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Assessing the Relationship Between Sustainability and Cost of Debt

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Abstract

We investigated the relationship between a set of corporate social responsibility factors from the CSRHub database and data on the cost of corporate debt from the Bloomberg database. We found that a 12-variable model for sustainability explained 9.3% of the variance in the cost of debt, or an estimated $343.4 billion in interest expenses for a group of 1,625 companies. Five of the 12 variables in our model had a direct relationship with cost of debt; three of the variables had an inverse relationship; and four variables had no significant relationship. Based on the results of our study and related prior research, we believe that the effect discovered may be due to unintentional lender sensitivity to certain sustainability-related issues.

The sustainability factors that had the most effect on debt varied by industry category and for those companies that had higher interest rates compared to those with lower ones. In general, better *Board* and *Compensation & Benefits* scores decreased debt cost. Strong *Product* and *Energy & Climate Change* scores can potentially enable companies with higher cost of debt to decrease their interest expenses. Companies with average and below average cost of debt in service and heavy industries benefitted from strong *Environmental Policy & Reporting* and *Resource Management* practices, while those in light industries were helped by stronger *Human Rights & Supply Chain* performance.

I   Introduction

Corporate social responsibility (CSR) or corporate sustainability[i] has been a hotly debated topic since its inception after the Second World War. In the 1970s, Milton Friedman famously argued its incompatibility with profit-making companies. However, many businesses have continuously engaged in philanthropic behavior. More recently, perspectives have shifted to align this behavior with business models, and incorporate sustainability into corporate strategy. Michael Porter, a professor at Harvard Business School, argues: "if...corporations were to analyze their prospects for social responsibility using the same frameworks that guide their core business choices, they would discover that CSR can be much more than a cost, a constraint, or a charitable deed—it can be a source of opportunity, innovation, and competitive advantage."[1] According to CSRHub, the private sector has reflected this sentiment by investing approximately $100 billion USD per year in sustainability-related initiatives and policies. However, capturing the return on sustainability investments accurately is difficult, as usually only immediate, narrow operational performance improvements are considered (for example, a decrease in energy costs resulting from energy efficiency measures). Longer-term, broader operational performance improvements, such as the reduction of reputational and operational risk, greater resilience, and market opportunities, are usually not included in such narrow scope return on investment (ROI) calculations. This often results in the underestimation ROI of sustainability projects, making companies more reluctant to invest in sustainability.

This study seeks to further explore the relationship between corporate sustainability and operational performance, by profiling and qualifying the association between corporate sustainability and cost of debt. Having access to relatively cheap capital is essential for businesses seeking to innovate and expand, and can also help balance cash flows in the short term. Therefore, it is in the interest of companies to find and capitalize upon new strategies to lower their interest rates. Conventionally, borrowing costs have been considered to be a function of a company's financial and tangible operational performance and risk. However, an increasing number of studies are suggesting that there is also a relationship between sustainability and cost of debt.

We found that such studies have generally focused on the relationship between one particular dimension of sustainability and either the cost of debt or credit ratings within a specific industry or country. The association between cost of debt and dimensions such as board structure and governance,[2-6] environmental risk, disclosure, and resource management,[7-10] compensation and benefits[11-13] has been studied extensively. However, little research has been conducted on the impact of community-related sustainability performance, such as adherence to human rights or philanthropy.

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[i] CSR and (corporate) sustainability will be used interchangeably in this report.

A few studies do consider CSR as a multidimensional force that could potentially affect the cost of credit.[ii] For example, Oikonomou et al. (2011) studied the impact of CSR on bond pricing and credit ratings using KLD Research & Analytics Inc. sustainability ratings, S&P credit ratings, Reuters, and third-party data from 1994 - 2008.[14] Based on their sample of 742 companies from 17 industries, they found that good sustainability performance, particularly as represented by various social indicators, was rewarded through lower bond yield spreads and higher bond ratings.[14] Attig et al (2013) used multivariate regression analysis to examine the relationship between S&P credit ratings and KLD ratings for 1,585 unique firms over the period 1991-2010 period.[15] Their analysis also suggested that rating agencies tend to award higher scores to firms with better CSR performance.[15] Jiraporn et al (2014) examined the impact on credit ratings by CSR of firms with the same three-digit zip code. They ran a regression between the KLD ratings and S&P ratings using a sample of 2,516 firm-year observations from 1995 to 2007, while controlling for company location using zip code.[16] Their results show that an increase in CSR ratings of one standard deviation from the mean improves a firm's credit rating by as much as 4.5%.[16]

Our study builds upon this research by providing a broader perspective on the relationship between corporate sustainability and cost of debt. Using sustainability ratings by CSRHub, we are able to cover a broader range of companies in size, credit rating range, geography, and industry type than previously studied.

The remainder of the report is structured accordingly: Section 2 gives an overview of the CSRHub ratings system; Section 3 outlines our hypotheses; Sections 4 and 5 detail the methodology and results of our work; Section 6 provides analysis and explanation for our results; and Sections 7, 8, and 9 summarize limitations, possible next steps, and our conclusions.

II   The CSRHub Rating System[17]

The current landscape of sustainability ratings systems is nebulous. Consumer advocacy, human rights, and environmental groups have devised a number of sustainability standards addressing specific industries and sustainability issues. The methodology and criteria used by these rating systems vary greatly, making it difficult to compare ratings across systems. Additionally, there are hardly any comprehensive and easily accessible databases that incorporate a variety of sustainability ratings and give users a good overview of a company's perceived sustainability.

[ii] Studies examining CSR performance as whole (such as the ones above) have often relied on the Kinder, Lydenberg, and Domini (KLD) social ratings database as a source for sustainability ratings. The KLD database has been providing social investors with corporate social research products since 1988.[28] During the existence of this data set, it has been used to create several indexes that seek to measure perceived sustainability. For example, in 2001, KLD (as the firm that originated the KLD database was known at the time) launched a Broad Market SocialSM Index (KLD BMS Index) to satisfy market demand for an integrated landscape of socially screened equities.[28] KLD simultaneously created a Large Cap SocialSM Index (KLD LCS Index), to track the performance of the largest socially screened US equities, based on market capitalization.[28]

CSRHub addresses these challenges by providing a web-based tool combining over 64 million pieces of data from 371 data sources on sustainability and CSR performance into a consistent set of ratings. By rating over 14,000 companies from 135 industries in 127 countries, CSRHub helps managers, researchers, and activists to learn about and compare company sustainability and CSR behavior.

Data used by CSRHub come from various sources, including Environment, Social, Governance (ESG) firms, such as ASSET 4 (Thomson Reuters), Carbon Disclosure Project (CDP), and MSCI (ESG intangible Value Assessment and ESG Impact Monitor); not for profit groups; crowd sources; publications; and other types of research groups. CSRHub aggregates data regularly from its sources, converts each data type into a score between 0 and 100, maps the data into its 12 subcategory schema, and then weights and normalizes each data source's score to optimize the ratings accuracy for each rated area for each rated company (see Table 1 below for subcategories).[iii] Companies can be either fully or partially rated depending on how much data is available. For companies with only a few data sources, coverage of a narrow range of sustainability issues, and/or a low quality of data, CSRHub calculates partial ratings. For a company to be classified as fully rated, a company must have:

- Ratings for all four categories,
- Ratings for at least five subcategories (so that a minimum of two subcategories for at least one category are rated),
- Enough total data quality (based on the number of sources, data elements per source, and weight of each source),
- Enough total sources, and
- A reasonable score if the weight is light or the number of sources is low.

Table 1: CSRHub Categories & Subcategories

Governance	Employee	Community	Environment
Board	Compensation & Benefits	Community Development & Philanthropy	Energy & Climate Change
Leadership Ethics	Diversity & Labor Rights	Human Rights & Supply Chain	Environmental Policy & Reporting
Transparency & Reporting	Training, Health & Safety	Product	Resource Management

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[iii] Ratings are not evenly distributed. The average company rating is typically about 50.

