

**Investor Engagement to Mitigate Climate Change:
Evidence from an Experiment with Mid-Cap Companies**

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Abstract

We use an experimental setting to investigate the impact of investor engagement and management attitudes on the reporting and performance of climate change management. Our results show that engaged companies were more likely than the control group to improve both their climate change reporting and performance, and that management recalcitrance significantly impeded improvement but did not eliminate the effectiveness of engagement. The study contributes to the understanding of the role of shareholder activism in advancing environmental, social and governance issues by offering evidence from non-confrontational engagement by a relatively small institutional investor and by highlighting the role of management. The study offers evidence to institutional investors that relatively small investment institutions can effectively engage with firms and change management practice without necessarily embarking on costly or time consuming programmes. The results also have implications for targeting engagement for maximum effectiveness and for the design and implementation of policy and regulation to promote better carbon management.

Keywords: Corporate Governance; Shareholder Activism; Private Engagement; Climate Change; Experimental Design

INTRODUCTION

In February 2016, the CEO of Blackrock, one of the leading asset management institutions, sent letters to the largest corporations in the US and Europe urging them to prioritize long-term focus and to recognize, incorporate and communicate environmental, social and governance issues within their business strategy (Turner, 2016). The letter emphasized that addressing corporate social responsibility (CSR) issues has tangible consequences for generating long-term sustainable returns for the investors. This letter is just one example of a growing trend whereby institutional investors engage with companies concerning their CSR. For example, in 2012, US companies received more than 1,000 shareholder resolutions related to environmental, social and governance issues (Ferraro & Beunza, 2014). Along similar lines, as of October 2016, over 1,500 investment institutions have joined the United Nations Principles for Responsible Investment and committed themselves to actively monitoring and engaging with their portfolio constituents regarding corporate social responsibility practices (UN PRI, 2016). Even so, prior research evidence, which has struggled to control for endogeneity, has shown that engagement by investors often fails to meet its objectives and can be an expensive and convoluted process (Flammer, 2015; Dimson, Karakas, & Li, 2015). Such research has typically shown that engagement does produce a statistically significant impact on performance whilst noting that engagement more often than not fails to produce the desired outcome (Dimson et al., 2015). This may be especially true where the investors do not have the financial muscle of Blackrock.

In this paper, we explore whether private engagement by a well-established, but relatively small, institutional investor is effective in encouraging companies to improve their climate change management and carbon emission performance. Climate change is increasingly recognized as a source of significant operational and financial risk, yet many companies are

reluctant to adopt proactive approaches to climate change management and to reduce carbon emissions as these developments can involve substantial costs (C2ES, 2015; Lash & Wellington, 2007). Despite gradual improvements, effective climate change management often lags behind business growth (Sullivan & Gouldson, 2013). The challenges of improving climate change management and performance render it an important and relevant setting in which to conduct our study. We use a three-year experiment structured as a randomized controlled trial. The experiment was conducted during 2012-2015 with the institutional investor engaging each year with a treatment and matched control group of companies from its investment portfolio. These companies all exhibited low carbon management or disclosure according to an independent assessment by the CDP¹. This research design helped us to clarify causality and to establish whether improvements could be attributed to investor involvement or whether they merely coincided with wider trends in corporate disclosure regarding climate change information.

We find that companies which received engagement from the investor were more likely to improve both their reporting of climate management information and their climate performance score than the control group. Further, companies which did not improve after one year of engagement continued to receive contact from the investor and were more likely to improve their carbon performance in subsequent years than the control group. Our study therefore complements prior knowledge in a number of ways. Firstly, we contribute to the understanding of the role of different forms of investor involvement in promoting corporate social responsibility. Given that most proposals on CSR issues do not gain many votes and promoting CSR issues in the companies often remains a challenge, prior research has highlighted the need for more analysis of the effect of engagement in different contexts (Flammer, 2015; Gifford, 2010; Goodman & Arenas, 2015). We complement prior evidence by using a different research design – a randomized experiment – to evaluate the causal impact

of engagement. We also set our experiment in a different context. Firstly, unlike most prior evidence, our measure of improvements in climate change performance is assessed independently from the investor thereby avoiding potentially severe common source bias; secondly, engagement takes the form of a dialog via letters to the company management and a follow up contact, and this contact is not accompanied by a media controversy or a vote on a resolution; thirdly, we use a clear and independent measure of management's opposition to climate change management to assess the import of management responsiveness; and finally, engagement is conducted by a well-established but relatively small investment fund. This context allows us to assess the effectiveness of a "soft" dialog between investor and target company.

From a practical viewpoint, given the difficulties that governments face in influencing corporate behavior, the possibility that investors can persuade companies to improve their climate-change disclosure and performance is to be welcomed. We offer empirical evidence that dialog-based engagement on climate change issues can make a difference.

HYPOTHESES DEVELOPMENT

Shareholder Engagement in Environmental, Social and Governance Issues

Research and practice of corporate governance have long emphasized the influence of shareholders on corporate strategic decisions. Firstly, institutional investors can sell their shares if they are dissatisfied with company performance, also known as "exiting", or "voting with their feet" (Admati & Pfleiderer, 2009; Parrino, Sias, & Starks, 2003). Alternatively, investors can intervene in the management of the company to change the issue of concern (i.e. exercise "voice", or "engagement", Ferraro & Beunza, 2014). Engagement is consistent with long-term investor stewardship, where shareholders show their commitment to the firm by

keeping their capital invested but at the same time trying to reduce the information asymmetry by actively seeking dialog with the management to bring about desired changes. Most empirical research has focused on a more “public” form of activism via submitting and voting on shareholder resolutions, and the effect of such activism on the management and, ultimately, the value of the firm. Prior studies in the US have shown that activist campaigns by hedge funds and other institutional investors can effect changes in business and investment strategies, capital structure and corporate governance (Brav, Jiang, Partnoy, & Thomas, 2008; Klein & Zur, 2009; Renneboog & Szilagyi, 2011; Thomas & Cotter, 2007). Further, these campaigns are generally found to be associated with positive market reaction, suggesting that investors believe such activist undertakings reduce agency costs and create value for the shareholders.

