogenous Treatment-Effects Models

3.1 Empirical Strategy

To examine whether ESG engagement has a risk-reduction effect, we use an endogenous treatment-effects model to address selection bias in the engagement decision (Wooldridge, 2010). We estimate an endogenous treatment-effects model that is expressed by both an outcome-regression equation (1) and an engagement-selection equation (2):

$$\text{Downside Risk}_{i,t} = \alpha_1 + \delta \text{Engagement Target}_{i,t} + x_{i,t}\beta + \varepsilon_{i,t} \quad (1)$$

$$\text{Engagement Target}_{i,t} = \alpha_2 + z_{i,t-1}\gamma + u_{i,t}, \quad (2)$$

where *Engagement Target*_{*i,t*} is the treatment variable in year *t* and takes the value 1 if a firm is an engagement target, and 0 if it is a control firm; *Downside Risk*_{*i,t*} is one of our three measure capturing

³ For example, The Federal Reserve and regulators in the European Union have accepted VaR as a risk measure in financial reporting. In 1995, the SEC issued a proposal to encourage market risk disclosure using a VaR measure as one of three available methods.

downside risk in year t ; $x_{i,t}$ and $z_{i,t-1}$ are vectors of control variables for the outcome and engagement selection equations in t and $t - 1$, and $\varepsilon_{i,t}$ and $u_{i,t}$ are error terms. All parameters are estimated using maximum likelihood. Our main coefficient of interest in this model is δ , which represents the average treatment effect (ATE) of investor engagement on downside risk. We explain all variables in detail below.

To conduct this analysis, we create a set of matched control firms that have similar characteristics but were *not* targeted by the investor. To identify such firms, we use the initial engagement date for each target firm and then search for a control firm in the FTSE All-World index within the same year. We use this index as engagement targets come from around the world.⁴ Similar to Brav et al. (2008) we match engagement targets with firms using three matching variables, namely country, industry, and size. By matching firms on country and industry as engagement may be more successful reducing risk in countries or industries that experienced governance, social, or environmental scandals (e.g., the Deepwater Horizon spill in the United States). We match firms on size as the occurrence of ESG risks likely has more adverse legal or reputational consequences for larger firms. Moreover, larger firms have been shown to respond more positively to shareholder activists (Dimson, Karakas, and Li, 2015). We use the largest number of possible matches available in the FTSE All-World index.⁵ Finally, we exclude 27 utilities firms from our subsequent analysis as they operate in heavily regulated environment where shareholder activists have lesser chance to effect change. The resulting matching sample contains 1,131 firms, including 269 engagement targets and 862 control firms.

To account for factors that may explain the decision to engage a target in the engagement-selection equation, we control for size, the market-to-book ratio, profitability, dividend yield, leverage, and proxies for corporate governance. We control for size as activist investors tend to engage with larger firms, which are more visible for institutional investors and their final asset owners, and likely contribute to a higher

⁴ The index covers about 98% of the world's investable market capitalization and includes more than 7,000 firms from 47 different countries.

⁵ We first match on country, then on industry, and finally on size. To match on size, we exploit that the index groups firms into two categories, medium and large size firms. We match only within the same size category.

portfolio risk (Dimson, Karakas, and Li, 2015; Karpoff, Malatesta, and Walkling, 1996; Smith, 1996). We measure size using the logarithm of the equity market capitalization. We control for the market-to-book ratio to capture growth opportunities and value potential, reflecting some investors' engagement preferences (see Brav et al., 2008). We also control for past performance using a firm's operating profit margin, calculated as operating income over sales. Past performance can affect an activist's engagement decision, as poor performance has been shown to trigger engagement (Karpoff, Malatesta, and Walkling, 1996; Smith, 1996). We further control for dividend yields as Dimson, Karakas, and Li (2015) show that target firms have relatively higher dividend yields. Dimson, Karakas, and Li (2015) also document that engagement targets have higher leverage than control firms, and we control for leverage as a result. Investors may also engage over concerns regarding target governance, which we capture using the free float and the anti-director rights index (ADRI) from La Porta et al. (1998) and Spamann (2009).

