

# Data Science for Finance

Group 28

Do ESG Scores Generate Differences in Risk-Adjusted Returns?



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## ABSTRACT

The purpose of this study is to analyze returns within four groups of companies within different ESG classes in the USA between 2015 and 2019. We collected data from both Thomson Reuters and Fama and French databases. In the first part, We created a 3 factors Fama & French model incorporating different ESG ratings, modelized by dummy variables. Our empirical results showed that there was not a significant difference in risk-adjusted returns between firms with a A-rating compared to D-ratings, but companies with B-rating and C-rating present lower risk-adjusted returns compared to D-ratings in terms of ESG combined scores. In the second part, our goal is to focus on other risk-adjusted return measurements. To do so, we computed the Sharpe ratio and the Treynor ratio and performed a linear regression of these two indicators on our dummies for ESG classes and various control variables. Then, we analyzed the difference in the total risk (i.e. systematic risk plus idiosyncratic risk) within the different groups. The results showed that companies with higher ESG ratings had lower idiosyncratic risk, but there is no difference in systematic risk. Finally, we analysed if the difference of the ESG ratings had an impact on the risk-adjusted returns within different industries.

Our paper offers a broad analysis of the relation between ESG rating and the firm performance through various risk-adjusted indicators. Furthermore, we also explored the risk dimension alone, which is also an important investment criteria to take into account.

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## INTRODUCTION

Although the prevalent motive for investment has generally been financial returns, the concepts of Corporate Social Responsibility (CSR) and or Socially Responsible Investment (SRI), are in no way new<sup>1</sup>. However, Milton, F. (1962) argued that the benefits of shareholder theory outweighed those of stakeholder theory spawning the Friedman Doctrine and more recently, Roselle, P. (2016) finds these earlier attempts to account for externalities through so-called negative screening generally indeed resulted in a sacrifice in returns.

Much has evolved since the early days of stakeholder theory and the concept of CSR has been more clearly defined and quantified using ESG scores. Amel-Zadeh, A. et al. (2018) examine how ESG is integrated into investing in practice and observe a wider array of strategies and not just negative screening. Although Bose, S. (2020) ascertained there is definitely still room for improvement, and incoherences in ratings systems are a subject of their own studied by Gibson, R. et al. (2019), ESG reporting frameworks have improved tremendously over the years and the ever-increasing abundance of data has spawned a plethora of research aiming to reconcile ESG considerations with financial market returns.

Although ESG has taken the financial industry by storm with the Financial Times going as far as to claim ESG funds are to overtake traditional funds by as soon as 2025<sup>2</sup>, it is still under debate whether it is just another marketing ploy, or an alpha-generating strategy. A 2015 meta-analysis by Deutsche AMW on around 2'000 research papers over 45 years has found that some ESG investment strategies do perform better than ones which disregard ESG.

As sustainability and social issues lie at the heart of today's discussions, the most foreseeing investors seek companies that present high ESG scores in order to significantly reduce risk exposure that would affect the stock price such as legal issues. But as shown by Starks L. et al (2017) not all investors share the same investment time horizon and because performance of active fund managers

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<sup>1</sup> <https://medium.com/blue-sky-thinking/evolution-of-esg-e41302a473e5>  
<sup>2</sup> <https://www.ft.com/content/5cd6e923-81e0-4557-8cff-a02fb5e01d42>

is evaluated in the short-term, ESG factors are not taken into account in the same way. For B-ratings and C-ratings, the cost of implementing ESG policies exceeds the benefits, and therefore do not attract investors as the A-ratings would do.

This particular paper aims to analyze how risk-adjusted returns evolve in relation to the ESG Score, individual Environmental (E) ,Social (S) and Governance (G) scores as well as the ESG Combined score hereafter grouped under the term *All ESG Scores* (AES). Initially, through an adaptation of the Fama and French model, then by the Sharpe and Treynor ratios and finally, we analyze the correlation between ESG Grades and risk. All these steps will be done first for the NYSE as a whole and then for each individual industry.

## **DATA DESCRIPTION**

The database on which we performed our analysis was obtained using Refinitive's Eikon Screener platform. From the original universe of 8'103 observations composed of companies quoted on the NYSE between 2015 and 2020, we filtered out stocks which did not have ESG scores in years 2015 to 2019 which left with over 5'500 observations for most variables sorted by ICB industry (Table 0A). Companies which are not in our final database have either failed to publish the necessary information or did not yet exist in 2019. We winsored our database at a 1% level of significance in order to eliminate any outliers.

In order to make valid use of the ESG data provided by the platform it is crucial to understand just how the final score is obtained. Let us proceed from the most granular level upward. To begin with, over 450 data points are entered. These consist of boolean measures, pertaining to whether an ESG policy is in place such as a water saving plan for example, as well as numeric ones. How much carbon dioxide was released that year for example or, even more subtly how, transparent is a given company on such metrics. These 450+ data points are then used to calculate the scores of the 10 categories which constitute the E,S and G pillars. These 10 categories are given a score from 0 to 100 on a percentile rank basis to assure sensible peer comparison and a weight depending on how

material (more relevant to a particular company) that category is to the type of the company in question. The adaptive weighting system aims to put more emphasis on material information and to eliminate hidden biases. With these 10 Category Scores one can derive the individual Pillar Scores as well as the ESG Score.