However, apart from filing resolutions, an increasing number of institutional investors engage in behind-the-scenes dialog with company management. For example, 63 percent of institutional investors in the survey conducted by McCahery, Sautner, and Starks (2015) had at least one direct dialog with the portfolio company management and 45 percent had dialogs with the boards of directors without management presence. Becht, Franks, Mayer, and Rossi (2009) analyze private engagements on various issues in corporate finance, business strategy and governance by a UK-based hedge fund. The authors find that the activities of the fund generated positive market reaction and targets maintained higher operating performance for at least two years after the intervention.

Although research on investor activist campaigns has predominantly focused on corporate finance and corporate governance, emerging studies examine investor involvement regarding corporate social responsibility. Social and environmental issues have historically received little support from mainstream investors and were mainly the domain of social activists (Flammer, 2015; King & Soule, 2007; Thomas & Cotter, 2007). However, with the growth of responsible investment, more institutional investors are attempting to take an active

position with regards to corporate social responsibility (Eccles, Krzus, & Serafeim, 2011). A relatively small number of emerging studies offer evidence on the effect of shareholder activism on environmental and social issues. Reid and Toffel (2009) find that shareholder proposals positively influenced large US firms to submit information on their climate change management to the CDP than if they did not receive the shareholder proposal. Activist shareholders are also shown to raise stakeholder perception of firms' environmental risk (Vasi & King, 2012). A study of engagement by a large asset management firm by Dimson, Karakas, and Li (2015) explores engagements on various issues including corporate governance, business ethics, environmental management, climate change, human rights, labor standards and public health. The authors are primarily focused on whether these engagements create value for the shareholders and also find that companies' operating performance and internal governance structure improve following engagement.

However, the potential effectiveness of engagement on a large scale is far from obvious. Firstly, persistent engagement with a large number of companies may not be feasible for institutional investors. For example, McCahery, Sautner, and Starks (2015) find that many institutions in their survey cited questionable benefits, lack of personnel, unfeasibility of engaging with a large number of firms and small stake as reasons for abstaining from shareholder engagement. In line with this evidence, Becht, Franks, Mayer, and Rossi (2009) show that some interventions by the Hermes U.K. Focus Fund lasted over 1,200 days and involved confrontation with management. Secondly, dialog without accompanying publicity and confrontation may seem too "soft" to be effective compared with more confrontational ways (Eesley & Lenox, 2006). Del Guercio and Hawkins (1999) also note how large institutional investors such as the California Public Employees' Retirement System (CalPERS) and the California State Teachers' Retirement System (CalSTRS) relied on publicity to further support their engagement. Along similar lines, Dimson, Karakas, and Li (2015) note that many

engagements in their study were triggered by public media. Even more importantly, descriptive statistics in the study reveal modest success rates of the dialog. This is in line with Flammer (2015) who notes that most CSR-related proposals still fail to be implemented. Consequently, engagement on environmental, social and governance issues remains a non-trivial undertaking. Finally, prior evidence is mostly focused on relatively large financial institutions. Nevertheless, all institutional investors are encouraged to be more proactive stewards of the portfolio companies.

Although an effective dialog on corporate social responsibility is challenging, direct contact with management can allow investors to articulate the issue of concern and influence the internal debate in the organization (Ferraro & Beunza, 2014). As the authors note, “in change terms, [...] dialogue can be seen as a form of synthesis, arising from the dialectical encounter and progressive convergence between the positions of activists and corporations” (Ferraro & Beunza, 2014: 6). Engagement with management may not need confrontation as the first goal of the investors could be to indicate their commitment to the environmental or social issue of concern and to request the management to address these issues. This is broadly in line with evidence by Bessler, Drobetz, and Holler, (2015) who, for a sample of German firms, find that non-confrontational activist campaigns by hedge funds can create value in the long term. Building on this evidence, we postulate that “patient” dialogue-based engagement without accompanying filing of the shareholder resolution by a reputable yet relatively small-scale institutional investor can be effective. We thus state the following hypothesis:

Hypothesis 1. Companies are more likely to improve their climate change disclosure and/or performance following initial dialog-based engagement from the investor.

In the light of the arguments about the cost of engagement, we further intend to test whether continuous engagement beyond the initial contact and request is in fact useful. Ferraro and

Beunza (2014) highlight that management response to engagement may be a gradual process as the internal debate in the organization is stirred and management reflect and subsequently act on the issue. Consequently, we could expect engagement to yield results beyond a “quick” response in the first year and we state the following additional hypothesis:

Hypothesis 2. Companies that have not improved after one year of engagement are more likely to improve their climate change disclosure and/or performance following further engagement from the investor.

Finally, prior evidence suggests that management’s initial attitude to the issue matters (Becht et al., 2009; Ferraro & Beunza, 2014). Given that climate change management is a costly endeavor, we finally propose that management’s initial position will influence the effectiveness of the engagement. We thus state the last hypothesis.

Hypothesis 3. Engagement is more likely to reach its objective if managers have not actively opposed it and/or have invested previously in emission reduction activities.

EXPERIMENTAL SETTING

Engagement was conducted by the Church Investment Group (CIG), a UK-based institutional investor representing 55 faith-related organizations in the UK and Ireland, with over £15 billion in assets under management, as of October 2016. CIG encouraged companies to improve their climate change reporting and performance which was assessed through independent evaluation by CDP. CDP information has been used in prior studies as a measure of proactive approach to climate change management (Reid & Toffel, 2009; Ioannou, Li, & Serafeim, 2015).

