Environmental Externalities and Cost of Capital

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*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. This paper combines and supersedes two papers that were previously circulated, "Environmentally Responsible Lending" and "Socially Responsible Investing and Expected Stock Returns". I would like to thank Matt Billett, Edith Hotckiss, Kose John, Shane Johnson, Marcin Kacperczyk, Alok Kumar, Praveen Kumar, Scott Lee, Gregor Matvos, Micah Officer, Oguzan Karakas, Shagun Pant, Ralitsa Petkova, Amiyatosh Purnanandam, Michael Roberts, Phil Strahan, Jerome Taillard, Wei Yang, Vijay Yerramilli, Joe Hong Zou, 2011 FIRS program committee, seminar participants at Arizona State University, Bank of Canada, Boston College, City University of Hongkong, 2010 European Financial Association Annual Meetings at Frankfurt, Federal Reserve Bank of Atlanta, Georgia Tech, Michigan State University and 2011 Spring Q Group Conference for helpful comments and suggestions.

ABSTRACT

I analyze the impact of a firm's environmental profile on its cost of equity and debt capital. 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) compared to firms without such environmental concerns. Lenders also charge a significantly higher interest rate on the bank loans issued to firms with these environmental concerns. I provide evidence that environmental profile of a firm is not simply proxying for an omitted component of its default risk. Further, firms with these environmental concerns have lower institutional ownership and fewer banks participate in their loan syndicate than firms without such environmental concerns. These results suggest that exclusionary socially responsible investing and environmentally sensitive lending and the consequent increase in the cost of equity and debt capital has the potential to prompt firms to internalize their environmental externalities.

I. Introduction

How can environmental externalities be internalized by a firm? The recent offshore oil spill by BP and the tremendous environmental and economic damage caused by the oil spill reemphasizes the need for a better understanding of this question. Some mechanisms currently being debated in the United States are a carbon tax, instituting a cap-and-trade program and imposing tough new regulations on the environmental performance of firms. Apart from the possibility of new regulations and taxes, there is a significant increase in the number of investors and lenders that attempt to influence corporate environmental policies by considering a firm's environmental profile in their investing and lending decisions. In this paper, I analyze the impact of such environmentally sensitive investing and lending on the cost of equity and debt capital of the affected firms.

Socially responsible investing (SRI) attempts to screen stocks based on undesirable characteristics such as the nature of a business, the amount of pollution, and climate change concerns. Similarly, environmentally sensitive lending attempts to consider the environmental impact of the borrower in the lending decision. If a sufficiently large number of shareholders abstain from investing in firms based on their environmental concerns, the expected return for these excluded firms can increase (Merton (1987); Heinkel, Kraus and Zechner (2001)). Similarly, if a large number of lenders abstain from lending to firms with environmental concerns and if these firms cannot easily switch to alternate sources of financing, the affected firms could end up paying higher interest rates on their bank loans. Motivated by these theoretical arguments, in this paper, I analyze whether the environmental profile of a firm affects its cost of equity and debt capital.

The amount of money devoted to SRI has increased steadily over the last few years, with a growth of 324% over the 1995–2007 time period and over 50 times in the last 20 years. The Social Investing Forum reports that \$1 in every \$8 (\$3.07 trillion out of \$25.1 trillion under management in the United States, as of 2010) is under SRI 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.[1] If SRI can make a difference to the cost of capital of affected firms, it has the potential to complement laws, regulations, and taxes in promoting environmentally responsible corporate behavior.

In parallel to this trend in SRI, there has been a substantial increase in the number of lenders considering social and environmental issues in their lending decisions. A large number of banks, representing approximately 80% of the global lending volume- have adopted the *Equator Principles* (`http://www.equator-principles.com/`), are signatories to the United Nations Environment Programme's Statement by Banks (UNEP, 1992), and have agreed to consider social and environmental issues in project finance. Cogan (2008) reports that many large, publicly traded banks across the world have started to incorporate climate change concerns in their lending decisions, with some banks (such as the Bank of America) explicitly stating a target for reducing greenhouse gas emissions in their lending portfolio.[2] Cogan (2008) also reports that 29 of the 40 banks in his survey are involved in clean energy and renewable energy lending.

Similar to SRI, lenders, as publicized, can be motivated by social responsibility. Lenders can be also sensitive to the environmental profile of a firm because of the potential for regulatory, compliance and litigation risk for the borrower which can lead to a higher credit risk. In addition, lenders can directly face two additional risks by lending to firms with environmental concerns: lender liability laws that can expose the lender to litigation risk and reputation risk stemming from association with polluting firms (and

[1]For example, Investor Network on Climate Risk (`https://www.ceres.org/incr`) represents institutional investors managing $9.5 trillion of assets and aims to leverage their collective power to promote improved disclosure and corporate governance practices on the business risks and opportunities posed by climate change. Landier and Nair (2009) report that during 2007, 331 out of 1150 shareholder resolutions that were filed were socially oriented.

[2]...Citigroup Inc., JPMorgan Chase & Co. and Morgan Stanley say they have produced the Carbon Principles together with several large power companies, Environmental Defense and the Natural Resources Defense Council, that will make it more difficult for new U.S. coal-fired power plants to secure financing. The focus of the principles will be to steer power companies away from plants that emit high levels of carbon dioxide (a greenhouse gas) and to focus on new, cleaner and renewable technologies. ... (Associated Press, Feb 4, 2008).

hence not conforming to prevailing social attitudes that are critical of polluting firms).[3]

Bank debt is an important source of debt financing even for large public companies (Houston and James (1996)). If a significant number of lenders adopt environmentally sensitive lending policies, it could have an impact on the cost of debt capital of the borrowers. Some lenders could refrain from lending to a firm based on its environmental profile, either for social responsibility considerations or to avoid the potential lender liability and reputation risk. But some other lenders may price the risk and charge a higher interest rate on loans issued to firms with environmental concerns to compensate for the potential liability and reputation risk they get exposed to by lending to these firms.

If SRI and environmentally sensitive lending lead to a significantly higher cost of equity and debt capital for firms with environmental concerns, the affected firms may internalize their environmental externalities. For example, hazardous waste and toxic emissions may be a natural by-product of a firm's business (say utilities or chemical companies). But firms can choose among various combinations of raw input material (such as fuel type), technology (including abatement technology), installation of additional pollution prevention equipment (such as scrubbers), and so forth, which can affect the amount and constitution of various pollutants. If the cost of capital increases sufficiently for firms adopting a polluting technology, firms may rationally switch to less polluting albeit more expensive technology (see Heinkel, Kraus, and Zechner (2001) and recent evidence in Holladay (2010) that polluters react to new environmental regulations by abating rather than relocating to avoid regulations).

The environmental profile of a firm encompasses two broad areas of concerns and

[3]...Faced with mounting pressure from protest groups, ten of the world's leading banks have agreed to adhere to international environmental and social-impact standards when financing dams, power plants, pipelines and other infrastructure projects... (Wall Street Journal, June 4, 2003)
...After years of legal entanglements arising from environmental messes and increased scrutiny of banks that finance the dirtiest industries, several large commercial lenders are taking a stand on industry practices that they regard as risky to their reputations and bottom lines... (Banks Grow Wary of Environmental Risks, New York Times, Aug 31, 2010)

strengths. One area includes environmental issues that are already regulated and are required to be reported by the U.S. government (e.g., 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 future regulation. Emissions of green-house gases and the carbon footprint of a firm fall into this category. In this paper, I analyze the relation between a firm's strengths and weaknesses in both these dimensions and its cost of equity and debt capital.

I use the implied cost of capital (ICC) computed from analysts' earnings estimate as a proxy for the ex-ante expected stock returns. Gebhardt, Lee and Swaminathan (2001), Pastor, Sinha, and Swaminathan (2008) and Chava and Purnanandam (2010) highlight the advantages of using the ICC as a proxy for expected returns instead of realized returns.[4] The abnormal realized returns to SRI are not clear (e.g., using different sample periods, Statman and Glushkov (2008) find no difference, Brammer, Brook, and Pavelin (2006) find underperformance, and Kempf and Osthoff (2007) find higher performance). Further, the relatively short time period for which firm-level environmental profile data are available, makes the ICC (which relies more on cross-sectional variation across firms) an attractive proxy for expected returns compared to realized returns. In addition, unlike measuring abnormal performance using realized returns, the ICC does not depend on a particular asset pricing model.

Using the ICC computed from the analysts' estimates, I find that there is a statistically and economically significant positive relation between the net environmental concerns of a firm and the expected returns on its stock. In contrast, there is no meaningful relation between expected returns and number of environmental strengths of a 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 change concern score

[4]In a recent paper, Wu and Zhang (2011) contrast ICC computed using the Gebhardt, Lee, and Swaminathan (2001) procedure with alternate methods and suggest that Gebhardt, Lee, and Swaminathan (2001) method is probably among the best accounting-based expected return models.

minus clean energy strength).

Investors expect significantly higher returns from stocks of firms that are significant emitters of toxic chemicals, firms with hazardous waste concerns, and those with climate change concerns. In contrast, firms that derive substantial revenue from environmentally beneficial products or have pollution prevention strengths do not have a lower ICC, but firms that derive substantial revenues from clean energy products seem to have a lower ICC (in the specification without industry fixed effects).

Moving on to the cost of debt capital, using a large sample of bank loans issued to domestic firms, I find that firms that have net environmental concerns (more environmental concerns than environmental strengths) are charged a higher interest rate on their bank loans. Closer analysis of the individual environmental concerns shows that banks seem to be concerned about both environmental issues that are already regulated (such as hazardous waste and substantial emissions of toxic chemicals) and environmental concerns that are not yet regulated (such as concerns related to green house gases or other climate change concerns).

Firms that derive substantial revenues from environmentally beneficial products or services seem to have lower interest rates on their bank loans. Interestingly, consistent with Fisher-Vanden and Thorburn (2011) and similar to the ICC results, lenders do not seem to attach much importance to a firm being signatory to CERES or the firm being an effective communicator of its environmental record.

Ultimately, in both the cost of equity and debt capital analysis, the alternate explanation to SRI and environmentally sensitive lending is that environmental profile of a firm is correlated with some omitted component of firm risk. It is a challenging task to conclusively rule out that some omitted (and possibly unobservable) firm-specific risk is driving the results. But I present some ex post evidence that alleviates this omitted risk concern by showing that at least the environmental profile of a firm is not simply proxying for an omitted component of its default risk. A conservative interpretation of the results is that default risk is not exclusively driving the observed relation between a firm's environmental profile and its cost of equity and debt capital.

Further, I provide supporting evidence that SRI and environmentally sensitive lending may be responsible for the higher cost of equity and debt capital for firms with environmental concerns. I document that such firms with environmental concerns indeed have a lower percentage of institutional ownership and fewer institutional owners hold their shares. In particular, I show that firms with hazardous waste and climate change concerns have significantly lower institutional ownership. I find similar results for the number of institutional owners of a 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).

I next show that fewer banks participate in the loan syndicate of borrowers with environmental concerns. There is no meaningful relation between loan syndicate size and the number of environmental strengths of a firm. This suggests that some lenders may be avoiding lending to firms with environmental concerns, especially, firms with substantial emission concerns. There is weak evidence of more banks lending to firms that derive substantial revenue from environmentally beneficial products. In general, lenders seem to avoid firms with environmental concerns but may not necessarily be flocking to firms with environmental strengths.