Some companies may rather use the simple aforementioned ESG Score but there also exists the ESG Combined Score which might be of interest. This combines the simple ESG Score with the Controversy Score which aims to quantify how controversial a company is by underlining involvement in litigations and scandals. The controversy score can only worsen the score and the degree to which it impacts the final score depends on the size of the company. The logic behind this weight is that a larger company will have more market exposure and more potential issues by virtue of its size. Much like debt classes, all the scores covered are sometimes expressed in letter grade to allow for more comprehensible reporting. The score to grade relation is as follows:

A: (75-100] B: (50-75] C: (25-50] D :[0-25]

A being the best grade possible and D the worst. Further stratification can also be done with for example A+ or B-, but this goes beyond the scope of our study. Note that we distinguish the ESG Score which goes from 0 to 100 and the ESG Grade which goes from D to A.

We also used Kenneth French's website<sup>3</sup> to retrieve the risk free return as well as the data needed for the 3FF factors for North America between 2015 and 2019.

Tables and graphs detailing how the companies we studied are distributed among industries and as well as among ESG and ESG Combined scores can be found in the annex under table 0B, 0C and 0D respectively.

## METHODOLOGY

In order to understand the relation between returns and ESG in US markets, we decided to use the *3 factor Fama & French (3FF)* model, elaborated by Fama & French (1993). To incorporate the effect of ESG ratings, we generated dummies that would categorise the companies into four different

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<sup>3</sup> [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html#Developed](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Developed)

groups, according to their ESG grade. We will analyze the correlation between the returns and AES. The four different groups are based on the four different ratings determined by Refinitiv stated above. This allowed us to perform the following regression for each AES:

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1 MktRf_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RatingA_{it} + \beta_5 RatingB_{it} + \beta_6 RatingC_{it} \quad (1)$$

Where  $MktRf$  is the market premium,  $SMB$  is the “Small Minus Big” Factor,  $HML$  is the “High Minus Low” Factor which can be found in the classic 3FF model.  $RatingA$  is a dummy variable equal to one if the rating (i.e. ESG Score, Environmental, Social and Governance Scores or ESG Combined Score, depending on the regression) stands in category A, zero otherwise. The same logic is applied for the dummy variable  $RatingB$  and  $RatingC$ .

As we are running a Fama and French model combined with dummy variables, therefore the constant in our model is the alpha generated by the firm when the ESG score is lower than 25 (category D). Additionally  $\beta_4, \beta_5$  and  $\beta_6$  are the differences in alphas from group A, B and C respectively compared to the D group. Alpha in the 3FF model is a measure for returns which is adjusted for various risk factors. It is interesting to use this model, as high ESG scores have been shown to be less risky stocks than others (Kumar A et al., 2016).

Thereafter, to investigate the common theory that ESG is a type of risk measurement or proxy, we constructed the Sharpe Ratio (SR) as well as the Treynor Ratio (TR) for each observation to study the relation between risk-adjusted returns and ESG. The formulas are the following:

$$SR_{it} = \frac{R_{it} - R_{ft}}{\sigma_{it}} \quad TR_{it} = \frac{R_{it} - R_{ft}}{\beta_{it}}$$

Where  $R_{it}$  is the return of stock i over year t,  $R_{ft}$  is the risk-free rate of year t,  $\sigma_{it}$  is the standard deviation of stock i over period t and finally,  $\beta_{it}$  is the market Beta of stock i over period t. Therefore, it allowed us to calculate the following regressions for AES:

$$\begin{aligned} SR_{it} = & \alpha_{it} + \beta_1 RatingA_{it} + \beta_2 RatingB_{it} + \beta_3 RatingC_{it} + \beta_4 MarketCap_{it} + \beta_5 DebtPerEquity_{it} \\ & + \beta_6 RevenuePerShare_{it} + \beta_7 CurrentRatio_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} TR_{it} = & \alpha_{it} + \beta_1 RatingA_{it} + \beta_2 RatingB_{it} + \beta_3 RatingC_{it} + \beta_4 MarketCap_{it} + \beta_5 DebtPerEquity_{it} \\ & + \beta_6 RevenuePerShare_{it} + \beta_7 CurrentRatio_{it} \end{aligned} \quad (3)$$

Furthermore, we wanted to analyze whether the ESG score is correlated with volatility, which accounts for total risk (i.e. systematic risk plus idiosyncratic risk) with the following regression:

$$STD_{it} = \alpha_{it} + \eta_t + \beta_1 RatingA_{it} + \beta_2 RatingB_{it} + \beta_3 RatingC_{it} + \beta_4 MarketCap_{it} + \beta_5 DebtPerEquity_{it} \\ + \beta_6 RevenuePerShare_{it} + \beta_7 CurrentRatio_{it} \quad (4)$$

We added fixed effects for years to this model to potentially avoid omitted variables bias. Indeed, volatility is affected a lot by events (macroeconomic events, new laws in the sector which could disadvantage the business or even a global pandemic) as we can observe in the VIX<sup>4</sup>. Thereby, a fixed effect for a year will absorb the potential shock that happened in a given year. For example, if there is a global pandemic that affects the economy worldwide, we can expect volatility of nearly all firms to increase. As investors may fly-to-safety by selling their stock , this will decrease stock prices and therefore increase volatility. Nevertheless, this increase in volatility is caused by an exogenous shock, thus controlling for that allows us to see volatility over ESG groups whether that shock didn't happen because that year volatility was abnormally high.

We did not add fixed effects for years in model (1), (2) and (3) because  $R_f$  plays that role in those models. Indeed, as we are focusing on excess returns, if the risk free rate in a given year is relatively high, this means that the economy is doing well. Therefore, the return needed to have a positive excess return is higher. The risk free rate is a proxy for the economy's state. In a recession we would expect a lower risk free rate in order to stimulate the economy. For the model with the Sharpe Ratio, the Treynor Ratio and Volatility(STD) we used the same control variables.