CDP is an international non-for-profit organization which developed, among other things, a global disclosure system whereby companies can report on their environmental impact

and activities to address material environmental issues (CDP, 2016). As of 2016, CDP is supported by over 800 institutional investors with over US\$95 trillion in assets. CDP issues an information request to companies worldwide, which comprises an extensive questionnaire covering management of climate change risks (e.g. compensation incentives, targets and responsibilities at the board level), risk assessment (e.g. regulatory, physical and financial), and carbon performance (e.g. emissions by scope, by fuel type, as well as assurance and external verification). Companies have to complete the questionnaire by a given deadline and the information is then assessed and benchmarked by CDP which derives two metrics: a disclosure score and a performance grade. The 0-100 disclosure score measures the extent to which a company provides information on the measurement and management of its climate change-related programs and carbon footprint. The performance grade, from A to E (with A being the highest), reflects whether a company's activities are appropriate and effective in reducing its emissions and managing its climate risks, e.g. whether appropriate targets are set and met and how these are verified (CDP, 2013). If a company provides insufficient disclosure (less than 50), it does not obtain any performance grade. Finally, some companies do not respond to CDP, and are indicated as "NR" in CDP reports, while some actively decline to participate and are indicated as "DP". Although CDP does not specifically verify the information provided, the disclosure scores and performance scores are public so a company's response is visible to stakeholders.

We use CDP disclosure score and CDP performance grade as our dependent variables. Prior research argues that environmental disclosure is important as it creates accountability and leads to improvements in environmental performance (Deegan, Rankin, & Voght, 2000). However, some studies point out that environmental disclosure does not necessarily imply robust performance as management may be inclined to show symbolic effort to appease stakeholders while not expending resources on real improvements (Al-Tuwaijri, Christensen,

& Hughes, 2004; Clarkson, Li, Richardson, & Vasvari, 2008; Dawkins & Fraas, 2011; Delmas & Montes-Sancho, 2010; Field, Lowry, & Shu, 2005; King & Lenox, 2000; Kolk, 2008; Patten, 2002; Westphal & Zajac, 1994). As the performance grade assessed by the CDP aims to capture the relevance and usefulness of the disclosed information to the company's industry, using both disclosure score and performance allows us to account for the potential discrepancy between providing information and having this information assessed as being effective and appropriate. Secondly, using CDP metrics as performance outcomes ensures that our outcome variable is assessed independently from the investor, ensuring objectivity. This contrasts with prior studies where the success of the engagement was determined by the investor (Dimson, Karakas, & Li, 2015). We believe this to be a useful difference as it ensures that, whether or not the management are responsive to the engagement request, improvement is only counted where it is independently substantiated.

Experimental Setup

The experiment was carried out in three stages during 2013- 2015 and was structured following a randomized controlled trial approach. Experimental design is important as, if properly executed, it allows drawing causal conclusions (Antonakis, Bendahan, Jacquart, & Lalive, 2010) and several emerging studies rely on it. For example, Crifo, Forget, and Teyssier (2015) conduct an experiment with private equity investors to explore how these investors incorporate environmental, social and governance information into their valuation of target firms. Similarly, Hafenbradl and Waeger (2016) use a novel prediction game approach to examine the underpinnings of managers' beliefs in the business case for CSR and the resulting impact on their CSR involvement. However, our study relies on a real-life experiment rather than a laboratory setting, which we believe is useful as we want to be able to determine the effect of the investor engagement in the presence of various confounding factors. An experimental

setting also allows us to account for the potential effect of a poor CDP assessment on its own. Chatterji and Toffel (2009) show that prominent ratings are able to drive underperforming companies to improve their scores as managers may be concerned about a negative reaction from stakeholders. As CDP is one of the most recognized providers of assessment of climate change practices and its reports are available to investors and other stakeholders, poorly-scoring companies may strive to improve their ratings. Given that both our test and control groups would be affected the CDP assessment, we will be able to assess the difference in response between the two groups that is not due to the CDP ratings themselves, provided that we ensure that there is no difference between the two groups with regards to the initial CDP scores.

Stage 1: Engagement and Assessment in 2013. The initial universe was identified as all companies from FTSE 250, the 101th to 350th largest companies on the London Stock Exchange, where the investor-members of CIG had shareholdings. Of these, the initial sample included 45 companies whose business was in high emitting industries (Energy, Industrials, and Materials) and who were scoring low (below grade C) in the 2012 CDP assessment. CDP underperformance was determined as scores D, E or no grade; the latter case could be because companies had a disclosure score below 50, declined to participate in CDP questionnaire or did not respond at all. Of these 45 companies, 23 were randomly assigned to the test group and 22 to the control group. Companies in the test group received engagement from the investor during March and April 2013. Engagement comprised sending letters to senior management and investor relations teams outlining investor concern about the issue and urging the company to a) complete the CDP questionnaire and disclose relevant information by the given deadline and b) improve performance to achieve grade C or higher. Grade C was defined by the CDP as representing “some activity with varied levels of integration into business strategy” (CDP,

2013: 6). Setting a target which indicates a reasonably good performance rather than the best practice is consistent with evidence from Ioannou, Li, and Serafeim (2015) who show that setting overly ambitious climate management targets reduces the likelihood that the targets will be met. Further, each company in the test group received follow-up contact by phone. Companies had to submit the information for CDP assessment in May 2013 and the results of the assessment were available from CDP in November 2013. Changes in performance scores were then compared across the test and control groups.

Stage 2: Engagement and Assessment in 2014. In the next stage, during spring 2014, the investor proceeded to engage with those companies in the test group who did not attain at least a grade C in the first stage of the experiment. The engagement included the same steps as previously, i.e. a letter to senior management and follow up contact. Companies in the test group which had already improved their performance up to grade C received no further contact from the investor. Further, 21 companies from the Consumer sectors were added to the engagement agenda. As with the first group, these companies were members of FTSE 250 where the investor had shareholdings and which had a substandard performance grade according to CDP assessment. These companies were randomly assigned to the test and control groups in the same manner as in the first stage, with 11 companies in the test group and 10 in control group. Finally, nine more high-risk companies were added to the experiment, with four in the test and five in the control group. These were companies that moved from FTSE 100 to FTSE 250 and scored poorly on CDP assessment. Engagement with the test group consisted of the same steps as in Stage 1. As in the previous engagement sequence, the submission to CDP was due in May 2014 and the outcome was assessed in November 2014.