The negative relation documented between institutional ownership (loan syndicate size) and a firm's environmental concerns is consistent with the positive relation documented between the ICC (loan spreads) and firm's environmental concerns (Merton (1987); Heinkel, Kraus, and Zechner (2001)). Taken together, these results suggest that SRI and environmentally sensitive lending are having an impact on the cost of capital of affected firms.

These findings contribute to the literature on investor and lender reaction to a firm's environmental and social externalities. Karpoff, Lott, and Wehrly (2005) find that firms that violate environmental laws suffer statistically significant losses (of similar magnitude to the legal penalties imposed) in the equity market. Hong and Kacperczyk (2009) show that sin stocks (tobacco, alcohol, and gambling) have higher realized equity returns and are held less by norm-constrained institutions. In contrast, I use ICC as a proxy for expected returns but, more importantly, I consider the environmental profile of a firm, as opposed to its nature of business. Firms can potentially internalize environmental externalities through the cost of capital channel but sin stocks, by definition, cannot change their line of business. In addition, unlike Hong and Kacperczyk (2009), I consider whether the environmental profile of a firm affects its bank loan spreads. Fisher-Vanden and Thorburn (2011) find that there is no abnormal stock reaction to a firm's announcement to join voluntary initiatives such as CERES. In line with their findings, I find that voluntary environmental initiatives do not reduce the cost of equity or debt capital. Fernando, Sharfman, and Uysal (2010) examine how ownership, analyst coverage, and the valuation of firms vary with their environmental performance.

The remainder of the paper is organized as follows. Section II explains the data sources and variable construction. The empirical results are presented in Section III. Section IV explores why investors and lenders may take into account the environmental profile of a firm. Section V concludes the paper.

II. Data

The data used in the analysis falls into four major categories: (1) Data on the environmental profile of the firm, (2) data on analyst estimates for the ICC calculations, (3) bank loan data, and (4) accounting and market data required to compute the control variables. Below, I describe each data source in detail and outline the construction of the variables used in the paper along with descriptive statistics for the variables.

A. Data: Environmental Profile of the Firm

The data source for firm-level environmental profile is KLD Stats. This database has information on environmental concerns and environmental strengths for a large sample of firms rated by KLD Research & Analytics, Inc, now a part of MSCI. There are other data sources such as a firm's 10-K reports, carbon data project and so forth, with information on some of the environmental variables I am interested in. But, currently, environmental profile disclosure is not uniform and when firms do report, for example, emissions, 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 their analysts evaluate the data decide whether a firm has a specific environmental exposure or not. KLD data is also available for a larger cross-section of firms and for a much longer time span than I would be able to gather from any alternate data sources. More importantly, it is necessary for me to use a database that a large number of SRI investors use as a source for their environmental screens. KLD publishes a number of environmental, social and governance (ESG) indices, including MSCI KLD 400 social index, and a vast majority of the top 50 institutional money managers worldwide use their research to integrate ESG factors into their investment decisions. Recent papers that have used this database include Hong and Kacperczyk (2009) and Fisher-Vanden and Thorburn (2011).

KLD 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 1992-2007 [5] except when mentioned otherwise (some envrionmental profile 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.

[5] I restrict the data to 1992–2007 to exclude the financial crisis of 2008 but the results remain similar even if I extend the data to inlclude 2008.

Environmental Concern Measures

I consider three individual environmental concerns[6] from the KLD database, each coded as one if the firm is exposed to that particular environmental concern during the year and zero otherwise: *hazardwaste*, *substemission* and *climchange*. Here, *hazardwaste* is a dummy variable that is coded as one if the company's liabilities for hazardous waste sites exceed $50 million or if it has recently paid substantial fines or civil penalties for waste management violations. The variable *substemission* is coded as one if the company's legal emissions of toxic chemicals (as defined by and reported to the Environmental Protection Agency (EPA)) from individual plants into the air and water are among the highest of the companies followed by KLD. The variable *climchange* (available since 2000) 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 indirectly from the combustion of coal or oil and its derivative fuel products (such companies include electric utilities, transportation companies with fleets of vehicles, automobile and truck manufacturers, and other transportation equipment companies).

Environmental Strength Measures

I consider four individual environmental strengths available in the KLD database, each coded as one if the firm is considered to have strength in that particular environmental dimension during the year, and zero otherwise: *benproduct*, *polprevent*, *cleanenergy* and *envcomm*. The variable *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-

[6]KLD also assigns values for some other concerns (e.g., ozone depletion), which I do not consider separately because they are sparsely populated. But these are included in the environmental concerns index computed by KLD, *numconcerns*, that I use in the analysis

to-energy plants, and deep injection wells. The variable *polprevent* is coded as one if the company has notably strong pollution prevention programs, including both emission reductions and toxic-use reduction programs. The variable *cleanenergy* is coded as one if the company has taken significant measures to reduce its impact on climate change and air pollution through the 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. Finally, *envcomm* (available since 1997) 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.

Summary Measures of Environmental Concerns and Strengths

In addition to the individual concerns and strengths described earlier in this section, the KLD database also provides a count of the total number of environmental concerns (*numconcerns*) and the total number of environmental strengths (*numstrength*) for a firm. I also construct a net measure of environmental concerns (*netconcerns*) defined as *numconcerns-numstrength* and a measure of exposure to climate change, *climscore*, defined as *climchange-cleanenergy*.

B. Data: ICC

Analyst Estimates for ICC Computation

I/B/E/S database is the source for analyst consensus estimates for one- and two-year ahead forecast of earnings per share[7] and long-term consensus growth forecast required to compute the ICC used as a proxy for expected returns. The ICC is computed as the internal rate of return that equates the present value of free cash flows to equity to current

[7]Kumar (2010) and Jiang, Kumar and Law (2010) find that some of the differences in individual analysts forecasts can be attributed to their gender and political preferences. Using the consensus forecasts of the analysts should mitigate some of the concerns regarding biases in individual analyst forecasts.

stock price. I closely follow Gebhardt, Lee, and Swaminathan (2001), Pastor, Sinha, and Swaminathan (2008), and Chava and Purnanandam (2010) for the construction of the ICC measure. The details of ICC construction are given in the Appendix. 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 1992, and ending in 2007. I subtract the risk-free rate based on one year treasury yield at that time to obtain a measure of the expected excess return on the stock.

Control Variables in ICC Regressions

The specification for the ICC regressions is based on Gebhardt, Lee, and Swaminathan (2001), Pastor, Sinha and Swaminathan (2008) and Chava and Purnanandam (2010). 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 (2008) provide evidence in support of a positive relation between expected market return and volatility. Chava and Purnanandam (2010) control for 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 size measured as the log of the firm's book assets ($logta$); market-to-book ratio of the firm (mtb); book leverage ($lever$); 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 are from CRSP. All financial data are lagged by at least six months so that they are available at the time of ICC construction (June 30 of each year). Further, all financial data are winsorized at 1% and 99% to handle outliers.

C. Data: Cost of Debt Capital

Bank Loan Data

Data on bank loans are obtained from the Dealscan database distributed by the Loan Pricing Corporation. Dealscan contains information on approximately $106,000$ facilities to domestic companies, out of which approximately $50,000$ facilities can be linked to firm level balance sheet information in Compustat (see Chava and Roberts (2008) for details on matching dealscan with COMPUSTAT). After merging these data with the KLD database I am left with 5879 bank loans to non-financial firms during $1992-2007$. This drop in the sample size is mainly attributable to the sample size of the firms covered by KLD Stats.

The key interest rate variable is the log of the loan spread *aisd*. Similar to Graham, Li and Qiu (2008), Hertzel and Officer (2011), Chava, Livdan, and Purnanandam (2009), Campello, Lin, Ma, and Zou (2010) I obtain *aisd* (all-in-spread-drawn) from the Dealscan database. This measures the amount the borrower pays in basis points over LIBOR for each dollar drawn down. It adds the spread of the loan with any annual fees (or facility fee) paid to the bank group.

Control Variables in Bank Loan Regressions

The source of firm characteristics is Standard and Poor's quarterly COMPUSTAT database. Market data are from CRSP. All financial data are lagged by at least six months so that they are available at the time of loan pricing. Further, all financial data are winsorized at 1% and 99% to handle outliers.

I use the following firm-level control variables based on Bradley and Roberts (2003) and Chava, Livdan and Purnanandam (2009) in the loan spread regressions. Here, *logasset* measures the natural logarithm of the total assets of the firm extracted from COMPUSTAT. The variable *opincbefdep_a* is the ratio of operating income before depreciation to the total assets of the firm. The variable *lever* 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. The variable *modzscore* is the modified z-score based on Graham, Lemmon and Schallheim (1998). The variable *unrated* is a dummy variable that is coded as one if the firm does not have a public debt rating and zero otherwise; and *Invgrade* is a dummy variable that is coded as one if the firm has public debt rated investment grade from Standard & Poor's and zero otherwise.

I control for the following loan specific features in the regression: *Maturity* is defined as the number of months between loan inception and loan end date; *perfprice* is a dummy variable that is coded as one if the loan has a performance pricing feature and zero otherwise; *termloan* is a dummy variable that is coded as one if the loan is a term loan and zero otherwise. I do not control for loan size since it is highly correlated with firm size, but controlling for loan size does not have a material impact on the results.

The regressions also include the following macro variables: *termspread*, constructed as the difference in yields between 10-year and 1-year Treasury notes, and *creditspread*, constructed as the difference in yields between BAA and AAA corporate bonds.

D. Descriptive Statistics: ICC Analysis

In the ICC analysis, I restrict attention to the firms in the intersection of the KLD, CRSP, COMPUSTAT and I/B/E/S databases. There are a total of 13114 firm-year observations in the sample belonging to 2679 unique firms. Panel A of Table I gives the industry (defined based on the Fama-French 12 industry codes) distribution of firms in the sample. Manufacturing accounts for the highest percentage of the sample, at 16%, where as telephone and television transmission sector accounts for only 3.1% of the sample.

Panel B of Table I presents the break-down of the sample both in the time dimension and at the level of individual environmental concerns and strengths of the firm. For the summary measures of the environmental profile (*netconcerns*, *numconcerns*, *numstrength*, and *climscore*), I present the averages of the variable. For the rest of the individual environmental concerns and strengths, I present the number of firms for which that particular environmental concern or strength is coded as one. Finally, the last three rows of Panel B of Table I present the statistics for the entire sample of 1992–2007.

The mean value of the *netconcerns* measure is 0.18 for the sample period 1992–2007, but there is some variation across the years. 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 0.19. The variables *climchange* and *envcomm* are available from 2000 and 1997 on respectively; hence the number of firms with data on these variables is lower than the total number of sample observations of 13,114. There are 1338 firm–year observations that have hazardous waste concerns belonging to 215 unique firms. Similarly, 937 firm-year observations belonging to 243 unique firms have substantial emissions concern coded as one. In contrast, fewer firms are coded as having environmental strengths during the sample period.

