Socially Responsible Investing and Expected Stock Returns*

Sudheer Chava
College of Management at Georgia Tech

September 16, 2010

*Please address all correspondence to Sudheer Chava, College of Management at Georgia Tech, 800 W Peachtree St NW, GA 30309-1148; *Phone:* 404-894-4371; *email:* sudheer.chava@mgt.gatech.edu.
I would like to thank Kose John, Shane Johnson, Marcin Kacperczyk, Alok Kumar, Praveen Kumar, Scott Lee, Gregor Matvos, Micah Officer, Shagun Pant, Ralitsa Petkova, Amiyatosh Purnanandam, seminar participants at Arizona State University, Bank of Canada, City University of Hongkong, Michigan State University and Georgia Tech for helpful comments and suggestions.

Socially Responsible Investing and Expected Stock Returns

Abstract

Using implied cost of capital derived from analysts' earnings estimates, I find that investors demand significantly higher expected returns on stocks excluded by environmental screens (such as hazardous chemical, substantial emissions and climate change concerns) widely used by socially responsible investors as compared to firms without these environmental concerns. I also document that firms with these environmental concerns have lower institutional ownership and are held by fewer institutional investors than firms without similar environmental concerns. These results suggest that exclusionary socially responsible investing and the consequent increase in the cost of capital is one channel through which environmental externalities can be internalized by the firm.

1. Introduction

How can environmental externalities be internalized by a firm? The recent offshore oil spill by British Petroleum and the tremendous environmental and economic damage caused by the oil spill reemphasizes the need for an understanding of this question. Some of the mechanisms currently being debated in the U.S. are carbon tax, instituting a cap and trade program and imposing tough new regulations on the environmental performance of the firms. Apart from the possibility of regulation, there is an increase in socially responsible investing (SRI) that attempts to screen stocks based on undesirable characteristics such as the nature of business, amount of pollution, and climate change concerns. If a sufficiently large number of shareholders abstain from investing in firms based on environmental concerns, the expected return for these firms would increase (Merton (1987), Heinkel, Kraus and Zechner (2001)) and this increase could potentially impact the behavior of the firms on the environmental dimension. Motivated by these theoretical arguments, in this paper, I analyze whether investors demand higher expected stock returns from firms that are excluded by the environmental screens widely used by socially responsible investors. [1]

The amount of money devoted to socially responsible investing has increased steadily over the last few years with a growth of 324% over the 1995-2007 time period and over fifty times in the last twenty years. Social Investing Forum reports that one in nine dollars ($2.71 trillion out of $25.1 trillion under management in the United States) are under socially responsible investing guidelines. In addition to screening out undesirable stocks, investors can attempt to influence the environmental policies of firms through shareholder proposals and lobbying the management. [2] For example, Landier and Nair (2009) report that during 2007, 331 out of 1150

[1] KLD, the source of environmental screens used in this paper publishes FTSE KLD 400 social index and 31 of the top 50 institutional money managers worldwide use KLDs research to integrate environmental, social and governance factors into their investment decisions. The environmental screens considered in this paper includes performance both on the toxic emissions dimension that are already regulated and Green house gas emissions and other climate change concerns that have a potential of being regulated in the future.

[2] For example, The Investor Network on Climate Risk (`www.incr.org`) represents asset managers, state and city treasurers and comptrollers, public and labor pension funds, foundations, and other institutional investors managing $6 trillion of assets. It aims to leverage the collective power of these investors to promote improved disclosure and corporate governance practices on the business risks and opportunities posed by climate change.

shareholder resolutions that were filed are socially oriented. As Carleton, Nelson and Weisbach (1998) document, it is not necessary for institutions to a get majority vote on the shareholder resolutions in order to push the companies to adopt the changes. If SRI can make a difference, it can complement laws, regulations and taxes in promoting environmentally sustainable corporate behavior.

In a recent paper, Hong and Kacperczyk (2009) present evidence that sin stocks (tobacco, alcohol and gambling) have higher expected returns and are held less by norm-constrained institutions such as pension plans as compared to mutual or hedge funds. As Hong and Kacperczyk (2009) point out, in contrast to firms that pollute, there is little that companies operating in the *sin* industries can change to be more acceptable to socially responsible investors. Higher expected returns for firms with unfavorable environmental profile can presumably change the economic behavior of these firms and their future environmental performance. In this paper, I analyze the relationship between the environmental concerns of the firm and the expected returns on the stocks as proxied by the implied cost of capital. To the best of my knowledge, this is the first paper that directly analyzes whether investors demand a higher expected return from stocks of firms with environmental concerns.

A firm's environmental profile encompasses two broad areas of concerns and strengths: One area includes the environmental issues that are already regulated and required to be reported by the U.S. government (for example, the emission of toxic chemicals and hazardous waste). The other area includes environmental strengths and concerns in areas that are not yet regulated by the government, but where there is a possibility of regulation or increased sensitivity by the investors. Emissions of green house gases and carbon footprint of the firm fall into this category. In this paper, I analyze the relationship between a firm's strengths and weaknesses in these areas and the cost of capital.

I analyze the impact of the environmental profile of the firm on the expected stock returns using the implied cost of capital (ICC) computed from analysts' earnings estimate as a proxy for the ex-ante expected stock returns (see Gebhardt, Lee and Swaminathan (2001), Pastor, Sinha

and Swaminathan (2007) and Chava and Purnanandam (2009) for more details about ICC and the advantages of using ICC as a proxy for expected returns instead of realized returns). ICC is especially an attractive proxy for expected returns in light of the contradictory results in the literature on investment performance of socially responsible firms and other firms using realized returns (for example, Statman and Glushkov (2008) find no difference, Brammer, Brook and Pavelin (2008) find underperformance and Kempf and Osthoff (2007) find higher performance). ICC relies more on cross-sectional variation across the firms and hence is a better proxy for expected returns in the current setting (as compared to using ex-post realized returns) given the short-sample period for which data on the environmental concerns are available. Further, unlike measuring abnormal performance using realized returns, ICC doesn't depend on a particular asset pricing model.

Using ICC computed from the analysts' estimates, I find that there is a statistically and economically significant positive relationship between the net environmental concerns of the firm and the expected returns on its stock. In contrast, there is no meaningful relationship between expected returns and number of environmental strengths of the firm. In a similar vein, investors seem to demand a significantly higher return on stocks of firms that have a higher climate concern score (defined as climate concern score minus clean energy strength). These results lend support to the view that socially responsible investing has an impact on stock prices consistent with the theoretical prediction of Merton (1987) and, Heinkel, Kraus and Zechner (2001). Socially responsible investors appear to screen out stocks with environmental concerns.