It is useful to remind that returns and volatility are linked. If returns are affected, this would necessarily affect the volatility of the stocks. Before proceeding with the interpretation of our results, we will give some insight of how the control variables can be correlated with the standard-deviation of the stock (volatility) or the stock return. The market capitalization is a proxy for the firm size. Big companies may have strong financial resources, a well-implemented business or an expertise that may affect the volatility of their stock and the returns. Indeed, for example a sudden shortage that

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<sup>4</sup> <https://www.macrotrends.net/2603/vix-volatility-index-historical-chart>

affects all the industry, may not affect big companies, as the suppliers will probably deliver them first due to their long term profitable relations. Therefore, we could expect a positive correlation between the market capitalization and the returns, and a negative one with the volatility. Debt-to-Equity is the firm's financial leverage. We can expect a positive relation between this ratio and volatility and a negative relation with returns. Too much debt can increase the risk that the firm has insufficient earnings to refund it and therefore increase the probability of default. Investors might not keep firms with high probability of default in their portfolio depending on their aversion to risk as they could lose all their investment. Revenue per Share can be a proxy of the profitability of the firm per investor, as we could expect a positive relation with returns and a negative one with the volatility. Indeed, a profitable firm is more likely to be stable, to generate growth and therefore to attract investors. The current ratio can be a measure of liquidity of the firm, as sufficient liquidity is primordial in a business in order to pay short term obligations. Even a promising firm with poor liquidity could go bankrupt, thereby investors might be interested in this ratio as it can show a certain safety of the firm. In the other hand, the firm is aware of the risk if this ratio is too low and therefore will try to have sufficient liquidities in order to avoid it. The correlation of current ratio with returns may be negative and positive with the volatility.

For the TR, the volatility is reflected in the beta. Indeed, the latter is defined as the covariance from the stock with the market, divided by the variance of the market. Therefore, the same intuitions regarding the volatility can be applied for the TR. We chose these control variables as they may be correlated with the dependent and independent variables in the different models. These control variables may be correlated with the ESG scores. For example, we could expect a positive correlation between high ESG score and Market Capitalization, as big firms may allocate more resources to ESG criterias.

## EMPIRICAL RESULTS

### *Entire US Market (NYSE) Analysis*

Before starting the discussion about the empirical results, it is important to highlight that in our paper we were not able to make an experiment, which is the gold-standard in econometrics. Indeed, it would allow us to interpret our results as causal relations. However, in our paper all the results must only be interpreted as correlations. After running our regression with the 3FF coefficients, we obtained some significant results. Indeed, we observed significant correlations between the dependent variables and market premium, as well as with the SMB factor, indicating that smaller companies outperform bigger companies in the long run, as suggested by the 3FF model. Nevertheless, we found insignificant correlation with the HML factor. When we analyse the excess returns based on the four ESG ratings (Table 1A, column 1), we notice that companies with a medium rating of B and C have a lower alpha compared to firms with a low rating of D, where the difference is significant at a 5-10% level of significance. Additionally the most surprising result is that the returns performances between firms with low rating D and high rating A are not significantly different. This would suggest that the market performance of a firm is the highest when the company performs poorly in terms of ESG, or extremely well. Nevertheless, if we conduct the same analysis for the ESG Combined rating, we notice that the returns between firms with low rating D and high rating A are not significantly different either (Table 1A, column 2). However, medium rated companies in the B/C category are statistically lower than low rated companies in category D. This would suggest that in order to achieve high market performances, a company should either perform exceptionally well in terms of ESG, or perform extremely poorly, but achieving moderate results does not pay off.

To support our findings on our 3FF model, we determined the Treynor ratio of each company per year, as both models are measures based only on systematic risk. We decided to focus exclusively on the ESG and ESG combined scores, as they are the paramount factors when accounting the general ethics of a firm, for the purpose of an investment decision, rather than considering the three pillars individually. Additionally, we controlled for additional independent variables as mentioned

above, in order to limit an omitted variable bias. Therefore, our estimations indicate that there are no significant differences in the Treynor Ratio between each class in both the singular ESG and the ESG combined score, suggesting that a higher ESG score does not decrease the systematic risk (Table 1B, column 3-4). Nevertheless, we wanted to determine whether there is a significant correlation between the ESG score and the total risk (i.e. systematic risk and idiosyncratic risk). Consequently, we determined the Sharpe ratio of each company per year, using the same methodology as the Treynor Ratio. Ultimately, the results were more favorable for high ESG score companies than previously. At first, when considering the singular ESG score, we notice that the Sharpe Ratio is significantly higher for the category C and B, but surprisingly not the category A (Table 1B, column 1). However, when analysing the effect of ESG on such variables, it is more suitable to use the ESG combined score, as it accounts for controversies. Indeed, when considering the latter, the correlation between the score and the Sharpe ratio is positively significant, at a 5-10% level of significance, and is at its highest for the category A (Table 1B, column 2). Therefore, it suggests that companies with a high ESG score have a higher Sharpe ratio, indirectly a lower total risk (and a lower idiosyncratic risk). To confirm the aforementioned statement, we decided to regress the standard deviation using the same methodology as the Sharpe and Treynor ratio. The results were able to confirm our proposal. Indeed, the ESG score and the volatility are negatively and significantly correlated, indicating that a high score may induce a lower volatility (Table 1B, column 5-6).

To summarize our findings in the US market, the 3FF and Treynor ratio models tend to agree that a higher ESG does not induce a lower systematic risk, as the risk-adjusted-returns in these models are equivalent in each score category. However, the Sharpe ratio model, supported by our volatility model, indicates that a higher ESG score does statistically reduce the total risk, particularly the idiosyncratic risk (as the systematic risk is not impacted). From these results, a well-diversified investor would not consider the ESG score for future investment decisions, as it would only face systematic risk. However, for an undiversified investor (e.g. a major owner of one or few

companies), it would have to consider the idiosyncratic risk of a company in order to limit its exposure to risks. Therefore, corporations with a high ESG score would allow this investor to do so.