Table 4 provides estimates of the selection equation. The three regressions we report correspond to the three outcome equations we estimated in Table 5 for the downside-risk measures. Control variables are measured one year prior to engagement. The estimates show that after matching target and control firms the decision to engage is unrelated to most firm characteristics that have been shown to explain engagement. Nevertheless, even after matching firms on size, we continue to find that larger firms are more often targeted by the investor. Furthermore, targeted firms tend to pay relatively higher dividends than control firms. Finally, we have some weak evidence that the investor generally engages more in countries with better minority shareholder protection, as captured by the ADRI index. This corresponds to Liang and Renneboog (2016), who find that corporate ESG standards are higher in countries where legal origins foster stronger investor protection. Overall, the remaining differences in firm characteristics documented in Table 4 highlight the need to carefully address selection bias beyond just matching firms through an econometric model.

3.2 Empirical Results: ESG Engagement and Downside Risk

We next estimate the effects of shareholder intervention on downside risk. We report three sets of results. First, we present result of the overall effect of ESG engagement on risk. We then provide results by engagement success to corroborate that our results are indeed driven by engagement of the investor and the subsequent response by the target. Finally, we provide results by engagement theme to understand which areas of engagement have the largest potential to reduce downside risk.

Constituting our first step, Table 5 reports regressions of the overall effect of ESG engagement on downside risk after accounting for engagement selection. Recall that we measure downside risk for each target-control-pair over the same time horizon, namely over the post-engagement period (from the initial engagement date to the end of the sample). To make different pairs comparable, we standardize all measures by year. We control in these regressions for firm size and the market-to-book ratio to capture risk factors that affect investment risk (Fama and French, 1993). We also account for leverage as higher debt increases the volatility of the earning stream towards stockholders. Finally, we control for profitability, which is related to firm risk (Wei and Zhang, 2006) as it reflects information about future cash flow streams which, in turn, drive returns (Vuolteenaho, 2002).

In Column (1) and (2) of Table 5 we find that the average treatment effect (ATE) of engagement on $LPM(0,2)$ is 1.4%, and it is 1.2% for $LPM(0,3)$, when estimated relative to control firms; both effects are statistically significant at the 1% level. Economically, this finding implies that negative returns of firms targeted by the investor are statistically less dispersed than those of control firms. Both numbers are economically meaningful, as the risk measures have mean values of 5.6% and 7.5% at control firms during the post-engagement period. Turning in Column (3) to the link between ESG engagement and value at risk, we find that engagement targets have a VaR that is 2.8% lower compared to the one at control firms, significant at the 1% level. This is again a large number as the VaR averages 14% across control firms over the post-engagement period, so the reduction in VaR due to engagement is about 20% of this value. The control variables in Table 5 indicate that larger firms, firms with higher market-to-book ratios, and more

profitable firms tend to have lower downside risk, while leverage is positively associated with downside risk. Overall, the regressions Table 5 provide some first evidence for a wealth-protection effect of ESG engagements. This effect is obtained after controlling both for the endogenous engagement decisions of our investor, and for observable variables that may also affect downside firm risk.

As our second step, we examine in Table 6 whether ESG-risk-reduction effect varies by success rate. We continue to run a treatment-effects model and keep using our control firms. Columns (1) through (3) report result for targets with high engagement success rates, while Columns (4) through (6) show results for targets with low engagement success rates. We consider the engagement success to be high (low) if at least Milestones 2 (Milestone 1 only) has been achieved.⁶ We perform this sample split to corroborate that it is indeed the engagement by the investor that reduces downside risk; if this were not the case we should *not* expect to see results that differ across success rates.

The results in Table 6 show that the risk-reduction effect of ESG engagement only exists for engagements where at least Milestone 2 was achieved, that is at firms acknowledged the existence of an ESG issue or even responded with real actions to the investor's engagement demands. In economic terms, we find that the ATE for successful engagements is 1.3% in terms of *LPM (0,2)* and 1.7% in terms of *LPM (0,3)*, and both effects are statistically significant at the 1% level. Moreover, targets achieving Milestone 2 or higher have VaRs that are 3.2% lower compared to control firms. At firms where engagement was unsuccessful, we find an increase in the all three downside risk measures. One possible explanation for this finding is that the engagement was initiated with the objective to address a latent ESG risk, and the failure to change ESG policies may have caused the risk to materialize.