Stage 3: Engagement and Assessment in 2015. In the final stage of the experiment, companies that had achieved grade C or above were considered to have met the investor's request and received no further engagement. The remaining companies were contacted by the investor in the same manner as before (letter and follow up) in spring 2015. At this stage a further 39 companies from FTSE 250 were included in the experiment. These companies came from different sectors including Consumer, Health Care, IT, Industrials, and Energy. Companies from Industrials, Energy, and Consumer were newly listed or newly included in FTSE 250. Of these 39 companies, 19 were in the test group and 20 in the control group. Companies in the test group were contacted by the investor and were required to submit their documents to CDP by the end of June 2015. The analysis of the changes in CDP-assessed performance was conducted in November 2015.

Thus in total there were 114 companies in the experiment, with 57 companies in test and 57 in control groups. The industry composition of the total sample in the experiment is presented in Table 1. The table shows that the distribution of the industries between the test and the control groups is almost even except for Industrials where there are three more companies in the control group and Materials where there are four more companies in the test group. However, these differences are not statistically significant ($\text{Chi}^2=1.42, p=0.92$) and were accepted, as both industries have high emissions intensity, and it was more important to balance the initial CDP performance between the test and control groups.

Insert Table 1 about here

Variables

Dependent Variable. The two main CDP measures used for the assessment of companies' improvements in managing carbon footprint are the CDP score and CDP grade. We first construct two variables indicating improvements in the score and grade one year after

the company entered the experiment. In a robustness test, we also construct two variables indicating the overall improvement in the score and grade over the full experiment although this will mean that for the pooled sample firms can be assessed over one, two or three years.

Engagement. Our main variable of interest is engagement, a binary variable taking the value of one if the company received engagement from the investor and zero otherwise.

Management recalcitrance. We use two measures to indicate management's support or opposition to climate change management. In the first instance, we simply take the firms previous dealings with CDP as indicative of their attitude. We use initial resistance to CDP expressed as a dummy variable taking the value of one if the company did not respond to the CDP questionnaire or actively declined to participate prior to the engagement period and zero otherwise. We also use the companies' previous performance in emission reduction as indicative of both their commitment to climate change management and the ease with which they may be able to meet the requirements of the CDP disclosure and performance criteria. This is measured as the emission reduction score² from Thomson Reuters' ASSET4 database at the start of the experiment.

Control Variables. Following prior research, we control for size expressed as a natural logarithm of market capitalization and concentrated ownership percentage, both collected from Datastream. We include industry and year dummies to control for intertemporal and interindustry differences. We additionally control for profitability (return on assets from Datastream), concentrated ownership (percentage of strategic shareholdings from Datastream), corporate governance score³ from ASSET4 and, finally, overall CSR score⁴ also collected from ASSET4.

METHOD

We first estimate whether test firms are more likely to improve their climate change performance after one year of engagement by the investor. Given that our dependent variables are binary, we use logistic regression approach and estimate the following equations:

$$\begin{aligned} \text{Score}1Y_i = & b_0 + b_1\text{Engagement}_i + b_3\text{Initial nonresponse}_i + b_2\text{Emission reduction}_i + \\ & b_4\text{Market capitalization}_i + b_5\text{Concentrated ownership}_i + b_5\text{ROA}_i + b_5\text{Corporate governance}_i \\ & + c_{1-3}\sum\text{Year}_t + d_{1-6}\sum\text{Industry}_i + e_i \end{aligned}$$

$$\begin{aligned} \text{Grade}1Y_i = & b_0 + b_1\text{Engagement}_i + b_3\text{Initial nonresponse}_i + b_2\text{Emission reduction}_i + \\ & b_4\text{Market capitalization}_i + b_5\text{Concentrated ownership}_i + b_5\text{ROA}_i + b_5\text{Corporate governance}_i \\ & + c_{1-3}\sum\text{Year}_t + d_{1-6}\sum\text{Industry}_i + e_i \end{aligned}$$

Score1Y is the binary indicator of improvement in CDP score and *Grade 1Y* of improvement in CDP grade. We investigate three test variables: *Engagement* is a binary indicator of the firm receiving engagement from the investor; *Initial nonresponse* is one if the company has not previously responded to or actively declined to participate in the CDP questionnaire and zero otherwise; *Emission reduction* is ASSET4's independent assessment of the emission reduction practices in each firm at the time of entering the experiment and expressed as a score from 0-100. Following feedback, we also investigate four control variables, although our randomized experimental approach should, and does, mean that these are ineffective. They are the *Market capitalization*, *Concentrated ownership*, the percentage of concentrated shareholdings, and *ROA* the return on profitability all collected from Datastream. Again, following feedback we look at the role of two other governance variables: *Corporate governance_i* which is the governance score from ASSET4, and overall *CSR* score again from ASSET4 of which governance is a component. We omit them from our reported results although we do test

whether they have any ability to discriminate between our test and control groups. Finally, $Year_i$ and $Industry_i$ are year and industry dummies.

We also assess the overall result of the experiment after three years. Here we use a cross-sectional model on the same sample as in the one-year test. We disregard the fact that some companies have had three instances of engagement while others had two or one as we are simply interested in the overall outcome of the three-year experiment. We use the same model as for the one-year outcome but with the dependent variable determined over the full period of the experiment. Naturally the outcome for a firm which has had one year to respond may differ from one that has had two but the year dummies are a fixed effect control between the different groups.