### ***Industries Analysis***

When proceeding with the same analysis for each industry in our database, we observe some converging (as well as diverging) results compared to the entire US market. A flaw in our database is that it only includes firms listed in the NYSE, which might generate estimation bias in some industries, particularly the technology industry, as they are usually listed in the NASDAQ stock exchange. Additionally, some industries might be mis-represented by the low number of observations (e.g. telecommunications, utilities basic materials).

From our estimations, we observe that the industrials (Table 8A/8B) and health care (Table 7A/7B) industries have the same results as the entire US market, which is that the ESG score is negatively and significantly correlated with the idiosyncratic risk, but has no significant effect on the systematic risk. In the basic materials industry, we observe that the ESG score does not have significant impact in any risk-adjusted measures. Indeed, regardless of the score's rating, there are no significant differences in the alpha of the 3FF, nor in the Sharpe ratio, Treynor ratio as well as the standard deviation (Table 2A/2B). These are not unexpected results, as firms of this industry might be reluctant to take major steps to undergo more ethical decisions, in favor of cost minimization. We observe similar results in the energy sector (Table 5A/5B), as firms of these two industries operate in the same “unethical style”. Additionally, the financials (Table 6A/6B), real estate (Table 9A/9B) and (Table 10A/10B) technology industries yield similar results (i.e. the risk-adjusted-measure are not significantly different depending on the score rating). In the consumer discretionary industry, we observe partially opposite results compared to the entire US market. Indeed, the differences in alpha generated by the 3FF model between the rating D and all other ratings are significant and negative (Table 3A). The same interpretation can be done with the Treynor ratio (Table 3B, column 3-4). However, the differences in the Sharpe Ratio between the rating D and all other ratings are non

significant (Table 3B, column 1-2). When looking at the volatility, we notice that at 1-5% level of significance, the volatility is lower with a higher score rating (Table 3B, column 5-6). This would suggest that systematic risk would increase in line with the score, but it would at the same time decrease the idiosyncratic risk. At the extreme, the results in the telecommunications industry would suggest that a higher score would negatively impact all risk-adjusted measures (Table 11A/11B).

## CONCLUSION

As sustainability and work ethics are becoming more and more popular, companies will have to adjust their investment decisions in the coming years in order to stay competitive and to adapt to this changing economic and societal environment. Through our empirical research, we wanted to compare companies with different ESG ratings to try to understand the impact on financial returns and risk. First, there was no significant difference in returns between firms with high and bad ESG scores using the 3FF model. But by considering other risk-adjusted returns, companies with high ESG scores had a better Sharpe ratio. By decomposing the risk structure, our models tend to show that the ESG score statistically reduces total risk through idiosyncratic risk. The last part of our analysis focused on applying our models across different industries. As the legal framework and resources vary widely from one sector to another, ESG scores do not impact all industries on an equal basis.

As future generations of stakeholders are concerned about sustainability, companies do not win over investors just by issuing reports. ESG practices must be integrated into long term strategy and operations in the near future if firms want to stay competitive and be in line with the global changing expectations. Finally, as the economy and humans are shifting towards more sustainable and ethical alternatives, an indicative measure such as the ESG scores is a crucial measure for future decisions, which might even raise fundamental questions regarding the current state of our economy, hustling some cornerstone principles elaborated by Milton Friedman<sup>5</sup>.

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<sup>5</sup> <https://www.bloomberg.com/news/articles/2020-12-01/how-wrong-was-milton-friedman-harvard-team-quantifies-the-ways>

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## APPENDIX

TABLE 0A: Descriptive Table

	N	Mean	STD	Min	Max
Returns	5668	.1068437	.3354019	-.66	1.27
Excess Returns	5668	.0967809	.3353338	-.6814	1.2698
Volatility	5729	.2955861	.1503969	.0962048	.9071959
Market Cap.	5763	16751.33	52175.89	21.01	1304765
Debt-to-Equity	5578	1.674618	4.996944	0	159.86
Revenue per Share	5800	170.4521	4189.728	0	155828.5
Current Ratio	4270	1.987761	1.500197	.14	19.06
ESG	5559	43.28832	19.45665	.88	93.21
ESG Combined	5559	41.79161	18.20473	.88	91.92
E	4219	38.09027	27.10173	.09	96.91
S	5559	45.27212	20.97837	.95	97.84
G	5559	52.36945	21.6702	.52	98.45
Market-Rf	5825	.1045	.1352951	-.0806	.2818
SMB	5825	-.02798	.0482221	-.0682	.0636
HML	5825	-.05908	.1444593	-.2024	.219
Rf	5825	.00994	.0084812	.0002	.0214

TABLE 0B: List of Industries

	N	Percentage	Cumulative %
Basic Materials	355	6.12	6.12
Consumer Discretionary	995	17.16	23.28
Consumer Staples	260	4.48	27.76
Energy	385	6.64	34.40
Financials	830	14.31	48.71
Health Care	390	6.72	55.43
Industrials	1220	21.03	76.47
Real Estate	700	12.07	88.53
Technology	325	5.60	94.14
Telecommunications	75	1.29	95.43
Utilities	265	4.57	100.00
Total	5800	100.00	