The descriptive statistics for the ICC measure and the inputs used in the ICC computation are presented in Panel C of Table I. The average one-year ahead EPS is \$1.90, with the median at \$1.58. The average and median for the two year ahead EPS is \$2.25 and \$1.86 respectively. The average value of the one year ahead and two year ahead EPS seem to be larger than for the full I/B/E/S sample and this can be attributed to the sample coverage by KLD. The mean and median values of the long-term growth forecasts are 15% and 14% respectively. The mean (median) of the ICC is 8.23% (7.92%) per annum. The average excess expected stock return is 4.18% with the median at approximately 3.91%. These numbers are broadly in line with those documented in the earlier literature.

E. Descriptive Statistics: Bank Loan Pricing

In the bank loan pricing analysis, I restrict attention to the firms that are in the intersection of KLD, CRSP, COMPUSTAT and Dealscan databases. The unit of observation is a facility and a firm can borrow under multiple loan facilities during the sample period. There are a total of 5879 facilties issued to 1341 unique firms. In contrast, the ICC analysis contains 2679 unique firms. The difference in sample size can be attributed to the coverage of firms in dealscan. Only firms that have borrowed from a bank during the sample period (and if the deal is included in the Dealscan database) would be in the sample.

I present the Fama-French 12 industry code distribution of the sample in Panel A of Table II. There are some differences between the industry distribution of the bank loan sample and that of the ICC sample. Utilities seem to account for a larger share (11.3%) in the bank loan sample as opposed to 6.9% in the ICC sample. Manufacturing again accounts for the highest percentage of the sample, at 16.4%, with consumer durables accounting for the lowest share, at 3.1%.

Panel B of Table II presents the break-down of the sample both in the time dimension and at the level of individual environmental concerns and strengths of the firm. The average value of net concerns is higher in the bank loan sample (0.29) as compared to the ICC sample (0.18). This difference is mainly driven by the higher value of environmental concerns index (0.52) since the average value of environmental strengths index is similar (0.22). In line with the aggreagete environmental concerns index, the percentage of firms with environmental concerns is higher in the bank loan sample as comared to the ICC sample. For example, 819 loans belonging to 154 unique firms have the hazardous waste concern flagged as 1.

Panel C of Table II presents the descriptive statistics for the loan level features, firm level variables, and macro variables used in the bank loan spread analysis. The firms in the sample are large with the average and median asset size at approximately

$7.83 billion and $2.98 billion respectively. Initially KLD covered firms in the S&P500 and later expanded to Russell 2000 firms, so it is expected that the firms would have a large asset size. The median leverage is around 28%, and 50% of the loans are given to investment-grade-rated firms, with another 26% of loans given to firms that are unrated.

The average loan spread is 125 bps over LIBOR with the median being 87.5 bps. The average loan size is around $568 million dollars with the median loan size at $300 million. This is understandable given that firms covered in KLD and Dealscan are larger than the typical COMPUSTAT firm. The median maturity of the loans is around five years. Almost half the loans in the sample have a performance pricing clause, and around 19% of the loans are term loans with the rest being revolvers. These numbers are similar to those documented in Chava and Roberts (2008) and Chava, Livdan, and Purnanandam (2009).

III. Empirical Results

I present the results of the empirical analysis in this section. I first consider aggregate measures of a firm's environmental profile, followed by the individual environmental concerns and then the individual environmental strengths of a firm. I first present the impact of each particular environmental profile variable on the cost of equity capital, followed by the impact on bank loan pricing. I include the environmental variables one at a time. Including all of the firm's environmental profile variables simultaneously reduces the sample period to only 2000–2007 instead of 1992–2007 (since some of the variables are available for a shorter period of time, e.g., climate change from 2000 onwards). But the results remain qualitatively similar if I restrict attention to only the 2000–2007 sample period and include all the individual environmental strengths and concerns in one specification.

In the ICC analysis, 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 concern and strength 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.

To analyze the impact of the environmental concerns and strengths of firms on loan pricing, I regress the log of the all-in-drawn spread (*logaisd*) on various measures of environmental strengths and concerns and other control variables. The control variables include firm-specific variables, loan-specific variables, and macro variables. The regressions also include year fixed effects, and dummies for loan purpose indicators. I also report specifications with and without industry fixed effects based on two-digit SIC codes to make sure that industry affiliation is not the main source of the results. All standard errors are clustered at the firm level to account for correlation across multiple observations of the same firm. I do not use firm fixed effects, since the environmental variables are highly persistent.

A. *Aggregate Measures of Environmental Concerns and Strengths and the Cost of Capital*

I first present the results relating environmental concerns and strengths indices with the cost of equity capital. Next, I present bank loan pricing results.

Expected Stock Returns

I analyze the relation between expected stock returns as proxied by the ICC and various summary measures of environmental strengths and concerns in Table III. 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 1.3% per annum higher than the risk free rate from a firm that has environmental concerns on all four dimensions considered compared to firms that have environmental strengths on all dimensions. The relation is statistically significant and economically meaningful, indicating that the environmental profile of a firm matters to investors. Inclusion of industry fixed effects at the two digit SIC level in Model 2 reduces the coefficient estimate of *netconcerns* and its statistical significance marginally, but the estimate is still statistically significant.

In Models 3 and 4, the key explanatory variable is the number of environmental concerns of a firm. The results demonstrate that there is a significant positive relation between the ICC and number of environmental concerns of a firm, in line with the theoretical predictions of Heinkel, Kraus and Zechner (2001). If a significant number of socially responsible investors screen out stocks with environmental concerns, then the expected returns on these stocks could go up. The results in Models 3 and 4 suggest that investors expect approximately 0.7% per annum *higher* for firms that have environmental concerns in all dimensions (almost 18% higher compared to the median firm).

Models 5 and 6 document that there is no meaningful relation between the number of environmental strengths and expected stock returns. This is in contrast to the strong positive relation between environmental concerns and expected stock returns, suggesting that while investors may be screening out stocks with environmental concerns, they are not necessarily flocking to stocks with environmental strengths.

In Models 7 and 8, the key environment variable is *climscore*, defined as the difference between climate change concern and clean energy strength. This variable measures the net exposure of a firm to the climate change concerns and is only available since 2000. In line with the results in Models 3 and 4, there is a very strong positive relationship between net climate change concerns and the ICC. Investors seem to demand a significantly higher return from firms that are more exposed to climate change concerns. The results are economically significant, representing 0.96% per annum higher expected returns for firms that have climate change concerns compared to firms that have clean energy strength. The inclusion of industry fixed effects significantly reduces the strength of this relation but this is not surprising, given that climate change concerns and clean energy are mostly defined at the industry level.

In all the models, the coefficients of 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 higher expected returns. More volatile firms have higher expected returns and there is a significant negative relation between expected returns and the past one month's stock returns. These results are consistent with the previous literature (e.g., Gebhardt, Lee and Swaminathan (2001) and Chava and Purnanandam (2010)).

Bank Loan Spreads

I document the relation between bank loan spreads and summary measures of the environmental profile of firms in Table IV. In Model 1, the key explanatory variable is net environmental concerns (*netconcerns*). The dependent variable is the log of the all in drawn loan spread over the LIBOR. As the results indicate, the higher the net environmental concerns (i.e., more environmental concerns than environmental strengths) of a firm, the higher its bank loan spread. The relation is both economically and statistically significant. I include industry fixed effects in Model 2 and, as expected, the magnitude of the coefficient of *netconcerns* decreases but is still significant. A firm that has environmental concerns in all dimensions considered pays an almost 20% higher loan interest rate (approximately 25bps) compared to a firm that has an equal number of environmental concerns and strengths.

The results in Models 3 and 4 show that banks charge firms with environmental concerns a higher loan interest rate. If a firm has environmental concerns in all dimensions considered, then the regression coefficients indicate that lenders charge the firm around 25 bps higher than a firm with no environmental concerns. Given that the average loan size is around $568 million dollars, this increase in cost of debt capital is significant for firms with environmental concerns. In addition, taken together with the results in Models 1 to 4 of Table III, it appears that both stock investors and lenders take into account the environmental concerns of a firm.

The results in Models 5 and 6 show that firms with a higher number of environmental strengths are charged lower loan interest rates on their bank loans but the relation is not statistically significant. Models 5 and 6 of Table III show similar results in the ICC regressions. It seems investors and lenders attach much more importance to the environmental concerns of a firm but not so much to its environmental strengths. The coefficient of *climscore* is positive but not statistically significant in Models 7 and 8 of Table IV, indicating that lenders are not pricing the net climate exposure of a firm. These results differ from the significant relation between ICC and net climate exposure documented in Models 7 and 8 of Table III. Stock investors and lenders may differ on the importance of a firm's climate change exposure but it is also likely that the smaller sample size in the bank loan regressions is causing the results. I analyze the constituents of *climscore* in more detail in later subsections.

The coefficients of the control variables in all the models are in the expected direction and consistent with the prior literature (Bradley and Roberts (2003); Chava, Livdan and Purnanandam (2009)). Larger firms and more profitable firms have lower loan spreads where as firms with higher leverage have higher loan spreads. As expected, firms that are farther from financial distress (higher *modzscore*) pay lower loan interest rates. Compared to firms that are rated non-investment grade, firms with investment-grade rating and unrated firms pay lower loan spreads. In the interest of space, I do not present the estimates on the loan-specific and macro control variables, but the results are in line with the literature. Among the loan-specific features, longer maturity loans are associated with lower loan spreads, and term loans have a higher loan spread (compared to revolvers). Performance pricing clauses do not seem to affect loan spreads significantly. The macro economic variables credit spread and term spread do not seem to be significantly related to the loan spreads, probably because of the inclusion of the year fixed effects. Not surprisingly, industry seems to matter for loan spreads, with the magnitude and significance of the coefficients of the environmental profile variables decreasing once industry effects are included.

B. *Individual Environmental Concerns and the Cost of Capital*

In this subsection, I first present the results relating individual environmental concerns with the cost of equity capital. Next, I present bank loan pricing results.

Expected Stock Returns

In Table V, I analyze the relation between the individual environmental concerns of a firm and expected returns on its stock. The regression specification remains the same as before. The key environmental concern variable in Models 1 and 2 is *hazardwaste*. There is a strong positive relation between *hazardwaste* and ICC, suggesting that investors demand a significantly higher stock return (approximately 7% higher) from firms with hazardous waste concerns. The result is robust to the inclusion of industry fixed effects in Model 2.

In Models 3 and 4, *subemissions*, an indicator variable for whether the firm is a substantial emitter of toxic chemicals as reported by EPA, is the key explanatory variable. Again, there is a statistically significant and economically meaningful positive relation between expected stock returns and substantial toxic chemical emission concerns. The introduction of industry fixed effects in Model 4 decreases the economic and statistical significance of the effect. The coefficient estimates indicate that investors demand 0.18% to 0.29% higher returns per annum on stocks of firms with substantial toxic chemical emission concerns, compared to the stocks of firms with no such concerns.

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. The variable *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 0.47% to 0.69% higher compared to firms with no such concern. Of the individual environmental concerns variables considered, impact of the climate change concerns is the highest.

Bank Loan Spreads

Next, I relate the individual environmental concerns to bank loan spreads to shed light on the specific environmental concerns that the lenders are most concerned about. The results are presented in Table VI. The regression specification is similar to the specification employed in Table IV, with the log of the loan spread as the dependent variable and using loan-level, firm-level, and macro controls. As before, I present regression specifications with and without industry fixed effects separately, but all specifications include year fixed effects.