My analysis individual environmental concerns indicates that investors seem to expect higher returns from stocks of firms that are significant emitters of toxic chemicals and those with hazardous waste concerns. I also find that there is a very strong positive relationship between expected returns and climate change concerns. This is especially interesting given that greenhouse gas emissions are not currently regulated. This suggests that socially responsible investors screen out firms based on this filter and that affects the expected stock returns of these firms. These results are also consistent with Hong and Kostovetsky (2009) who find that mutual fund

managers who make campaign contributions to democrats hold less of their portfolio (relative to non-donors or republican donors) in industries that are deemed socially irresponsible (eg., tobacco, guns and defense, natural resources).

I find that a firm's environmental strengths do not have a significant effect on the expected return on the firm's stock as proxied by the implied cost of capital. Notably, firms that derive substantial revenues from clean energy products seem to have a much lower expected returns and the magnitude is economically significant. The other environmental strengths such as deriving substantial revenue from environmentally beneficial products and pollution prevention products don't have an impact on the expected stock returns. Interestingly, better environmental communication and being a signatory to voluntary principles such as CERES principles don't affect the expected stock return on the firm. These results confirm the findings of Fisher-Vanden and Thorburn (2009) who document that there is insignificant abnormal stock return to the announcement of joining CERES and other voluntary environmental initiatives.

Next, I document that firms with environmental concerns indeed have a lower percentage of institutional ownership and fewer institutional owners. In particular, I show that firms with hazardous waste concerns and climate change concerns have significantly lower institutional ownership[3]. I find similar results for the number of institutional owners of the firm's stock. The higher expected returns and lower institutional ownership in stocks with environmental concerns are consistent with the theoretical arguments in Merton (1987) and Heinkel, Kraus and Zechner (2001) and suggest that if a sufficiently large number of shareholders abstain from investing in certain firms based on environmental and other concerns, the expected return for these firms would increase.

My paper is related to Karpoff, Lott and Wehrly (2005), Hong and Kacperczyk (2009), Hong and Kostovetsky (2009), Fisher-Vanden and Thorburn (2009) , Fernando, Sharfman and Uysal (2010) and Chava (2010). Karpoff, Lott and Wehrly (2005) find that while firms that violate

[3]After controlling for the following variables based on the specification in Hong, Kubik and Sten (2008): market capitalization of the firm, market to book ratio, beta of the firm's stock, inverse of the firm's stock price, mean monthly return of the firm's stock return over the past one year, volatility of the firm's stock return and a dummy for S&P500 membership and a dummy for whether the firm is listed on NASDAQ

environmental laws suffer statistically significant losses in the market value of firm equity, the losses, however, are of similar magnitudes to the legal penalties imposed.

I build on the work of Hong and Kacperczyk (2009) by studying the expected returns on firms with environmental concerns. But in contrast to their paper, I use ICC to proxy for expected returns (as opposed to realized returns) and more importantly, considering environmental concerns of the firm (as opposed to sin stocks). A shorter time series of environmenal concerns data is available compared to the sin stocks making ICC more suitable than realized returns in the current context. Additionally, firms have some flexibility in changing their environmental policies as compared to sin stocks that can't change their line of business by definition.

Fisher-Vanden and Thorburn (2009) find that there is no abnormal stock reaction to firms announcements to join voluntary initiatives such as CERES and consistent with their findings, I show that investors do not expect significantly different returns from stocks of firms joining voluntary initiatives such as CERES. In a recent paper, Fernando, Sharfman and Uysal (2010) examine how the ownership, analyst coverage and stock market valuation of U.S. firms vary with their environmental performance. One important difference between the two papers is that I use implied cost of capital from analysts estimates to proxy for expected returns in contrast to Fernando, Sharfman and Uysal (2010) who use realized returns as a proxy for the expected returns.

In a related paper, Chava (2010) studies the impact of the environmental profile of a firm on the cost of its private debt capital. An interesting question for future research is whether this increased cost of capital fully internalizes the firm's environemntal externalities and whether it is sufficient to change the firm's environmental footprint.

The remainder of the paper is organized as follows. Section 2 explains the data and variables used. The empirical results are presented in Section 3. Section 4 explores why investors demand higher returns from firms with environmental concerns. Section 5 concludes the paper.

2. Data and Construction of Variables

2.1 Environmental Concerns and Strengths of the firm

The data source for firm level environmental data is KLD Stats. The database has information on environmental concerns and environmental strengths for a large sample of firms rated by KLD Research & Analytics, Inc. [4] The database expanded its coverage over the years starting with S&P500 firms during 1991-2000 and expanding to Russell 2000 firms starting in 2001. The sample period is 1991-2008 except when mentioned otherwise (some variables are available from a later date). The KLD database divides the environmental profile of a firm into two components: environmental strengths and environmental weaknesses.

Environmental Concern Measures

The individual environmental concerns are flagged by KLD with each coded as a dummy variable that takes the value of one if the firm has that particular environmental concern for that year and zero otherwise. *hazardwaste* is a dummy variable that is coded as one if the company's liabilities for hazardous waste sites exceed $50 million, or if the company has recently paid substantial fines or civil penalties for waste management violations. *substemission* is coded as one if the company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD. *climchange* is a dummy variable that is coded as one if the company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or if the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products (such companies include electric utilities, transportation companies with fleets of vehicles, auto

[4] There are other data sources such as a firm's 10-K reports, carbon data project etc., with information on some of the environmental variables I am interested in. But, currently, disclosure of green house gas emissions is not mandatory and when firms do report these numbers it is difficult to evaluate and quantify the risk implied by these numbers. In contrast, KLD collects this information from a number of data sources and qualified analysts evaluate the data and make decisions on whether the firm has a specific environment exposure or not. KLD data is also available for a larger cross-section of firms and for a much longer time span than I could gather from any of the alternate data sources. Recent papers that have used this database include Hong and Kacperczyk (2009) and Fisher-Vanden and Thorburn (2009)

and truck manufacturers, and other transportation equipment companies). Data for this variable is available from 1999 onwards.

Environmental Strength Measures

The individual environmental strengths are also coded as a dummy variable that is coded as one if the firm has that particular environmental strength for that year and zero otherwise. *benproduct* is a dummy that takes the value of one if the company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or if the company has developed innovative products with environmental benefits. But this does not include services with questionable environmental effects, such as landfills, incinerators, waste-to-energy plants, and deep injection wells. *polprevent* is coded as one if the company has notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs. *cleanenergy* is coded as one if the company has taken significant measures to reduce its impact on climate change and air pollution through use of renewable energy and clean fuels or through energy efficiency or if the company has demonstrated a commitment to promoting climate-friendly policies and practices outside its own operations. *envcomm* is a dummy variable that is coded as one if the company is a signatory to the CERES Principles, publishes a notably substantive environmental report, or has notably effective internal communications systems in place for environmental best practices. KLD began assigning strengths for this issue in 1996.