TABLE 0C: Frequency of ESG Score

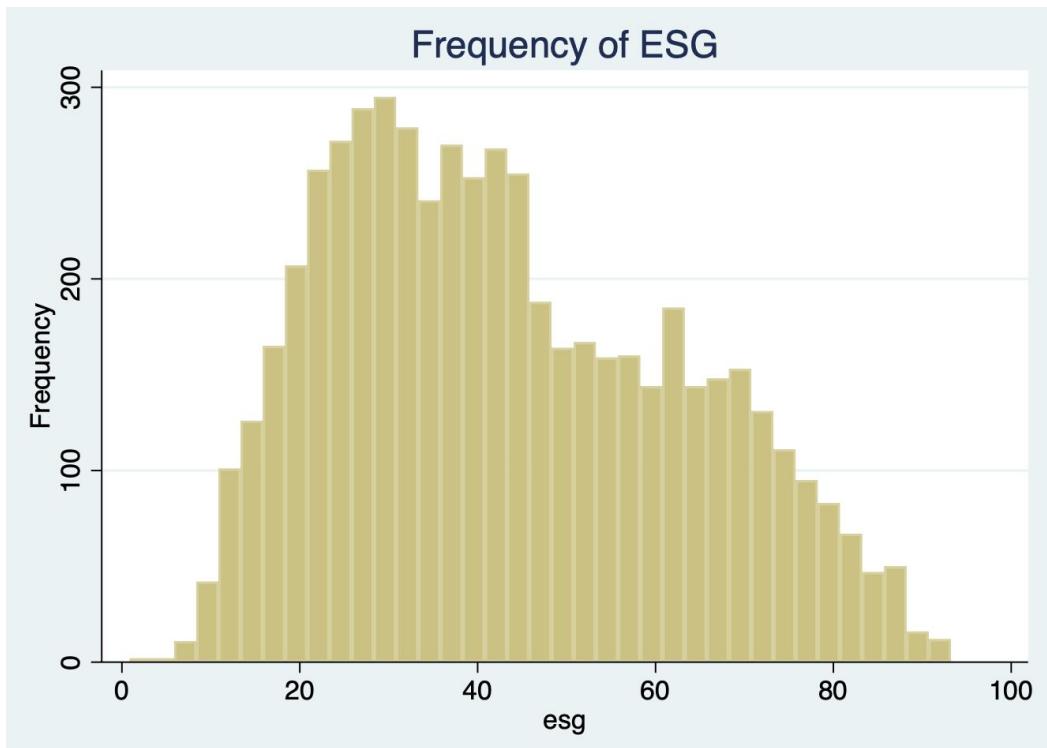


TABLE 0D: Frequency of ESG Combined

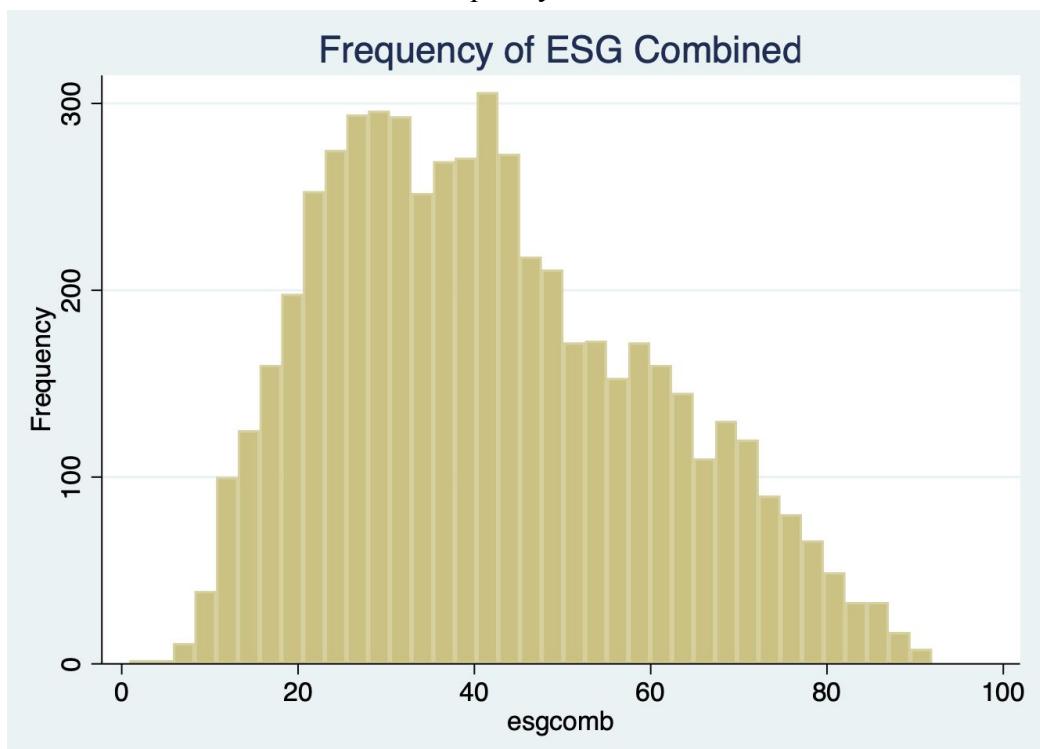


TABLE 1A: Three Factor Fama-French Model in the US Market

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.943*** (0.0515)	0.942*** (0.0514)	0.943*** (0.0515)	0.937*** (0.0515)	0.941*** (0.0513)
SMB	0.823*** (0.263)	0.823*** (0.262)	0.795*** (0.263)	0.847*** (0.263)	0.823*** (0.263)
HML	0.107 (0.0813)	0.107 (0.0812)	0.114 (0.0814)	0.102 (0.0813)	0.106 (0.0814)
Dummy Cat. A	-0.0164 (0.0160)	-0.000292 (0.0182)	-0.000193 (0.0116)	-0.00911 (0.0141)	-0.0365** (0.0143)
Dummy Cat. B	-0.0251** (0.0117)	-0.0291** (0.0118)	-0.0177* (0.0101)	-0.0190 (0.0125)	-0.00896 (0.0124)
Dummy Cat. C	-0.0208* (0.0114)	-0.0190* (0.0112)	-0.0206* (0.0109)	-0.0257** (0.0120)	-0.00432 (0.0134)
Constant (Alpha)	0.0435*** (0.0123)	0.0430*** (0.0123)	0.0329*** (0.00946)	0.0445*** (0.0130)	0.0373*** (0.0134)
N	5668	5668	5668	5668	5668
R <sup>2</sup>	0.200	0.200	0.200	0.200	0.200