Constituting our third and final step, we investigate whether the effects of ESG engagement on downside risk vary across engagement themes. To this end, we report in Table 7 regressions by engagement

⁶ If several engagements are simultaneously conducted at a target firm by the investor, we calculate the firm average engagement success rate. We calculate this average success rate as the sum of the milestones achieved from the initial engagements up to December 2014, divided by the number of engagements, times 4.

theme. This is an important analysis as it can indicate where engagement can yield the most effective results in terms of reducing downside risk. The estimates in Columns (1) through (3), and (10) through (12), show that ESG engagement reduces risk when concerns over governance and, to a weaker extent, strategy topics are addressed by the investor. For these themes we find a negative and mostly significant ATE of shareholder engagement, after controlling for selection. While we cannot find a direct risk-reduction effect for engagement over environmental topics (not reported), we do find in Columns (7) through (9) that risk is significantly reduced if environmental engagement is combined with improving governance. This finding indicates that changing a firm's sustainability agenda without addressing governance is unlikely to yield a risk-reduction effect. This finding echoes the results in Monks et al. (2004), who find that shareholder proposals which combine CSR issues with traditional corporate governance gain more support than proposals over of CSR issues alone. We cannot find corresponding effects for engagement over social themes, neither individually (not reported) nor in combination with governance engagement (Columns (7) through (8)).

4. Empirical Tests II: Weekly Stock-Return Analysis

An advantage of our treatment-effects analysis is that results are straightforward to interpret, but the disadvantage is that most variables are measured on an annual frequency only (e.g., the accounting variables). We next complement this analysis with tests that examine whether engagement reduces the loadings of target firms' weekly stock returns to a downside-risk factor. To measure exposure to downside risk, we construct a downside-risk factor (DOWN) as the return difference between portfolios of stocks with high minus low downside risk. Stocks with high (low) downside risk in the previous period belong to the top (bottom) 30% in term of downside risk, which we continue to measure using either LPM or VaR. We then use a firm's time varying exposure to this factor to capture changes in firm riskiness resulting from ESG engagement by our investor. We capture the timing of engagement by creating a two-sided dummy variable (Post) that equals 1 for stock-return observations from the two-year period after our investor started to engage a target, -1 for stock-return observations from the two-year period before, and zero for all other

observations. We also use a modified version of this dummy variable which takes the value 1 in the two-year period after Milestone 2 has been achieved, -1 in the two-year period before, and zero otherwise. We then run in Table 8 the following factor model explaining weekly excess returns ($r_{i,t} - r_f$):

$$r_{i,t} - r_f = \alpha_i + \rho_i Post_{i,t} * DOWN_t + d_i DOWN_t + \theta_i Post_{i,t} + b_i MKT_t \quad (3)$$

$$+ s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + \varepsilon_{i,t}$$

The key variable of interest in this model is ρ_i , the coefficient on the interaction term $DOWN * Post$. A negative value of ρ_i would indicate that the exposure of targets to the downside-risk factor decreases after investor engagement, relative to the period before. Panel A of Table 8 generates the $DOWN$ factor using $LPM(0,2)$ and Panel B uses VaR instead. We include in all regressions the five factors proposed by Fama and French (2015). These factors contain the MKT , SMB , and HML factors of the three-factor model (Fama and French, 1993), as well as a profitability (RMW) and investment factor (CMA).

The regressions in Table 8 show that target firms generally have positive exposure to the $DOWN$ factor. Columns (1) and (3) further show that this exposure is not significantly altered once our investor starts to engage a target, as reflected in the insignificant interaction term on $Post * DOWN$. However, there is strong evidence in Columns (2) and (4) that exposure to the downside-risk factor significantly decreases after Milestone 2 has been achieved. This indicates that the portfolio of firms for which Milestone 2 has been achieved are less tilted towards high downside risk, reflecting a reduction in risk due to ESG engagement. A concern to the analysis in Table 8 is that these results may partially reflect the ability of our investor to pick stocks that, independent of engagement, became less risky. To mitigate this concern we run regressions as in Table 8 but replace the excess returns of targeted firms with the return difference between targeted and one to one propensity score matched firms. In these weekly difference-in-differences regressions we continue to find that engagement reduces downside risk.

5. Conclusion

This paper provides direct evidence that shareholder engagement by institutional investors over ESG topics creates value by reducing downside risk at portfolio firms. We document this effect based on proprietary data provided by a large institutional investor. The investor has more than \$200 billion assets under management and is considered to be one of the most influential activists when it comes to promoting ESG standards. The database contains 682 engagements across 296 targeted firms worldwide, covering the period 2005 to 2014. The investor most commonly engages firms over corporate governance issues, accounting for half of all engagements, followed by social (21%), environmental (18%), and strategy engagements (13%).

We document the risk-reduction effect of ESG shareholder engagement by using an endogenous treatment-effects model to address selection bias in the engagement decision. After controlling for selection, we find that engagement targets have lower downside risk, which we measure using lower partial moments and value at risk. The estimated effects of ESG engagement are economically meaningful. Lower partial moments of the second (third) order are 1.2% (1.4%) lower at engagement targets compared to matched control firm that were not targeted. Engagement targets also have value at risks that are 2.8% lower compared to matched control firms.