Summary Measures of Environmental Concerns and Strengths

In addition to the individual concerns and strengths described in detail later in this section[5], the database also provides a count of the total number of environmental concerns (*numconcerns*) for the firm and the total number of environmental strengths (*numstrength*) for the firm. I

[5]KLD also assigns values for some other concerns and strengths (for example, ozone depletion), that I do not consider as they are sparsely populated.

also construct a net measure of environmental concerns (*netconcerns*) defined as *numconcerns-numstrength* and a measure of exposure to climate change defined as *climchange-cleanenergy*.

Descriptive statistics for the environmental concerns and strengths of the firm are presented in Panels C, D and E of Table 1. The mean value of the *netconcerns* measure is 0.16. On average, firms have more environmental concerns than environmental strengths with the average value of environmental concerns at 0.37 and the average value of environmental strengths at 0.21. 9.87% of firms have a hazardous waste concerns and 7% of firms have climate change concerns.

2.2 Analyst Estimates for ICC computation

I/B/E/S database is the source for the analyst consensus estimates for one-year and two-year ahead forecast of earnings per share and long-term consensus growth forecast required to compute the implied cost of capital (ICC) used as a proxy for expected returns in this paper. ICC is computed as the internal rate of return that equates the present value of free cash flows to equity to current stock price. I closely follow Lee, Gebhardt and Swaminathan (2001), Pastor, Sinha and Swaminthan (2007), and Chava and Purnanandam (2009) for the construction of the ICC measure.

I compute the ICC using the discounted cash flow model of equity valuation. In this approach, the expected return on a stock is computed as the internal rate of return that equates the present value of free cash flows to the current price. The stock price $P_{i,t}$ of firm i at time t is given by:

$$P_{i,t} = \sum_{k=1}^{k=\infty} \frac{E_t(FCFE_{i,t+k})}{(1+r_{i,e})^k}, \tag{1}$$

where $FCFE_{i,t+k}$ is the free cash flow to equity of firm i in year $t+k$, E_t is the expectation operator conditional on the information at time t and $r_{i,e}$ is the ICC.

Equation 1 models current stock price as the discounted sum of all future cash-flows. I explicitly forecast cash flows for the next $T = 15$ years and capture the effect of subsequent cash flows using a terminal value calculation. We estimate the free cash-flow to equity of firm i in

year $t+k$ using

$$E_t(FCFE_{i,t+k}) = FE_{i,t+k} * (1 - b_{t+k}), \tag{2}$$

where $FE_{i,t+k}$ is the earnings estimate of firm i in year $t+k$ and b_{t+k} is its plowback rate. $FE_{i,t+k}$ is estimated using the earnings forecast available from the I/B/E/S database. I use one-year and two-year ahead consensus (median) forecasts as proxies for $FE_{i,t+1}$ and $FE_{i,t+2}$, respectively. I compute the earnings estimate for year $t+3$ by multiplying the year $t+2$ estimate by the consensus long-term growth forecast. I/B/E/S provides the long-term consensus growth forecast for most firms. In the case of missing data, I compute the growth rate using earnings forecasts for years $t+1$ and $t+2$. I assign a value of 100% to firms with a growth rate above 100% and 2% to firms with a growth rate below 2% to avoid the outlier problems. I forecast earnings from year $t+4$ to $t+T+1$ by mean-reverting the year $t+3$ earnings growth rate to a steady long-run value by year $t+T+2$. The steady state growth rate of a firm's earnings is assumed to be the GDP growth rate (g) as of the previous year. The growth rate for year $t+k$ is assumed to follow

$$g_{i,t+k} = g_{i,t+k-1} * exp^{\frac{ln(g/g_{i,t+3})}{T-1}}. \tag{3}$$

Using these growth rates, we compute earnings as follows:

$$FE_{i,t+k} = FE_{i,t+k-1} * (1 + g_{i,t+k}). \tag{4}$$

Next I compute the plowback rate (i.e., one minus the payout ratio) from the most recent fiscal year data. The payout is defined as the sum of dividends (DVC) and share repurchases (PRSTKC) minus any issuance of new equity (SSTK). I get the payout ratio by dividing this number by net income (IB) if it is positive. If we are unable to compute the plowback ratio based on this method, then I set it to the industry (two-digit SIC Code) median payout ratio. If the payout ratio of a firm is above 1 or below -0.5, I set it to the industry median payout ratio as well. I use the plowback ratio computed using the above procedure for the first year of estimation and mean-revert it to a steady state value by year $t+T+1$. The steady state

formula assumes that the product of the return on new investments ROI and the plowback rate is equal to the growth rate in earnings in steady state (i.e., $g = ROI * b$ in steady-state). I set ROI for new investments to r_e under the assumption that competition drives returns on new investments to the cost of equity. With these assumptions, the plowback rate for year $t + k$ $(k = 2, 3, ...T)$ is given by the following:

$$b_{i,t+k} = b_{i,t+k-1} - \frac{b_{i,t+1} - b_i}{T}. \tag{5}$$

$$b_i = \frac{g}{r_{i,e}}. \tag{6}$$

I compute terminal value as the following perpetuity:

$$TV_{i,t+T} = \frac{FE_{i,t+T+1}}{r_{i,e}}. \tag{7}$$

Collecting all the terms, I get the following equation that I solve for $r_{i,e}$ to get the ICC. :

$$P_{i,t} = \sum_{k=1}^{k=T} \frac{FE_{i,t+k} * (1 - b_{i,t+k})}{(1 + r_{i,e})^k} + \frac{FE_{i,t+T+1}}{r_{i,e}(1 + r_{i,e}^T)}. \tag{8}$$

I estimate ICC for every firm covered in the intersection of KLD, CRSP, COMPUSTAT and I/B/E/S databases as of June 30 starting from 1990 and ending in 2008. I subtract the risk-free rate based on one year treasury yield at that time to get a measure of expected excess return on the stock. The descriptive statistics for the ICC measure and the inputs used in the ICC computation are presented in Panels A and B of Table 1. The average one-year ahead EPS is \$1.86 with the median at \$1.55. The average and median for the two year ahead EPS is \$2.23 and \$1.85 respectively. The average value of the one year ahead and two year ahead EPS seem to be larger than the full I/B/E/S sample and this can be attributed to the sample coverage in KLD. The mean and median values of the long-term growth forecasts are 16% and 14% respectively. The mean and median of ICC is 8% per annum. The average excess expected stock return is 4.25% with the median at approximately 4.00%. These numbers are broadly in

line with those documented in the earlier literature.