The results in Models 1 and 2 suggest that banks seem to charge a significantly higher loan spread (12% to 13% higher) for firms with hazardous waste concerns compared to firms without such concerns. The relation is economcally and statistically significant. Models 3 and 4 show that lenders price substantial emissions concerns and charge an approximately 9% to11% higher spread on loans issued to firms with substantial emissions concerns, compared to firms that have no such concerns. The inclusion of industry effects increases the coefficient estimate and statistical significance.

There seems to be a significant positive relation between climate change concerns and loan spreads when industry fixed effects are not included in Model 5. However, once the industry fixed effects are included in Model 6, the magnitude of the coefficient drops considerably and the relation is no longer statistically significant. In light of the limited within-industry variation in the climate change concerns, the results in Model 5 (without industry fixed effects) are still interesting and suggest that firms with climate change concerns pay a higher spread on their bank loans. This is remarkable for a couple of reasons. First, bank loans are relatively short term, with the average maturity of the loans around 3.5 years. It is not likely that the climate change would impact the firm significantly during the life of the loan. Second, there are currently no regulations governing the emissions of greenhouse gases and carbon emissions of firms in the U.S., but, some of the lending banks are signatories to CERES, climate leaders, and equator principles that aim to cut down the greenhouse gas emissions.

The relation between individual environmental concerns and the ICC (presented in Table V) and bank loan spreads (presented in Table VI) are largely consistent with each other, with some minor differences depending on whether industry effects are included or not. Stock investors and lenders seem to take into account the environmental concerns of the firm, but not all environment concerns are equally weighed. To address the concern that *hazardwaste* (defined as a dummy that is coded as one if the company's liabilities for hazardous waste sites exceed $50 million or if it has recently paid substantial fines or civil penalties for waste management violations) may be measuring two different issues, I re-estimate the regressions after controlling for the variable *regconcerns* (available from KLD), which measures whether the firm has any recent regulatory concerns. Both the ICC and bank loan spread results presented earlier remain similar after controlling for a firm's regulatory concerns, indicating that the relation is mainly driven by a firm's hazardous waste liability concerns rather than the regulatory penalties paid by that firm.

Interestingly, climate change concerns that proxy for the green-house gas emissions and carbon footprint of a firm seem to have the most impact for both the ICC and bank loan spreads (when industry fixed effects are not included) even though they are not yet regulated. With industry fixed effects, the statistical significance in the bank loan spread results disappears, while it remains strong in the ICC results (this may be partly explained by the smaller sample in the bank loan analysis with 119 unique firms with the climate change concern compared to 165 unique firms in the ICC analysis). Climate change concerns may matter if socially responsible investors screen out stocks with climate change concerns or due to the anticipated costs of future regulation. The cost of anticipated future regulation may include compliance costs and litigation costs that may arise from the new rules.

C. Individual Environmental Strengths and the Cost of Capital

In this subsection, I first present the results relating individual environmental strengths with the cost of equity capital. Next, I present bank loan pricing results.

Expected Stock Returns

Table VII documents the results from an analysis of expected returns and individual environmental strengths of a firm. The results are presented in Models 1 to 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 VII), but the relation is not statistically significant. The results in Models 3 and 4 relate 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 emission reductions and toxic-use reduction programs. The coefficient of *polprevent* is in fact positive but not statistically significant after the inclusion of industry fixed effects.

The most significant relation 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 of *cleanenergy* indicates that after controlling for other firm specific factors, investors seem to demand 0.4% per annum lower returns from stocks that have a clean energy environmental strength than stocks of firms that do not (almost 10% lower than the median firm in the sample). The inclusion of industry fixed effects eliminates the statistical significance of this measure. This is not surprising given that clean energy is mostly an industr- level variable and there is not enough within-industry variation in this measure.

Interestingly, there does not seem to be any meaningful association between firm expected returns and environmental communication (or CERES signatory) strength. These results are consistent with Fisher-Vanden and Thorburn (2011), who find that there are no significant abnormal returns around firm announcements of joining CERES. These results seem to indicate that investors do not attach much weight to voluntary environmental initiatives.

Bank Loan Spreads

I consider the relation between firm individual environmental strengths and loan spreads in this subsection. The results in Model 1 and 2 of Table VIII show that lenders charge significantly *lower* spreads for firms that derive substantial revenues from environmentally beneficial products. The relation is highly significant both statistically and economically. Firms that are considered strong in this dimension pay approximately 20%, or 25bps, lower spreads compared to firms that do not have this flag. So, there is a lower cost of equity and debt capital for firms with *benproduct* environmental strength, even though the relation in the equity market is not statistically significant.

The results in Models 3 and 4 (Model 5 and 6) show that there is no statistically significant relation between loan spreads and pollution prevention program indicators (*cleanenergy*). These results are in contrast with the lower expected stock return (without industry effects) for firms with *cleanenergy* strength documented in Model 5 of Table VII. Similar to the ICC results in Models 7 and 8 of Table VII and consistent with Fisher-Vanden and Thorburn (2011), Models 7 and 8 of Table VIII show that bank loan spreads are not affected by the borrower being a signatory to voluntary environmental initiatives.

Overall, the only individual environmental strength variable that has a statistically significant relation with bank loan spread is *benproduct*. The other environmental strength variables have a negative relation with the loan spread, but the relations are not statistically significant. This is in contrast to the strong positive relation between all the individual environmental concerns variables and bank loan spreads documented in Table VI.

D. Robustness Tests

Expected Stock Returns

So far, I chose to present the results with each individual environmental concern and strength entering regressions separately so as to preserve the sample size. Given that some of the environmental profile variables are available only from 2000 onward, including all of the environmental concerns and strengths in one specification would restrict the sample period to only 2000–2007. But the results remain qualitatively similar if I restrict the sample period to 2000–2007 and include all the environmental strengths and concerns in one specification.

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

I also run 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. The 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, given the short time series availability of some of the key explanatory variables. For example, the climate change concerns variable is available only after 2000. In addition, the sample composition changed around 2001.

I use the past one month's stock return to control for any staleness in analysts' forecasts (Chava and Purnanandam (2010)). The results remain similar if the previous three- or six-month 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.

Bank Loan Spreads

The relation between the bank loan spread and environmental concerns and strengths remains quantitatively and qualitatively similar in a number of robustness tests. As in the ICC regressions, the results remain qualitatively similar if I restrict the sample period to 2000-2007 and inlcude all the strengths and concerns in one specification instead of including the individual concerns and strengths separately in each of the regressions.

First, as documented, the relation is robust to the inclusion of industry fixed effects at the two digit SIC level. In unreported tests, I find that the results are robust if I control for the industry factors at the Fama-French 48-industry level. In another robustness test, I include a dummy for whether a loan is collateralized or not. Information on whether a loan is collateralized or not is available only for approximately half of the sample and hence I do not include it in the main results. But in unreported tests I confirm that the inclusion of a dummy for whether a loan is secured or not does not materially impact the results . Another loan feature that I do not include in the main specifications is the loan size. Loan size is highly correlated with firm size. The inclusion of loan size, however, does not change the results significantly.

E. Is the Environmental Profile of a Firm Proxying for an Omitted Component of the Firm's Default Risk?

One concern with the results documented so far is that firms with more environmental concerns (strengths) have higher (lower) default risk (over and above the default risk proxied by the explanatory variables included in the loan spread specifications). In that case, lenders (and possibly stock investors) may simply be pricing the default risk of a firm and not necessarily its environmental concerns and strengths.

The ICC and loan spread regressions include many of the covariates that proxy for the firm's default risk, such as its size and leverage. Still, there may be a concern that environmental concerns and strengths are proxying for an omitted component of the default risk of the firm. To rule out this alternate explanation, I rely on a direct model of bankruptcy prediction used widely in the default risk literature. If environmental concerns and strengths are simply proxying for the default risk of the firm, then we should observe a higher (lower) number of defaults among firms with environmental concerns (strengths). To test this, I run a hazard model for bankruptcy prediction (Shumway (2001); Chava and Jarrow (2004); Chava, Stefanescu and Turnbull (2011)) using individual environmental concerns and strengths as an additional covariate.

I estimate a Cox proportional hazard model with the dependent variable *bankruptcy* set to one if the firm has filed bankruptcy[8], and zero otherwise. There is one observation per firm per year with the latest available accounting and market data. The covariates are from Shumway (2001) and are shown to have both in-sample and out-of-sample explanatory power to predict bankruptcy. They include net income to total assets (*nita*), total liabilities to total assets (*tlta*), equity volatility over the past 12 months (*sigma*), excess return over the market index (*exret*), and size relative to the market defined as the market capitalization of the firm divided by the total market capitalization of all

[8]Bankruptcies include both Chapter 7 and Chapter 11 bankruptcies during 1992–2007. Bankruptcy data are from Chava and Jarrow (2004) and Chava, Stefanescu, and Turnbull (2011). The bankruptcy sample is comprehensive and includes the majority of bankruptcies among publicly listed firms during 1992-2007.

AMEX/NYSE/NASDAQ stocks (*relsize*).

The results documented in Models 2, 5, 6, and 7 of Table IX demonstrate that there is no significant relation between environmental concerns and the likelihood of bankruptcy filing. If individual environmental concerns are simply proxying for the omitted default risk of the firm, then there should be a significant positive coefficient for the environmental concern variable. However, the coefficient of all the individual environmental concerns variables are highly insignificant and in two out of three cases are in the opposite direction.

In a similar vein, it may be that firms with environmental strengths have a lower default risk, which explains the significantly lower spreads charged to firms that derive significant revenue from environmentally beneficial products (*benproduct*). The results in Model 8 show that this is not the case. Firms with *benproduct* environmental strength are not less likely to file bankruptcy. In fact, the coefficient is positive but not statistically significant. Interestingly, the results in Models 3, 10, and 11 show that firms with *polprevent* and *cleanenergy* are more likely to file for bankruptcy, but the results from Table VIII indicate that banks do not charge a higher spread on the loans to these firms.[9]

The results are qualitatively similar if I use a simple logistic model instead of the Cox proportional hazards model employed in the analysis. I chose to report Cox models because they take the time at risk into consideration and are statistically superior for bankruptcy prediction (Shumway (2001); Chava and Jarrow (2004)). In unreported results, I estimated a model with frailty at the industry level (Chava, Stefanescu, and Turnbull (2011); Duffie, Eckner, Horel, and Saita (2009)). The results are qualitatively similar.

It is difficult to conclusively rule out the alternate explanation that an omitted, possibly unobserved component of a firm's risk is driving the observed relation between a firm's environmental profile and the cost of its debt and equity capital. A conservative interpretation of the bankruptcy results documented in Table IX is that default risk is

[9]I remove Enron from the sample as it is clearly an accounting fraud case but including it does not change the statistical significance of any of the results

not exclusively driving the observed positive (negative) relation between the environmental concerns (strengths) of a firm and its cost of equity and debt capital. Investors and lenders seem to be concerned about the environmental profile of a firm independent of its default risk.