RESULTS

Descriptive statistics

Table 2 presents descriptive statistics for the test and control groups separately. In the test group, 56.1 percent of the companies have improved their climate change disclosure score after one year of engagement as opposed to 38.6 percent of the control companies; further, 38.6 percent of test companies increased their performance grade after one year of engagement while only 21.1 percent of the control companies did so. As discussed before, both groups are similar in other firm characteristics, with the test group having a slightly lower level of initial resistance to CDP (45.6 percent v 49.1), slightly larger market capitalization (log market capitalization 14.0 v 13.9), slightly higher levels of concentrated ownership (26.5 v 25.3), and lower ROA (7.4 v 9.4). Where we introduce additional control variables, the sample size is slightly reduced. Again, test and control groups are similar, with test group having marginally higher corporate governance score (69.8 v 67.1), lower CSR score (50.9 v 53.0) and higher

emission reduction score (49.1 v 46.7). Statistical tests further confirm that the differences in the control variables between the two groups are not significant.

Insert Table 2 about here

Table 3 reports correlations between the variables. The engagement variable is positively and significantly correlated with the one-year improvement in the performance grade (0.192) but not with the disclosure score. Further, there is unsurprisingly a strong negative correlation between resistance to CDP and both outcome variables (- 0.478 and - 0.427). Finally, there is a positive correlation between CSR score and both outcome variables and emission reduction score and both outcome variables.

Insert Table 3 about here

Testing Initial Random Assignment

Despite this intentional randomized assignment, there still remained a possibility that the two groups were significantly different. To see whether this was the case, we estimated a logit model where the dependent variable was equal to one if the company was in the test group and zero otherwise. We started with a simple model where the independent variables included size (logarithm of market capitalization), a binary indicator of initial resistance to CDP (equal one if the company declined to participate in a previously administered questionnaire or gave no response to the CDP and zero otherwise) and industry dummies. Next, we added profitability (return on assets), concentrated ownership (percentage of strategic shareholdings), corporate governance score, emission reduction score and, finally, overall CSR score. As governance and emission reduction scores are components of the overall CSR score, we did not include them together. However, in a robustness test we included governance and emission reduction together in the same model, and the results remained consistent. The results are reported in Table 4. None of the variables were statistically significant, which suggests that our test and

control groups were not significantly different in any of those firm characteristics and were therefore suitable for the experiment.

Insert Table 4 about here

Engagement Effect

Table 5 reports the results of the cross-sectional analysis of improvements in carbon disclosure. In all models industry and year dummies are included and statistical significance is estimated using robust standard errors clustered by industry. In Model 1 we test the effectiveness of engagement alone within one year of the engagement and assess its impact on carbon disclosure. The statistical significance indicated in the table follows the convention of identifying statistical difference from zero but in each case our hypotheses are directional so the indicated significance understates the true results. We further include the dummy variable indicating prior non-response in Model 2 and the emission reduction score in Model 3. Given the matched experimental setting there is no obvious reason to suppose that control variables are necessary but in response to feedback we also include Model 4 with all three test variables and size, ownership and profitability as control variables. Finally, in Model 5 we extend the experimental window to include the full period of the experiment although this does mean that some firms will have three years to respond to engagement, others two years and a final group only one year. The inclusion of year dummies allows the model to adjust for differences in responsiveness.

The results are unequivocal with engagement having a statistically significant impact on improvement in disclosure in all five models (Model 1: $\beta=0.818$, $p<0.01$; Model 2: $\beta=0.944$, $p<0.05$; Model 3: $\beta=0.894$, $p<0.05$; Model 4: $\beta=0.967$, $p<0.01$; Model 5: $\beta=1.490$, $p<0.01$) with the marginal effect ranging from 15.1 percent higher probability of improvement to 20.5 percent. Stronger still is the significance of the management reluctance variable which is

strongly significant in each model (Model 2: $\beta = -2.382$, $p < 0.001$; Model 3: $\beta = -2.144$, $p < 0.001$; Model 4: $\beta = -2.258$, $p < 0.001$; Model 5: $\beta = -2.767$, $p < 0.001$). It may be expected but engaging with management that are not interested in carbon reporting will be a hard task. Finally, previous performance in emission reduction as assessed independently by ASSET4 is positively associated with improving disclosure (Model 3: $\beta = 0.014$, $p < 0.01$; Model 4: $\beta = 0.015$, $p < 0.001$; Model 5: $\beta = 0.035$, $p < 0.01$). This may be interpreted as indicating management commitment or simply that having made investments in the past it is easier for management to meet the requirements of CDP reporting. Overall, our Hypothesis 1 is supported with regards to climate disclosure.

Insert Table 5 about here

In Table 6 we report the results for the same models as in Table 5 but with the CDP assessment of performance rather than disclosure as the dependent variable. The results for engagement and initial non-response are the same as for carbon disclosure in Table 5. Engagement is robustly statistically significant (Model 1: $\beta = 1.057$, $p < 0.01$; Model 2: $\beta = 1.395$, $p < 0.01$; Model 3: $\beta = 1.357$, $p < 0.01$; Model 4: $\beta = 1.488$, $p < 0.01$; Model 5: $\beta = 1.322$, $p < 0.05$) with a marginal impact ranging from 17.7 percent to 18.3 percent, previous non-response is again strongly negatively significant (Model 2: $\beta = -2.796$, $p < 0.001$; Model 3: $\beta = -2.513$, $p < 0.001$; Model 4: $\beta = -2.919$, $p < 0.001$; Model 5: $\beta = -2.783$, $p < 0.001$). However, the results for emission reduction are somewhat weaker (Model 3: $\beta = 0.017$, $p < 0.10$; Model 4: $\beta = 0.009$, *insig.*; Model 5: $\beta = 0.016$, $p < 0.05$). Prior investment in emission reduction, as assessed by ASSET4, is thus less influential when we examine improvements in carbon performance than when looking at carbon disclosure. A re-examination of the ASSET4 metric does indeed reveal it to be rather more pertinent to reporting than performance. Most importantly, after controlling for management's attitude, engagement still appears to be effective providing further support to our Hypothesis 1 with regards to climate performance.