2.3 Control variables

The specification for the ICC regressions is based on Lee, Gebhardt, Swaminathan (2001), Pastor, Sinha and Swaminathan (2008) and Chava and Purnanandam (2009). In cross-sectional studies, Gebhardt, Lee, and Swaminathan (2001) find robust relation between cost of capital and some firm level attributes such as size and book-to-market ratio. Pastor, Sinha and Swaminathan (2007) provide evidence in support of a positive relation between expected market return and volatility. Chava and Purnanandam (2009) control for the past stock returns to account for any staleness in analyst forecasts and show that the past stock return is a significant predictor of the expected return on the stock. Based on these papers, I include the following firm level variables in the regressions: firm's size measured as the log of book assets of the firm (*logta*), market-to-book ratio of the firm (*mtb*), book leverage (*booklev*), stock return volatility of the firm over the past one year (*stdret*) and past one month's stock return of the firm ($ret_{t-1,t}$).

The sources of firm characteristics is Standard and Poor's quarterly COMPUSTAT database. Market data is from CRSP. All financial data is lagged by at least six months so that it is available at the time of ICC construction (June 30 of each year). Further, all financial data is winsorized at 1% and 99% to handle outliers.

3. Empirical Results

3.1 Empirical Methodology

I estimate panel regressions with the expected excess return on the firm as the dependent variable and environmental concerns and strengths as the key explanatory variables. The regressions include firm level control variables and year fixed effects with standard errors clustered at the firm level. I estimate specifications with and without industry fixed effects at the two digit SIC level. I do not use firm fixed effects in light of the persistence of the key environmental concerns

and strengths variables. In unreported tests, I also estimate a Fama-MacBeth regression model with annual cross-sectional regressions every year with correction for autocorrelations up to two lags in computing the standard errors. The results are essentially the same, but I decided to report the panel regressions given the short time-series available for some of the environmental variables.

3.2 Aggregate Environmental Concerns and Expected Equity Returns

In Table 2 I analyze the relationship between expected stock returns as proxied by the implied cost of capital and various summary measures of environmental strengths and concerns. The results in Model 1 indicate that the investors expect significantly higher returns for firms that have higher net environmental concerns (net of environmental strengths). Investors expect 1.6% higher than the risk free rate per annum from a firm that has environmental concerns on all four dimensions considered compared to firms that have environmental strengths on all dimensions. The relationship is statistically significant and economically meaningful and indicates that the environmental profile of the firm matters for investors. Inclusion of industry fixed effects at the two digit SIC level in Model 2 reduces the coefficient estimate on *netconcerns* and its statistical significance marginally but the estimate is still highly statistically significant.

In Models 3 and 4, the key explanatory variable is the number of environmental concerns of the firm. The results demonstrate that there is a significant positive relationship between implied cost of capital and the number of environmental concerns of the firm. These results are in line with the theoretical predictions of Heinkel, Kraus and Zechner (2001). If socially responsible investors screen out stocks with environmental concerns, then the expected returns on these stocks will go up. Results in model 3 and 4 suggest that investors expect approximately 0.8% per annum *higher* for firms that have environmental concerns on all dimensions (almost 18% lower compared to the expected return on the median firm).

Models 5 and 6 document the relationship between number of environmental strengths of

the firm and the expected returns as proxied by implied cost of capital. There is no meaningful relationship between expected stock returns and the number of environmental strengths of the firm. This is in contrast to the strong positive relationship between environmental concerns and expected stock returns suggesting that investors may be screening out stocks with environmental concerns but may not necessarily be flocking to stocks with environmental strengths.

In Model 7 and 8, the key environment variable is *climscore* defined as the difference between climate change concern and clean energy strength. It measures the net exposure of the firm to the climate change concerns. In line with the results in Models 3 and 4, there is a very strong positive relationship between net climate change concerns and implied cost of capital. Investors seem to demand a significantly higher return from firms that are more exposed to climate change concerns. The results are economically significant, representing 0.86% per annum higher expected returns for firms that have climate change concerns compared to firms that have clean energy strength. Inclusion of industry fixed effects reduces the strength of this relationship significantly but this is not surprising given that the climate change concerns and clean energy are mostly defined at the industry level.

In all the models, the coefficients on the control variables are in the expected direction and consistent with the previous literature. Small firms have a significantly higher cost of capital and firms with higher leverage have a higher expected returns. More volatile firms have higher expected returns and there is a significant negative relationship between expected returns and past one month's stock returns. These results are consistent with the previous literature (for exmaple, Chava and Purnanandam (2009).

3.3 Individual Environmental Concerns and Expected Equity Returns

Next, in Table 3 I analyze the relationship between the individual environmental concerns of the firm and the expected returns on the firm's stock. The regression specification remains the same as before. The key environmental concern variable in Models 1 and 2 is *hazardwaste*, a dummy

that is coded as one if the company's liabilities for hazardous waste sites exceed $50 million or if the company has recently paid substantial fines or civil penalties for waste management violations. There is a strong positive relationship between *hazardwaste* and ICC suggesting that investors demand a significantly higher return from the stocks of the firm with hazardous waste concerns. The coefficient estimate indicates that firms with hazardous waste concerns pay approximately 9% higher than firms with no hazardous waste concerns. The result is robust to the inclusion of industry fixed effects in Model 2.

subemissions, an indicator variable for whether the firm is a substantial emitter of toxic chemicals as reported by EPA is the key explanatory variable in Models 3 and 4. Again, there is a statistically significant and economically meaningful positive relationship between expected stock returns and substantial toxic chemical emission concern. The effect decreases marginally but remains statistically and economically significant after inclusion of industry fixed effects in Model 4. Investors demand 0.28% - 0.46% higher returns per annum on stocks of firms with substantial toxic chemical emission concerns compared to stocks of the firms with no such concern.

In models 5 and 6, I include *climchange*, a dummy variable that measures whether the firm derives substantial revenues from the sale of coal or oil and its derivative products. *climchange* has a significantly positive effect on the expected returns of the firm. The result is robust to the inclusion of industry fixed effects in Model 6. The expected return on the stocks of firms with climate change concerns are 0.43% to 0.66% higher compared to firms with no such concern. Of the individual environmental concerns variables considered, the impact of the climate change concerns is the highest.

The results demonstrate that investors care about the environmental concerns of the firm but not all environment concerns are equally weighed. Interestingly, climate change concerns that proxy for the green house gas emissions of the firm and the carbon footprint of the firm seem to have the most impact even though they are not regulated yet. This may be caused in part by socially responsible investing that screens out stocks with climate change concerns or

the anticipated costs of future regulation. The cost of anticipated future regulation may include compliance costs and costs of litigation that may arise from the new rules.

3.4 Individual Environmental Strengths and Expected Equity Returns

Table 4 documents the results from an analysis of expected returns and individual environmental strengths of the firm. Results are presented in Models 1-8 with and without industry fixed effects.