IV. Discussion: Why Does the Environmental Profile of a Firm Matter for Its Cost of Capital?

So far I have documented that investors demand a higher expected return on the equity of firms with environmental concerns and similarly lenders charge a higher interest rate on the bank loans issued to firms with such environmental concerns. In this section, I try to address why stock investors and lenders could take the environmental profile of the firm into account.

A. Why Do Investors Expect Higher Stock Returns From Firms With Environmental Concerns?

The results documented in Tables III, V and VII show that there is a strong positive relation between expected returns and environmental concern measures, but there seems to be no statistically significant relation between expected returns and environmental strengths (except clean energy without industry fixed effects). 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 riskier than 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 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 had no effect on the results. I also included proxies for default risk such as size, leverage, and volatilty (Shumway (2001); Chava and Jarrow (2004)). In addition, in the previous section, I present evidence that alleviates the concern that a firm's environmental profile is proxying for an omitted component of its default risk.

Another distinct possibility is that, as publicized, 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 them, SRI can then impact the stock price and expected returns (Merton (1987); Heinkel, Kraus, and Zechner (2001)). I present some evidence that is consistent with this hypothesis in Tables X and XI.

Institutional Ownership and Number of Institutional Owners

To understand whether SRI is the driver behind the observed positive relation between environmental concerns and expected stock returns, I analyze the relation between total institutional ownership in a firm and its firm's environmental profile in Table X. The key dependent variable is the total institutional ownership in the firm's stock, expressed as a percentage of the firm's shares outstanding.[10] The data source for the institutional ownership is Thomson's 13-F data. I closely follow Hong and Kacperczyk (2009) for the regression specifications. In the interest of space, I present only the coefficients of individual environmental concerns and strengths but all the regressions include firm market capitalization, market to book ratio, stock beta, the inverse of stock price, the mean monthly return of the firm's stock 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).

Panel A of Table X relates aggregate measures of environmental concerns with total institutional ownership. As before, I present results with and without industry fixed

[10]I also considered whether the institutional ownership patterns are different for different types of institutions such as banks, insurance companies and, mutual funds etc., I did not present these results, however, since 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.

effects. The results show that firms with higher *netconcerns* and higher *numconcern* have lower institutional ownership. These results are consistent with institutional investors screening stocks based on environmental concerns and consequently a higher cost of equity capital for the excluded stocks. Interestingly, the coefficient estimates for *numstrength* and *climscore* reveal that institutional investors hold fewer stocks of firms with environmental strengths. The results in Panel C show that this is mainly due to the lower institutional holdings in firms with *cleanenergy* and *envomm* environmental strengths.

In Panel B of Table X, I consider the relation between individual environmental concerns and total institutional ownership. The regression specification is the same as before. The results indicate that firms with environmental concerns, such as hazardous waste concerns, substantial emission concerns, and climate change concerns, have significantly lower institutional ownership compared to firms without such concerns. Interestingly, a firm that has concerns on all these environmental dimensions has approximately 14% to 15% lower institutional ownership, roughly in line with the percentage of dollars invested in SRI. The results in Panel C of Table X 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 Table XI, I consider the natural logarithm of the 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 fewer institutional owners compared to firms that do not have these environmental concerns.

These institutional ownership and holdings results in Tables X and Table XI provide some positive evidence that exclusionary SRI can impact the expected stock returns of excluded firms, consistent with the results presented in Tables III, V, and VII. 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 the higher ICC for firms with environmental concerns.

B. Why Do Lenders Charge Higher Interest Rates on Loans Issued to Firms With Environmental Concerns?

The results in Tables IV, VI, and VIII show that firms that have environmental concerns are charged a higher loan interest rate and firms with environmental strengths are charged a lower interest rate. Lenders seem to price all the environmental concerns variables including toxic emissions, hazardous waste, and climate change concerns. In contrast, lenders charge lower loan spreads only to firms that derive substantial revenues from environmentally beneficial products but do not seem to price the pollution prevention, clean energy, and environmental communication strengths of a firm.

Why would lenders care about the environmental concerns and strengths of a borrower? A non-exhaustive list of reasons why lenders may consider the environmental concerns of the borrower in their lending decisions include: higher credit risk (through the potential for adverse impact of current or future regulation and increased scrutiny from regulators on the borrowers, litigation risk and compliance costs for the borrowers due to environmental concerns); [11] and, more directly for the lender, reputation risk arising from lending to environmentally damaging firms; and finally, lender liability laws. The results presented in Table IX should alleviate the concern that higher default risk is exclusively driving the observed relation between bank loan spreads and the environmental profile of a firm.

[11] For example, see Taillard (2010) for the impact of asbestos litigation and Gormley and Matsa (2010) for corporate responses to liability risk arising from its workers exposure to newly identified carcinogens.

Lender Liability Laws

Lenders are potentially liable for *environmental damage* caused by borrowers under the terms of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and its Superfund Amendments. Other relevant laws include the Resource Conservation and Recovery Act, the Clean Water Act, the Clean Air Act [12] and the Toxic Substance Control Act. Under these federal laws, current and past owners of contaminated property or of businesses located on contaminated property, and those who dispose or transport hazardous substances are potentially liable for any clean up costs associated with the environmental damage. A lender could be potentially liable for clean up of hazardous waste spilled by a borrower if the lender is significantly involved in the borrowers decision making (e.g., see United States v. Fleet Factor Corp and United States vs Maryland Bank & Trust Co.). CERCLA does provide a secured creditor exemption from liability for banks and other lenders that do not participate in the management of the property. Several court decisions had significantly limited the scope of the secured lender exemption under CERCLA and consequently Section 2502 of The Asset Conservation, Lender Liability, and Deposit Insurance Protection Act of 1996 clarified the liability of lenders (`http://www.epa.gov/brownfields/laws/lendliab.htm`) but the banks may still be liable under the state environmental laws exposing the banks to risk of environmental litigation.

Recognizing the environmental risks faced by lenders, the Federal Deposit Insurance Corporation (FDIC) has issued guidelines to federally supervised depositary institutions to develop an *environmental risk assessment program.* FDIC suggests that as part of the institution's overall decision-making process, the environmental risk program should establish procedures for identifying and evaluating potential environmental concerns as-

[12] For example, recently the EPA announced that it had reached preliminary findings that six greenhouse gasses endangered public welfare and that motor vehicles contribute to the environmental levels of four of these. The decision was required by the Clean Air Act, as interpreted by the US Supreme Court

sociated with lending practices and other actions relating to real property. [13]

Reputation Risk to Lenders

Another distinct possibility is that lenders will face a reputation risk as a result of lending to environmentally damaging projects. Lenders may partly be influenced by the bad publicity and social attitudes that are increasingly critical of the polluting firms. There are a number of anecdotes about how banks are becoming more environmentally sensitive.[14] Examples inlcude Bank of America's withdrawal from mountain top removal, banks reluctance to financing tar sands and HSBC as well as Rabobank curtailing their relation with environmentally damaging firms (NYT, Aug 31, 2010).

Consequently, if a significant number of lenders concerned about social responsibility (similar to SRI) or litigation risk or reputation risk abstain from lending to firms with environmental concerns or price the litigation and reputation risk they may be exposed to, the potential effects on the affected firm's cost of debt capital would be similar to the increase in the cost of equity capital due to exclusionary green investing in the stock market (See Heinkel, Kraus, and Zechner (2001)). However, the impact of a firm's environmental profile on its bank loan spreads could be muted if the bank loan markets are not transparent and the identity of lenders of polluting firms cannot be easily identified or the lenders are not concerned about litigation risk stemming from lending to firms

[13] FDIC further suggests "...that as part of Environmental Risk Analysis, prior to making a loan, an initial environmental risk analysis needs to be conducted during the application process. An appropriate analysis may allow the institution to avoid loans that result in substantial losses or liability and provide the institution with information to minimize potential environmental liability on loans that are made. ...In addition, the loan application might be designed to request relevant environmental information, such as the present and past uses of the property and the occurrence of any contacts by federal, state or local governmental agencies about environmental matters. The loan officer or other representative of an institution might visit the site to evaluate whether there is obvious visual evidence of environmental concerns..."

[14] Rainforest Action Network (RAN), an environmental action group, has persuaded supporters to cut up their Citigroup credit cards and mail them back to the company, and pressured college students not to sign up for the cards at all. Last winter, it even hung a large banner across from Citigroup's headquarters accusing it of "banking on" global warming and forest destruction. Citigroup opened a dialogue with the group prior to its 2003 annual meeting, where RAN was scheduled to introduce shareholder proposals related to environmental policies. (Wall Street Journal, June 4, 2003). On the same lines, RAN kept the pressure on banks financing mountain top removal coal mining and tar sand exploration.

with environmental concerns.

Loan Syndicate Structure

In parallel with the institutional ownership analysis, I analyze whether fewer lenders participate in the loan syndicate of firms with environmental concerns. I present the results of the loan syndicate analysis in Table XII. The dependent variable is the natural logarithm of the number of lenders in the loan syndicate (see Ivashina (2009) for a detailed analysis of loan syndicates in bank loans). The regressions include all the control variables used in the loan spread regressions and year fixed effects. As before, I present results with and without industry fixed effects. I present results with summary environmental profile variables in Panel A of Table XII, with individual environmental concerns in Panel B and with individual environmental strengths variables in Panel C.

The results presented in Models 1 and 2 of Panel A of Table XII show that firms with net environmental concerns have a significantly lower loan syndicate size. This seems to be mainly due to the fact that firms with higher environmental concerns have a significantly lower syndicate size compared to firms without such environmental concerns (Models 3 and 4). The results are also economically significant. A firm with environmental concerns on all four dimensions considered has an approximately 18% lower syndicate size (or two fewer lenders) compared to a firm with no environmental concerns. Other models in Panel A show that there is no statistically significant relation between the number of environmental strengths and the syndicate size. Lenders do not seem to be flocking to firms with environmental strengths. There is also no meaningful relation between lending syndicate size and the climate score of a firm.

Panel B (Panel C) of Table XII explore the relation between individual environmental concerns (environmental strengths) and syndicate size. The coefficient estimate for all the environmental concern variables is negative but, only *subemissions* has a statistically significant relation with syndicate size. Fewer lenders (18% less, or two fewer lenders) participate in the loan syndicate of firms with substantial emissions concerns. Of the individual environmental strengths, only *benproduct* has a marginally significant relation with lending syndicate size. The coefficient on *envomm* is negative and marginally significant. Overall, these results are consistent with the bank loan pricing results presented earlier and suggest that some lenders could be avoiding lending to firms with environmental concerns due to either social responsibility considerations, lender liability laws, or reputation risk.

V. Conclusion

I provide evidence that the environmental profile of a firm has a significant effect on its cost of capital. In particular, both stock investors and private lenders, seem to take into account the environmental concerns of a firm, leading to a higher cost of equity and debt capital for the firm. Notably, firms with climate change concerns have a significantly higher cost of equity and debt capital, indicating that even though green house gas emissions are not currently regulated, investors do seem to take these issues into consideration. On the other hand, in general, the cost of equity and debt capital are not lower for firms with environmental strengths. But lenders charge lower interest rates on bank loans to firms that derive significant revenue from environmentally beneficial products.