Insert Table 6 about here

In Table 7 we report the effectiveness of continuing to engage when the improvement has not been made in the first trial. This indicates that non-responsiveness continues to impede, that engagement has some continuing effects although modest with regards to improving the disclosure score (Model 1: $\beta=1.699$, $p<0.1$; Model 2: $\beta=2.714$, insig.; Model 3: $\beta=2.798$, $p<0.05$) but that there is a statistically significant impact of continued engagement on carbon emission performance (Model 4: $\beta=1.187$, $p<0.001$; Model 5: $\beta=1.793$, $p<0.001$; Model 3: $\beta=1.786$, $p<0.001$). These are small sample results and should not be over-emphasized but they are nevertheless encouraging for socially responsible investors and offer some support for Hypothesis 2.

Insert Table 7 about here

Finally, in Table 8 we test the effect of the engagement on a sub-sample of companies which actively resisted participating in CDP questionnaire or did not respond at all and subsample of companies who had responded. The main aim is to see whether the effect of the engagement is not driven by initially more proactive companies. Indeed, we find that engagement coefficient is positive and significant in the “resisting” subsample (Model 1: $\beta=1.843$, $p<0.05$; Model 2: $\beta=2.608$, $p<0.05$) although not among previously responsive companies. We do not draw strong conclusions given a very small sample size. However, the results do not support Hypothesis 3 and provide some indication that the positive effect of engagement is not driven by “easier” cases of companies that were themselves more disposed towards climate disclosure.

Insert Table 8 about here

Overall, given the small sample size, the regression results can be less than obvious. However, in Figures 1a and 1b we show the improvement levels of test and control companies in different industry groups over the course of the whole three-year experiment period. Figure 1a shows that in all industry groups except Health Care, more test companies improved their disclosure

score than control companies, and the result holds both for emission-intensive industries (Materials, Energy and Industrials) and other industries. Figure 1b shows that in all sectors except Industrials, more test companies improved their performance grade than control companies. We find this simple comparison encouraging and suggest that engagement can be effective with companies from various industries.

Insert Figure 1a and 1b about here

DISCUSSION AND CONCLUSION

Prior research suggests that a) behind the scenes dialog between socially responsible investors and corporate management is an important mechanism to align the interests of the two and b) that engagement is a costly undertaking which often fails to achieve its objectives (Flammer, 2015). Our study builds on these findings and explores whether private engagement by an institutional investor on the issues of climate change management and performance can be effective. One useful element of our setting is that we have a robust indicator of the attitude of management to complying with the CDP programme: their failure or refusal to do so earlier. Allied to that we use an independent assessment of the emission reduction performance which will jointly encapsulate the firms' investment in this in earlier years and the cost of complying with the CDP requirements.

The empirical setting is that of an experiment set up as a randomized controlled trial, where an investor engaged with a test group of companies and requested that they improve their CDP disclosure score and performance grade. The resulting changes were compared with a group of otherwise similar control companies which did not receive engagement. The engagement was conducted via writing a letter to CEOs and a follow up contact, an approach that many (particularly smaller) institutional investors choose to adopt as it can be used with a

relatively large number of portfolio companies. We believe ours to be the first study to conduct an experiment to test the effect of investor engagement and it is further strengthened by using an independent assessment of response to engagement.

The findings offer interesting insights about the role of investor engagement. Firstly, the results are consistent with engagement leading companies to improve their disclosure of climate management information and their climate performance score. The marginal effect range from 15-20 percent improvement in the likelihood of improved disclosure and 17-18 percent likelihood of improved emissions performance. This improvement comes after relatively light engagement and requests compliance with the demanding reporting programme of CDP and the costly investment required to improve carbon emissions. We further find that engagement stimulates improvement both after one year and after three years of engagement. In fact, continuing to engage pays off, as companies are more likely to improve their performance grade in subsequent years if investors continue their contact. This is an interesting finding as we anticipated that, given that climate change issues are increasingly the subject of national and international discussions among policymakers, the engagement could gradually make less difference to the outcome as companies overall would of their own volition increase their disclosure of climate change strategies. Our results suggest that investor engagement can still make a difference.

We also find that the attitude of management, as indicated by response to earlier approaches from the CDP and their earlier investment in emissions reduction as measured by ASSET4, is crucial. The statistical significance of prior non-response is stronger than that of engagement. This result may well be useful to investors wishing to influence business. They are likely to have more success if they can identify sympathetic management in advance. That said engagement still has an impact, although it produces fewer successes, if management is opposed.

The results of this experiment also highlight that a focused dialog can be effective even when conducted by a smaller-scale institutional investor rather than large asset management firms or pension funds and where there is no immediate threat of a public campaign. Prior research mostly focused on the public means of engagement such as shareholder resolutions or private means accompanied by or preceded by a public campaign or a media controversy. While publicity does reinforce the effect of the engagement, we show that focused dialog with no immediate reputational threat can also be reasonably effective.

The analysis has a few inevitable limitations. Firstly, it is based on a small sample of companies, which precludes more detailed investigation. For example, although we show visual differences in improvement amongst test and control firms in different industries, we are unable to reliably shed light on the differences between different industries. The small sample also prevents us from investigating in more detail whether initial responsiveness mediated the effect of the engagement. However, we ensured that there were no statistically significant differences between test and control groups in terms of the initial resistance, thus ensuring that our result for the engagement variable is not driven by engaged firms being more responsive to begin with. Further research could investigate the effectiveness of engagement under a finer classification of companies. Finally, our analysis is set in the UK; we cannot generalize our findings to different geographies and leave this for further research. It is an interesting setting, though, as the UK is a common-law country, rendering information asymmetry between investors and managers an important problem. Consequently, studying how investors can reduce this asymmetry and in particular advance environmental and social goals is a question of practical importance.

From the practical point of view, despite the fact that governments have recently pledged to reduce emissions to remain within two degrees' increase in global temperature, investor action on climate change is as crucial as ever to stir companies to take action and set

more manageable goals and our findings are encouraging in this respect. From the theoretical point of view, our study complements qualitative research investigating the engagement process. In particular, it extends prior empirical research by establishing the effectiveness of engagement by a smaller-scale investor and engagement conducted via non-confrontational dialog.