Investors seem to expect lower returns from stocks of firms that derive substantial revenue from environmentally beneficial products (Models 1 and 2 of Table 4). But the relationship is not statistically significant. Results in models 3 and 4 analyze the relationship between expected stock returns and *polprevent*, a dummy variable that takes the value of one for firms that have notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs. The coefficient on *polprevent* is in fact positive but not statistically significant after inclusion of industry fixed effects.

The most significant relationship with expected returns among the environmental strength variables is with clean energy environmental strength. Investors demand a significantly lower expected return from firms that have a clean energy environmental strength. The coefficient on *cleanenergy* indicates that after controlling for other firm specific factors, investors seem to demand 0.29% per annum lower returns from stocks that have a clean energy environmental strength than stocks of firms that don't have this strength (almost 8% lower than the median firm in the sample). Inclusion of industry fixed effects eliminate the statistical significance of this measure. This is not surprising given that clean energy is mostly a industry level variable and there is not enough within industry variation in this measure.

Interestingly, there doesn't seem to be any meaningful association between expected returns and environmental communication (or CERES signatory) strength of the firms. These results are consistent with Fisher-Vanden and Thorburn (2009) who find that there is no significant abnormal return around firm announcements of joining CERES. These results seem to indicate

that investors do not seem to attach much weight to voluntary environmental initiatives.

3.5 Robustness of the ICC results

So far, I have analyzed the impact of individual concerns and strengths separately on the expected returns. In Models 1 and 2 of Table 5, I include all the environmental concerns in the same specification. The results are similar to those in Table 3 with the exception of substantial emission concern that loses significance in the specification with industry effects. As mentioned before, it is to be expected that substantial emissions concerns and hazardous chemical concerns would be positively correlated. In Models 3 and 4, all the environmental strengths of the firm are included in the specification and results are similar to the results in Table 4. None of the environmental strengths have a significant effect on the expected returns. In Models 7 and 8, all the environmental concerns and strengths are included in the specification and the results are similar to the results in earlier models in this table and those in Table 3 and Table 4 .

In all the tables, I presented results with and without industry fixed effects to document that industry is not always the main driving force of the relationship between expected stock returns and environmental concerns and strengths measures. The results are also robust to the inclusion of industry fixed effects using Fama-French 48 industry classification system in lieu of the two digit SIC code industry dummies. I presented the results with year and industry fixed effects with standard errors clustered at the firm level. I have also checked the robustness of the results to clustering the standard errors at the industry level. Results remain qualitatively and quantitatively similar.

I also ran the regressions using the Fama-Macbeth approach by running separate annual regressions and considering the time-series mean and standard error on the independent variables. Results do not materially change. I decided to present the pooled cross-sectional regressions using year and industry fixed effects instead of the Fama-Macbeth estimates mainly because of the short time-series availability of some of the key explanatory variables. For example, climate change concerns variable is available only after 1999. In addition, the sample changed around

2001.

I used the past one month's stock return to control for any staleness in analyst's forecasts (Chava and Purnanandam (2009)). The results remain similar if the previous three-months or six-months cumulative stock return is used instead of the past one month's stock return. In the interest of space, I present the results only with the past one month's stock returns as one of the control variables.

4. Why do investors expect higher stock returns from firms with environmental concerns?

The results documented in the previous three tables show that there is a strong positive relationship between expected returns and environmental concerns measures but there seems to be no statistically significant relationship between expected returns and environmental strengths (except clean energy). Why would investors demand a higher expected return from stocks of firms with environmental concerns? The natural possibility is that investors consider firms with environmental concerns as more risky compared to firms without these environmental concerns. Investors may be pricing in the possibility of future regulation and the costs of compliance or costs associated with potential litigation for firms with the environmental concerns. The regressions already include controls for important determinants of firm risk such as size and market-to-book ratio. In unreported tests, the inclusion of the firm's stock beta didn't have an effect on the results. I also included proxies for default risk such as size, leverage and volatilty (Shumway (2001) and Chava and Jarrow (2004)). However, it is possible that there is an omitted component of firm specific risk (not captured by the control variables in the regression) and this omitted risk factor could be driving the observed relationship with expected returns. Chava (2010) presents evidence that firms with environmental concerns are not more likely to file for bankruptcy compared to firms without these environmental concerns. But, it is a challenging task to conclusively rule out the possibility that an omitted risk factor that is not captured by

the conventional variables used in the implied cost of capital regressions could be driving the result.

Another distinct possibility is that socially responsible investors screen out stocks with environmental concerns. If a large number of investors use environmental screens to screen out stocks considered undesirable based on environmental concerns and hence do not invest in stocks of firms with environmental concerns, socially responsible investing can then have an impact on the stock price and the expected returns of the stocks (Merton (1987) and, Heinkel, Kraus and Zechner (2001)). I present some initial evidence that is consistent with this hypothesis in Table 6 and Table 7.

In order to understand whether socially responsible investing is the driver behind the observed positive relationship between environmental concerns and expected stock returns, I analyze the relationship between total institutional ownership in the firm and the firm's environmental profile in Table 6. The key dependent variable is the total institutional ownership in the firms' stock, expressed as a percentage of the shares outstanding of the firm [6]. The data source for the institutional ownership is Thomson 13-F data. I closely follow Hong and Karparcyzk (2010) and Hong, Kubik and Stein (2008) for the regression specifications. In the interest of space, I present only the coefficients on individual environmental concerns and strengths but all the regressions include market capitalization of the firm, market to book ratio, beta of the firm's stock, inverse of the firm's stock price, mean monthly return of the firm's stock return over the past one year, volatility of the firm's stock return, a dummy for S&P500 membership and a dummy for whether the firm is listed on NASDAQ).

Results presented in Model 1 of Table 6 show that firms with environmental concerns such hazardous waste concerns, substantial emission concerns and climate change concerns have significantly lower institutional ownership compared to firms that don't have these environmental concerns. Interestingly, a firm that has concerns on all these environmental dimensions has

[6] I also considered whether the institutional ownership patterns are different for different types of institutions such as banks, insurance companies, mutual funds etc., I didn't present these results as categorization of institutions is not reliable after 1997 using Thomson data. This issue aside, I do find that the ownership patterns of stocks with environmental concerns for all types of institutions are similar

approximately 14%-15% lower institutional ownership, roughly in line with the percentage of dollars invested in socially responsible investing. Other models in Table 6 indicate that the percentage of institutional ownership is not higher for firms with environmental strengths. In fact, firms with clean energy and environmental communications strengths have significantly lower institutional ownership.

In the next table, Table 7, I consider the natural logarithm of number of institutional owners as the key independent variable. The regression specification remains the same as in institutional ownership regressions. The results are also similar indicating that firms with environmental concerns such as hazardous waste and climate change concerns are held by significantly lower number of institutional owners compared to firms that do not have these environmental concerns.