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 1B: Sharpe Ratio, Treynor Ratio and Volatility in the US market

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	0.0913 (0.0847)	0.191** (0.0968)	-0.00976 (0.0276)	0.0155 (0.0313)	-0.0703*** (0.0115)	-0.0804*** (0.0110)
Dummy Cat. B	0.164*** (0.0538)	0.163*** (0.0539)	0.0300 (0.0190)	0.0267 (0.0188)	-0.0501*** (0.00819)	-0.0519*** (0.00810)
Dummy Cat. C	0.126*** (0.0485)	0.112** (0.0477)	0.0141 (0.0175)	0.0125 (0.0173)	-0.0229*** (0.00660)	-0.0275*** (0.00676)
Market Cap.	0.00000265*** (0.000000378)	0.00000261*** (0.000000354)	0.000000534*** (9.88e-08)	0.000000515*** (9.31e-08)	0.000000393*** (0.000000133)	0.000000437*** (0.000000137)
Debt per Equity	-0.00566* (0.00334)	-0.00560* (0.00334)	-0.00184 (0.00122)	-0.00184 (0.00122)	0.000976* (0.000562)	0.000982* (0.000564)
Revenue per Share	-0.000754*** (0.000211)	-0.000760*** (0.000212)	-0.000295*** (0.0000644)	-0.000297*** (0.0000647)	0.0000681 (0.0000615)	0.0000644 (0.0000620)
Current Ratio	-0.00429 (0.0122)	-0.00303 (0.0122)	-0.00571 (0.00419)	-0.00550 (0.00419)	0.00641*** (0.00245)	0.00650*** (0.00244)
F.E. Year 2016					0.0498*** (0.00499)	0.0505*** (0.00502)
F.E. Year 2017					-0.0285*** (0.00481)	-0.0278*** (0.00482)
F.E. Year 2018					0.0188*** (0.00494)	0.0197*** (0.00493)
F.E. Year 2019					0.0888*** (0.00561)	0.0886*** (0.00561)
Constant	0.319*** (0.0513)	0.319*** (0.0511)	0.132*** (0.0188)	0.132*** (0.0187)	0.307*** (0.00926)	0.309*** (0.00932)
N	3911	3911	3791	3791	3962	3962
R <sup>2</sup>	0.023	0.023	0.012	0.011		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 2A: Three Factor Fama-French Model in the Basic Materials Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.878*** (0.202)	0.864*** (0.202)	0.865*** (0.205)	0.880*** (0.202)	0.866*** (0.203)
SMB	5.553*** (1.159)	5.640*** (1.163)	5.612*** (1.166)	5.587*** (1.163)	5.531*** (1.167)
HML	-0.505 (0.367)	-0.526 (0.367)	-0.528 (0.368)	-0.532 (0.368)	-0.520 (0.368)
Dummy Cat. A	0.0467 (0.0644)	0.0332 (0.0646)	0.0263 (0.0582)	-0.0728 (0.0610)	-0.0519 (0.0595)
Dummy Cat. B	-0.0238 (0.0498)	-0.0372 (0.0514)	-0.0443 (0.0439)	-0.0244 (0.0528)	0.00358 (0.0588)
Dummy Cat. C	0.0437 (0.0509)	0.0149 (0.0509)	0.0178 (0.0474)	-0.0303 (0.0524)	-0.0699 (0.0632)
Constant (Alpha)	0.121** (0.0558)	0.139** (0.0577)	0.138*** (0.0479)	0.161*** (0.0594)	0.164*** (0.0607)
N	345	345	345	345	345
R <sup>2</sup>	0.432	0.431	0.431	0.430	0.433

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 2B: Sharpe Ratio, Treynor Ratio and Volatility in the Basic Materials Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.210 (0.247)	-0.225 (0.254)	-0.0396 (0.0909)	-0.0400 (0.0937)	0.0660 (0.0466)	0.00833 (0.0467)
Dummy Cat. B	0.0475 (0.193)	0.0280 (0.196)	-0.0345 (0.0589)	-0.0413 (0.0591)	-0.0213 (0.0306)	-0.0249 (0.0327)
Dummy Cat. C	0.111 (0.168)	0.0450 (0.167)	0.00533 (0.0547)	-0.00507 (0.0531)	-0.0194 (0.0277)	-0.0318 (0.0269)
Market Cap.	0.0000244 *** (0.00000535)	0.0000241 *** (0.00000537)	0.00000598 *** (0.00000147)	0.00000597 *** (0.00000149)	-0.00000448 *** (0.000000999)	-0.00000407 *** (0.00000105)
Debt per Equity	0.00886 (0.0277)	0.00991 (0.0280)	0.0163 (0.0114)	0.0166 (0.0114)	0.00787 *** (0.00183)	0.00811 *** (0.00183)
Revenue per Share	0.000881 (0.00177)	0.000954 (0.00177)	-0.0000730 (0.000596)	-0.0000659 (0.000594)	-0.000806 ** (0.000349)	-0.000843 ** (0.000356)
Current Ratio	0.0187 (0.0723)	0.0208 (0.0720)	0.00435 (0.0173)	0.00452 (0.0170)	0.00209 (0.0116)	0.00215 (0.0112)
F.E. Year 2016					0.0673 *** (0.0197)	0.0665 *** (0.0198)
F.E. Year 2017					-0.0655 *** (0.0170)	-0.0658 ** (0.0169)
F.E. Year 2018					-0.0321 * (0.0180)	-0.0298 * (0.0176)
F.E. Year 2019					0.0774 *** (0.0195)	0.0785 *** (0.0197)
Constant	0.0178 (0.281)	0.0403 (0.280)	0.0210 (0.0804)	0.0251 (0.0792)	0.410 *** (0.0441)	0.420 *** (0.0444)
N	336	336	324	324	340	340
R <sup>2</sup>	0.051	0.049	0.041	0.041		