NOTES

1. CDP was previously known as the Carbon Disclosure Project.
2. ASSET4 emission reduction score is a standardized 0-100 score capturing management's commitment to and efficiency in reducing corporate emissions (including GHG) in its operations and production.
3. ASSET4 corporate governance score is a standardized 0-100 score based on multiple criteria covering board structure, board function, compensation policy, and protection of shareholder rights.
4. The overall CSR rating provided by ASSET4 is constructed using equally weighted environmental, social, governance, and economic scores.

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TABLE 1
Sample by Industry

Industry groups	Test	Control	Total
Energy	7	7	14
Industrials	13	16	29
Materials	11	7	18
Consumer	15	16	31
IT	7	6	13
Health Care	4	5	9
Total	57	57	114
Pearson Chi2(5)=1.420 Pr=0.922			

Sample are all companies in the three-year experiment. Test refers to the group of companies which received engagement from the investor. Control denotes the group of companies which were not contacted by the investor.

TABLE 2
Descriptive statistics

	Mean	SD	Max	Min	N	Mean	SD	Max	Min	N	Test of differences
	Test Group					Control Group					Pearson Chi ²
One-year improvement in climate change disclosure score (<i>Score1Y</i>)	0.561	0.501	1.000	0.000	57	0.386	0.491	1.000	0.000	57	Chi ² =3.519 (p=0.061)
One-year improvement in climate change performance grade (<i>Grade1Y</i>)	0.386	0.491	1.000	0.000	57	0.211	0.411	1.000	0.000	57	Chi ² =4.191 (p=0.041)
Initial non-response	0.456	0.503	1.000	0.000	57	0.491	0.504	1.000	0.000	57	Chi ² =0.141 (p=0.708)
											T-test
Emission reduction	49.129	25.110	94.150	11.060	55	46.707	26.482	93.960	11.060	54	t=-0.490 (p=0.625)
Market capitalization	14.013	0.883	18.619	12.827	57	13.925	0.528	15.112	12.970	57	t=-0.643 (p=0.521)
Concentrated ownership	26.544	24.375	88.000	0.000	57	25.263	23.055	96.000	0.000	57	t=-0.288 (p=0.773)
ROA	7.390	9.792	27.610	-34.360	57	9.443	8.400	29.340	-4.030	57	t=1.201 (p=0.232)
Corporate governance	69.837	21.654	94.730	8.760	55	67.106	25.761	95.430	7.130	54	t=-0.599 (p=0.550)
CSR	50.897	26.544	94.550	4.990	55	52.976	28.267	96.050	3.450	54	t=0.396 (p=0.693)

TABLE 3
Correlation

	1	2	3	4	5	6	7	8	9	10
1 Improvement in climate change disclosure score	1.000									
2 Improvement in climate change performance grade	0.572*	1.000								
3 Engagement	0.176	0.192*	1.000							
4 Initial non-response	-0.478*	-0.427*	-0.035	1.000						
5 Emission reduction	0.272**	0.292*	0.047	-0.256*	1.000					
6 Market capitalization	-0.029	0.098	0.061	-0.013	0.169	1.000				
7 Concentrated ownership	-0.134	-0.180	0.027	0.019	0.152	-0.190*	1.000			
8 ROA	0.002	-0.032	-0.113	0.104	0.006	-0.266*	-0.106	1.000		
9 Corporate governance	0.186	0.121	0.058	-0.069	0.058	-0.338*	-0.185	0.609*	1.000	
10 CSR	0.262**	0.238*	-0.038	-0.205*	0.138	-0.362*	-0.079	0.817*	0.775*	1.000

* p < 0.05

TABLE 4
Examination of the Differences between the Test and the Control group

	(1)	(2)	(3)	(4)	(5)	(6)
Market capitalization	0.134 (0.254)	0.148 (0.264)	0.155 (0.266)	0.119 (0.269)	0.111 (0.272)	0.207 (0.283)
Initial non-response	-0.211 (0.389)	-0.154 (0.392)	-0.153 (0.392)	-0.019 (0.402)	-0.003 (0.420)	-0.107 (0.418)
Industrials	-0.200 (0.649)	-0.049 (0.657)	-0.066 (0.661)	-0.028 (0.674)	-0.035 (0.679)	0.111 (0.692)
Materials	0.471 (0.724)	0.496 (0.725)	0.512 (0.725)	0.449 (0.768)	0.439 (0.774)	0.595 (0.767)
Consumer	-0.066 (0.636)	0.053 (0.640)	0.066 (0.643)	0.154 (0.661)	0.151 (0.658)	0.140 (0.668)
IT	0.153 (0.768)	0.433 (0.799)	0.431 (0.797)	0.424 (0.802)	0.435 (0.809)	0.507 (0.794)
Health care	-0.244 (0.854)	-0.063 (0.867)	-0.039 (0.875)	0.005 (0.895)	0.020 (0.907)	-0.185 (0.898)
ROA		-0.025 (0.021)	-0.026 (0.022)	-0.028 (0.022)	-0.028 (0.022)	-0.033 (0.022)
Concentrated ownership			-0.002 (0.010)	-0.005 (0.010)	-0.005 (0.010)	-0.009 (0.010)
Corporate governance				0.001 (0.010)		
Emission reduction					0.001 (0.009)	
CSR						-0.010 (0.009)
Constant	-1.778 (3.582)	-1.908 (3.702)	-1.943 (3.727)	-1.484 (3.745)	-1.390 (3.732)	-2.009 (3.871)
Observations	114	114	114	109	109	109
Pseudo R-squared	0.01	0.02	0.02	0.02	0.02	0.03

Note: Standard errors in parentheses. No coefficients are statistically different from zero at $p < 0.10$

TABLE 5
The Impact of Engagement and Management Attitudes on CDP Disclosure Scores