Results presented in Table 6 and Table 7 are consistent with the results presented in Table 3 and Table 4 that there is a significant positive relationship between expected stock returns and environmental concerns and that there is no meaningful relationship between environmental strengths of the firm and expected stock returns. These results provide some evidence that socially responsible investors impact the expected stock returns of firms with environmental concerns by screening out the stocks of these firms. While it is difficult to conclusively rule out the risk story, the observed lower institutional ownership for firms with environmental concerns suggests that an omitted risk factor may not be exclusively driving investors demand for higher expected stock returns from stocks with environmental concerns.

5. Conclusion

In this paper, I provide evidence that investors expect significantly higher returns on stocks of firms with environmental concerns. Notably, expected returns on stocks with climate change concerns are significantly higher indicating that even though green house gas emissions are not currently regulated, investors do seem to take these issues into account. While I cannot completely rule out that this is driven by perceived regulation risk in the future, I provide some

preliminary evidence that the observed positive relationship between expected stock returns and firm's environmental concerns is partly driven by socially responsible investors screening out stocks with environmental concerns. The results suggest that exclusionary socially responsible investing can cause firms to internalize environmental externalities by prompting the firms to adopt more environmentally friendly policies.

Appendix: Variable Definitions

Firm Characteristics

- *logta* refers to the natural logarithm of total book assets of the firm in billions of USD.
- *mtb* is the market-to-book ratio of the firm.
- *booklev* measures the leverage of the firm constructed as the ratio of total debt (sum of long-term- and short-term-debt) scaled by the total assets of the firm.
- *stdret* is the standard deviation of firm's daily stock returns over the past year.
- $ret_{t-1,t}$ represents the firm's past one month stock return.

Environmental Concerns and Strengths Variables

- *numconcerns* measures the total number of environmental concerns for the firm recorded in the KLD database
- *numstrength*, the total number of environmental strengths for the firm recorded in the KLD database.
- *netconcerns* is a net measure of environmental concerns and is constructed as *numconcerns-numstrength*.
- *climscore* is constructed as the difference of climate change concerns (*climchange*) and clean energy strength (*cleanenergy*).
- *hazardwaste* is a dummy variable that is coded as one if the company's liabilities for hazardous waste sites exceed $50 million, or if the company has recently paid substantial fines or civil penalties for waste management violations.

- *substemission* is coded as one if the company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD.

- *climchange* is a dummy variable that takes the value of one if the company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or if the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products.

- *benproduct* is a dummy that takes the value of one if the company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or it has developed innovative products with environmental benefits. But this does not include services with questionable environmental effects, such as landfills, incinerators, waste-to-energy plants, and deep injection wells.

- *polprevent* is a coded as one if the company has notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs.

- *cleanenergy* is coded as one if the company has taken significant measures to reduce its impact on climate change and air pollution through use of renewable energy and clean fuels or through energy efficiency or if the company has demonstrated a commitment to promoting climate-friendly policies and practices outside its own operations.

- *envcomm* is a dummy variable that takes the value of one if the company is a signatory to the CERES Principles, publishes a notably substantive environmental report, or has notably effective internal communications systems in place for environmental best practices.

References

Brammer, S., C. Brooks and S. Pavelin, 2006, Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures, *Financial Management*, 35: 97–116.

Carleton, W.T, J.M. Nelson and M.S. Weisbach, 1998, The Influence of Institutions on Corporate Governance through Private Negotiations: Evidence from TIAACREF, *Journal of Finance*, 53, 1335-1362.

Chava, Sudheer, 2010, Environmentally Responsible Lending, Working Paper, Georgia Institute of Technology.

Chava, Sudheer., and Amiyatosh Purnanandam, 2010, Is Default-Risk Negatively Related to Stock Returns?, *Review of Financial Studies*, 23, 2523 – 2559 .

Fernando, C.S, M.P. Sharfman and V.B. Uysal, 2010, Does Greenness Matter? The Effect of Corporate Environmental Performance on Ownership Structure, Analyst Coverage and Firm Value, Working Paper, University of Oklahoma.

Fisher-Vanden, K., and K. Thorburn, 2009, Voluntary Corporate Environmental Initiatives and Shareholder Wealth, Working Paper, Dartmouth College.

Gebhardt, William R., Charles M. C. Lee, and Bhaskaran Swaminathan, 2001, Toward an implied cost of capital, *Journal of Accounting Research* 39, 135–176.

Heinkel, R., A. Kraus and J. Zechner, 2001, The impact of green investment on corporate behavior, *Journal of Financial and Quantitative Analysis*, 36: 431–449.

Hong, H., J. Kubik and J. Stein, 2008, The Only Game in Town: Stock-Price Consequences of Local Bias, *Journal of Financial Economics*, 90: 20–37.

Hong, H., and M. Kacperczyk, , 2009, The price of sin: the effects of social norms on markets, forthcoming in *Journal of Financial Economics*, 93: 15–36.

Hong H., and L. Kostovetsky, 2009, Red and Blue Investing: Values and Finance, Working Paper, Princeton University.

Karpoff, Jonathan, M., John R. Lott Jr, and Eric W. Wehrly, 2005, The reputational penalties for environmental violations: empirical evidence, *Journal of Law and Economics* 48(2), 635–675.

Kempf, A and P. Osthoff, 2007, The Effect of Socially Responsible Investing on Portfolio Performance, CFR-Working Paper No. 06-10

Landier A., and V. Nair, 2009, Investing for Change: Profit from Sustainable Investment, Oxford University Press.

Merton, Robert., 1987, A Simple Model of Capital Market Equilibrium with Incomplete Information, *Journal of Finance*, 42 (3): 483–510.

Pastor, L., M. Sinha and B. Swaminathan, 2008, Estimating the Intertemporal Risk-Return Tradeoff Using the Implied Cost of Capital, *Journal of Finance* 63, 2859–2897.

Statman, M., and D. Glushkov, 2008, The Wages of Social Responsibility, Working Paper, Santaclara University.

Table 1: **Descriptive statistics for the Variables Used in Implied Cost of Capital Analysis**

Panel A and B of this table provides the distribution of consensus analysts' forecasts and the distribution of the ICC measure. $EPS1$ and $EPS2$ measure the one- and two-year- ahead earnings per share forecasts, respectively. LTG measures the long-term growth rate forecast. Descriptive statistics of the firm level characteristics are presented in Panel C. Panels D and E provide the summary statistics for the environmental variables used in the analysis. All variable definitions are provided in the Appendix.