The effect of ESG engagement on downside risk is stronger for more successful engagements. This corroborates that it is indeed the engagement by the investor that reduces downside risk. We further document that the risk-reduction effect of ESG engagement varies across engagement themes. ESG engagement is effective when governance or strategy topics are addressed, and for environmental engagements that are combined with governance improvements. This supports the notion that changing a firm's environmental agenda without addressing governance is unlikely to yield a risk-reduction effect. We cannot find corresponding effects for engagement over social themes, neither individually nor in combination with governance engagements.

We corroborate the validity of these findings with tests that examine the effects of engagement on the exposure of targeted firms' returns to a downside-risk factor. We find that exposure to the downside-risk factor significantly decreases after successful engagement.

Our findings are important as they provide new insights into the channel by which ESG engagement creates value for investors.

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Figure 1: ESG Engagements by Country

This figure reports engagements by country. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

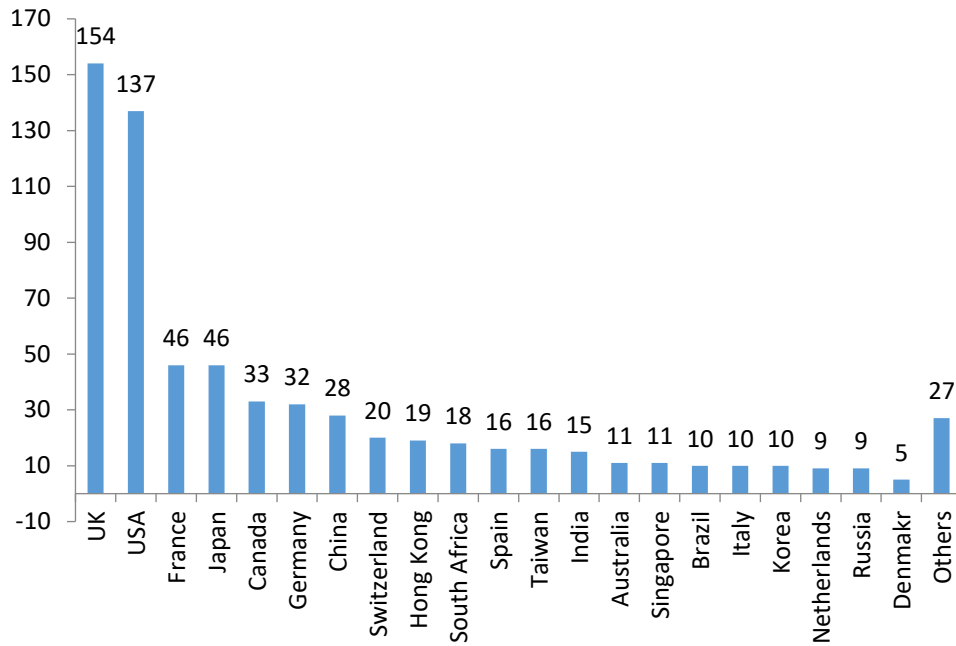


Figure 2: ESG Engagements by Industry

This figure reports engagements by industry. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