III   Hypotheses

Hypothesis 1: There is a correlation between the cost of debt and perceived corporate sustainability.

Cost of debt is based on several different factors. Analysts and lenders assess both tangible aspects such as cash flow and leverage, as well as less tangible variables such as governance. Both sustainability ratings and cost of debt calculations reflect the perception of an external agency of a company's performance. This perception may be unknowingly influenced by non-rational factors. Taking the nature of the data as well as the results of previous studies into account, we expect there to be a relationship between cost of debt and *perceived* corporate sustainability.

Hypothesis 2: The correlation between cost of debt and perceived corporate sustainability varies by industry.

As the Sustainability Accounting Standards Board (SASB) highlights in its work, the materiality of sustainability issues varies by industry. For example, while ethical sourcing and human rights may be of great relevance for the electronics manufacturing industry, it is not equally material for the service industry.[29, 30] This is due to each industry being associated with specific characteristics, such as impacts, cash flow patterns, and systemic risks. Taking this into account, we expect the association between cost of debt and specific CSRHub subcategories to vary between industries.

IV   Methodology

i. Selection of Dependent and Independent Variables

This study examined the correlation between CSRHub's 12 subcategories that measure perceived sustainability performance (independent variable)[iv] and a measure of operational performance (dependent variable) - credit cost. We chose cost of debt as our dependent variable due to the availability of cost of debt data through Bloomberg and the importance of low-cost debt in operating and expanding a business.

[iv] CSRHub allows users to created customized, issue-specific scores through the adjustment of each category's weight. The average user weighting used in this study assigns the following weights to each category: *Community* - 2.6, *Employees* 2.8, *Environment* - 3.7, *Governance* - 2.9.

ii. Sampling

Diagram 1: CSRHub & Bloomberg Venn Diagram

14,000+ CSRHub companies

Sample: 1,625 companies*

30,000+ Bloomberg companies
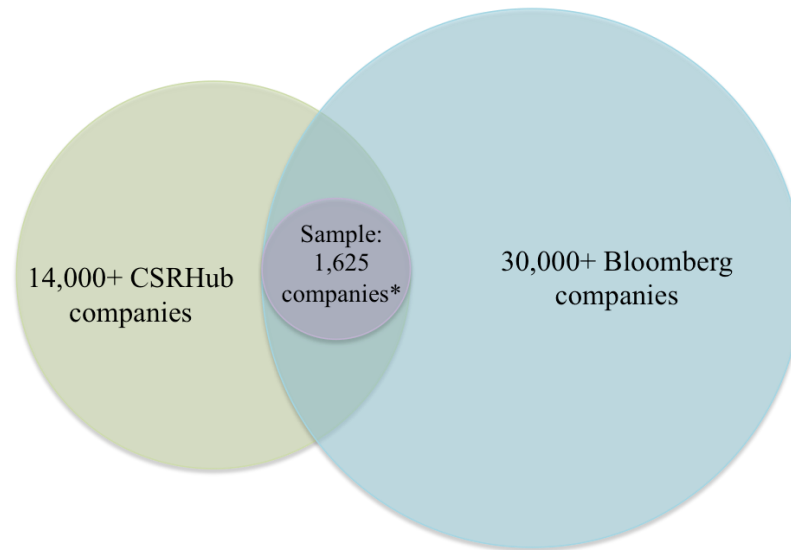
Inclusion criteria: matching tickers, available cost of debt & credit rating
information for 2014, available ratings for all 12 CSRHub subcategories for 2014

We began with a dataset comprised of all 6,591 fully-rated companies from CSRHub's database. Using this company list and the corresponding tickers, we extracted cost of debt, credit ratings,[v] and revenue data from Bloomberg. However, since CSRHub also rates private companies not covered by Bloomberg, and since Bloomberg only provides partial information for some companies, we had to further reduce the sample size. We excluded companies with mismatched tickers, missing credit ratings, and missing cost of debt. This narrowed the dataset to 1,625 (see Diagram 1 above; see Diagram 2 for distribution of sample companies' overall CSRHub score). We compared the scores in our dataset with the CSRHub overall scores for all companies excluded from our dataset and found the score distribution to be similar (see Diagram 3).
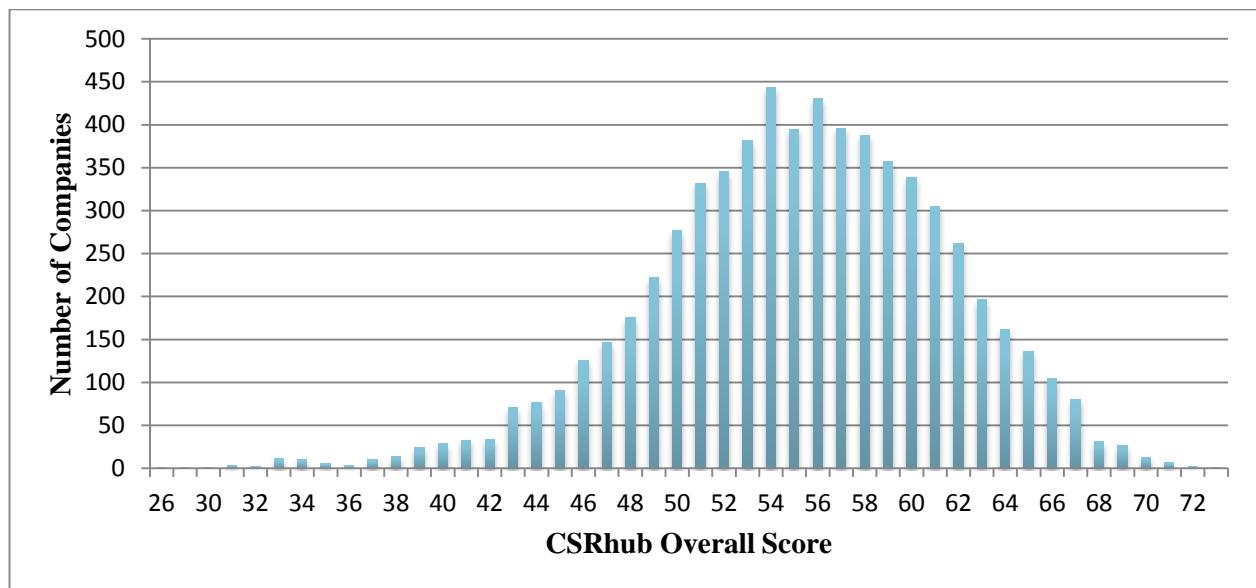
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[v] Since credit rating institutions incorporate much of the operational and financial information for their own consideration, and many major firms receive grades for their performance, credit ratings provide a robust and tangible operational measure.

Diagram 2: Sample Distribution of CSRHub Overall Score
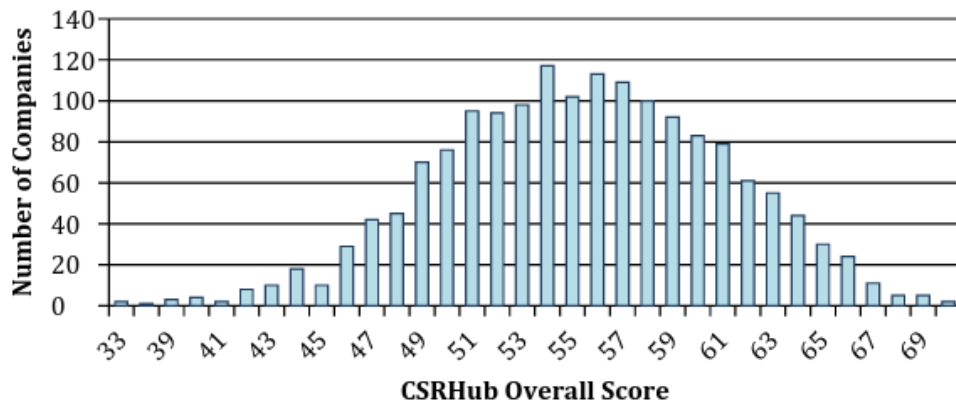
Diagram 3: Distribution of CSRHub Overall Score

After this process, we classified the companies in our dataset by industry using the Sustainability Accounting Standards Board's (SASB) Sustainable Industry Classification System (SICS). We chose SASB's categorization because it classifies companies based on the "similarity of companies' sustainability challenges and innovation opportunities," rather than financial considerations.[27] Also, SASB "surface[s] industries with great innovation potential in terms of addressing sustainability challenges, without regard to the market cap of currently listed companies."[27] For these reasons, we believe that the use of the SICS will facilitate the analysis of our dataset at the industry level.