Standard errors in parentheses

\* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

TABLE 3A: Three Factor Fama-French Model in the Consumer Discretionary Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.852*** (0.149)	0.846*** (0.149)	0.832*** (0.148)	0.828*** (0.148)	0.837*** (0.148)
SMB	1.056 (0.759)	1.077 (0.761)	1.046 (0.760)	1.199 (0.758)	1.028 (0.763)
HML	-0.290 (0.238)	-0.296 (0.239)	-0.270 (0.238)	-0.317 (0.237)	-0.282 (0.239)
Dummy Cat. A	-0.0918** (0.0445)	-0.0738 (0.0510)	0.0149 (0.0279)	-0.0778** (0.0367)	-0.0523 (0.0384)
Dummy Cat. B	-0.0910*** (0.0319)	-0.0973*** (0.0323)	-0.0649** (0.0294)	-0.0943*** (0.0343)	0.00583 (0.0315)
Dummy Cat. C	-0.0730** (0.0313)	-0.0661** (0.0306)	0.0185 (0.0280)	-0.109*** (0.0319)	0.0467 (0.0339)
Constant (Alpha)	0.0669* (0.0344)	0.0645* (0.0343)	0.0117 (0.0267)	0.0888** (0.0357)	-0.00586 (0.0348)
<i>N</i>	974	974	974	974	974
<i>R</i> <sup>2</sup>	0.149	0.149	0.145	0.153	0.146

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 3B: Sharpe Ratio, Treynor Ratio and Volatility in the Consumer Discretionary Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.326 (0.211)	-0.304 (0.256)	-0.117* (0.0711)	-0.113 (0.0788)	-0.0770** (0.0248)	-0.102*** (0.0227)
Dummy Cat. B	-0.145 (0.119)	-0.162 (0.120)	-0.0971** (0.0473)	-0.101** (0.0472)	-0.0482** (0.0189)	-0.0465** (0.0182)
Dummy Cat. C	-0.111 (0.110)	-0.111 (0.108)	-0.0492 (0.0470)	-0.0507 (0.0463)	-0.0398*** (0.0147)	-0.0433*** (0.0147)
Market Cap.	0.00000455*** (0.00000135)	0.00000427*** (0.00000125)	0.00000130*** (0.000000475)	0.00000120*** (0.000000449)	-0.000000513** (0.000000209)	-0.000000557** (0.000000219)
Debt per Equity	0.00287 (0.00438)	0.00274 (0.00437)	-0.000956 (0.00138)	-0.000963 (0.00138)	0.000118 (0.000648)	0.000120 (0.000648)
Revenue per Share	0.0000273 (0.000493)	0.00000719 (0.000494)	-0.00000925 (0.000146)	-0.0000127 (0.000146)	-0.000122 (0.0000797)	-0.000124 (0.0000804)
Current Ratio	-0.0177 (0.0369)	-0.0163 (0.0366)	-0.00909 (0.0145)	-0.00839 (0.0145)	0.00472 (0.00572)	0.00477 (0.00569)
F.E. Year 2016					0.0501*** (0.0120)	0.0508*** (0.0120)
F.E. Year 2017					0.0139 (0.0124)	0.0135 (0.0125)
F.E. Year 2018					0.0339*** (0.0111)	0.0338*** (0.0112)
F.E. Year 2019					0.128*** (0.0127)	0.128*** (0.0127)
Constant	0.348*** (0.127)	0.348*** (0.126)	0.155*** (0.0522)	0.155*** (0.0520)	0.328*** (0.0211)	0.330*** (0.0208)
N	803	803	785	785	811	811
R <sup>2</sup>	0.028	0.027	0.020	0.020		

Standard errors in parentheses

\* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

TABLE 4A: Three Factor Fama-French Model in the Consumer Staples Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.802*** (0.208)	0.802*** (0.207)	0.822*** (0.207)	0.807*** (0.205)	0.818*** (0.208)
SMB	-1.739* (0.991)	-1.786* (0.997)	-1.977* (1.005)	-1.816* (0.983)	-1.828* (1.002)
HML	0.676** (0.308)	0.677** (0.311)	0.730** (0.314)	0.698** (0.307)	0.684** (0.311)
Dummy Cat. A	-0.122** (0.0561)	-0.0975 (0.0602)	-0.0380 (0.0424)	-0.0951 (0.0603)	-0.0953* (0.0543)
Dummy Cat. B	-0.0708 (0.0551)	-0.0736 (0.0545)	-0.0588 (0.0453)	-0.0964 (0.0629)	-0.0593 (0.0534)
Dummy Cat. C	-0.103 (0.0628)	-0.0809 (0.0584)	-0.0537 (0.0534)	-0.130* (0.0663)	-0.0298 (0.0548)
Constant (Alpha)	0.0673 (0.0571)	0.0556 (0.0567)	0.0169 (0.0443)	0.0800 (0.0652)	0.0378 (0.0553)
<i>N</i>	250	250	250	250	250
<i>R</i> <sup>2</sup>	0.107	0.099	0.097	0.109	0.104