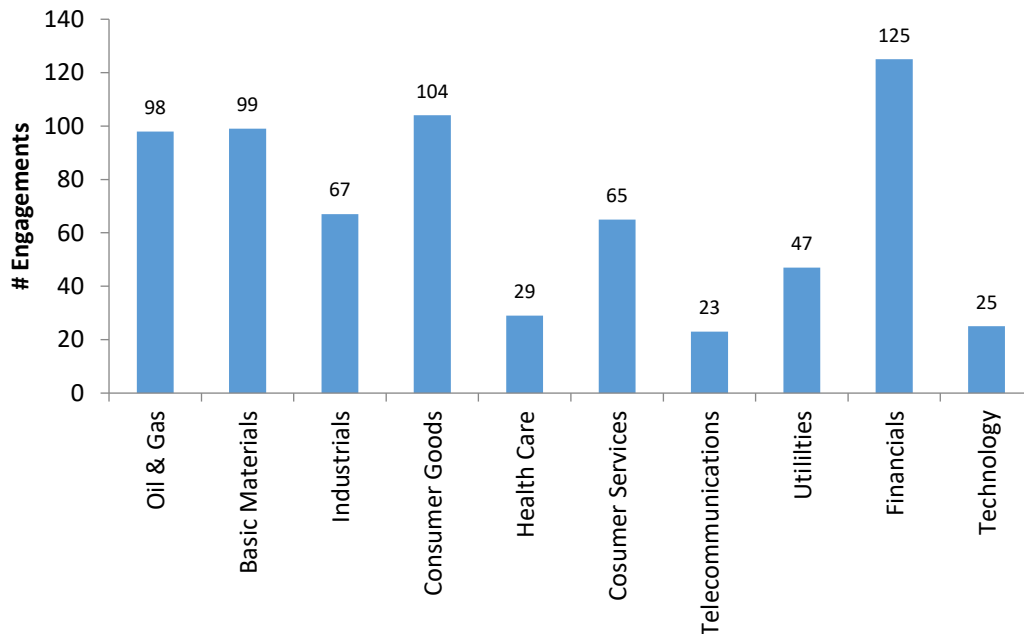


Figure 3: ESG Engagements by Year

This figure reports engagements by year. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

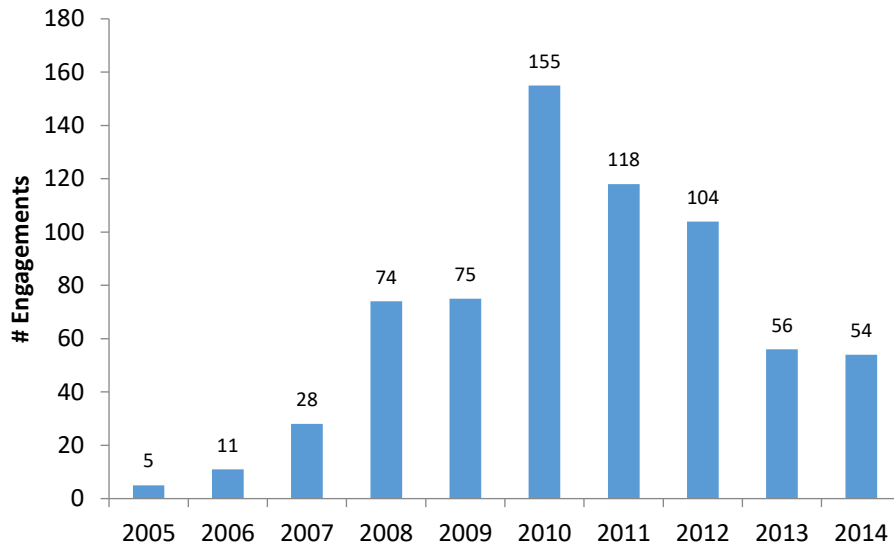


Table 1: Summary Statistics on Engagement Themes

This table provides summary statistics across four engagement themes: (i) governance; (ii) social; (iii) environmental; and (iv) strategy. The table also classifies the themes into sub-themes, and we report the number (percentage) of engagements within each engagement theme. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

Governance Engagement			Social Engagement			Environmental Engagement			Strategy Engagement		
Subthemes	#	%	Subthemes	#	%	Subthemes	#	%	Subthemes	#	%
Board structure	122	37	Health and safety	27	19	Climate change	54	45	Business strategy	42	47
Remuneration	103	31	Supply chain management	25	17	Other environmental	22	18	Risk management	36	40
Other governance	32	10	Bribery and corruption	18	13	Forestry	13	11	Capital structure	4	4
Succession planning	30	9	Community relations	14	10	Water stress	11	9	Shareholder returns	3	3
Separation of chair/CEO	20	6	Operation in trouble regions	14	10	Environmental management	8	7	Reputational risk	3	3
Shareholder communication	6	2	Employee relations	12	8	Biodiversity	5	4	Other strategy and risk	2	2
Accounting/auditing issues	5	2	Corporate culture	10	7	Oil sand	5	4			
Committee structure	5	2	License to operate	7	5	Nuclear power safety	1	1			
Conflicts of interest	2	1	Other social and ethical	7	5	Waste	1	1			
Related party transaction	2	1	Access to medicine	3	2						
Voting rights not 1 share 1 vote	1	0.3	Customer relations	2	1						
			Labor issues	2	1						
			Political risk management	2	1						
Total	328	100	Total	144	100	Total	120	100	Total	90	100
% of All Engagements (N=682)	48			21			18			13	

Table 2: Summary Statistics on Milestones and Engagement Duration

This table displays descriptive statistics on measures of engagement success (milestones) as well as engagement durations. We report engagement durations in months and by milestone and theme. We report means, standard deviations, minimums and maximums of engagement durations. As the average engagement duration equals 34 months and our data end in 2014, some engagements are still work-in-progress or pending, implying that Milestone 3 or 4 have not yet been achieved. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