We used CSRHub's industry classification to allocate companies to corresponding SICS industry groups and sectors (see Appendix 1). We then aggregated these sectors into even broader industry classifications (here forth referred to as 'macro industry groups'): heavy, light, and service industries (for

definitions see Table 2). The final data set consists of 32% heavy, 19% light, and 48% service industry companies (see Appendix 2.1 for graphic representation). We also included CSRHub's regional categorization in our dataset. This showed that 67% of the companies we examined are domiciled in North America (see Appendix 2.2 for further detail on regional distribution).

Table 2: Definition of Macro Industry Groups

Industry	Defining Characteristic	Prominent Examples
Heavy	Large capital investment in heavy machinery and plants; business-oriented[18]	Automobile, Mining, Steel
Light	Less resources and capital intensive than heavy industry; focused on consumer-oriented or smaller articles[19]	Garment, Technology, Consumer Electronics
Service	Provision of services and/or goods to individual consumers or businesses[20]	Retail, Insurance, Hospitality

iii. Statistical Procedure

We defined variation in the cost of debt by comparing each individual company's cost of debt to the average cost of debt for its credit rating group (see Appendix 3 for average cost of debt by credit rating). We used credit ratings from Moody's because it covers a larger number of sample companies (1,625) compared to S&P (1,387) or Fitch (681). We called our calculated dependent variable the *deviation of cost of debt* (equal to *credit rating average cost of debt* minus *company cost of debt*) or "deviation," with a positive *deviation of cost of debt* (here forth also referred to as '*deviation'*) designating a cost of debt lower than the average and vice versa.

We regressed the 12 CSRHub subcategories against *deviation* 1. for all companies within the sample (sample set 1), 2. by macro industry group (heavy, light, service), 3. by SICS industry sector, 4. by SCIS industry group, 5. by regions, and 6. by company size (small, medium, and large based on revenue[vi]). Due to uneven distribution of geographic regions, we chose to not focus on geography. In addition, we were unable to get a consistently reliable metric of company size for use in our analysis without further limiting our data, so this variable was also excluded. Similarly, we also chose not to focus on SICS industry sectors or groups as the distribution of companies varied significantly across SICS industry sectors and groups, resulting in many sectors and groups not having enough observations to perform a meaningful statistical analysis.

To examine whether the association between perceived sustainability and cost of debt was different for companies with above average interest rates, we created two further sample sets: sample set 2 comprising all

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[vi] As we created the company size categories by dividing the dataset into thirds, each category covers the same number of companies.

companies with above average cost of debt (negative *deviation*), and sample set 3 comprising all companies with average (zero *deviation*) or below average borrowing cost (positive *deviation*). We found that 1,087 companies, or two-thirds of our data set, fall into sample set 3 with *deviation* ranging from zero to 0.04 (see Diagram 3 below). Sample set 2 consists of the remaining 538 companies, which had a deviation in the range of -0.01 to -0.22. We replicated the analysis performed on sample set 1 using sample sets 2 and 3.

Diagram 3: Distribution of Deviation of Cost of Debt
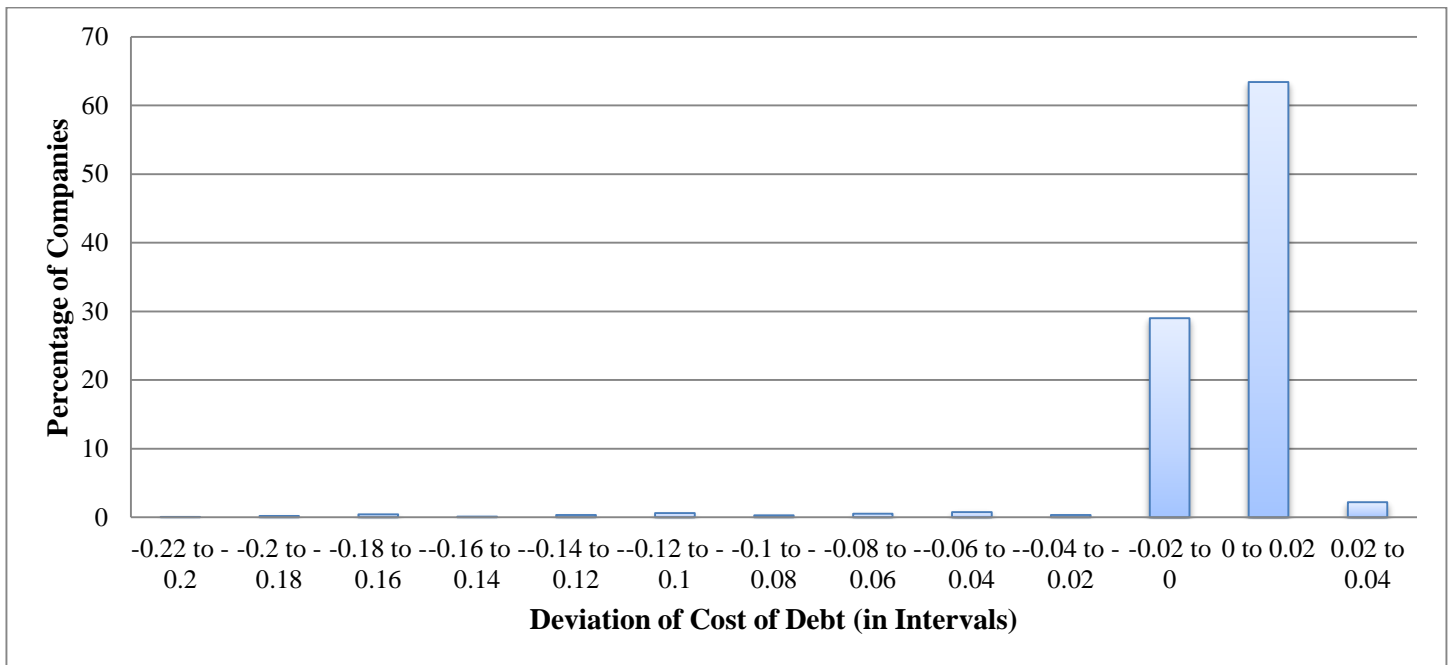
V   Results

Note on interpretation: The coefficients shown in the results tables represent the percentage point increase or decrease in *deviation of cost of debt*. As such, a coefficient of -0.08 equates to a 0.08 percentage point decrease in *deviation*. Considering that *deviation of cost of debt* equals *average cost of debt by credit rating* minus *company cost of debt*, this decrease in *deviation* would represents a 0.08 percentage point increase in the cost of debt when controlling for the credit rating. Similarly, as *deviation* increases, cost of debt would decrease by the corresponding number of percentage points. *Deviation of cost of debt* and cost of debt have an inverse relationship.