Further exploration reveals that the environmental profile of a firm is not simply proxying for some omitted firm-level default risk. It is a challenging task to conclusively rule out the risk story, but I provide evidence that the observed positive relation between expected stock returns (spread on the bank loans) and a firm's environmental concerns is partly driven by socially responsible investors (environmentally sensitive lenders) screening out stocks with environmental concerns. The results suggest that exclusionary SRI and environmentally sensitive lending, through the higher cost of capital channel, have the potential to prompt firms to internalize their environmental externalities.

Appendix 1: Computing the ICC

I compute the ICC using the discounted cash flow model of equity valuation. I closely follow Gebhardt, Lee, and Swaminathan (2001), Pastor, Sinha, and Swaminathan (2008) and Chava and Purnanandam (2010) to compute the ICC. Below, I reproduce the methodology from these papers for the sake of completeness. 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. I 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, I 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 I am 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: $TV_{i,t+T} = \frac{FE_{i,t+T+1}}{r_{i,e}}$. Collecting all the terms, I get the following equation that I solve for $r_{i,e}$ to get the ICC:

$$P_{i,t} = \sum_{k=1}^{k=T} \frac{FE_{i,t+k} * (1 - b_{i,t+k})}{(1 + r_{i,e})^k} + \frac{FE_{i,t+T+1}}{r_{i,e}(1 + r_{i,e}^T)}. \tag{7}$$

Appendix 2: Variable Definitions

Appendix 2A: Environmental Profile

Summary Measures of Environmental Concerns and Strengths

- *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*).

Individual Environmental Concerns Variables

- *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.

Individual Environmental Strength Variables

- *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.

Appendix 2B: Definitons of variables used in the ICC analysis

- *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.

- *lever* 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.

Appendix 2C: Definitons of variables used in the bank loan spread analysis

Loan Level Variables

- *aisd* is the all-in-drawn spread on the bank loan measured over the LIBOR.

- *loansize* is the amount of the loan in millions of USD.

- *loanmat* indicates the maturity of the loan in months.

- *perfprice* is a dummy variable that takes the value of one if the loan has a performance pricing feature and zero other wise.

- *termloan* is a dummy variable that takes the value of one if the loan is a term loan and zero otherwise.

Macro Variables

- *termspread* constructed as the difference in yields between 10 year and 1 year treasury notes
- *creditspread* is the difference in yields between BAA and AAA corporate bonds.

Firm Characteristics

- *assets* refers to the total book assets of the firm in billions of USD in the month before the loan.
- *logasset* refers to the natural logarithm of total book assets of the firm in billions of USD.
- $opincbefdep\_a$ is the ratio of operating income before depreciation to the total assets of the firm.
- *lever* 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.
- *modzscore* is the modified z-score based on Graham et al (1998).
- *unrated* is a dummy variable that takes the value of one if the firm does not have a public debt rating and zero otherwise.
- *invgrade* is a dummy variable that takes the value of one if the firm has public debt rated investment grade from Standard & Poor's and zero otherwise.

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Table I. ICC Analysis: Descriptive Statistics

The following table presents descriptive statistics for the variables used in the ICC analysis. Panel A presents the industry (based on Fama-French 12 industry codes) distribution of firms in the intersection of CRSP, COMPUSTAT, KLD and IBES used in the implied cost of capital analysis. Panel B gives the year-by-year break-down of firms in sample by various environmental concerns and strengths. In the second to fifth column of Panel B, I present the average value of the environmental indices (*netconcerns*, *numconcern*, *numstrength* and *climscore*) for each year. For each of the individual environmental concerns (*hazardwaste*, *subemissions* and *climchange*) and environmental strengths (*benproduct*, *polprevent*, *cleanenergy* and *envcomm*), I present the number of observations in the sample for which that particular environmental concern or strength has a value of one. I present descriptive statistics for the entire sample period (1992-2007) in second part of the panel. In the first row I present the mean value of the index for the sample period. In the second row I present the number of observations that have a value of one during 1992–2007. In the third row I give the number of unique firms for which that particular environmental concern or strength has a value of one during the sample period. The last row has the number of non-missing observations for each environmenal concern or strength. I provide the distribution of consensus analysts' forecasts and the distribution of the ICC measure along with descriptive statistics of firm level control variables in Panel C. $EPS1$ and $EPS2$ measure the one- and two-year- ahead earnings per share forecasts, respectively. LTG measures the long-term growth rate forecast. r_e denotes ICC computed according to Gebhardt, Lee and Swaminathan (2001) procedure detailed in the Appendix 1 and $r_e - r_f$ denotes expected excess return on the stock after subtracting the risk-free rate based on one year treasury yield from ICC. *assets* measures the total book assets of the firm in billions of USD, *lever* 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, *mtb* is the market-to-book ratio of the firm, *stdret* is the standard deviation of firm's daily stock returns over the past year and $ret_{t-1,t}$ represents the firm's past one month stock return. The definitions of environmental profile variables are given in Appendix 2.

Panel A: Fama-French 12 Industry Distribution of the Sample

Fama-French 12 Industry	Number	Percent
Consumer Nondurables	1004	7.7
Consumer Durables	481	3.7
Manufacturing	2096	16
Energy	689	5.3
Chemicals	525	4
Business Equipment	2488	19
Telephone and Television Transmission	408	3.1
Utilities	909	6.9
Wholesale, Retail, and Some Services	1813	13.8
Healthcare, Medical Equipment, and Drugs	1111	8.5
Other Industries	1590	12.1
Total	13114	100

Table I. ICC Analysis: Descriptive Statistics Contd.,

Panel B: Year by Year Break down of Environmental Profile of the Firm

year	net concerns	num concern	num strength	clim score	hazard waste	sub emissions	clim change	ben product	pol prevent	clean energy	env comm
1992	0.17	0.44	0.27	.	62	51	.	15	31	41	.
1993	0.26	0.51	0.26	.	81	56	.	16	28	39	.
1994	0.26	0.55	0.29	.	88	52	.	15	30	42	.
1995	0.29	0.60	0.31	.	93	41	.	26	21	40	.
1996	0.21	0.54	0.33	.	98	29	.	24	26	42	.
1997	0.16	0.50	0.34	.	84	38	.	25	34	41	13
1998	0.17	0.51	0.34	.	81	37	.	28	38	42	26
1999	0.19	0.50	0.31	.	86	40	.	25	37	4	33
2000	0.26	0.55	0.29	0.02	81	32	44	23	33	36	28
2001	0.25	0.52	0.27	0.02	74	33	46	26	24	38	25
2002	0.26	0.45	0.19	0.02	83	80	68	33	19	54	24
2003	0.20	0.40	0.19	0.03	74	56	65	34	31	46	23
2004	0.12	0.21	0.09	0.02	83	61	93	37	30	59	27
2005	0.17	0.24	0.07	0.03	89	108	102	37	26	43	28
2006	0.14	0.27	0.13	0.04	92	93	117	51	29	51	67
2007	0.13	0.29	0.16	0.03	89	130	117	52	30	69	72
Desc. Stats for the Full Sample Period 1992–2007											
Mean	0.18	0.37	0.19	0.03							
Obs coded 1					1338	937	652	467	467	723	366
Unique firms coded 1					215	243	165	98	109	168	109
Total nonmissing obs					13114	13114	9413	13114	13114	13114	10783

Table I. ICC Analysis: Descriptive Statistics Contd.,

Panel C: Desc. Stats for the Firm Level Variables

Variable	Mean	Median	Std. Dev.
Inputs for expected return computation			
EPS1	1.90	1.58	2.20
EPS2	2.25	1.86	2.25
LTG	0.15	0.14	0.10
Measures of Expected Return			
r_e	8.23	7.92	2.61
$r_e - r_f$	4.18	3.91	2.87
Firm-Level Characteristics			
assets (billions $US)	6.05	1.85	12.06
lever	0.22	0.22	0.17
mtb	2.15	1.69	1.37
$ret_{t-1,t}$	0.0051	0.0033	0.0964
stdret	0.0963	0.0856	0.0475

Table II. Bank Loan Spread Analysis: Descriptive Statistics

The following table presents descriptive statistics for the variables used in the bank loan spread analysis. Panel A presents the industry (based on Fama-French 12 industry codes) distribution of firms in the intersection of CRSP, COMPUSTAT, KLD and Dealscan used in the bank loan spread analysis. Panel B gives the year by year break down of firms in sample by various environmental concerns and strengths. In the second to fifth column of Panel B, I present the average value of the environmental indices (*netconcerns*, *numconcern*, *numstrength* and *climscore*) for each year. For each of the individual environmental concerns (*hazardwaste*, *subemissions* and *climchange*) and environmental strengths (*benproduct*, *polprevent*, *cleanenergy* and *envcomm*), I present the number of observations in the sample for which that particular environmental concern or strength has a value of one. I present descriptive statistics for the entire sample period (1992-2007) in second part of the panel. In the first row I present the mean value of the index for the sample period. In the second row I present the number of observations that have a value of one during 1992–2007. In the third row I give the number of unique firms for which that particular environmental concern or strength has a value of one during the sample period. The last row has the number of non-missing observations for each environmental concern or strength. In Panel C, I provide the descriptive statistics for loan features and firm level control variables used in the analysis. Variable definitions are given in Appendix 2.

Panel A: Fama-French 12 Industry Distribution of the Sample

Fama-French 12 Industry	Number	Percent
Consumer Nondurables	551	9.4
Consumer Durables	183	3.1
Manufacturing	963	16.4
Energy	375	6.4
Chemicals	274	4.7
Business Equipment	570	9.7
Telephone and Television Transmission	233	4
Utilities	665	11.3
Wholesale, Retail, and Some Services	914	15.5
Healthcare, Medical Equipment, and Drugs	454	7.7
Other Industries	697	11.9
Total	5879	100

Table II. Bank Loan Spread Analysis: Descriptive Statistics Contd.,

Panel B: Year by Year Break down of Environmental Profile of the Firm

year	net concerns	num concern	num strength	clim score	hazard waste	sub emissions	clim change	ben product	pol prevent	clean energy	env comm
1992	0.35	0.57	0.22	.	14	15	.	.	5	9	.
1993	0.41	0.66	0.24	.	31	14	.	2	4	11	.
1994	0.41	0.72	0.31	.	47	21	.	3	12	16	.
1995	0.22	0.59	0.38	.	29	6	.	3	2	30	.
1996	0.26	0.59	0.33	.	36	11	.	5	8	21	.
1997	0.26	0.61	0.35	.	42	20	.	8	14	31	9
1998	0.20	0.54	0.34	.	35	12	.	10	11	22	6
1999	0.28	0.56	0.28	.	44	19	.	8	11	23	6
2000	0.38	0.68	0.30	0.04	60	21	48	7	18	37	16
2001	0.33	0.65	0.31	0.05	79	28	49	21	25	33	12
2002	0.45	0.71	0.27	0.03	78	80	77	14	21	63	25
2003	0.42	0.68	0.26	0.05	74	59	70	14	26	48	14
2004	0.25	0.40	0.15	0.05	78	69	85	29	25	46	15
2005	0.27	0.38	0.11	0.05	71	90	68	27	23	30	11
2006	0.28	0.42	0.14	0.08	58	55	83	17	11	23	34
2007	0.17	0.40	0.23	0.02	43	72	50	29	9	38	35
Desc. Stats for the Full Sample Period 1992–2007											
Mean	0.29	0.52	0.22	0.05	819	592	530	197	225	481	183
Obs coded 1					819	592	530	197	225	481	183
Unique firms coded 1					154	164	119	61	69	116	68
Total nonmissing obs					5879	5879	4602	5879	5879	5879	5186