Milestone 1: Concern Raised with Portfolio Firm				
Achieved Milestone 1 Only	# Engagements		%	
	102		15	
Engagement Duration (in months)	Mean	STD	Min	Max
Governance	4	10	1	87
Social	3	6	1	31
Environmental	4	9	1	65
Strategy	4	8	1	53
All	4	9	1	87
Milestone 2: Issue Acknowledged by Portfolio Firm				
Achieved Milestone 1 to 2	# Engagements		%	
	231		34	
Engagement Duration (in months)	Mean	STD	Min	Max
Governance	13	19	1	114
Social	9	13	1	85
Environmental	7	12	1	72
Strategy	11	16	1	74
All	11	16	1	114
Milestone 3: Actions Taken by Portfolio Firm				
Achieved Milestone 1 to 3	# Engagements		%	
	158		23	
Engagement Duration (in months)	Mean	STD	Min	Max
Governance	25	23	1	126
Social	21	16	1	71
Environmental	16	15	2	59
Strategy	28	25	2	91
All	24	22	1	126
Milestone 4: Engagement Successfully Completed				
Achieved Milestone 1 to 4	# Engagements		%	
	191		28	
Engagement Duration (in months)	Mean	STD	Min	Max
Governance	34	26	2	126
Social	38	21	2	77
Environmental	27	25	2	74
Strategy	34	28	1	95
All	34	25	1	126

Table 3: Summary Statistics of Engagement Actions and Targeted Individuals

This reports summary statistics on different engagement actions (Panel A) as well as the individuals that were targeted by the investor (Panel B). We report these statistics by engagement themes as well as by milestones achieved. The sample consists of 682 engagements across 296 targeted firms over the period 2005 to 2014.

		Engagement Themes					Engagement Progress by Milestones				
		Social	Governance	Environ- mental	Strategy	Total	Milestone 1	Milestone 2	Milestone 3	Milestone 4	Total
Panel A. Action Types											
Meeting	#	435	823	217	303	1778	144	491	616	527	1778
	<i>Per Engmt.</i>	3.0	2.5	1.8	3.4	2.6	1.4	2.1	3.9	2.8	2.6
Call	#	184	260	94	68	606	51	167	192	196	606
	<i>Per Engmt.</i>	1.3	0.8	0.8	0.8	1.0	0.5	0.7	1.2	1.0	0.9
Email	#	62	91	31	20	204	16	78	55	55	204
Letter	#	39	86	40	38	203	24	58	51	70	203
Web update	#	14	30	17	6	67	1	15	22	29	67
AGM	#	1	16	1	0	18	2	4	2	10	18
Shareholder meeting	#	2	8	2	4	16	0	4	5	7	16
Announcement	#	2	10	5	0	17	0	7	3	7	17
Internal review	#	1	9	0	1	11	0	0	1	10	11
Site visit	#	2	0	2	1	5	0	1	2	2	5
Conference	#	2	0	0	0	2	0	0	2	0	2
Panel B. Targeted Individuals											
Chairman	#	80	251	44	96	471	27	124	163	157	471
	<i>Per Engmt.</i>	0.6	0.8	0.4	1.1	0.7	0.3	0.5	1.0	0.8	0.7
Board of directors	#	132	474	58	141	805	54	211	267	273	805
	<i>Per Engmt.</i>	0.9	1.4	0.5	1.6	1.2	0.5	0.9	1.7	1.4	1.2
Senior executives	#	275	410	153	166	1004	91	301	340	272	1004
	<i>Per Engmt.</i>	1.9	1.3	1.3	1.8	1.5	0.9	1.3	2.2	1.4	1.5
CSR	#	173	49	121	39	382	39	105	144	94	382
	<i>Per Engmt.</i>	1.2	0.1	1.0	0.4	0.6	0.4	0.5	0.9	0.5	0.6
Investor relations and legal	#	184	320	84	108	696	52	192	204	248	696
	<i>Per Engmt.</i>	1.3	1.0	0.7	1.2	1.0	0.5	0.8	1.3	1.3	1.0
Secretary	#	57	187	21	46	311	18	86	105	102	311
	<i>Per Engmt.</i>	0.4	0.6	0.2	0.5	0.5	0.2	0.4	0.7	0.5	0.5