Dependent Variable	(1) Score 1Y	(2) Score 1Y	(3) Score 1Y	(4) Score 1Y	(5) Score 3Y
Engagement	0.818** (0.265)	0.944* (0.405)	0.894* (0.350)	0.967** (0.373)	1.490** (0.549)
Initial non-response		-2.382*** (0.381)	-2.144*** (0.415)	-2.258*** (0.450)	-2.767*** (0.633)
Emission reduction			0.014** (0.005)	0.015*** (0.004)	0.035** (0.013)
Market capitalization				-0.327 (0.220)	-0.063 (0.427)
Concentrated ownership				-0.006 (0.010)	-0.012 (0.020)
ROA				0.021 (0.023)	0.018 (0.029)
Constant	-0.431* (0.206)	0.460 (0.490)	-0.235 (0.651)	4.239 (3.211)	-1.248 (5.137)
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	yes
Observations	114	114	109	109	109
Pseudo R-squared	0.089	0.269	0.262	0.276	0.382
Marginal effect of engagement	0.180** (0.054)	0.156* (0.071)	0.151* (0.064)	0.160* (0.063)	0.205** (0.065)

Standard errors in parentheses. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 6
The Impact of Engagement and Management Attitudes on CDP Performance Assessment

Dependent Variable	(1) Grade 1Y	(2) Grade 1Y	(3) Grade 1Y	(4) Grade 1Y	(5) Grade 3Y
Engagement	1.057** (0.403)	1.395** (0.437)	1.357** (0.454)	1.488** (0.452)	1.322* (0.564)
Initial non-response		-2.796*** (0.546)	-2.513*** (0.543)	-2.919*** (0.633)	-2.783*** (0.543)
Emission reduction			0.017† (0.009)	0.009 (0.007)	0.016* (0.007)
Market capitalization				-0.031 (0.340)	0.356 (0.293)
Concentrated ownership				-0.031† (0.018)	-0.004 (0.022)
ROA				-0.004 (0.014)	0.026 (0.031)
Constant	-2.652*** (0.273)	-2.646*** (0.310)	-3.499*** (0.876)	-2.324 (5.347)	-6.216† (3.614)
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	yes
Observations	114	114	109	109	109
Pseudo R-squared	0.157	0.345	0.339	0.376	0.370
Marginal effect of engagement	0.181** (0.063)	0.178** (0.059)	0.177** (0.060)	0.183*** (0.053)	0.183** (0.058)

Standard errors in parentheses. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 7

**The Impact of Engagement and Management Attitudes on CDP Disclosure Scores
and Performance Assessment Following Previous Non-Compliance**

Dependent Variable	(1) Score	(2) Score	(3) Score	(4) Grade	(5) Grade	(6) Grade
Engagement	1.699† (0.902)	2.714 (1.798)	2.798* (1.314)	1.187*** (0.349)	1.793*** (0.512)	1.786*** (0.482)
Initial non-response		-2.884** (0.909)	-1.160 (1.652)		-3.145* (1.239)	-3.183* (1.284)
Emission reduction			0.061 (0.048)			-0.006 (0.006)
Constant	-2.274*** (0.582)	-1.403 (1.206)	-6.234 (4.127)	-0.468*** (0.134)	0.897† (0.465)	1.144† (0.617)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38	38	35	51	51	48
Pseudo R-squared	0.158	0.330	0.396	0.086	0.317	0.311
Marginal effect of engagement	0.255* (0.103)	0.323† (0.167)	0.305* (0.129)	0.228*** (0.057)	0.243*** (0.033)	0.252*** (0.030)

Standard errors in parentheses. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 8
The Impact of Engagement Conditioned on Management Attitudes

Dependent Variable	(1)	(2)	(3)	(4)
	“Resisting” subsample		“Non-resisting subsample”	
	Score 3Y	Grade 3Y	Score 3Y	Grade 3Y
Engagement	1.843* (0.833)	2.608* (1.325)	1.272 (0.854)	0.714 (0.743)
Constant	-3.068* (1.516)	-3.369† (2.031)	-0.232 (0.954)	0.204 (0.913)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	43	43	56	60
Pseudo R-squared	0.166	0.265	0.228	0.264
Marginal effect of engagement	0.324** (0.106)	0.314* (0.136)	0.1668 (0.106)	0.110 (0.112)

FIGURE 1A
Improvements in Climate Change Disclosure Score after Three Years of Engagement

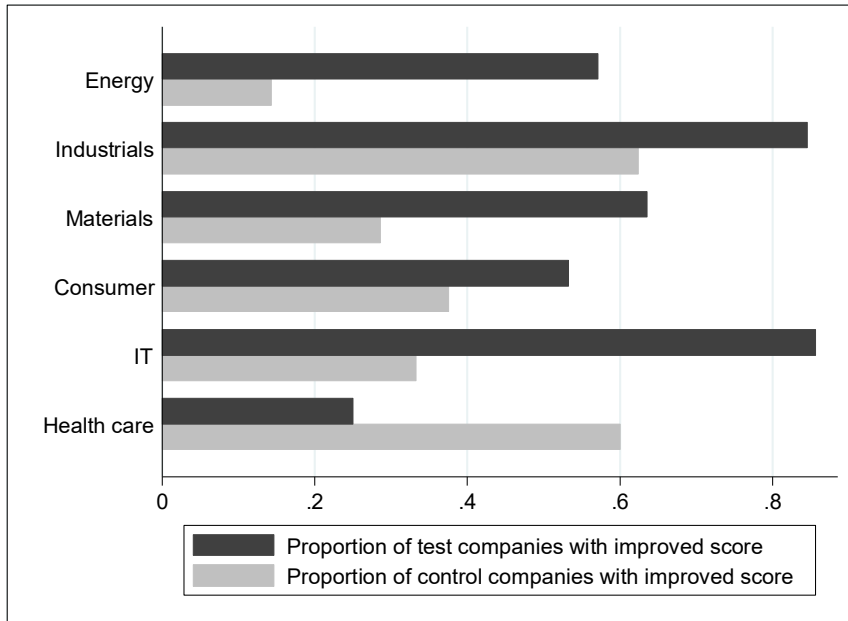


FIGURE 1B
Improvement in Climate Change Performance Grade after Three Years of Engagement