Several significant interactions were identified between CSRHub subcategory ratings and deviation (see Table 3). Our 12-subcategory statistical model accounted for 9.3% of the variation in *deviation* in sample set 1, which covers all 1,625 companies ($R^2 = 9.3\%$, N = 1,625[vii]). Eight CSRHub subcategories showed

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[vii] R2 = represents the proportion of the variability in the data that is accounted for by the statistical model; N = the number of companies in the sample used for the analysis

significant interactions with *deviation* in this sample set (90% C.I.[viii]). Increases in *Human Rights & Supply Chain, Diversity & Labor Rights*, *Leadership Ethics*, and *Transparency & Reporting* scores are related to a decrease in *deviation* and therefore an increase in a company's interest rates. Higher CSR rating scores for *Environmental Policy & Reporting*, *Product*, *Compensation & Benefits,* and *Board* appear to be associated with an increase in the *deviation,* and therefore a decrease in cost of debt (see Table 3 for simplified table; see Appendix 4 for full statistical results table).

Table 3 – Statistically Significant Variables for Sample Set 1 All Industries	
Positive coefficients	
Environmental Policy & Reporting	0.0236
Product	0.020
Compensation & Benefits	0.046
Board	0.048
Negative coefficients	
Human Rights & Supply Chain	-0.038
Diversity & Labor Rights	-0.049
Leadership Ethics	-0.030
Transparency & Reporting	-0.015

The macro industry group analysis of sample set 1 showed that the R^2 value and correlation coefficients vary across macro industry groups (see Table 4.1 – 4.3 for simplified table; see Appendix 4 for full statistical results table). For light industry, the model was able to explain 20.32% of variation in *deviation* ($R^2 = 20.32\%$, N = 313). The explanatory power of the model was lower for services ($R^2 = 8.63\%$, N = 785) and heavy industry ($R^2 = 9.32\%$, N = 527).

While the direction of the correlations did not change at the macro industry level, statistical significance varied between the aggregate and macro industry group analysis (90% C.I.). Only *Board, Compensation & Benefits*, and *Human Rights & Supply Chain* remained significant across all three macro industry groups in sample set 1. The association between *deviation* and *Environmental Policy & Reporting*, *Product* and *Leadership Ethics* only remained significant for service companies in sample set 1. *Diversity & Labor Rights* only remained significant in the light and service industry, while *Product* was only significant for heavy and service industry companies in sample set 1. *Resource Management* and *Training, Health & Safety* were the only two variables which were significant in the heavy industry, but not for all industries.

[viii] C.I. = confidence interval; For a variable to be significant it's p-value had to be less than or equal to 0.1.

Table 4.1 - Statistically Significant Variables for Sample Set 1 Heavy Industry	
Positive coefficients	
Compensation & Benefits	0.026
Training	0.026
Board	0.047
Negative coefficients	
Resource Management	-0.038
Human Rights & Supply Chain	-0.024

Table 4.2 - Statistically Significant Variables for Sample Set 1 Light Industry	
Positive coefficients	
Compensation & Benefits	0.064
Board	0.090
Negative coefficients	
Human Rights & Supply Chain	-0.074
Diversity & Labor Rights	-0.064

Table 4.3 - Statistically Significant Variables for Sample Set 1 Service Industry	
Positive coefficients	
Environmental Policy & Reporting	0.021
Product	0.025
Compensation & Benefits	0.039
Board	0.036
Negative coefficients	
Human Rights & Supply Chain	-0.041
Diversity & Labor Rights	-0.033
Leadership Ethics	-0.041

Looking at the results for sample set 2 and 3, we found that R^2 values, coefficients, and significance varied (see Table 5 for simplified table; see Appendix 5 for full statistical results table). Sample set 2 had a higher R^2 compared to both sample set 1 and 3 (R^2 = 26.96%, N = 545), which shows that sustainability has a stronger explanatory power for companies with above average cost of debt. The majority of significant sustainability variables identified in sample set 1 remained significant in sample set 2, with the exception of *Environmental Policy & Reporting* and *Transparency & Reporting*. *Energy & Climate Change* was the only variable that gained significance in sample set 2, despite not being significant in sample set 1. For the majority of significant subcategories, the relationship with *deviation* was stronger in sample set 2 than in sample set 1. For example, the associated decrease in cost of debt resulting from a 1-point increase in *Board* went from 0.048 percentage points in sample set 1 to 0.12 percentage points in sample set 2.

Conversely, sample set 3 had lower R^2 than both sample set 1 and 2 (R^2 = 3.28%, N = 1,094). Only three of the significant subcategories found in sample set 1 remained significant in sample set 3 (*Environmental Policy & Reporting, Human Rights & Supply Chain,* and *Board*). *Training* and *Energy & Climate Change* became significant at the 90% level as well. All other subcategories were not significant.

Table 5 – Statistically Significant Variables for Sample Set 2 and 3 All Industries	
Sample Set 2	
Positive coefficients	
Energy & Climate Change	0.036
Product	0.070
Compensation & Benefits	0.081
Board	0.12
Negative coefficients	
Human Rights & Supply Chain	-0.078
Diversity & Labor Rights	-0.12
Leadership Ethics	-0.092
Sample Set 3	
Positive coefficients	
Environmental Policy & Reporting	0.0066
Human Rights & Supply Chain	0.0094
Negative coefficients	
Energy & Climate Change	-0.0059
Training	-0.0048
Board	-0.0048

VI   Analysis

The following section will explain the relationship between the most significant subcategories and *deviation*. These are *Board, Compensation & Benefits, Human Rights & Supply Chain,* and *Environmental Policy & Reporting.*

i. Board

Of the 12 subcategories, *Board* has the strongest positive and statistically significant association with cost of debt. For sample set 1, a 1-point increase in board effectiveness is associated with a 0.048 percentage point decrease in cost of debt. For sample set 2 we found that the significance of *Board* increased and that a 1-point increase in *Board* is associated with a 0.12 percentage point decrease in the cost of debt. Sample set 3 was the only area where *Board* showed a negative association with the *deviation*, with a 1-point increase in *Board* being related to a very small, but significant, increase in the cost of debt of 0.0048 percentage points.

This positive relationship between *Board* and cost of debt is related to the concept that having an effective board can reduce default risk by decreasing agency costs, reducing informational asymmetries, and improving oversight and accountability. The *Board* subcategory assesses board effectiveness based on board structure,

policies, and compensation. Board structure, characterized by, for example, independence or board size, has been specifically linked to lower agency cost and information asymmetry, as well as more effective monitoring, which reduces risk and thus borrowing costs.[2-5&21] Default risk can be further reduced through the introduction of specific board policies such as takeover defenses, transparency, policy disclosures, and independent auditing committees.[2&6] The risk of conflicts of interest and agency costs can also be further lowered through equity-based board remuneration, which aligns stakeholder and board interest.[22]

At the macro industry level for sample set 1, we also observe strong, positive correlations between *Board* and cost of debt. In the light industry, every 1-point increase in the *Board* score is associated with a 0.090 percentage point decrease in cost of debt. In heavy and service industries, the average expected decrease in cost of debt is lower with only 0.046 and 0.036 percentage points respectively. The significantly higher relationship between *Board* and cost of debt for light industry companies in sample set 1 could be related to boards having more room to influence a company's operations and direction. Since light industry has the highest average cost of debt at 2.84%, there is the most space for a well directed board to impact the cost of debt. The results found in sample set 2 further indicate that companies with higher cost of debt could reap the most benefits from investing in this area, while the data from sample set 3 indicates that those with average or below average interest rates may be better served by investing elsewhere.

While the results of our study support these conclusions, it should be noted that we found *Board* and *Leadership Ethics* to be jointly significant (F = 15.14; Prob > F = 0.000). This is unsurprising for several reasons. Firstly, both strong leadership ethics and an effective board enhance corporate governance. Secondly, as discussed above, an effective board seeks to provide good governance and guidance, while minimizing information asymmetries and conflicts of interest - doing so is an ethical choice. Our findings confirm that good governance is associated with a reduction in a firm's cost of debt. It might be an area of future exploration to see if these two variables have enough interaction that they should be evaluated as one combined variable so that their true impact on sustainability can better be determined.

ii. Compensation & Benefits

Compensation & Benefits is the second-strongest, positively-associated subcategory and shows significance across all macro industry groups. In sample set 1, we see that a 1-point increase in *Compensation & Benefits* is associated with a 0.046 percentage point decrease in borrowing costs. At the macro industry group level, the strongest correlation between *Compensation & Benefits* and cost of debt is observed in the light industry, which exhibits a 0.064 percentage point decrease in the cost of debt when *Compensation & Benefits* increases by 1 point, followed closely by the service industry, which exhibits a 0.039 percentage point increase under similar circumstances. The relationship is much weaker in the heavy industry group, due to the fact that heavy industries are more capital intensive than either light or service industries. As such, cost

of debt in the heavy industry is more influenced by asset value than employee compensation.

Similar to *Board*, companies in sample set 2 have greater *Compensation & Benefits* coefficients, and therefore *Compensation & Benefit* investments by these companies are associated with greater reductions in the cost of debt. For these companies, a 1-point increase in *Compensation & Benefits* is linked to a 0.081 percentage point decrease in the cost of debt. When looking at the macro industry level, this relationship becomes even stronger in light and service industries, which both show an average 0.001 percentage point decrease in the cost of debt when *Compensation & Benefits* increases by 1 point for companies in sample set 2. This mirrors and strengthens the findings for all companies.

Though employee turnover and compensation packages vary widely among industries, these results are unsurprising. The subcategory is closely linked to employee satisfaction, engagement, loyalty, and productivity. In other words, the more a firm's employees feel satisfied and loyal to the company, the more engaged and productive they are. As such, satisfactory compensation packages can directly affect a firm's operational performance by boosting long-term operational stability, improving efficiency, and reducing costs related to training and employee turnover. All of these can increase financial stability and the ability to service its debt, both of which can decrease cost of debt, since lending institutions can expect more consistent payments.

Many studies also provide evidence that supports our argument that better employee compensation packages are associated with a lower cost of debt. For example, "Sears conducted an 800-store survey that showed the impact of employee attitudes on the bottom line. When employee attitudes improved by 5%, customer satisfaction jumped 1.3%, consequently increasing revenue by one-half a percentage point."[11] Conversely, low morale among employees can negatively affect performance, which "could lead to a strike or sabotage that might hinder an organization's effectiveness."[11] Though it may be cheaper to deny employees adequate or satisfactory benefits in the short-term, in the long-term this can harm the profitability and long-term viability, thus increasing default risk and cost of debt.

There is also evidence that a company's reputation is a factor in attracting potential employees. Unsurprisingly, students prefer to work for companies that have a better CSR reputation. A study by Zukin & Szeltner (2012) found that among undergraduate and graduate students, 58% were willing to accept lower pay in order to work for a company that shares their values.[12] For those with less education and thus fewer choices, sustainability reputation may not mean as much. Albinger and Freeman (2000) conducted a study that suggested that the more choices an employee has, the more important CSR reputation is to him or her.[13] For companies that are interested in remaining relevant in our rapidly transforming economy, this is a notable trend. A firm's competitiveness and future profitability derive from talented, smart employees. A profit-generating company can more easily repay their debt, which makes them more attractive to lending

institutions. Thus, for companies, the potential of highly skilled employees are immeasurable, and can positively affect cost of debt.

iii. Human Rights & Supply Chain

The relationship between *Human Rights & Supply Chain* and the cost of debt is perhaps the most complicated of the relationships we examined. When looking at the aggregate level, it appears as if *Human Rights & Supply Chain* has a negative association with cost of debt, but this broad viewpoint ignores many of the complexities and intricacies of the relationship.

When looking at sample set 3 companies, *Human Rights & Supply Chain* has a positive association with cost of debt. A 1-point increase in this variable is associated with a 0.0094 percentage point increase in borrowing cost, and a 0.022 percentage point increase in the cost of debt specifically for those in the light industry group.

In addition, there is a joint significance between *Human Rights & Supply Chain* and *Product* (F = 10.28; Prob > F = 0.000). This interaction complicates the interpretation of both variables, especially since they act in different directions on cost of debt. The joint association could be linked to the fact that these variables look at a company's offering from two different perspectives. *Product* describes end user effects, environmental innovations, and new advances that positively impact the quality of life of end users. *Human Rights & Supply Chain* captures sustainability practices related to sourcing, manufacturing, and other supply chain processes. This includes ensuring that overseas and domestic labor and sourcing practices are well managed and compliant with international standards. It may be that sustainability practices and policies affecting end users lower borrowing costs, as an improved *Product* score can offer visible benefits, including a decrease in product recalls and access to niche markets, such as organic producers.

However, it is important to note that *Human Rights & Supply Chain* has a negative association with the cost of debt in sample set 1, sample set 1 macro industries, and sample set 2. The reasons for this are diverse. First, it should be noted that human rights reporting and transparency (also measured by this variable) is often higher in industries more prone to human rights violations and that have received negative publicity as a result. Consequently, a higher score may be the result of increased transparency after some drastic violation, rather than actual improvements. Even when a company is taking active steps to improve its stance on human rights, there may be a significant lag time before the positive impacts of these reforms are reflected in financial outcomes.

In the future, it is likely that good human rights and supply chain practices will have a more positive effect on the cost of debt calculations in all industries as the public exerts more pressure on financial institutions. There are nascent signs of this in the case of companies with average cost of debt. In lending

markets with fewer intermediaries between companies and investors, such as the corporate bond market, the impacts of *Human Rights & Supply Chain* performance are being felt. A study by Oikonomou et al. (2011) found that strong human rights and supply chain practices can decrease bond spreads by as much as 43.4%.[14] Therefore, though our present results demonstrate a negative association between human rights and cost of debt, this is not a permanent trend.

iv. Environmental Policy & Reporting

For sample set 1, *Environmental Policy & Reporting* shows that a 1-point increase in the *Environmental Policy & Reporting* score is associated with a 0.024 percentage point decrease in cost of debt. In sample set 3, a 1-point increase in *Environmental Policy & Reporting* is associated with a 0.0066 percentage point decrease in borrowing costs. *Environmental Policy & Reporting* was not significant in sample set 2. When examining the association at the macro industry level for all companies in sample set 1, we see that it only remains significant in the service industry

A further interesting finding is that each of the environmental subcategories is significant and positively related to cost of debt in at least one of the macro industries for sample set 2 and 3 (see Appendix 5.2 for results table). *Energy & Climate Change,* for example, is associated with a 0.057 percentage point decrease in cost of debt for service industry companies in sample set 2. *Resource Management* is significant for heavy industry companies in sample set 3 and for light industry companies in sample set 2. *Environmental Policy & Reporting* maintains its significance for the service industry in sample set 3, with a 1-point increase being associated with a 0.0092 percentage point decrease in borrowing cost. As such, we can conclude that environmental performance is related to cost of debt across the heavy, light, and service industry, though the impact of environmental sustainability is captured by different environmental subcategories within each industry and/or company group.

The overall importance of environmental sustainability can be explained in terms of the various risks and opportunities associated with environmental issues and risk management. In light of growing concerns over the environment and climate change as well as resource scarcity, environmental issues such as pollution, resource management, and GHG emissions, are increasingly associated with legal, financial, and reputational risks.[10&23] These risks can affect earnings potential, firm value, and available cash flow, which may in turn affect a company's ability to service debt.[7-8] Additionally, environmental management and disclosure is associated with improved economic performance and operational effectiveness, which is a further indicator of future earnings potential.[24] Many studies provide evidence that both the lower uncertainty and higher perceived earnings potential associated with proactive environmental risks management decreases the perceived (default) risks of a company, and reduces implied uncertainty in the eyes of investors, and therefore cost of debt.[8] For example, a study conducted by Sharfman & Fernando (2006) argues that better

environmental risk management is associated with a reduction in the cost of equity capital, a shift to debt financing due to lower risk resulting in lower cost of debt, and higher tax benefits due to the ability to include more debt financing.[9]

The financial services sector may be moving towards the inclusion of environmental factors in its credit decision-making process. One prominent example of this effort is the Equator Principles, which actively advocate for the inclusion of social and environmental risks in financing decisions.[25] To date, 80 financial institutions, covering 70% of project finance debt in emerging markets, are adhering to these principles.[25]

iv. Remaining Significant Variables

Diversity & Labor Rights and *Transparency & Reporting* both have negative associations with *deviation*, although *Transparency & Reporting* is only significant for all industries in sample set 1. This is expected, as there is little reason why Transparency & Reporting would have a strong relationship with debt.

Similar to *Human Rights & Supply Chain*, we expect that the relationship between *Diversity & Labor Rights* the cost of debt is complicated. However, it does not appear that this is the best area to focus on, if the company's objective is to lower the cost of debt.

VII   Limitations

In conducting this study, we faced several limitations. First, our choice of a dependent variable was limited by data availability.

Second, our sample size was limited by the fact that CSRHub and Bloomberg use different tickers, which limited the number of companies we were able to match and extract. This limited our sample size and made it harder to evaluate the true relationship between perceived sustainability and cost of debt.

Third, while wildly used in the market place, credit rating scores may not necessarily reflect the most-up-to evaluation of a company depending on how often credit ratings are updated.

Four, CSRHub's scores estimate a company's sustainability performance using data drawn from a wide variety of sources. CSRHub considers each data source to be an independent estimate of that source's perception of a company's sustainability performance. As such, CSRHub's scores are a statistically-derived aggregate of the perceived sustainability performance of an entity rather than a set of facts about that entity's actual sustainability performance.

VIII   Next Steps

Avenues for further research include and increasing the size of the dataset. This can be achieved by

considering other data sources beyond Bloomberg and by using alternative data matching methods. For studies looking into the relationship between cost of debt and one particular subcategory or category, it may be worth considering the inclusion of partially rated CSRHub companies to increase the sample size.

In addition, researchers could consider looking at extending the analysis to cover more time periods. This will add a temporal dimension to the relationship between sustainability and cost of debt and would highlight the potential returns of sustainability initiatives and policies over time. While doing this research, we would need to carefully control for survivor bias.

IV   Conclusion

Based on our results, we conclude that lenders are already considering sustainability as a factor for determining cost of debt. While some lenders, such as banks abiding by the Equator Principles, are explicitly including sustainability-related risks and opportunities in their calculations, other lenders appear to be unconsciously considering sustainability variables. This is evident due to the difference between credit ratings, which reflect perceived value, and actual interest rates. As our study showed, 9.3% of variation in cost of debt can be explained by sustainability factors. In financial terms, this means that $343.4 billion of the estimated $3.7 trillion[ix] in total interest expenses incurred by our 1,625 sample companies is associated with sustainability factors. Therefore, companies investing in sustainability can expect to free up cash for investments in, for example, more comprehensive sustainability projects, R&D, or market expansion, while also benefiting from greater resilience and adaptability.

We also found that the significance of the 12 sustainability subcategories varies between company groups, suggesting that different companies benefit from investing in different sustainability dimensions. Companies with above average cost of debt seem to be able to reap greater benefits from investing in sustainability, particularly when investing in the areas of *Board*, *Compensation & Benefits*, *Product,* and *Energy & Climate Change*. These strategic investments in sustainability may help high cost of debt companies catch up to their competitors. Companies that have an average or below average cost of debt might focus their energies more on *Human Rights & Supply Chain* and *Compensation & Benefits* in light industries, *Environmental Policy & Reporting* in service industries, and *Resource Management* in heavy industries.

[ix] As we only had revenue and interest rate data available, we used a modified form of the interest coverage ratio (*earning before interest and taxes* divided by *interest expenses*) to estimate total interest expenses for our sample. Using revenue gave us a more conservative estimate of company debt and interest expenses, resulting in a likely underestimation of both numbers. We assumed an interest coverage ratio of 60. While a relatively high ratio, we considered this assumption to be reasonable as our sample companies span the entire debt spectrum. While some companies have an interest coverage ratio of around 20 (e.g. Merck or Lincoln Electric), others have a higher ratio (IBM e.g. has a ratio of 57). Based on these numbers, we estimated the total interest expense for all 1,625 companies ($3.7 trillion) and multiplied this number by the sample set 1 R^2 (9.3%) to estimate the total amount of interest expenses associated with sustainability factors.

Investments in these areas could enable them to attain a competitive advantage in their cost of debt.

Appendix 1: Industry classification overview

CSRHub Industry	SASB Industry Group	SASB Industry Sector	Macro Industry Sectors
Accounting	Services	Services	Services
Adult Entertainment	Media	Services	Services
Advertising	Media	Services	Services
Aerospace & Defense	Industrials	Resource Transformation	Heavy
Agriculture	Food	Consumption	Heavy
Agriculture & Mining	Classified by company	Classified by company	Heavy
Air Freight	Air Transportation	Transportation	Services
Airport	Air Transportation	Transportation	Services
Alternative Energy	Alternative Energy	Renewable Resources & Alternative Energy	Heavy
Amusement Parks	Hospitality & Recreation	Services	Services
Apparel	Apparel & Textiles	Consumption	Light
Architectural	Infrastructure	Infrastructure	Services
Audio & Video Equipment Manufacturing	Industrials	Resource Transformation	Light
Automotive Equipment Rental & Leasing	Automobiles	Transportation	Services
Banking	Banking & Investment Banking	Financials	Services
Beer	Beverages	Consumption	Light
Beverage Manufacturing	Beverages	Consumption	Light
Biotechnology	Biotech & Pharma	Health Care	Light
Broadcasting & Advertising	Media	Services	Services
Brokerage & Capital Markets	Banking & Investment Banking	Financials	Services
Business Support Services	Services	Services	Services
Cattle Ranching and Farming	Food	Consumption	Heavy
Chemicals	Chemicals	Resource Transformation	Heavy
Commercial Banking	Banking & Investment Banking	Financials	Services
Communications Equipment Manufacturing	Technology	Technology & Communication	Light
Computer and Office Machine Repair and Maintenance	Technology	Technology & Communication	Services
Computers & Peripherals	Technology	Technology & Communication	Light
Conglomerates	Created separate industry group - Conglomerates	Created separate sector - Conglomerates	Heavy
Construction	Infrastructure	Infrastructure	Heavy

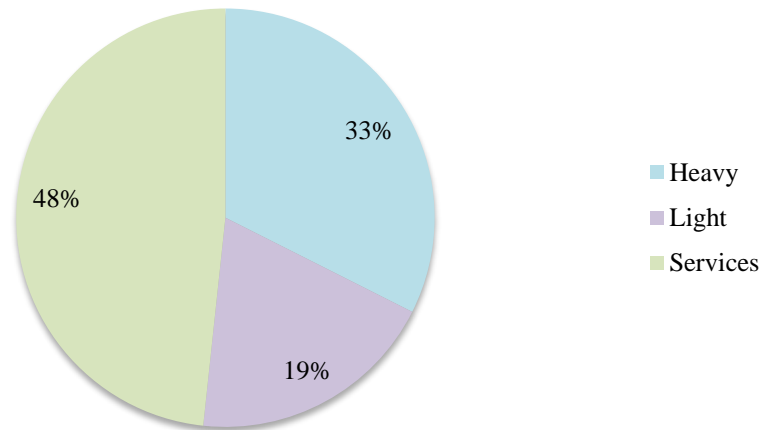|			
Construction Machinery Manufacturing	Industrials	Resource Transformation	Heavy
Construction Materials	Construction Materials	Non-Renewable Resources	Heavy
Consumer Electronics Repair and Maintenance	Consumer Discretionary Products	Consumption	Light
Containers & Packaging Manufacturing	Industrials	Resource Transformation	Light
Credit Card Processing	Specialty Finance	Financials	Services
Cruise Ship Operations	Hospitality & Recreation	Services	Services
Data & Records Management	Technology	Technology & Communication	Services
Data Processing	Technology	Technology & Communication	Services
Diversified Consumer Services	Classified by company	Classified by company	Services
Diversified Financial Services	Banking & Investment Banking	Financials	Services
Electric & Gas Utilities	Utilities	Infrastructure	Heavy
Electrical Equipment Manufacturing	Industrials	Resource Transformation	Heavy
Electronic Equipment & Instrumentation	Industrials	Resource Transformation	Heavy
Electronic Shopping and Mail-Order Houses	Retailers	Consumption	Services
Energy Equipment & Services	Oil & Gas	Non-Renewable Resources	Heavy
Facilities Support Services	Classified by company	Classified by company	Classified by company
Financial Planning	Banking & Investment Banking	Financials	Services
Food Products	Food	Consumption	Light
Forestry & Fishing	Forestry & Paper	Renewable Resources & Alternative Energy	Heavy
Gambling Industries	Hospitality & Recreation	Services	Services
Games & Gaming	Hospitality & Recreation	Services	Services
Grocery and Related Product Wholesalers	Retailers	Consumption	Services
Hardware Manufacturing	Technology	Technology & Communication	Light
Health Care & Pharmaceuticals	Classified by company	Health Care	Classified by company
Healthcare Providers	Health Care Delivery	Health Care	Services
Heavy & Civil Engineering Construction	Infrastructure	Infrastructure	Heavy
Hospitals	Health Care Delivery	Health Care	Services
Hotels	Hospitality & Recreation	Services	Services
Household Products	Consumer Discretionary Products	Consumption	Light
Industrial Conglomerates	Created separate industry group - Conglomerates	Created separate industry group - Conglomerates	Heavy
Insurance Carriers	Insurance	Financials	Services

Investigation and Security Services	Services	Services	Services
IT & Network Services	Technology	Technology & Communication	Services
Legal Services	Services	Services	Services
Leisure Equipment Manufacturing	Consumer Discretionary Products	Consumption	Light
Lumber & Other Const. Matl's Wholesalers	Retailers	Consumption	Services
Luxury Goods & Cosmetics Manufacturing	Consumer Discretionary Products	Consumption	Light
Machinery Manufacturing	Industrials	Resource Transformation	Heavy
Management & Sales Consulting	Services	Services	Services
Manufacturing	Consumer Discretionary Products	Consumption	Light
Mechanical Component Manufacturing	Industrials	Resource Transformation	Heavy
Media & Entertainment	Media	Services	Services
Medical & Diagnostic Laboratories	Health Care Delivery	Health Care	Services
Medical Equipment & Supplies Manufacturing	Medical Technology	Health Care	Heavy
Mining	Oil & Gas	Non-Renewable Resources	Heavy
Mining (except Oil & Gas)	Metals & Mining	Non-Renewable Resources	Heavy
Motion Picture & Sound Recording	Media	Services	Services
Motor Vehicle Manufacturing	Automobiles	Transportation	Heavy
Motor Vehicle Parts Manufacturing	Automobiles	Transportation	Heavy
Natural Gas Distribution	Oil & Gas	Non-Renewable Resources	Heavy
Networking Equipment	Technology	Technology & Communication	Light
Newspaper	Media	Services	Services
Office Machinery Manufacturing	Consumer Discretionary Products	Consumption	Light
Oil and Gas Extraction	Oil & Gas	Non-Renewable Resources	Heavy
Other Services	Services	Services	Services
Paper Products	Forestry & Paper	Renewable Resources & Alternative Energy	Light
Participatory Sports	Hospitality & Recreation	Services	Services
Passenger Airlines	Air Transportation	Transportation	Services
Personal Care Products	Consumer Discretionary Products	Consumption	Light
Petroleum Refineries	Oil & Gas	Non-Renewable Resources	Heavy
Pharmaceutical & Medicine Manufacturing	Biotech Pharma OR Medical Technology	Health Care	Light
Property Leasing	Real Estate	Infrastructure	Services
Real Estate	Real Estate	Infrastructure	Services

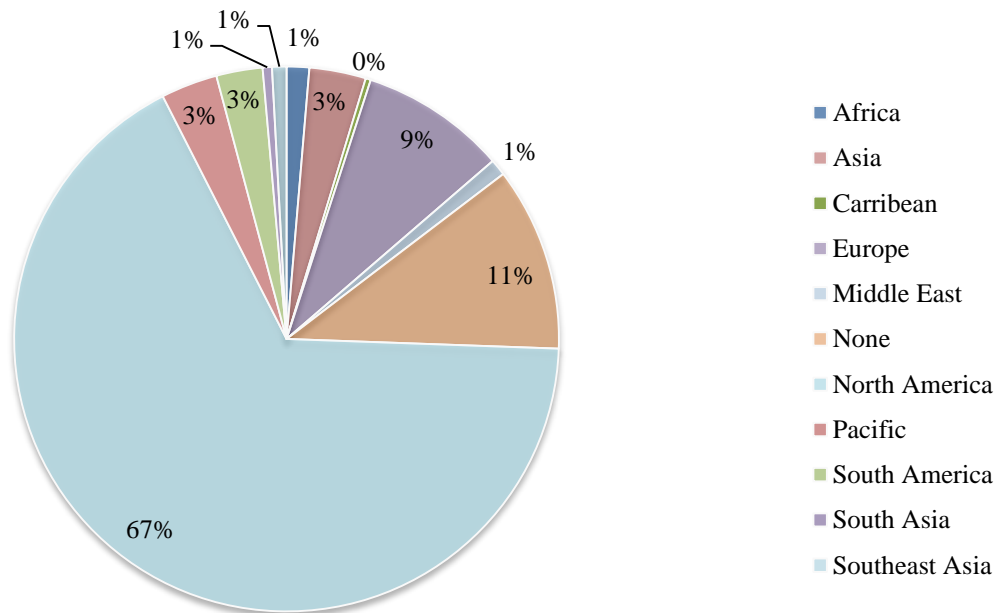| Real Estate Agents	Real Estate	Infrastructure	Services
Real Estate Financial Services	Real Estate	Infrastructure	Services
Real Estate Management & Development	Real Estate	Infrastructure	Services
REITs	Real Estate	Infrastructure	Services
Residential Building Construction	Infrastructure vs. Real Estate	Infrastructure	Heavy
Resort & Casinos	Hospitality & Recreation	Services	Services
Retail	Retailers	Consumption	Services
Semiconductor & Other Electronic Component Mfg.	Technology	Technology & Communication	Light
Software & Internet	Technology	Technology & Communication	Light
Specialty Retail	Retailers	Consumption	Services
Spectator Sports	Hospitality & Recreation	Services	Services
Supermarket	Retailers	Consumption	Services
Telecommunications	Telecommunications	Technology & Communication	Light
Textiles & Apparel	Apparel & Textiles	Consumption	Light
Thrifts & Mortgage Finance	Specialty Finance	Financials	Services
Tobacco	Tobacco	Consumption	Light
Trains	Land Transportation	Transportation	Services
Travel	Hospitality & Recreation	Services	Services
Travel Arrangement & Reservation Services	Hospitality & Recreation	Services	Services
Trust	Banking & Investment Banking	Financials	Services
Utilities	Utilities	Infrastructure	Heavy
Warehousing	Retail	Consumption	Services
Waste Management & Remediation Services	Waste Management	Infrastructure	Services
Water	Utilities	Infrastructure	Heavy
Water Transportation	Marine Transportation	Transportation	Services
Wholesale Trade	Retail	Consumption	Services
Wired Telecommunications Carriers	Telecommunications	Technology & Communication	Services
Wireless Telecommunications Carriers	Telecommunications	Technology & Communication	Light