Table 4: Determinants of Effect: Selection Equation

This table reports results from the selection equation of an endogenous treatment-effects models to estimate the effect of ESG engagement on downside risk. The three regressions we report correspond to the three outcome equations we estimate in Table 5 for our three measures of downside risk. The sample in this analysis consists of a total of 1,131 firms, including 269 engagement targets and 862 control firms. *Engagement target* is a dummy variable that equals 1 if a firm is an engagement target, and 0 if it is a control firm. Control firms are matched with engagement targets using country, industry, and size as matching criteria. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significant at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	Engagement Target		
	(1)	(2)	(3)
Log(Market cap)	0.688*** (8.70)	0.696*** (8.80)	0.705*** (8.93)
Market-to-book ratio	0.009 (1.12)	0.008 (1.08)	0.008 (1.05)
Profit margin	-0.002 (-1.09)	-0.002 (-1.19)	-0.002 (-1.23)
Dividend yield	0.069*** (3.10)	0.067*** (2.95)	0.064*** (2.82)
Leverage	0.002 (1.44)	0.002 (1.43)	0.002 (1.43)
Free float	0.002 (1.04)	0.001 (0.73)	0.002 (0.74)
Anti-director right index	0.064 (1.33)	0.065 (1.32)	0.090* (1.80)
Matched sample	Yes	Yes	Yes
Obs.	1040	1040	1040

Table 5: Effect of ESG Engagement on Downside Risk: Outcome Equation

This table reports results from the outcome equation of an endogenous treatment-effects models to estimate the effect of ESG engagement on downside risk. The engagement selection equation has been estimates as in Table 4. The sample in this analysis consists of a total of 1,131 firms, including 269 engagement targets and 862 control firms. *Engagement target* is a dummy variable that equals 1 if a firm is an engagement target, and 0 if it is a control firm. Control firms are matched with engagement targets using country, industry, and size as matching criteria. We use three dependent variables to measure investment risk at firm level in the outcome equations: (i) the lower partial moment of the second order (*LPM (0,2)*); (ii) the lower partial moment of the third order (*LPM (0,3)*); and (iii) the value at risk (*VaR*). *t*-statistics are reported in parentheses. *, **, and *** denote statistical significant at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	LPM (0,2)	LPM (0,3)	VaR
	(1)	(2)	(3)
Engagement Target	-0.012*** (-2.68)	-0.014** (-2.45)	-0.028*** (-2.59)
Log(Market cap)	-0.005*** (-4.48)	-0.007*** (-4.43)	-0.011*** (-4.14)
Market-to-book ratio	-0.0003*** (-4.55)	-0.0005*** (-4.66)	-0.0007*** (-3.96)
Profit margin	-0.0002*** (-5.07)	-0.0002*** (-4.82)	-0.0003*** (-4.37)
Leverage	0.00001*** (5.95)	0.00002*** (6.82)	0.00003*** (4.50)
Matched sample	Yes	Yes	Yes
Selection bias corrected	Yes	Yes	Yes
Obs.	1040	1040	1040

Table 6: Effect of ESG Engagement on Downside Risk: Results by Success Rates

This table reports results from endogenous treatment-effects models to estimate the effect of ESG engagement on downside risk. We report results from the outcome equation only. The selection equation has been estimated as in Table 4. We split the sample based on a measure of the engagement success. We consider the engagement success to be high (low) if Milestones 2 or more (Milestone 1) have been achieved. The sample in this analysis consists of a total of 1,131 firms, including 269 engagement targets and 862 control firms. *Engagement target* is a dummy variable that equals 1 if a firm is an engagement target, and 0 if it is a control firm. Control firms are matched with engagement targets using country, industry, and size as matching criteria. We use three dependent variables to measure investment risk at firm level in the outcome equations: (i) the lower partial moment of the second order (*LPM (0,2)*); (ii) the lower partial moment of the third order (*LPM (0,3)*); and (iii) the value at risk (*VaR*). *t*-statistics are reported in parentheses. *, **, and *** denote statistical significant at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	LPM (0,2)	LPM (0,3)	VaR	LPM (0,2)	LPM (0,3)	VaR
	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Engagement achieved Milestone 2 or more			Engagement did not achieve Milestone 2		
Engagement target	-0.013*** (-3.02)	-0.017*** (-2.79)	-0.032*** (-2.83)	0.025*** (2.95)	0.041*** (4.17)	0.069*** (3.50)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Matched sample	Yes	Yes	Yes	Yes	Yes	Yes
Selection bias corrected	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	833	833	833	207	207	207