Variable	Mean	10^{th} percentile	25^{th} percentile	50^{th} percentile	75^{th} percentile	90^{th} percentile	Standard deviation
Panel A: Inputs for expected return computation							
EPS1	1.86	0.29	0.82	1.55	2.45	3.58	2.15
EPS2	2.23	0.54	1.09	1.85	2.83	4.09	2.22
LTG	0.16	0.07	0.10	0.14	0.20	0.25	0.11
Panel B: Measures of Expected Return							
r_e	8.00	6.00	7.00	8.00	9.00	11.0	3.00
$r_e - r_f$	4.25	0.95	2.35	3.99	5.84	7.72	2.93

Variable	mean	median	std. dev.
Panel C: Firm-Level Characteristics			
assets (billions $US)	5.39	1.56	11.02
lever	0.22	0.21	0.17
mtb	2.20	1.68	1.54
$ret_{t-1,t}$	0.0046	0.0015	0.1068
stdret	0.1050	0.0904	0.0576
Panel D: Environmental Indices			
netconcerns	0.16	0.00	0.84
numconcern	0.37	0.00	0.84
numstrength	0.21	0.00	0.52
climscore	0.02	0.00	0.31

Panel E: Environmental Concerns and Strengths

Variable	number of firms	% of sample
hazardwaste	1555	9.87%
subemissions	1185	7.52%
climchange	842	7.10%
benproduct	581	3.69%
polprevent	549	3.49%
cleanenergy	924	5.87%
envcomm	523	3.94%

Table 2: **Impact of Environmental Concerns and Strength Indices on Expected Stock Returns**

This table presents regression results analyzing the impact of summary environmental measures on the expected stock returns. The dependent variable is the expected risk-premium calculated as the difference between the ICC and one-year risk-free rate. The sample period is 1990-2008. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
netconcerns	0.1963	0.1516						
	[5.42]	[4.83]						
numstrength			-0.0119	0.0132				
			[-0.21]	[0.26]				
numconcern					0.2310	0.2091		
					[5.35]	[5.58]		
climscore							0.4341	0.1483
							[3.96]	[1.49]
logta	-0.1871	-0.1809	-0.1562	-0.1645	-0.2142	-0.2071	-0.2035	-0.2039
	[-7.23]	[-7.74]	[-5.94]	[-6.97]	[-7.48]	[-8.38]	[-7.94]	[-8.08]
mtb	-0.1916	-0.1120	-0.1968	-0.1142	-0.1898	-0.1108	-0.2180	-0.1212
	[-9.60]	[-5.94]	[-9.81]	[-6.02]	[-9.50]	[-5.87]	[-11.07]	[-5.98]
booklev	0.6956	0.8167	0.7089	0.8199	0.7050	0.8420	0.9778	0.9921
	[3.19]	[3.85]	[3.23]	[3.86]	[3.24]	[3.98]	[4.16]	[4.25]
stdret	1.4942	2.3956	1.5806	2.5336	1.5682	2.3806	1.2246	2.2814
	[2.33]	[3.70]	[2.44]	[3.90]	[2.45]	[3.68]	[1.78]	[3.29]
$ret_{t-1,t}$	-4.5215	-4.5536	-4.4965	-4.5450	-4.5284	-4.5675	-4.3808	-4.4524
	[-18.68]	[-17.81]	[-18.55]	[-17.76]	[-18.72]	[-17.89]	[-16.52]	[-15.97]
R^2	0.270	0.411	0.268	0.409	0.271	0.411	0.265	0.400
N	14979	14979	14979	14979	14979	14979	11666	11666
industry fixed effects	no	yes	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table 3: **Impact of Environmental Concerns on Expected Stock Returns**

This table presents regression results analyzing the impact of environmental concerns on the expected stock returns. The dependent variable is the expected risk-premium calculated as the difference between the ICC and one-year risk-free rate. The sample period is 1990-2008. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	0.3891	0.3990				
	[3.57]	[4.31]				
subemissions			0.4602	0.2840		
			[4.09]	[2.83]		
climchange					0.6602	0.4287
					[4.30]	[2.59]
logta	-0.1856	-0.1887	-0.1833	-0.1784	-0.2234	-0.2122
	[-6.82]	[-7.86]	[-6.89]	[-7.50]	[-8.61]	[-8.42]
mtb	-0.1934	-0.1118	-0.1953	-0.1140	-0.2140	-0.1212
	[-9.65]	[-5.91]	[-9.76]	[-6.02]	[-10.85]	[-5.99]
booklev	0.7280	0.8422	0.7128	0.8267	0.9405	0.9957
	[3.33]	[3.97]	[3.25]	[3.89]	[4.00]	[4.28]
stdret	1.5688	2.4663	1.5446	2.4682	1.3114	2.2675
	[2.43]	[3.81]	[2.40]	[3.80]	[1.91]	[3.27]
$ret_{t-1,t}$	-4.5140	-4.5627	-4.5037	-4.5508	-4.3985	-4.4654
	[-18.63]	[-17.85]	[-18.61]	[-17.80]	[-16.65]	[-16.04]
R^2	0.269	0.410	0.269	0.410	0.265	0.400
N	14979	14979	14979	14979	11666	11666
industry fixed effects	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm

Table 4: **Impact of Environmental Strengths on Expected Stock Returns**

This table presents regression results analyzing the impact of environmental strengths on the expected stock returns. The dependent variable is the expected risk-premium calculated as the difference between the ICC and one-year risk-free rate. The sample period is 1990-2008. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
benproduct	-0.1693	-0.2051						
	[-1.12]	[-1.24]						
polprevent			0.2321	0.1041				
			[1.97]	[0.94]				
cleanenergy					-0.2857	0.0443		
					[-2.40]	[0.41]		
envcomm							0.1430	0.1586
							[0.93]	[1.32]
logta	-0.1577	-0.1638	-0.1630	-0.1660	-0.1506	-0.1641	-0.1827	-0.1883
	[-6.33]	[-7.16]	[-6.40]	[-7.11]	[-5.95]	[-7.13]	[-6.84]	[-7.49]
mtb	-0.1974	-0.1155	-0.1973	-0.1142	-0.1982	-0.1143	-0.2139	-0.1187
	[-9.85]	[-6.11]	[-9.82]	[-6.02]	[-9.86]	[-6.02]	[-10.78]	[-6.04]
booklev	0.7083	0.8187	0.7243	0.8233	0.7332	0.8191	0.8828	0.9385
	[3.22]	[3.86]	[3.29]	[3.87]	[3.33]	[3.86]	[3.87]	[4.21]
stdret	1.5511	2.4797	1.5933	2.5347	1.5127	2.5315	1.4892	2.3584
	[2.40]	[3.82]	[2.46]	[3.90]	[2.33]	[3.90]	[2.20]	[3.47]
$ret_{t-1,t}$	-4.4969	-4.5454	-4.4976	-4.5462	-4.4923	-4.5459	-4.3131	-4.4077
	[-18.56]	[-17.77]	[-18.56]	[-17.77]	[-18.50]	[-17.77]	[-16.92]	[-16.47]
R^2	0.268	0.409	0.268	0.409	0.268	0.409	0.274	0.412
N	14979	14979	14979	14979	14979	14979	13060	13060
industry fixed effects	no	yes	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table 5: **Impact of Environmental Concerns and Strengths on Expected Stock Returns**