Table II. Bank Loan Spread Analysis: Descriptive Statistics Contd.,

Panel C: Desc. Stats for Loan and Firm Level Variables

Variable	mean	median	std. dev.
Loan Characteristics			
aisd (*bps* over LIBOR)	125.05	87.50	113.03
loansize (millions $US)	568.46	300.00	739.84
loanmat (months)	44.53	59.00	23.90
perfprice	0.51	1.00	0.50
termloan	0.19	0.00	0.39
Firm-Level Characteristics			
assets (billions $US)	7.83	2.98	12.12
opincbefdep_a	0.04	0.04	0.02
lever	0.29	0.28	0.17
modzscore	0.76	0.76	0.66
unrated	0.26	0.00	0.44
invgrade	0.50	1.00	0.50
Macro Variables			
cspread (*bps*)	0.87	0.83	0.19
tspread (*bps*)	1.29	1.00	1.18

Table III. 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 includes firms in the intersection of CRSP, COMPUSTAT, KLD and IBES during 1992-2007. Appendix 1 contains the details of the ICC construction. Variable definitions are given in Appendix 2. Robust t-statistics adjusted for firm level clustering are presented in the parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
netconcerns	0.1726	0.1298						
	[4.47]	[3.77]						
numconcern			0.1762	0.1465				
			[3.95]	[3.81]				
numstrength					-0.0598	-0.0421		
					[-0.93]	[-0.72]		
climscore							0.4804	0.2462
							[4.04]	[2.17]
logta	-0.1549	-0.1519	-0.1207	-0.1310	-0.1665	-0.1632	-0.1585	-0.1581
	[-5.30]	[-5.75]	[-4.20]	[-5.02]	[-5.33]	[-5.97]	[-5.48]	[-5.56]
mtb	-0.1716	-0.0926	-0.1778	-0.0955	-0.1695	-0.0909	-0.1901	-0.0896
	[-7.27]	[-4.24]	[-7.47]	[-4.34]	[-7.16]	[-4.15]	[-7.53]	[-3.58]
lever	0.7323	0.8641	0.7234	0.8515	0.7266	0.8738	1.0200	0.9844
	[3.20]	[3.94]	[3.14]	[3.88]	[3.18]	[3.99]	[4.02]	[4.00]
stdret	2.2680	2.6068	2.3215	2.7278	2.3795	2.6345	2.2757	2.7954
	[2.86]	[3.31]	[2.91]	[3.45]	[3.01]	[3.34]	[2.48]	[3.11]
$ret_{t-1,t}$	-4.7689	-5.1404	-4.7607	-5.1374	-4.7683	-5.1397	-4.4848	-4.9650
	[-15.77]	[-16.19]	[-15.70]	[-16.17]	[-15.76]	[-16.19]	[-12.18]	[-13.02]
R^2	0.220	0.364	0.217	0.363	0.219	0.364	0.191	0.330
N	13114	13114	13114	13114	13114	13114	9413	9413
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 IV. Impact of Environmental Concerns and Strength Indices on Bank Loan Spreads

The following table presents regression results relating bank loan spreads and aggregate environmental concerns and strength variables. The dependent variable is the log of all-in-drawn spread on the loan. The sample includes firms in the intersection of CRSP, COMPUSTAT, KLD and Dealscan during 1992-2007. Variable definitions are given in Appendix 2. loan level controls include: *loan purpose indicators*, *maturity*, *perfprice* and *termloan*. macro controls include: *termspread* and *creditspread*. t-statistics are given in parentheses below the estimates and are adjusted for firm level clustering.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
netconcerns	0.0502	0.0535						
	[3.24]	[3.01]						
numconcern			0.0518	0.0606				
			[3.05]	[3.07]				
numstrength					-0.0360	-0.0448		
					[-1.06]	[-1.31]		
climscore							0.0503	0.0276
							[1.28]	[0.62]
logasset	-0.1890	-0.1992	-0.1926	-0.2043	-0.1748	-0.1860	-0.1697	-0.1821
	[-11.69]	[-11.79]	[-11.95]	[-11.97]	[-11.61]	[-11.47]	[-9.85]	[-10.06]
opincbefdep_a	-6.5311	-6.5168	-6.5069	-6.5095	-6.6436	-6.6066	-6.5271	-6.3171
	[-10.01]	[-10.70]	[-9.93]	[-10.65]	[-10.21]	[-10.78]	[-9.66]	[-10.04]
lever	0.4901	0.5177	0.4872	0.5198	0.4892	0.5157	0.3788	0.4258
	[4.39]	[4.71]	[4.39]	[4.70]	[4.36]	[4.68]	[3.33]	[3.78]
modzscore	-0.2086	-0.1707	-0.2075	-0.1694	-0.2158	-0.1739	-0.2330	-0.1804
	[-7.67]	[-5.81]	[-7.61]	[-5.75]	[-7.85]	[-5.92]	[-8.27]	[-6.04]
unrated	-0.2178	-0.2462	-0.2197	-0.2488	-0.2084	-0.2355	-0.1745	-0.2118
	[-4.94]	[-5.68]	[-4.97]	[-5.73]	[-4.71]	[-5.41]	[-3.87]	[-4.59]
invgrade	-0.6684	-0.6737	-0.6719	-0.6756	-0.6618	-0.6739	-0.6554	-0.6742
	[-14.50]	[-15.43]	[-14.55]	[-15.53]	[-14.10]	[-15.41]	[-13.64]	[-13.94]
R^2	0.632	0.719	0.632	0.718	0.630	0.717	0.610	0.690
N	5879	5879	5879	5879	5879	5879	4602	4602
industry fixed effects	no	yes	no	yes	no	yes	no	yes
loan level controls	yes	yes	yes	yes	yes	yes	yes	yes
macro variables	yes	yes	yes	yes	yes	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table V. Impact of Environmental Concerns on Expected Stock Returns

This table presents regression results analyzing the impact of individual 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 includes firms in the intersection of CRSP, COMPUSTAT, KLD and IBES during 1992-2007. Appendix 1 contains the details of the ICC construction. Variable definitions are given in Appendix 2. Robust t-statistics adjusted for firm level clustering are presented in the parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	0.2673	0.2338				
	[2.30]	[2.38]				
subemissions			0.2922	0.1801		
			[2.35]	[1.72]		
climchange					0.6879	0.4777
					[4.34]	[2.75]
logta	-0.1439	-0.1486	-0.1400	-0.1424	-0.1743	-0.1657
	[-4.77]	[-5.55]	[-4.75]	[-5.34]	[-5.97]	[-5.82]
mtb	-0.1734	-0.0929	-0.1751	-0.0944	-0.1847	-0.0898
	[-7.30]	[-4.23]	[-7.38]	[-4.30]	[-7.32]	[-3.58]
lever	0.7353	0.8685	0.7251	0.8608	0.9722	0.9830
	[3.21]	[3.96]	[3.16]	[3.92]	[3.82]	[4.00]
stdret	2.3538	2.6899	2.3475	2.7026	2.4085	2.7696
	[2.96]	[3.41]	[2.95]	[3.41]	[2.64]	[3.09]
$ret_{t-1,t}$	-4.7585	-5.1414	-4.7596	-5.1332	-4.5042	-4.9743
	[-15.71]	[-16.19]	[-15.71]	[-16.15]	[-12.24]	[-13.05]
R^2	0.218	0.363	0.218	0.363	0.191	0.331
N	13114	13114	13114	13114	9413	9413
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 VI. Impact of Individual Environmental Concerns on Bank Loan Spreads

The following table presents regression results relating bank loan spreads and individual environmental concern variables. The dependent variable is the log of all-in-drawn spread on the loan. The sample includes firms in the intersection of CRSP, COMPUSTAT, KLD and Dealscan during 1992-2007. Variable definitions are given in Appendix 2. loan level controls include: *loan purpose indicators*, *maturity*, *perfprice* and *termloan*. *macro controls* include: *termspread* and *creditspread*. *t*-statistics are given in parentheses below the estimates and are adjusted for firm level clustering.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
hazardwaste	0.1229	0.1332				
	[2.74]	[2.76]				
subemissions			0.0904	0.1174		
			[1.90]	[2.36]		
climchange					0.1492	0.0293
					[3.03]	[0.45]
logasset	-0.1871	-0.1985	-0.1835	-0.1971	-0.1756	-0.1824
	[-11.56]	[-11.74]	[-11.74]	[-11.88]	[-10.17]	[-10.07]
opincbefdep_a	-6.5729	-6.5621	-6.5688	-6.5671	-6.4679	-6.3199
	[-10.06]	[-10.71]	[-10.03]	[-10.64]	[-9.65]	[-10.04]
lever	0.4990	0.5259	0.4895	0.5257	0.3604	0.4266
	[4.48]	[4.78]	[4.40]	[4.76]	[3.18]	[3.78]
modzscore	-0.2079	-0.1683	-0.2131	-0.1704	-0.2244	-0.1800
	[-7.65]	[-5.72]	[-7.77]	[-5.77]	[-8.00]	[-6.02]
unrated	-0.2157	-0.2435	-0.2129	-0.2425	-0.1843	-0.2121
	[-4.88]	[-5.59]	[-4.81]	[-5.57]	[-4.12]	[-4.60]
invgrade	-0.6720	-0.6771	-0.6661	-0.6739	-0.6633	-0.6749
	[-14.45]	[-15.56]	[-14.39]	[-15.46]	[-13.77]	[-14.02]
R^2	0.631	0.718	0.630	0.717	0.612	0.690
N	5879	5879	5879	5879	4602	4602
industry fixed effects	no	yes	no	yes	no	yes
loan level controls	yes	yes	yes	yes	yes	yes
macro variables	yes	yes	yes	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm

Table VII. 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 includes firms in the intersection of CRSP, COMPUSTAT, KLD and IBES during 1992-2007. Appendix 1 contains the details of the ICC construction. Variable definitions are given in Appendix 2. Robust t-statistics adjusted for firm level clustering are presented in the parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
benproduct	-0.2269	-0.2550						
	[-1.33]	[-1.41]						
polprevent			0.2348	0.0956				
			[2.11]	[0.87]				
cleanenergy					-0.4082	-0.0668		
					[-3.22]	[-0.54]		
envcomm							0.2320	0.2098
							[1.23]	[1.31]
logta	-0.1256	-0.1351	-0.1303	-0.1360	-0.1192	-0.1329	-0.1658	-0.1736
	[-4.50]	[-5.24]	[-4.56]	[-5.20]	[-4.26]	[-5.15]	[-5.72]	[-6.21]
mtb	-0.1782	-0.0972	-0.1775	-0.0950	-0.1812	-0.0952	-0.2029	-0.1004
	[-7.50]	[-4.44]	[-7.45]	[-4.32]	[-7.59]	[-4.33]	[-8.57]	[-4.30]
lever	0.7192	0.8531	0.7364	0.8587	0.7696	0.8548	0.9550	0.9854
	[3.13]	[3.89]	[3.20]	[3.91]	[3.33]	[3.89]	[3.93]	[4.19]
stdret	2.3028	2.6605	2.3654	2.7459	2.2021	2.7391	2.3194	2.6615
	[2.88]	[3.37]	[2.97]	[3.47]	[2.75]	[3.46]	[2.73]	[3.15]
$ret_{t-1,t}$	-4.7550	-5.1335	-4.7514	-5.1339	-4.7588	-5.1368	-4.7315	-5.1247
	[-15.69]	[-16.17]	[-15.67]	[-16.16]	[-15.69]	[-16.17]	[-14.19]	[-14.71]
R^2	0.218	0.363	0.218	0.363	0.218	0.363	0.222	0.360
N	13114	13114	13114	13114	13114	13114	10783	10783
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 VIII. Impact of the Individual Environmental Strengths on Bank Loan Spreads

The following table presents regression results relating bank loan spreads and individual environmental strengths of a firm. The dependent variable is the log of all-in-drawn spread on the loan. The sample includes firms in the intersection of CRSP, COMPUSTAT, KLD and Dealscan during 1992-2007. Variable definitions are given in Appendix 2. loan level controls include: *loan purpose indicators*, *maturity*, *perfprice* and *termloan*, macro controls include: *termspread* and *creditspread*. t-statistics are given in parentheses below the estimates and are adjusted for firm level clustering.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
benproduct	-0.2090	-0.1617						
	[-3.33]	[-2.40]						
polprevent			-0.0984	-0.0597				
			[-1.28]	[-0.69]				
cleanenergy					0.0606	-0.0725		
					[1.01]	[-1.08]		
envcomm							-0.0646	-0.0015
							[-0.85]	[-0.02]
logasset	-0.1779	-0.1892	-0.1786	-0.1880	-0.1753	-0.1871	-0.1696	-0.1852
	[-11.64]	[-11.58]	[-11.77]	[-11.52]	[-11.53]	[-11.64]	[-10.78]	[-10.85]
opincbefdep_a	-6.6751	-6.6202	-6.6025	-6.6165	-6.6171	-6.6040	-6.9946	-6.7479
	[-10.26]	[-10.79]	[-10.15]	[-10.77]	[-10.21]	[-10.78]	[-10.43]	[-10.81]
lever	0.4820	0.5221	0.4820	0.5156	0.4832	0.5161	0.4855	0.5139
	[4.32]	[4.76]	[4.30]	[4.68]	[4.32]	[4.66]	[4.30]	[4.46]
modzscore	-0.2126	-0.1715	-0.2112	-0.1739	-0.2138	-0.1733	-0.2245	-0.1738
	[-7.75]	[-5.83]	[-7.71]	[-5.90]	[-7.76]	[-5.89]	[-8.07]	[-5.82]
unrated	-0.2106	-0.2347	-0.2142	-0.2354	-0.2102	-0.2355	-0.1739	-0.2159
	[-4.78]	[-5.41]	[-4.85]	[-5.39]	[-4.74]	[-5.40]	[-3.88]	[-4.79]
invgrade	-0.6642	-0.6757	-0.6686	-0.6740	-0.6630	-0.6746	-0.6506	-0.6674
	[-14.40]	[-15.56]	[-14.30]	[-15.40]	[-14.34]	[-15.48]	[-13.89]	[-14.42]
R^2	0.631	0.717	0.630	0.717	0.630	0.717	0.625	0.706
N	5879	5879	5879	5879	5879	5879	5186	5186
industry fixed effects	no	yes	no	yes	no	yes	no	yes
loan level controls	yes	yes	yes	yes	yes	yes	yes	yes
macro variables	yes	yes	yes	yes	yes	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table IX. Are Environmental Concerns and Strengths Proxying for an Omitted Component of a Firm's Default Risk?

The following table presents the results of a Cox proportional hazard regression relating bankruptcy likelihood to the environmental concern and strength variables during 1992-2007. The regressions also include the following covariates (estimates not presented) from Shumway (2001) model: $\frac{\text{netincome}}{\text{total assets}}$, $\frac{\text{total liabilities}}{\text{total assets}}$, log of market capitalization of the firm to the toal market capitalization of all NYSE, AMEX,NASDAQ stocks, idiosyncratic volatility of firm's stock returns over the past 12 months, excess return of the stock over the market. Environmental variable definitions are given in the Appendix 2. *t*-statistics are given in parentheses below the estimates and are adjusted for firm level clustering.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
netconcerns	-0.3068										
	[-1.31]										
numconcern		-0.1165									
		[-0.46]									
numstrength			0.4341								
			[1.76]								
climscore				-1.4313							
				[-2.73]							
hazardwaste					-0.5376						
					[-0.94]						
subemissions						0.3421					
						[0.60]					
climchange							-0.2387				
							[-0.28]				
benproduct								0.6108			
								[1.08]			
polprevent									0.4585		
									[0.70]		
cleanenergy										1.1633	
										[2.88]	
envcomm											1.0806
											[2.61]
R^2											
N	20149	20149	20149	15106	20149	20149	15106	20149	20149	20149	16984

Table X. Impact of Environmental Concerns and Strengths on Institutional Ownership

This table presents regression results analyzing the impact of a firm's environmental profile on its 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. The sample period is 1992-2007. 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 2. Robust t-statistics adjusted for firm level clustering are presented in the parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Panel A: Aggregate Measures of Environmental Concerns and Strengths								
netconcerns	-0.0114	-0.0059						
	[-3.16]	[-1.59]						
numconcern			-0.0232	-0.0143				
			[-5.98]	[-3.31]				
numstrength					-0.0281	-0.0157		
					[-4.44]	[-2.66]		
climscore							-0.0251	-0.0119
							[-1.90]	[-1.20]
R^2	0.223	0.342	0.225	0.343	0.229	0.344	0.126	0.239
N	12667	12667	12667	12667	12667	12667	8958	8958
Panel B: Individual Environmental Concerns								
hazardwaste	-0.0385	-0.0241						
	[-3.60]	[-2.16]						
subemissions			-0.0291	-0.0090				
			[-2.92]	[-0.94]				
climchange					-0.0932	-0.0392		
					[-6.53]	[-2.54]		
R^2	0.224	0.343	0.222	0.342	0.140	0.241		
N	12667	12667	12667	12667	8958	8958		
Panel C: Individual Environmental Strengths								
benproduct	0.0072	0.0016						
	[0.49]	[0.12]						
polprevent			0.0013	-0.0238				
			[0.11]	[-1.97]				
cleanenergy					-0.0909	-0.0193		
					[-6.15]	[-1.60]		
envcomm							-0.0340	-0.0250
							[-2.16]	[-1.78]
R^2	0.221	0.342	0.221	0.342	0.233	0.342	0.151	0.269
N	12667	12667	12667	12667	12667	12667	10332	10332
control variables	yes	yes	yes	yes	yes	yes	yes	yes
industry fixed effects	no	yes	no	yes	no	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table XI. Impact of Environmental Profile on Number of Institutional Owners

This table presents regression results analyzing the impact of a firm's environmental profile on its institutional ownership. The dependent variable is the log(number of institutional owners) in the firm computed from Thomson 13-F data at the end of each calendar year. The sample period is 1992-2007. 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 2. Robust t-statistics adjusted for firm level clustering are presented in the parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Panel A: Aggregate Measures of Environmental Concerns and Strengths								
netconcerns	-0.0151	-0.0184						
	[-4.22]	[-4.62]						
numconcern			-0.0122	-0.0201				
			[-2.82]	[-3.98]				
numstrength					0.0140	0.0074		
					[2.16]	[1.08]		
climscore							-0.0372	-0.0243
							[-3.21]	[-1.95]
R^2	0.915	0.924	0.915	0.923	0.915	0.924	0.909	0.917
N	12667	12667	12667	12667	12667	12667	8958	8958
Panel B: Individual Environmental Concerns								
hazardwaste	-0.0424	-0.0575						
	[-3.30]	[-4.12]						
subemissions			-0.0086	-0.0202				
			[-0.87]	[-1.94]				
climchange					-0.0380	-0.0223		
					[-2.57]	[-1.22]		
R^2	0.915	0.924	0.915	0.923	0.909	0.917		
N	12667	12667	12667	12667	8958	8958		
Panel C: Individual Environmental Strengths								
benproduct	0.0468	0.0331						
	[2.84]	[1.93]						
polprevent			0.0162	-0.0015				
			[1.13]	[-0.10]				
cleanenergy					0.0143	0.0282		
					[0.94]	[2.00]		
envcomm							-0.0242	-0.0381
							[-1.54]	[-2.67]
R^2	0.915	0.923	0.915	0.923	0.915	0.923	0.913	0.921
N	12667	12667	12667	12667	12667	12667	10332	10332
control variables	yes	yes	yes	yes	yes	yes	yes	yes
industry fixed effects	no	yes	no	yes	no	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm

Table XII. Impact of Environmental Profile on the Loan Syndicate Size

This table presents regression results analyzing the impact of a firm's environmental profile on the number of lenders participating in its loan syndicate. The dependent variable is the log(number of lenders in the loan syndicate). The sample includes firms in the intersection of CRSP, COMPUSTAT, KLD and Dealscan during 1992-2007. Variable definitions are given in Appendix 2. Control variables whose estimates are not presented include firm level controls such as *log(total assets)*, *opincbefdep_a*, *lever*, *modzscore*, *unrated*, *Invgrade*, loan level controls such as *loan purpose indicators*, *maturity*, *perfprice* and *termloan* and, macro controls such as *termspread* and *creditspread*. t-statistics are given in parentheses below the estimates and are adjusted for firm level clustering.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Panel A: Aggregate Measures of Environmental Concerns and Strengths								
netconcerns	-0.0418	-0.0479						
	[-2.36]	[-2.43]						
numconcern			-0.0441	-0.0492				
			[-2.23]	[-2.19]				
numstrength					0.0271	0.0538		
					[0.70]	[1.32]		
climscore							-0.0352	-0.0430
							[-0.84]	[-0.91]
R^2	0.283	0.414	0.283	0.414	0.282	0.413	0.334	0.413
N	5879	5879	5879	5879	5879	5879	4602	4602
Panel B: Individual Environmental Concerns								
hazardwaste	-0.0035	-0.0392						
	[-0.06]	[-0.66]						
subemissions			-0.1898	-0.1680				
			[-3.42]	[-2.86]				
climchange					-0.0548	-0.0539		
					[-0.95]	[-0.73]		
R^2	0.282	0.413	0.285	0.414	0.334	0.413		
N	5879	5879	5879	5879	4602	4602		
Panel C: Individual Environmental Strengths								
benproduct	0.1446	0.1290						
	[1.83]	[1.51]						
polprevent			0.0072	-0.0653				
			[0.08]	[-0.74]				
cleanenergy					-0.0302	0.1283		
					[-0.37]	[1.43]		
envcomm							-0.2322	-0.2388
							[-1.74]	[-1.81]
R^2	0.282	0.413	0.282	0.413	0.282	0.413	0.304	0.409
N	5879	5879	5879	5879	5879	5879	5186	5186
control variables	yes	yes	yes	yes	yes	yes	yes	yes
industry fixed effects	no	yes	no	yes	no	yes	yes	yes
year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
std err clustering	firm	firm	firm	firm	firm	firm	firm	firm