Appendix 2: Graphs describing sample

Appendix 2.1: Sample Breakdown by Macro Industry

- Heavy: 33%
- Light: 19%
- Services: 48%

Appendix 2.2: Sample breakdown by region

- Africa
- Asia
- Carribean
- Europe
- Middle East
- None
- North America
- Pacific
- South America
- South Asia
- Southeast Asia

Appendix 3: Average cost of debt by credit rating

Rating	Average cost of debt
aaa	0.013
aa+	0.015
aa	0.015
aa-	0.016
a+	0.016
a	0.017
a-	0.019
bbb+	0.021
bbb	0.022
bbb-	0.032
bb+	0.031
bb	0.031
bb-	0.024
b+	0.028
b	0.030
b-	0.032
ccc+	0.036
ccc	0.036
ccc-	0.027
d	0.040

Appendix 4: Summary statistics sample set 1

Appendix 4 - Summary Statistics Sample Set 1 All Industries and Macro Industry Groups

Variables	All Industries	Heavy Industry	Light Industry	Service Industry
Energy & Climate Change	-0.0016	0.0051	0.013	-0.0016
	(0.0076)	(0.021)	(0.029)	(0.0084)
Environment Policy & Reporting	0.0236***	-0.012	0.030	0.021**
	(0.0084)	(0.016)	(0.036)	(0.0098)
Resource Management	-0.016	-0.038*	-0.024	0.011
	(0.015)	(0.021)	(0.039)	(0.020)
Community Development & Philanthropy	0.017	0.0024	0.024	0.023
	(0.013)	(0.018)	(0.025)	(0.018)
Human Rights & Supply Chain	-0.038***	-0.024*	-0.074**	-0.041**
	(0.012)	(0.014)	(0.030)	(0.020)
Product	0.02***	0.02*	0.042	0.025**
	(0.0070)	(0.010)	(0.026)	(0.011)
Compensation & Benefits	0.046***	0.026**	0.064**	0.039***
	(0.0087)	(0.011)	(0.027)	(0.012)
Diversity & Labor Rights	-0.049***	-0.038	-0.064*	-0.033*
	(0.015)	(0.025)	(0.036)	(0.019)
Training	-0.0069	0.026**	-0.025	-0.019
	(0.0096)	(0.012)	(0.020)	(0.019)
Board	0.048***	0.047***	0.090***	0.036**
	(0.0095)	(0.014)	(0.026)	(0.014)
Leadership Ethics	-0.03**	-0.0030	-0.040	-0.041*
	(0.014)	(0.014)	(0.029)	(0.024)
Transparency & Reporting	-0.015*	-0.016	-0.022	-0.011
	(0.0081)	(0.013)	(0.023)	(0.012)
Constant	-0.26	0.126	-1.69	-0.61
	(0.59)	(0.90)	(1.45)	(0.91)
R2	9.31%	9.32%	20.32%	8.63%
Number of observations	1625	527	313	785

*** $p<0.01$; **$p < 0.05$; *$p < 0.1$

Note: The standard error for each variable is shown in parenthesis below the coefficient.

Appendix 5: Summary statistics sample set 2 and 3

Appendix 5.1 - Summary Statistics Sample Set 2 and 3 All Industries

Variables	Sample Set 2	Sample Set 3
Energy & Climate Change	0.036*	-0.0059*
	(0.021)	(0.0032)
Environmental Policy & Reporting	0.00034	0.0066**
	(0.022)	(0.0032)
Resource Management	-0.035	0.000052
	(0.032)	(0.0040)
Community Development & Philanthropy	0.025	0.00030
	(0.032)	(0.0033)
Human Rights & Supply Chain	-0.078***	0.0094***
	(0.026)	(0.0036)
Product	0.070***	0.0017
	(0.018)	(0.0021)
Compensation & Benefits	0.081***	0.0012
	(0.016)	(0.0024)
Diversity & Labor Rights	-0.12***	-0.0050
	(0.032)	(0.0036)
Training	0.011	-0.0048*
	(0.025)	(0.0028)
Board	0.12***	-0.0048**
	(0.021)	(0.0023)
Leadership Ethics	-0.092***	0.0026
	(0.034)	(0.0035)
Transparency & Reporting	-0.023	-0.00026
	(0.020)	(0.0031)
Constant	-2.18	0.67***
	(1.49)	(0.18)
R^2	26.96%	3.28%
Number of observations	545	1094

*** $p<0.01$; ** $p < 0.05$; * $p < 0.1$

Note: The standard error for each variable is shown in parenthesis below the coefficient.

Appendix 5.2 - Summary Statistics Sample Set 2 and 3 Macro Industry Groups

Variables	Sample Set 2			Sample Set 3		
	Heavy Industry	Light Industry	Service Industry	Heavy Industry	Light Industry	Service Industry
Energy & Climate Change	0.01772	.12935*	.04515**	-0.00835	.00193	-.0032
	(0.04811)	(0.07554)	(.0229)	(.00645)	(.00894)	(.00416)
Environmental Policy & Reporting	-.02707	.05953	-.000698	-.00535	-.00354	.00873**
	(.04632)	(.06592)	(.02834)	(.00552)	(.00975)	(.00437)
Resource Management	-.07846*	-.17277**	.04256	.01888***	.00604	-.00664
	(.044)	(.08256)	(.04349)	(.00697)	(.01151)	(.00562)
Community Development & Philanthropy	-.01052	.07511	.02717	-.000369	-.02011***	.00663
	(.04)	(.0607)	(.0478)	(.00552)	(.00747)	(.00463)
Human Rights & Supply Chain	-.12075***	-.10825*	-.11878**	.00299	.02173**	.00337
	(.04018)	(.05504)	(.05109)	(.00614)	(.01069)	(.0051)
Product	.0538**	.10601**	.07394***	.00333	-.00322	-.000900
	(.02725)	(.04593)	(.02784)	(.00359)	(.00639)	(.00317)
Compensation & Benefits	.04993**	.104**	.10071***	-.00665	.01503**	.00288
	(.02063)	(.04605)	(.02652)	(.00426)	(.0069)	(.00349)
Diversity & Labor Rights	-.07475	-.11762*	-.04064	-.00421	-.01845**	-.00512
	(.05556)	(.06313)	(.0528)	(.00613)	(.00808)	(.00543)
Training	.04257	-.4646	-.03321	.00273	-.00138	-.00297
	(.03221)	(.04605)	(.04528)	(.0047)	(.00737)	(.00414)
Board	.0709**	.15263***	.14165***	-.00609	.000843	-.00141
	(.02882)	(.04681)	(.03413)	(.00413)	(.00539)	(.00355)
Leadership Ethics	-.01458	-.05492	-.15402**	.00714	-.00157	-.00192
	(.03633)	(.04442)	(.06774)	(.00645)	(.00899)	(.00525)
Transparency & Reporting	-.00631	-.07704	-.02571	-.00387	.0036	.00166
	(.02705)	(.0548)	(.03509)	(.00538)	(.00858)	(.00419)
Company Size (based on revenue)	-1.02052***	-.43016	-.32752	-.05208	-.18164***	-.11088***
	(.36615)	.43505	(.26555)	(.04409)	(.0536)	(.03396)
Region	-.66964***	-.51813**	.57033***	.000956	-.0573*	-.04159**
	(.16246)	(.21159)	(.16592)	(.02236)	(.03378)	(.01863)
Constant	9.33507***	1.37595	-1.18132	.71746*	1.25812**	1.07091***
	(3.55337)	(3.54067)	(2.41126)	(.39058)	(.52726)	(.27602)
R2	38.69%	48.23%	37.47%	5.61%	14.36%	6.96%
Number of observations	181	127	230	346	186	555

*** p<0.01; **p < 0.05; *p < 0.1

Note: The standard error for each variable is shown in parenthesis below the coefficient.

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