Table 7: Effect of ESG Engagement on Downside Risk: Results by Engagement Themes

This table reports results from endogenous treatment-effects models to estimate the effect of ESG engagement on downside risk across engagement themes. We report results from the outcome equation only. The engagement selection equation has been estimated as in Table 4. The sample in this analysis consists of a total of 1,131 firms, including 269 engagement targets and 862 control firms. *Engagement target* is a dummy variable that equals 1 if a firm is an engagement target, and 0 if it is a control firm. Control firms are matched with engagement targets using country, industry, and size as matching criteria. We use three dependent variables to measure investment risk at firm level in the outcome equations: (i) the lower partial moment of the second order (*LPM (0,2)*); (ii) the lower partial moment of the third order (*LPM (0,3)*); and (iii) the value at risk (*VaR*). *t*-statistics are reported in parentheses. *, **, and *** denote statistical significant at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	Governance Engagement			Environmental and Governance Engagement			Social and Governance Engagement			Strategy Engagement		
	LPM (0,2)	LPM (0,3)	VaR	LPM (0,2)	LPM (0,3)	VaR	LPM (0,2)	LPM (0,3)	VaR	LPM (0,2)	LPM (0,3)	VaR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Engagement target	-0.010** (-2.02)	-0.013** (-1.97)	-0.027** (-2.30)	-0.015* (-1.70)	-0.018 (-1.53)	-0.048** (-2.49)	0.008 (0.57)	0.014 (0.55)	-0.018 (-0.66)	-0.013 (-1.63)	-0.021* (-1.92)	-0.039** (-2.08)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matched sample	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Selection bias corrected	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	730	730	730	122	122	122	182	182	182	259	259	259

Table 8: Effect of ESG Engagement on Downside Risk: Evidence from Weekly Stock Returns

This table shows regressions of weekly excess stock returns (stock return minus risk-free rate) on the DOWNSIDE factor, the Post dummy, and an interaction of the two. We construct the downside-risk factor (DOWNSIDE) as the difference between the returns of portfolios of stocks with high minus low downside risk. Stocks with high (low) downside risk are in the highest (lowest) 30% of the respective downside-risk measure. Panel A generates the DOWNSIDE factor using LPM (0,2), while Panel B uses VaR instead. LPM (0,2) is the lower partial moment of the second order, while VaR is the value at risk. In Columns (1) and (3) the dummy variable Post equals 1 for stock-return observations from the two-year period after our investor started to engage a target, -1 for stock-return observations from the two-year period before, and zero for all other observations. In Columns (2) and (4) the Post dummy takes the value 1 in the two-year period after Milestone 2 has been achieved, -1 in the two-year period before, and zero otherwise. We further include in all regressions the five factors proposed by Fama and French (2015), which contain the MKT, SMB, and HML factors as well as a profitability (RMW) and investment factor (CMA). The sample includes 269 engagement targets. *, **, and *** denote statistical significant at the 10%, 5% and 1% levels, respectively.

Time period used to measure Post dummy:	Panel A: LPM (0,2)		Panel B: VaR	
	Initial	Milestone 2	Initial	Milestone 2
	Engagement		Engagement	
	Excess Returns		Excess Returns	
	(1)	(2)	(3)	(4)
Post * DOWNSIDE	-0.001 (-0.17)	-0.030*** (-3.43)	0.002 (0.26)	-0.030*** (-4.14)
DOWNSIDE	0.039*** (7.46)	0.038*** (7.33)	0.062*** (14.73)	0.060*** (14.15)
Post	-0.000 (-1.11)	-0.001** (-2.58)	-0.000 (-0.84)	-0.001** (-2.42)
MKT	0.971*** (238.49)	0.971*** (238.73)	0.959*** (238.48)	-0.001 (-0.23)
SMB	0.066*** (19.61)	0.066*** (19.63)	0.064*** (19.12)	-0.005 (-1.31)
HML	0.063*** (9.79)	0.063*** (9.85)	0.058*** (9.25)	-0.012 (-1.55)
RMW	-0.095*** (-9.99)	-0.094*** (-9.95)	-0.081*** (-8.60)	0.053*** (4.72)
CMA	-0.001*** (-9.85)	-0.001*** (-9.81)	-0.001*** (-10.13)	-0.000 (-0.01)
Constant	-0.000*** (-3.29)	-0.000*** (-3.40)	-0.000*** (-3.80)	-0.000*** (-3.97)
Obs.	225,295	225,295	225,295	225,295
R-squared	0.288	0.288	0.289	0.287