This table presents regression results analyzing the impact of environmental concerns and strengths on the expected stock returns. The dependent variable is the expected risk-premium calculated as the difference between the ICC and one-year risk-free rate. The sample period is 1990-2008. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	0.3791	0.4114			0.3909	0.3892
	[2.92]	[3.60]			[3.04]	[3.39]
subemissions	0.3698	0.1705			0.3600	0.1571
	[2.64]	[1.34]			[2.55]	[1.23]
climchange	0.5672	0.4181			0.5770	0.4116
	[3.62]	[2.48]			[3.65]	[2.41]
benproduct			-0.1963	-0.2468	-0.1950	-0.2687
			[-1.17]	[-1.34]	[-1.13]	[-1.42]
polprevent			0.2710	0.1108	0.1632	0.0591
			[2.00]	[0.89]	[1.06]	[0.42]
cleanenergy			-0.1727	0.1117	-0.2274	0.0992
			[-1.41]	[0.92]	[-1.71]	[0.72]
envcomm			0.1526	0.1352	0.1270	0.1433
			[0.95]	[1.08]	[0.80]	[1.07]
logta	-0.2652	-0.2435	-0.1846	-0.1928	-0.2671	-0.2512
	[-9.26]	[-9.17]	[-6.81]	[-7.61]	[-8.94]	[-9.07]
mtb	-0.2116	-0.1194	-0.2160	-0.1201	-0.2137	-0.1215
	[-10.79]	[-5.94]	[-10.88]	[-6.13]	[-10.88]	[-6.06]
booklev	0.9668	1.0275	0.9053	0.9481	0.9847	1.0411
	[4.12]	[4.42]	[3.96]	[4.25]	[4.19]	[4.48]
stdret	1.2596	2.1888	1.4255	2.3045	1.1951	2.1221
	[1.85]	[3.17]	[2.10]	[3.39]	[1.75]	[3.07]
$ret_{t-1,t}$	-4.4112	-4.4863	-4.3118	-4.4138	-4.4094	-4.4943
	[-16.73]	[-16.14]	[-16.90]	[-16.51]	[-16.69]	[-16.17]
R^2	0.268	0.401	0.274	0.412	0.268	0.402
N	11666	11666	13060	13060	11666	11666
industry fixed effects	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm

Table 6: **Impact of Environmental Concerns and Strengths on Institutional Ownership**

This table presents regression results analyzing the impact of environmental concerns and strengths on the institutional ownership. The dependent variable is the percentage of institutional ownership in the firm computed from Thomson 13-F data at the end of each calendar year as total institutional ownership in the firm divided by the number of shares outstanding of the firm. The sample period is 1990-2008. The specification follows Hong and Karparcyzk (2009). The control variables in the regression but whose coefficients are not presented in the table include log (market capitalization of the firm), log(market to book ratio of the firm), beta of the firms' stock computed from daily returns over the past one year, inverse of the stock price of the firm at the end of the fiscal year, mean monthly stock return over the past one year, volatility of daily stock returns over the past one year, indicator variable for whether the firm is a member of S&P500, and indicator variable for whether the firm is listed in NASDAQ. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	-0.0399	-0.0282			-0.0312	-0.0226
	[-2.98]	[-2.10]			[-2.43]	[-1.69]
subemissions	-0.0192	-0.0037			-0.0156	0.0006
	[-1.88]	[-0.35]			[-1.55]	[0.06]
climchange	-0.0848	-0.0403			-0.0790	-0.0404
	[-6.04]	[-2.70]			[-5.63]	[-2.71]
benproduct			0.0173	0.0001	0.0110	-0.0020
			[1.07]	[0.01]	[0.65]	[-0.12]
polprevent			0.0147	-0.0133	0.0180	-0.0085
			[1.00]	[-0.90]	[1.14]	[-0.52]
cleanenergy			-0.0841	-0.0235	-0.0639	-0.0233
			[-6.10]	[-1.94]	[-4.57]	[-1.82]
envcomm			-0.0364	-0.0378	-0.0271	-0.0376
			[-2.52]	[-2.73]	[-1.83]	[-2.56]
R^2	0.180	0.268	0.191	0.292	0.186	0.270
N	11250	11250	12648	12648	11250	11250
control variables	yes	yes	yes	yes	yes	yes
industry fixed effects	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm

Table 7: **Impact of Environmental Concerns and Strengths on Number of Institutional Owners**

This table presents regression results analyzing the impact of environmental concerns and strengths on the number of institutional owners. The dependent variable is the log(number of institutional owners) computed from Thomson 13-F data at the end of each calendar year. The sample period is 1990-2008. The specification follows Hong and Karparcyzk (2009). The control variables in the regression but whose coefficients are not presented in the table include log (market capitalization of the firm), log(market to book ratio of the firm), beta of the firms' stock computed from daily returns over the past one year, inverse of the stock price of the firm at the end of the fiscal year, mean monthly stock return over the past one year, volatility of daily stock returns over the past one year, indicator variable for whether the firm is a member of S&P500, and indicator variable for whether the firm is listed in NASDAQ. Variable definitions are given in the Appendix. Robust t-statistics adjusted for firm level clustering are presented in the paranthesis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	-0.0518	-0.0662			-0.0544	-0.0650
	[-3.56]	[-4.34]			[-3.75]	[-4.30]
subemissions	-0.0012	-0.0186			0.0003	-0.0150
	[-0.09]	[-1.32]			[0.03]	[-1.09]
climchange	-0.0410	-0.0285			-0.0393	-0.0239
	[-2.72]	[-1.61]			[-2.60]	[-1.37]
benproduct			0.0419	0.0243	0.0385	0.0233
			[2.51]	[1.41]	[2.23]	[1.30]
polprevent			0.0163	0.0074	0.0204	0.0159
			[1.03]	[0.46]	[1.24]	[0.87]
cleanenergy			0.0106	0.0119	0.0305	0.0184
			[0.71]	[0.82]	[1.94]	[1.21]
envcomm			-0.0567	-0.0706	-0.0486	-0.0605
			[-3.34]	[-4.40]	[-2.80]	[-3.65]
R^2	0.897	0.906	0.899	0.908	0.897	0.906
N	11250	11250	12648	12648	11250	11250
control variables	yes	yes	yes	yes	yes	yes
industry fixed effects	no	yes	no	yes	no	yes
year fixed effects	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm