Increasing Returns, One Tree at a Time

An honors thesis for the Department of Economics

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Do Environmental, Social, or Corporate Governance Performances Impact a Firm's Return in the Stock Market?

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Abstract

Using a comprehensive dataset of environmental, social, and corporate governance (ESG) performances for a panel of global firms listed in the MSCI World Index from January 2007 – December 2012, environmental factors were found to have a positive effect on risk-adjusted stock returns. The results are of economic importance as an increase of one standard deviation in environmental score results in 3.165% in excess returns over one year, with industry variation controlled.

I. INTRODUCTION

Over the past decade, firms have come under increased scrutiny for the environmental and ethical impacts of their operations. From the irresponsibility of large financial institutions in the financial crisis of 2008 to British Petroleum's oil spill in 2010, there is more pressure for firms to do well by doing 'good' to society today than there has ever been before. Given this pressure, investors are rapidly moving towards socially responsible investing (SRI). SRI is an investing ideology where the social good of an investment is considered alongside the financial return in making an investment decision.

According to the Sustainable Investment Forum (2014), one out of every nine dollars under

professional management in the United States today is managed under SRI principles.

Investors today are more inclined to invest their money in companies that do 'good', as

opposed to investing in companies that may harm society or the environment.

Despite the recent influx of money to socially responsible investing practices, the

consensus is still out on whether or not environmental, social, or corporate governance

(ESG) factors can positively affect a firm's return in the stock market. While studies[1] have

shown that ESG adds an additional risk factor to an investment, allowing an investor to

further diversify and experience a decrease in downside risk, the evidence for ESG actually

increasing returns is conflicting.

Economists have chosen a variety of methods, datasets, and time periods to examine

this relationship; yet, the existing literature remains inconsistent. Derwall, Guenster, Bauer,

and Koedijk (2005) found that highly rated portfolios in terms of eco-efficiency performed

better than low ranked portfolios, supporting the idea that better environmental

performance is rewarded in the stock market. Conversely, Brammer, Brooks, and Pavelin

(2006) found that companies who are the best in their social performance offer poor

financial reward. Thus, in attempting to evaluate the impact of environmental, social, and

corporate governance factors as a whole, the relationship remains unclear.

The goal of this paper is to clarify this relationship, by analyzing the impact

environmental, social, and corporate governance factors have on a firm's return in the

stock market in very recent history. A lot has changed in the global marketplace since

Derwall et al. (2005) and Brammer et al. (2006). Significant corrections occurred in global

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[1] See Horter, Mader, and Menzinger (2010) and "Demystifying Responsible Investment Performance" (2007)

stock markets in 2008 as a result, in part, of a lack of oversight of large financial institutions and credit ratings agencies. Subsequently, individuals around the world have become more sensitive to the impact companies' operations have on society and the environment. Movements, such as Occupy Wall Street, have gained momentum and have become prominent themes in global discourse. Additionally, niche market ideologies, such as socially responsible investing, have begun to enter the mainstream.

In effort to investigate this trend of awareness, this paper examines monthly stock returns of over 4,000 global companies in the MSCI World Index from 2007 to 2012. Utilizing a comprehensive dataset composed of ESG data from MSCI and financial data from Bloomberg, this study conducts a cross-sectional regression of excess stock returns on ESG scores, in addition to three factors identified by the Fama-French model (1992) that are known to explain stock returns including beta, size, and value. Following Manescu (2011), a cross-sectional approach is preferred to a portfolio approach, as the interest of this paper is focused on the individual effect of ESG factors on stock returns.

This paper differs from the existing literature in a few ways. This study covers a unique and recent time period containing a significant global stock market correction. In addition, the time period of this study contains an increased emphasis and scrutiny of firms' behavior and impact on society and the environment. Lastly, rather than focusing on one particular pillar of ESG, the MSCI data allows this paper to investigate each pillar and evaluate the individual effect of ESG factors in one study.

The remainder of this paper will continue as follows. Section II will discuss the background of socially responsible investing and ESG. Section III will highlight the existing literature. Section IV will layout the empirical model and theory. Section V will discuss the

data used in the study, and Section VI will report and discuss the empirical results. Section VII will conclude and present avenues for further research.

II. BACKGROUND

Despite its status as a new trend today, the practice of socially responsible investing has been around for some time, and the concept has evolved substantially throughout its history. According to a report done by Deutsche Bank Climate Change Advisors (2012), early ethical investing was simply the decision to not invest in companies or industries that did not align with personal values. It is thought that Quakers during the 1500s, who sought to align their investments with their faith by not investing in gambling, tobacco, or alcohol related businesses, were some of the first prominent ethical investors[2]. Thus, founded primarily out of religious beliefs, early SRI practices were predominantly driven by values, and resulted in investors simply choosing to not invest in an activity they did not fundamentally agree with.

In the 1900s, these practices began to grow on a global level, and exclusionary efforts became synonymous with socially responsible investing. In 1971 during the Vietnam War, the Pax World Fund was created as the first ethical mutual fund designed as an investment option for those who were against weapons production. Furthermore in the 1970s, SRI found itself at the center of a global effort with the international community divesting from South Africa during apartheid. Thus, during its early history, SRI practices

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[2] See "Establishing Long-Term Value and Performance" (2012)

largely referred to a "values-based or exclusionary investment approach" where investors

simply did not invest in practices they did not agree with[3].

In the late 1990s to early 2000s, modern socially responsible investing practices

began to take shape. Negative ethical screens were common for socially aware mutual

funds during this time. However, the emphasis began to shift away from ethics and toward

incorporating ESG factors into investment decisions. ESG developed as a catchall phrase

referring to the consideration of environmental, community and societal, and corporate

governance criteria in investment analysis. With Levering and Moskowitz' analysis of the

"100 Best Companies to Work for" (1998), and new financial requirements created by the

Sarbanes-Oxley Act in 2002[4], investors in the mid 2000s became particularly focused on

corporate governance, as well as the "extra-financial performance" of a company according

to Hoepner (2013). Thus, ESG factors started to gain relevance. In 2004, ESG was further

endorsed when the UNEP Finance Initiative[5] found ESG factors to effect long-term

shareholder value. Shortly after, in 2006, the UN developed the Principles for Responsible

Investment, which redefined socially responsible investing as ESG factors were

incorporated into the investment decision-making process[6]. Thus, SRI evolved into ESG-

oriented investing, with investors considering both financial and ESG factors when valuing

companies.

Given the constantly evolving nature of socially responsible investing, it is important

to understand the context of ESG factors in SRI history. ESG is a new subset of investment

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[3] See "Establishing Long-Term Value and Performance" (2012)
[4] Sarbanes-Oxley was created out of the corporate scandals of Enron, WorldCom, and others. The Act
enhanced the standards for financial reporting and disclosure for firms, and provided for personal
responsibility by executives for firm conduct.
[5] UNEP FI is a global partnership between the United Nations Environment Program and the financial sector
that works to understand the impacts of environmental and social considerations on financial performance.
[6] See "The Six Principles" (2014)

research, only becoming relevant in the mid-2000s. The integration of ESG factors into investment decision-making is a very different process from the negative and ethical screens common in early SRI practices. ESG seeks to integrate and support investment analysis, whereas early SRI eliminates and constrains investments from an investor's choice-set.

With this changing concept of SRI, there has been a large amount of disparity within the research of this subject to date. Depending on how a researcher interprets SRI, the outcome of a study can vary greatly. Thus, the general disagreement by economists on the effect ESG factors may have on a firm's return in the stock market can possibly be due to the evolution of SRI over the past decade. As the literature in the next section will show, depending on the methodology economists take, studies can end up with substantially different results.

This paper seeks to clarify some of the disparity on this issue by evaluating the impact ESG factors have on stock returns under this most current definition of SRI, where ESG is incorporated into the investment decision-making process. It is the goal of this paper to determine if firms with higher ESG performances actually have higher returns in the stock market, and whether or not ESG-integrated investing can be an avenue to increased returns for investors in the near future.

III. LITERATURE REVIEW

As mentioned earlier, the empirical evidence for high ESG performance increasing a firm's return in the stock market is inconsistent. Over the past decade, a wide range of

literature has been developed that both supports and denies the impact different

environmental, social, and corporate governance factors have on a firm's financial

performance. Of the few studies that examine all three ESG factors at once, conflicting

results are reported as well. In an effort to methodically discuss the existing research, this

literature review will present research on each individual pillar of ESG one at a time.

In studies focused specifically on the environmental pillar of ESG, there are

inconsistencies in the empirical results. In looking at portfolio studies, Diltz (1995)

constructed various screened portfolios on a variety of ethical performance indicators. His

study found that environmental screens enhanced stock performance from 1989-91, or the

entire period of his study. Yamashita, Sen, and Roberts (1999) found that the highest

environmentally ranked stocks performed much better than the lowest environmentally

ranked stocks in conducting a comparison of 10-year risk-adjusted returns. Moreover,

Derwall et al. (2005) discovered that higher-ranked eco-efficiency portfolios, where eco-

efficiency is "the economic value a company creates relative to the waste it generates[7]",

performed better than low ranked portfolios from 1995-2003. Yet, the trend of a positive

relationship becomes inconsistent, as Brammer et al. (2006) found environmental

indicators to be negatively correlated with firm returns.

For studies focused on the social pillar of ESG, the results vary as well. Brammer et

al. (2006) found stocks with high social indicators to offer poor financial reward, and that

holding the *least desired* stocks in this group can lead to excess market returns. Edmans

(2011) investigated the relationship between employee satisfaction and long run stock

returns by looking at a portfolio of the "100 Best Companies to Work for in America." In the

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[7] See Derwall et al. (2005)

study, Edmans found a positive relationship between employee satisfaction and long run stock returns, which he attributed to mispricing. Mispricing, in general, is the scenario when a stock's price deviates from its true value. In Edmans' study, mispricing occurs as ESG is value relevant, however it is not efficiently reflected in stock prices[8]. Edmans found that high satisfaction causes higher firm value, but that the market does not capitalize on the higher value immediately. Additionally, in a study covering 1992 – 2008, Manescu (2011) found a community relations indicator to have a positive effect on risk-adjusted stock returns, which she attributed to mispricing as well. However, in contrast, Manescu's study also revealed a changing effect for an employee relations indicator, as the relationship was positive from 1992 – 2003[9], and negative from 2003 – 2008[10].

Despite movements in the early 2000s to tighten up corporate governance[11], the existing literature for this pillar is conflicting as well. Gompers, Ishii, and Metrick (2003) conducted a study using data from 1990 – 1999 that found firms with weak shareholder rights to exhibit significant stock market underperformance. However, Brammer et al. (2006) found stocks with high corporate governance indicators to offer poor financial reward. The research done by Gompers et al. was reexamined by Core, Guay, and Rusticus (2011) where they found the same relationship, but discovered that stock underperformance did not surprise the market, and concluded that weak governance does not cause poor stock returns.

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[8] See Manescu (2011)

[9] The positive relationship was due to mispricing; the negative relationship was due to a low non-sustainability risk.

[10] Overall, Manescu (2011) finds certain ESG attributes to be value relevant, but not efficiently incorporated into stock prices.

[11] The Sarbanes-Oxley Act was enacted in 2002.

Further complicating matters is work that has been done surrounding sin stocks - which are stocks of companies involved in gambling, alcohol, and weapon production - and highly rated ESG stocks. Kempf and Osthoff (2007) conducted an experiment buying stocks with high social responsibility ratings (the equivalent of an ESG rating), while selling stocks with low ratings. The strategy, conducted from 1992 – 2004, yielded alphas of 8.7% a year. Shortly after, however, work conducted by Kacperczyk and Hong (2009) found that sin stocks had higher expected returns than otherwise comparable stocks. They attributed this relationship to sin stocks being neglected by norm-constrained investors and facing greater litigation risk that was heightened by social norms. Yet, during this time, Statman and Glushkov (2009) found that tilting a portfolio for 'good', socially responsible firms gave an investor an advantage over the conventional investor. They found that the benefits for firms engaged in social responsibility exceeded the costs, confirming the work done by Kempf and Osthoff (2007) that higher-ranking firms perform better in the stock market. Statman and Glushkov (2009) also noted that shunning certain stocks would only offset this advantage, in contradiction to Hong and Kacpercyzk (2009).

The one aspect of this issue that business people agree on is that ESG adds a heightened element of diversification to a portfolio, which can reduce a portfolio's risk. In a study conducted by the research firm Risklab (2010), researchers created two portfolios of companies: one of companies with management aware and active on ESG issues, and another of companies with management unaware and inactive on ESG. Running both portfolios through various market scenarios influencing equity returns over twenty years, they assessed the risk of the two portfolios. Using a conditional value at risk metric of 95%, downside risk for the ESG-aware portfolio was -26.7%, much less than that of the ESG-

unaware portfolio, which had a downside risk of -52.3%[12]. Later, Risklab ran the same study with three defined markets of analysis: developed equity, emerging markets equity, and corporate bonds. With the same setup, Risklab found ESG-enhanced portfolios to have considerably less risk than non-enhanced and ESG-poor portfolios. However, the study lacked conclusion on ESG enhancing returns, only noting that, holding risk levels constant, it is possible for an ESG-enhanced portfolio to exceed the market.

Thus, despite agreement on ESG's potential to reduce risk, the existing literature is inconclusive in determining a relationship between ESG performance and stock returns. This ambiguity is directly related to the ever-changing nature of ESG, as well as SRI evolution over time. The general split on ESG is that some believe ESG-guided investment may sacrifice profit for a firm, while others believe that ESG-sensitive investing might encourage more investors to invest in a particularly 'good' company[13]. The sacrificed profit theory is that in facing increased scrutiny of the ESG impacts of its operations, firms may give up potentially profitable opportunities, leading to poorer financial performance. This theory has been supported by Walley and Whitehead (1994). The encouraged-ESG theory is that with high performance on ESG pillars, a company is boosted by market-based tailwinds. Consumers are more willing to buy products from a 'good' company and investors are more willing to invest in a 'good' company. This theory has been confirmed by Earnhart and Lizal (2009) who found firms that increased environmental performance increased profits, as well as by Flammer (2013) who found that companies that were reported to exhibit environmental responsibility experienced a significant stock price

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[12] For perspective, Risklab (2010) ran a standard global equity portfolio through the same model and found a downside risk of -38.8%.
[13] Good in terms of ESG performance

increase. Given increased awareness of firms' ESG behavior over the past decade, it is very possible that society is becoming more sensitive to firms' ESG impacts, especially with recent examples of how poor ESG practices can manifest in the global marketplace. Thus, it is possible that the sacrificed profit theory is disappearing, as the encouraged-ESG theory gains momentum through societal awareness of ESG concerns.

Moreover, following Manescu (2011), it appears that the controversy surrounding ESG and financial returns arises due to the "non-exclusiveness" of two stock universes[14]. Manescu states that "good firms" are those with high ESG performance in at least one pillar, whereas "bad firms" may not have the lowest ESG performance, but are "ignored by ethical investors [due to]... their beliefs."[15] Thus, it is possible that the consensus on ESG is confounded by the viewpoint of SRI taken by the researcher. Early SRI viewpoints using exclusion experiments like Kacpercyzk and Hong (2009), conflict with modern SRI studies and are not aligned with the contemporary SRI practices of ESG integration.

This study revisits this debate with the contemporary view of SRI. By evaluating a global set of companies on three factors known to explain stock returns, plus ESG pillar scores, this study aligns with modern SRI practices. By using data from 2007 – 2012, this study takes advantage of increased societal awareness of companies' ESG performance, which should manifest in firm stock returns. This study will build off the existing literature and attempt to evaluate ESG impact on firms' returns in modern light.

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[14] See Manescu (2011) p. 2
[15] See Manescu (2011) p. 3

IV. EMPIRICAL MODEL

The goal of this study is to test for a relationship between ESG performance and firms' returns in the stock market. This study conducts a cross-sectional regression of excess stock returns on ESG scores, in addition to three factors identified by the Fama-French model (1992) that are known to explain stock returns including beta, size, and value. The test for each pillar of ESG concern is whether their estimated effect is statistically indistinguishable from zero, as the model predicts.

This procedure follows the methods advocated by Fama (1998) by investigating monthly stock returns over time, rather than conducting an examination of buying and holding stocks for abnormal returns[16]. Similar to Edmans (2011), stock returns were chosen as the dependent variable as they suffer fewer reverse causality issues than using valuation ratios or firm profits, given the independence of the market from firm operations. Additionally, stock returns are more closely linked to shareholder value than firm profits, and valuation methods may underestimate this relationship.

Cross sectional regressions were chosen as this study seeks to identify why average stock returns may vary across assets[17]. Returns of a particular asset should be volatile if the asset contains large exposure to risk factors. Moreover, following Manescu (2011), a cross-sectional approach is preferred to the portfolio approach in analyzing returns, as the interest of this paper is focused on the individual effect of ESG factors on stock returns. Additionally, traditional portfolio theory suggests that screened portfolios reduce returns

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[16] See Brammer et al. (2006)
[17] See Cochrane (2005)

by limiting an investor's choice-set[18]. By conducting company level analyses rather than portfolio analyses, this study aligns with the contemporary SRI viewpoint of ESG integration and seeks to determine whether or not ESG factors significantly explain firms' stock returns.

The risk factors chosen for this study are the three factors identified by Fama and French (1992) known to explain stock returns: the market risk – as measured by firm beta, size – as measured by firm market capitalization, and value – as measured by firm book-to-market ratio. Book-to-market ratios are chosen as they absorb the roles of leverage and the price-to-earnings ratio, in accordance with Fama and French (1992). Moreover, Fama and French (1992) found book-to-market to capture more variation in average stock returns than other valuation metrics.

This three-factor model is built upon by adding three ESG variables, representing an individual environmental score, an individual social score, and an individual corporate governance score for each firm. The model, similar to Manescu (2011), is as follows:

$$R_{jt} = \delta_0{}^t + \delta_1{}^t \hat{\beta}_j + \delta_2{}^t Size_{jt} + \delta_3{}^t BookToMarket_{jt} + \delta_4{}^t Environment_{jt} + \delta_5{}^t Social_{jt}$$

$$+ \delta_6{}^t Governance_{jt} + \varepsilon_{jt}$$

where the excess stock return for firm j in month t (R_{jt}) is a function of the estimated beta ($\hat{\beta}_j$) of the firm, the market capitalization of the firm ($Size_{jt}$), the book-to-market ratio ($BookToMarket_{jt}$) of the firm, the environmental performance ($Environment_{jt}$) of the firm, the social performance ($Social_{jt}$) of the firm, the corporate governance performance ($Governance_{jt}$) of the firm, and an error term (ε_{jt}).

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[18] See Markowitz (1952)

Size, book-to-market, and all three ESG pillar variables were updated monthly. Unlike Brammer et al. (2006), given the focus on the individual ESG concerns in the analysis, this study used scores for each individual pillar of ESG rather than one overall ESG score[19]. Additionally, Bloomberg was used to obtain beta estimates[20]. Bloomberg estimated beta for each asset j ($j = 1... N$) by regressing the market-index return[21] on each asset's returns over the period of the study. The estimates are used in what is considered a two-pass Fama and MacBeth (2007) regression, as the betas estimated by Bloomberg are used as the explanatory variables in the cross-sectional regression.

Given the multi-dimensionality of the ESG concept, it is quite possible that the relationship with ESG performance and stock returns could be industry-specific. One industry may have exceptional ESG performance and financial returns, while another industry may contain firms with poor ESG performance and low stock returns. Thus, in order to prevent a false positive association between ESG performance and stock returns, this study must control for industry effects. Additionally, it is possible ESG effects could be different across industries, with some industries receiving market tailwinds from the ESG-guidance theory, while others face headwinds from the sacrificed profit theory. The costs and benefits of ESG may be different in different industries, thus in order to avoid obscuring the overall effect, industries will be controlled for. Following Manescu (2011), the previous model is augmented with dummy industry variables $Industry_i$ to control for confounding effects as follows:

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[19] Similar to Manescu (2011)
[20] See Section V. for description of Bloomberg.
[21] The MSCI World Index is used here.

$$R_{jt} = \delta_0{}^t + \alpha_i{}^t\,Industry_i + \delta_1{}^t\,\hat{\beta}_j + \delta_2{}^t\,Size_{jt} + \delta_3{}^t\,BookToMarket_{jt} + \delta_4{}^t\,Environment_{jt}$$

$$+ \delta_5{}^t\,Social_{jt} + \delta_6{}^t\,Governance_{jt} + \varepsilon_{jt}$$

which will be the main model used in this study. The model will be used to test whether the effect of each individual pillar of ESG is statistically indistinguishable from zero.

V. DATA

The ESG Dataset. Environmental, social, and corporate governance data are difficult to measure. As such, the expertise of MSCI, a leading investment research and index company, was used for this study. The ESG dataset was obtained via MSCI's subsidiary MSCI ESG Research. MSCI ESG Research has a 24-year legacy in conducting research on environmental, social, and corporate governance factors for stocks and bonds. In addition to the firm's in-house efforts, MSCI acquired the former research firm Kinder, Lydenberg, and Domini (KLD) Research & Analytics in the early 2000s. At the time of its acquisition, KLD was the leading provider of ESG research and its research was featured prominently in academic papers. Today, MSCI has the largest dedicated ESG research business out of all investment research companies. The company employs ninety dedicated ESG research analysts around the world, and is the leading provider of ESG research to institutional investors and asset managers.

The ESG dataset covers over 5,000 companies within the MSCI World Index. For each company, MSCI ESG analysts assess nearly 1,000 data points across thirty-four ESG issues, focusing on key ESG issues that pose significant financial risks and opportunities for

a company. The issues are sorted into three pillars, constituted of environmental, social, and corporate governance performances. Each pillar contains several sub-pillars. For example, the social pillar contains sub-pillars on issues such as community relations, diversity, human rights, and product safety. MSCI sources data from corporate documents, government data centers, popular trade and academic journals, news media, interviews with trade groups and industry experts, as well as from non-governmental organizations. After assessing each sub-pillar, the three main pillars are assigned individual scores. The scores are weighted and adjusted per industry, and aggregated to obtain a final company rating.

The dataset covers 5,346 companies in the MSCI World Index from January 2007 to December 2012. Each company has an overall ESG rating on an AAA to CCC scale, similar to municipal bonds. Each ESG pillar has a numerical score on a range from 0 – 10. The data were updated on a monthly basis.

The Financial Dataset. The financial data were obtained from Bloomberg. Bloomberg provides financial software tools and analytics through its Bloomberg terminal. The company is the largest provider of financial data to the financial services industry, and is highly regarded by professionals. Unique ISINs, which stand for each firm's International Securities Identifying Number, were extracted for each company listed in the MSCI ESG Dataset and inputted into Bloomberg. These ISINs were used in Bloomberg to obtain the monthly data for each company's corresponding stock returns, market capitalization, price-to-book ratios, estimated betas, and industry variables. Bloomberg financial data could be obtained for roughly 4,000 out of the 5,346 companies in the MSCI ESG dataset. Prior to its

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collection from Bloomberg, the financial data were converted to United States dollars. Bloomberg was also used to obtain monthly MSCI World Index returns, which were used in estimating firm betas.

The monthly financial data were then merged with monthly ESG data to complete the dataset for this study. The risk-free rate used to compute the excess stock returns series was the monthly return on the 3-year US Treasury. This series was used in the empirical tests, as well as in the estimation of beta. Data for monthly 3-year US Treasury returns were also obtained via Bloomberg.

VI. EMPIRICAL ANALYSIS

Sample Description. As previously mentioned, the ESG data sample consisted of 5,346 members of the MSCI World Index from 2007 – 2012. Monthly data on ESG scores were obtained from the ESG Dataset. ESG pillar performances were scored on a performance scale from 0 – 10. Summary statistics for the ESG scores are presented below.

Table 1. Summary Statistics: ESG

	Environment	Social	Governance
Mean	5.00	5.32	5.48
Standard Deviation	*(1.76)*	*(1.68)*	*(1.67)*
1st Quartile	3.84	4.27	4.50
Median	5.01	5.31	5.44
3rd Quartile	6.20	6.44	6.60

Note: Standard deviation in parenthesis

All of the ESG scores were uniformly distributed around their respective means, as shown in the histograms in Chart 1, Chart 2, and Chart 3 in the Appendix (Section VIII)[22]. Additionally, each pillar's scores contained low levels of variance, with the standard deviation only amounting to about 1/5th of each pillar's mean score.

Moreover, in order to confirm the specification of the empirical model and run the regressions with all three ESG score variables included, a correlation matrix was created to test for collinearity among the ESG variables. A threshold of 0.60 was used to determine if the regressions would be run with all three score variables included in the same regression. As shown in the correlation matrix below, the correlations between environment scores, social scores, and corporate governance scores were all under the threshold of 0.60, thus all three variables were included in the regressions and did not have to be regressed separately.

Table 2. Correlations between Variables

	Social	Governance
Environment	0.5006	0.4127
Social		0.4768

Using firm ISINs, corresponding financial data were obtained via Bloomberg. Monthly data were obtained for returns, price-to-book ratios, market capitalization, and estimated beta for each firm from January 2007 – December 2012. Summary statistics for returns, price-to-book ratio, market capitalization, and estimated beta are listed below on the following page.

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[22] Chart 3 shows a distribution of Governance scores. It contains outliers at scores of 7, 8.5, and 9.9. However, heteroskedasticity of the curve is in line with that of Charts 1 and 2, given the large sample size. Thus, the curve was considered a uniform distribution and the outliers were kept in the sample.

Table 3. Summary Statistics: Financial Data

	Returns	Price-to-Book	Market Capitalization ($Bn)	Beta
Mean	0.71	3.45	16.74	1.10
Standard Deviation	*(16.72)*	*(7.07)*	*(31.43)*	*(1.15)*
1st Quartile	-5.38	1.39	3.29	0.67
Median	0.88	2.25	7.19	1.04
3rd Quartile	6.45	3.66	16.51	1.46

Note: Standard deviation in parenthesis

The monthly data for firm stock returns covered a period of extreme market correction 2007-2008. This correction was followed by a tremendous rebound in stock prices in 2009, as the S&P 500 returned about 22% as assets returned to normal price levels[23]. Thus, the large standard deviation here is not surprising, given a very wide range of returns during this period.

The price-to-book ratio contained some interesting characteristics as well. One particular point that stood out was a small sample of very high price-to-book ratios, giving the data a skew to the right. These ratios were attributed to technology stocks, which, according to Jarzemsky and Winkler (2013), have been receiving increasing valuations by investors since 2010. Dropping these observations from the sample would ignore a specific selection of stocks as well as ignore a specific market trend. As such, the high ratios here were not surprising, and the data were included in the analysis.

Market capitalization data exhibited a large standard deviation, which was due to the presence of a few very large multi-national companies, such as Exxon Mobil Corp. Thus, the data contained a slight skew to the right. Brammer et al. (2006) noted that large firms are likely to receive higher ESG scores than small firms, although he found the association to be only moderately strong. Dropping these firms would have excluded a unique portion

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[23] See "Stock Market Year in Review" (2014)

of the sample, and since some of the firms are considered blue-chip companies[24], dropping

them from the study would misrepresent the market. Thus, the observations were included

in the analysis.

Beta is uniformly distributed around its mean of 1.10. It is higher than 1.00 due to

data coming from the MSCI World Index. The index contains exposure to a broad range of

developed international and emerging market stocks, thus the higher beta is indicative of

higher risk. Additionally, it is important to note that 1% of the observations contained

negative betas. Some stocks in this sample moved in a statistically opposite direction of the

market over the period of this study, possibly due to emerging market exposure. As such,

the negative betas were not considered a surprise and were included in the analysis.

The sample was classified into nine industry groups, as identified by Bloomberg.

The sample distribution is as follows: basic materials (9.40%), communications (8.72%),

consumer cyclical (13.82%), consumer non-cyclical (15.77%), energy (6.98%), financial

(19.72%), industrial (15.04%), technology (5.47%), and utilities (5.06%). The remaining

firms without industry identifiers (0.02%) were dropped from the analysis. This industry

data allowed for fixed effects regressions, controlling variation across different industries.

Analysis and Discussion

Both models were estimated using cross-sectional regressions for excess stock

returns on ESG scores, in addition to three factors identified by the Fama-French model

(1992) that are known to explain stock returns including beta, size, and value. The test for

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[24] According to "Blue Chip Companies: Guide to World's Best Stocks"

each pillar of ESG concern is whether its estimated effect is statistically indistinguishable from zero, as the model predicts. The first model was run without control for industry variation, while the second model took this factor into account by running fixed effects regressions. Additionally, both models were estimated first without ESG concerns, then with ESG concerns to examine whether ESG explains any portion of excess stock returns.

In estimating the first model without ESG concerns, firm price-to-book ratio, market capitalization, and beta all explained the cross-section of excess stock returns at the 1% α-level (see Table 4). The results were expected as these are the three factors identified by Fama and French (1992) that are known to explain stock returns. As expected, both price-to-book ratios and market capitalization had a positive effect on excess stock returns. Beta had a negative effect on excess stock returns, however this was not surprising given market correction and negative returns from 2007 – 2009, primarily due to a global recession. This can be interpreted as stocks that had higher, positive betas – or riskier stocks – experienced negative overall returns in the market during the period of this study, which is logical given the recession of 2007 – 2008.

Table 4. Without Industry Dummies

	Return	Return
EnvScore		0.134***
		(0.04)
SocScore		-0.010
		(0.04)
GovScore		-0.025
		(0.04)
PxToBk	0.047***	0.046***
	(0.01)	(0.01)
MktCap	0.005***	0.004**
	(0.00)	(0.00)
Beta	-0.357***	-0.354***
	(0.10)	(0.10)
Constant	0.639***	0.214
	(0.14)	(0.27)
Observations	45793	45749
R-squared	0.0013	0.0016

Note: Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

In estimating this first model with ESG concerns included in the analysis, all three factors known to explain excess stock returns as identified by Fama and French (1992) maintain statistical significance. Market capitalization was statistically significant at the 5% α-level, while price-to-book ratio and beta remained significant at the 1% α-level (see Table 4 on the above page). Additionally, all three factors maintain the signs of their coefficients, consistent with the previous regression. It is important to note here that the addition of ESG factors did not fundamentally change the price-to-book, market capitalization, and beta estimated coefficients. Each coefficient was lowered very slightly with the addition of ESG, yet the significance levels remained the same, with the exception of market capitalization's significance at the 5% α-level.

Moreover, with ESG scores included in this analysis, the environmental score reported statistical significance at the 1% α-level. This result is of economic importance as the analysis reveals that a 1-point increase in environmental score results in a 0.134% increase in monthly excess stock returns. Accordingly, one standard deviation increase in environmental score results in a 0.236% increase in monthly excess stock returns. Annualized for one year, one standard deviation increase in environmental score results in 2.87% excess returns over one year. However, despite the significance of the environmental score, both the social score and the corporate governance score were not statistically significant at any α-level. Additionally, the coefficients for social and corporate governance were negative, indicating a negative relationship between social and corporate governance scores and excess stock returns. However, this relationship is negligible as the 95% confidence interval for both coefficients captures zero.

In estimating the second model while controlling for industry fixed effects without

ESG factors included in the regression, all three factors identified by Fama and French

(1992) that are known to explain excess stock returns are statistically significant at the 1%

α-level (see Table 5 below). Firm price-to-book ratio and market capitalization have

slightly less positive relationships with excess stock returns, while beta has an increased

negative relationship in comparison to the first model.

In estimating the second model controlling for industry variation through a fixed

effect specification with ESG factors included, firm price-to-book ratio and beta maintain

statistical significance at the 1% α-level (see Table 5). Market capitalization is significant at the 5% α-level. Again, it is important to highlight that the estimated coefficients of the three known factors did not fundamentally change with the addition of the ESG variables. With ESG scores included in this regression, the environmental score is statistically significant at the 1% α-level. Both social scores and corporate governance scores remain insignificant, and both of their respective 95% confidence intervals capture zero. Additionally, the

Table 5. Industry Fixed Effects

	Return	Return
EnvScore		0.148***
		(0.04)
SocScore		0.006
		(0.04)
GovScore		-0.018
		(0.04)
PxToBk	0.046***	0.047***
	(0.01)	(0.01)
MktCap	0.005***	0.004**
	(0.00)	(0.00)
Beta	-0.419***	-0.424***
	(0.11)	(0.11)
Constant	0.704***	0.11
	(0.14)	(0.28)
Observations	45622	45578
R-squared	0.0559	0.0800
Number of Industries	9	9

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

relationship between environmental scores and excess stock returns appears to be

strengthened with industry variation controlled for. The result is of economic importance as a 1-point increase in firm environmental score results in a 0.148% increase in monthly excess stock returns in this analysis. Correspondingly, an increase of one standard deviation in environmental score results in a 0.260% increase in monthly excess stock returns. Annualized for one year, an increase of one standard deviation in environmental score results in 3.165% in excess returns over one year.

Moreover, controlling for industry fixed effects appears to strengthen the entire analysis as it leads to higher R^2 values for the second model in comparison to the first model. In estimating both models without ESG concerns, the R^2 value increases from 0.0010 to 0.0559 when controlling for industry fixed effects. When estimating both models with ESG concerns included, the R^2 value increases from 0.0016 to 0.0800 with industry fixed effects controlled. Thus, there appears to be a decent amount of variation between different industries with regard to ESG performance and excess stock returns. While initial R^2 were low for the first model, R^2 values for the second model were on point with values obtained in the existing literature[25]. Additionally, low R^2 values are typical of a cross-sectional regression such as the one executed here.

These results offer support to some of the existing literature. These results support earlier portfolio-level research conducted by Diltz (1995) who found that screening for high environmentally performing firms enhanced portfolio returns from 1989-91. Additionally, these results confirm that the relationship found by Yamashita, Sen, and Roberts (1999) still exists in the modern era, and that high environmentally ranked stocks perform better than low environmentally ranked stocks. Moreover, the work couples

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[25] In fact, R^2 values obtained exceeded those obtained by Manescu (2011) and Brammer et al. (2006)

individual firm level analyses with portfolio level analyses done by Derwall et al. (2005), where he found higher eco-efficiency portfolios to have higher performance. Lastly, the work refutes recent research on the environmental pillar by Brammer et al. (2006), as the results show environmental performance is positively related and statistically significant in explaining excess stock returns, as opposed to the negative relationship found by Brammer et al.

With statistically insignificant results for the social pillar, this research does not offer any support to the existing literature in this area. The study did not confirm Brammer et al. (2006) finding that high social performance is indicative of poor financial reward. Additionally, the study did not confirm the work done by Edmans (2011) that firms with high levels of employee satisfaction exhibit higher long-run stock returns. Rather, these results indicate that social performance is not value relevant and has no statistically significant impact on excess stock returns.

Additionally, these results find no evidence for corporate governance as a significant factor explaining excess stock returns. While these results do not confirm work done by Gompers et al. (2003) – that weak governance leads to stock underperformance, they also do not confirm the work done by Brammer et al. (2006) – that high corporate governance offers poor reward. Rather, like the social pillar, these results indicate that corporate governance performance is not value relevant and has no statistically significant impact on excess stock returns.

These results offer some support for existing literature surrounding overall ESG and SRI ratings. Kempf and Osthoff (2007) found a strategy of buying stocks with high social responsibility ratings to lead to alphas of 8.7% a year from 1992 - 2004. Statman and

Glushkov (2009) found that the benefits for firms engaged in social responsibility exceeded the costs, confirming Kempf and Osthoff's study. Both of their studies found evidence that high ESG ratings can indicate high stock returns. While both focused on overall ESG ratings, these results in particular identify the environmental pillar as the statistically significant ESG factor explaining excess stock returns.

These results refresh the empirical analysis and establish the importance of evaluating environmental factors in stock analysis, however, the results are not surprising. There are a few possible reasons why the environmental pillar is significant in explaining excess stock returns, while the social and corporate governance pillars are not. The first possibility is an issue of societal awareness of certain ESG concerns. While investor awareness of ESG factors has increased dramatically over the past decade, each pillar of ESG has become important at different points in time. The early 2000s were characterized by a renewal of corporate governance awareness. Through the Enron scandal and the creation of the Sarbanes-Oxley Act, corporations and executives faced increased accountability and scrutiny of their financial statements. Thus, it is possible that the impact of governance on excess stock returns was value relevant, and that the governance pillar explained a portion of excess stock returns during this time. However, this study reveals that from January 2007 – December 2012 this no longer appears to be the case, as revealed by the statistically insignificant results for governance.

Consequently, given heightened societal awareness of environmental concerns over the past decade, this study reveals environmental factors to be value relevant from January 2007 – December 2012. Over the period of this study, environmental concerns have been at the forefront of media attention. From a wave of new research surrounding global climate

change to British Petroleum's oil spill, the environment has been one of the main focal points of mainstream media. Thus, given heightened environmental awareness, an encouraged ESG dynamic may have taken hold. Following Earnhart and Lizal (2009) firms performing well on environmental factors may have received consumer tailwinds, boosting profitability and financial performance. Moreover, following Flammer (2013), investors may have placed more of an emphasis on firms who perform well in environmental areas, marking up the share price. Coupled together, it would appear that the encouraged-ESG hypothesis has taken hold over this study, resulting in a statistically significant environmental pillar.

Moreover, the significance of the environmental pillar may be supported by an increased ability to collect numerical data on environmental issues during this study. ESG data is very difficult to evaluate, especially given the wide range of issues the topic covers. Each pillar of ESG represents a completely different subset of issues and areas, some of which currently lack substantial numerical values. For example, how does one numerically evaluate how well a company treats indigenous people affected by its operations? This can create problems in allowing investors to evaluate these issues. However, over the past decade, corporations have faced pressure from financial regulators, such as the SEC, to disclose their environmental performance in their financial statements and annual company reports[26]. As a result, companies have begun to collect data to quantify their environmental performance. Additionally, pressure from non-profit organizations such as the Carbon Disclosure Project has increased the amount of companies that release statements regarding the environmental impacts of their operations. In fact, from 2005 -

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[26] In 2010, the SEC requested corporate disclosure on climate change issues material to business operations.

2012, the amount of companies responding to CDP climate change programs increased

from 355 to 4,112 firms. As such, data for the environmental pillar has become more

quantifiable, and it is possible that environmental performance became easier to interpret

with more firms disclosing information. Thus, given more quantifiable data and increased

societal awareness of environmental concerns, environmental performance became

relevant in explaining stock returns.

Looking forward from this study, it may very well be that this relationship continues

to exist today and could continue to exist in the future. Environmental issues continue to

remain a focal point of society, as highlighted by recent activism for fossil fuel divestment[27]

and protests over the controversial Keystone XL pipeline[28]. Moreover, investors continue

to request even more corporate environmental data from firms. According to the CDP, in

February 2014, 767 investors representing $90 trillion in assets – or about a third of the

world's invested capital – requested carbon emission disclosure and climate change

strategies from 5,500 publicly traded companies. With continued public activism and

investor awareness of environmental risks, the environmental pillar may continue to

explain excess stock returns in the future.

VII. SUMMARY AND CONCLUSION

By conducting cross-sectional regressions of ESG scores on excess stock returns, in

addition to three factors identified by the Fama-French model (1992), this study finds that

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[27] According to Wentz (2014), Whitman College was the most recent school to protest for divestment in April 2014. Whitman joins schools such as Brown, Harvard, Tufts, and Yale in schools pressuring their universities to divest the school's endowment from fossil fuel companies.
[28] According to Goode (2014), protests occurred in Washington DC over the Keystone Pipeline in April 2014.

from January 2007 – December 2012 environmental factors had a positive effect on stock returns, significant at a one percent α-level. The results are economically relevant as an increase of one standard deviation in environmental score results in 3.165% in excess returns over one year, with industry variation controlled for. Moreover, the results emphasize that, within the ESG investment research niche, environmental performance is the most value relevant pillar of ESG.

This study differs from previous research in a few different ways. First, by examining monthly stock returns of global companies in the MSCI World Index from 2007 to 2012, this study covers a recent time period containing a global stock market correction. Additionally, this study investigates a period of heightened societal awareness of ESG concerns by focusing on this particular time period. Moreover, rather than focusing on one particular pillar of ESG, the MSCI data allow this paper to investigate each pillar and evaluate the individual effect of ESG factors in one study. Lastly, this study examines the relationship between stock returns and ESG performance at a company-level, rather than a portfolio level as highlighted in the existing literature.

The findings of this study may have importance to both investors and to corporate management. Investors may be interested in knowing that the environmental pillar explained excess stock returns from January 2007 – December 2012. Additionally, investors may be interested in the finding that the environmental pillar is the only statistically significant pillar of ESG in explaining stock returns. Since ESG is very wide-ranging, this knowledge could allow investors to research only one particular pillar of ESG, and thus could save them time with more focused research. Additionally, this study could potentially save investors money, given fees charged by research companies for their ESG

research. Since the social and governance pillar were found to have no statistical impact in explaining stock returns, investors might no longer need research on these two pillars. Moreover, investors may find opportunities to outperform the market, by investing in firms with the best environmental performance. Given the focus of mainstream media on environmentalism as well as the development of long-term climate-driven events, firm environmental performance may continue to explain excess stock returns in the future and it is possible the results of this study may continue to hold.
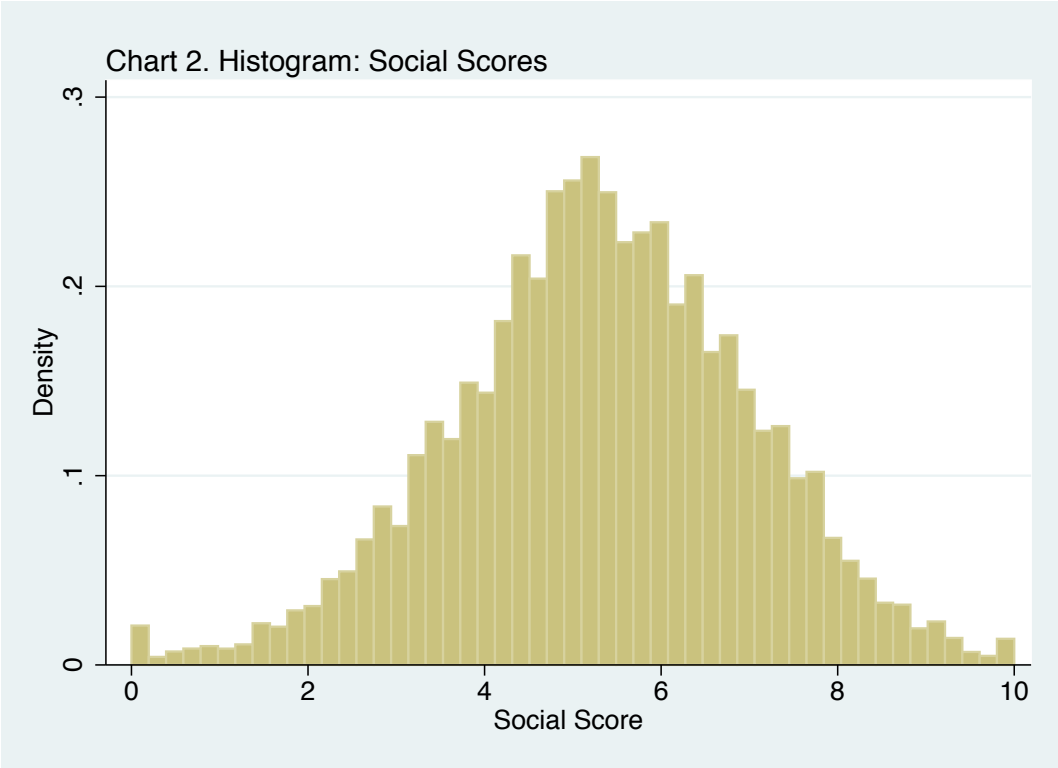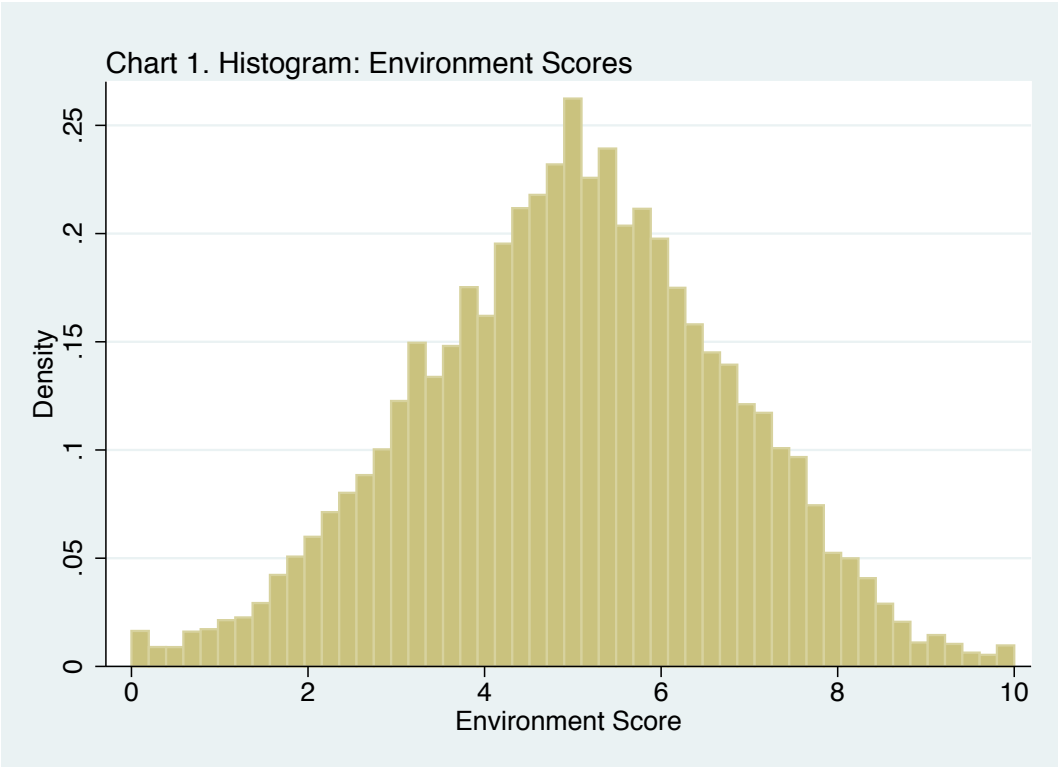
Corporate strategists may be interested in these results as well. Since these results reveal that firms with high environmental performance perform better in the stock market, corporations may be inclined to increase their own environmental performance as a means to reducing their cost of capital through a higher share price. As the results reveal, a 1-point increase in environmental score results in a 0.148% increase in monthly excess stock returns in this analysis. Thus, firms have potential to drive up their share price in the short term through improved environmental performance.
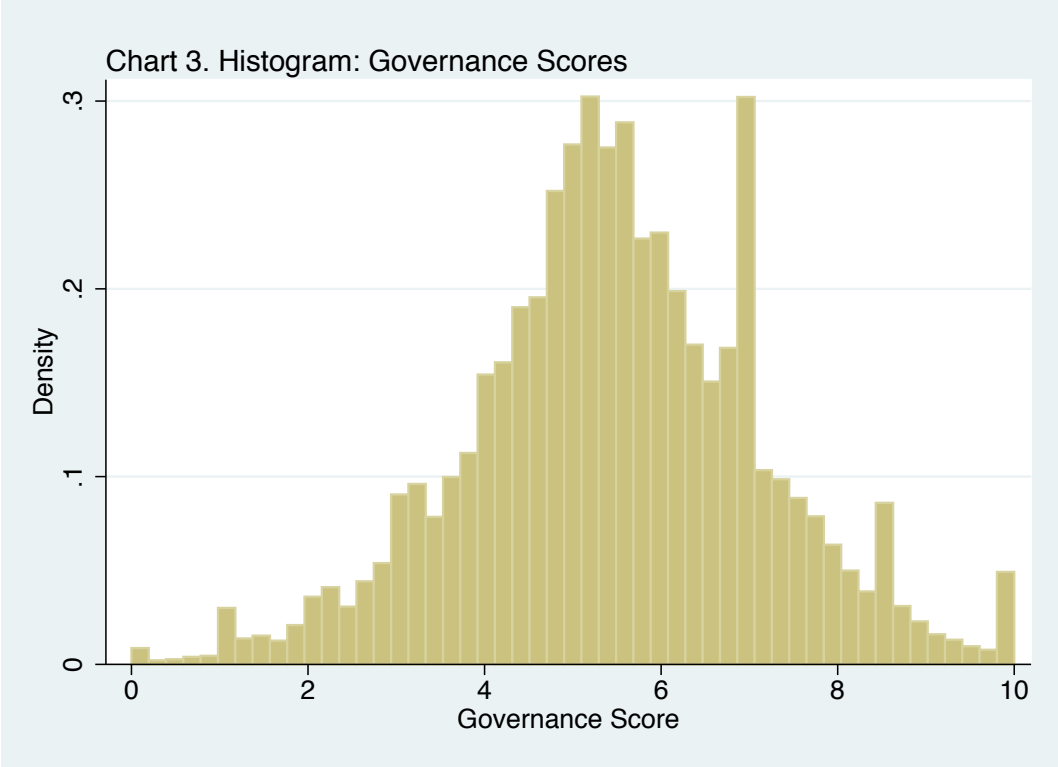
There are a few different avenues of further research from this study. First, one could investigate if the relationship between ESG and stock returns changes within each of the different industries, as that could offer investors industry-specific ESG strategies. Second, research could be conducted to examine whether the relationship shifted with the global recession of 2008. ESG may become more or less value relevant in market booms or busts, and the global recession of 2008 offers an excellent lens for this research. Additionally, since this study establishes firm environmental performance as a statistically significant factor explaining stock returns, research conducted with a more in-depth dataset containing a variety of environmental factors may be able to ascertain which exact

factors within the environmental pillar are of most importance. Moreover, one could follow the statistical tests conducted by Manescu (2011) and attempt to see whether it is mispricing or non-sustainability risk that explains the significance of environmental performance. Lastly, since levels of awareness of ESG concerns may shift over time, it is possible that each of the pillars may explain stock returns at different times – depending on societal awareness of key ESG issues. Therefore, reexamination of this relationship may be needed periodically as societal awareness of ESG concerns continues to shift and change over the years.

VIII. APPENDIX

Chart 1. Histogram: Environment Scores

Chart 2. Histogram: Social Scores

Chart 3. Histogram: Governance Scores

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