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 4B: Sharpe Ratio, Treynor Ratio and Volatility in the Consumer Staples Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.212 (0.280)	-0.0983 (0.309)	-0.0728 (0.131)	-0.0548 (0.148)	-0.0482** (0.0242)	-0.0473* (0.0267)
Dummy Cat. B	0.0396 (0.242)	0.00924 (0.236)	0.0147 (0.114)	-0.0222 (0.108)	-0.0276 (0.0244)	-0.0342 (0.0239)
Dummy Cat. C	-0.193 (0.234)	-0.113 (0.220)	-0.122 (0.119)	-0.0672 (0.115)	0.0219 (0.0255)	0.00865 (0.0245)
Market Cap.	0.00000307* (0.00000164)	0.00000330** (0.00000154)	0.000000446 (0.000000616)	0.000000643 (0.000000566)	-0.000000655*** (0.000000143)	-0.000000702*** (0.000000144)
Debt per Equity	0.00515 (0.00398)	0.00409 (0.00363)	0.000661 (0.00113)	0.0000285 (0.00114)	-0.000366 (0.000307)	-0.000308 (0.000305)
Revenue per Share	-0.000824** (0.000351)	-0.000801** (0.000365)	-0.000341*** (0.000110)	-0.000329*** (0.000114)	0.000120 (0.0000868)	0.000114 (0.0000858)
Current Ratio	0.0701 (0.0791)	0.0706 (0.0765)	0.0169 (0.0301)	0.0104 (0.0294)	-0.00595 (0.00895)	-0.00414 (0.00827)
F.E. Year 2016					0.0141 (0.0190)	0.0153 (0.0185)
F.E. Year 2017					0.00885 (0.0148)	0.00769 (0.0151)
F.E. Year 2018					0.0524*** (0.0184)	0.0536*** (0.0188)
F.E. Year 2019					0.0827*** (0.0188)	0.0765*** (0.0193)
Constant	0.358 (0.286)	0.329 (0.276)	0.211* (0.120)	0.217* (0.116)	0.251*** (0.0272)	0.253*** (0.0260)
N	227	227	225	225	231	231
R <sup>2</sup>	0.052	0.044	0.033	0.022		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 5A: Three Factor Fama-French Model in the Energy Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.660*** (0.211)	0.662*** (0.210)	0.652*** (0.211)	0.636*** (0.210)	0.641*** (0.210)
SMB	3.343*** (1.060)	3.323*** (1.058)	3.308*** (1.076)	3.361*** (1.064)	3.352*** (1.067)
HML	0.474 (0.316)	0.486 (0.316)	0.483 (0.323)	0.468 (0.318)	0.460 (0.317)
Dummy Cat. A	0.0188 (0.0497)	0.0386 (0.0660)	0.0529 (0.0409)	0.0551 (0.0494)	-0.0560 (0.0591)
Dummy Cat. B	-0.0295 (0.0484)	-0.0249 (0.0462)	-0.00472 (0.0464)	-0.00305 (0.0446)	-0.0244 (0.0558)
Dummy Cat. C	-0.0514 (0.0405)	-0.0503 (0.0397)	-0.0384 (0.0446)	-0.0185 (0.0399)	-0.0585 (0.0572)
Constant (Alpha)	0.0397 (0.0431)	0.0396 (0.0427)	0.0237 (0.0392)	0.0221 (0.0424)	0.0541 (0.0617)
<i>N</i>	369	369	369	369	369
<i>R</i> <sup>2</sup>	0.398	0.398	0.397	0.396	0.397

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 5B: Sharpe Ratio, Treynor Ratio and Volatility in the Energy Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.266 (0.236)	-0.271 (0.256)	-0.0939 (0.0756)	-0.0873 (0.0861)	-0.0244 (0.0314)	-0.00899 (0.0284)
Dummy Cat. B	-0.0392 (0.154)	-0.0738 (0.151)	-0.0545 (0.0503)	-0.0567 (0.0495)	-0.0420 (0.0328)	-0.0450 (0.0306)
Dummy Cat. C	-0.0640 (0.125)	-0.0695 (0.125)	-0.0287 (0.0479)	-0.0412 (0.0476)	-0.00958 (0.0199)	-0.0122 (0.0198)
Market Cap.	0.00000306** (0.00000136)	0.00000260** (0.00000123)	0.000000814*** (0.000000303)	0.000000671*** (0.000000254)	-0.00000128*** (0.000000383)	-0.00000128*** (0.000000350)
Debt per Equity	0.0277 (0.0295)	0.0283 (0.0295)	0.0140 (0.00926)	0.0138 (0.00932)	0.00343 (0.00261)	0.00338 (0.00260)
Revenue per Share	0.000223 (0.000581)	0.000236 (0.000583)	-0.0000110 (0.000183)	-0.00000980 (0.000183)	0.000180* (0.0000920)	0.000179* (0.0000920)
Current Ratio	0.0160 (0.0321)	0.0145 (0.0319)	0.00616 (0.00952)	0.00594 (0.00953)	-0.0112** (0.00488)	-0.0113** (0.00486)
F.E. Year 2016					0.101*** (0.0196)	0.100*** (0.0198)
F.E. Year 2017					-0.0488*** (0.0183)	-0.0502*** (0.0182)
F.E. Year 2018					-0.00394 (0.0165)	-0.00596 (0.0164)
F.E. Year 2019					0.0653*** (0.0189)	0.0640*** (0.0190)
Constant	-0.192 (0.134)	-0.181 (0.133)	-0.0455 (0.0496)	-0.0392 (0.0497)	0.433*** (0.0246)	0.436*** (0.0243)
N	357	357	343	343	359	359
R <sup>2</sup>	0.025	0.024	0.025	0.025		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 6A: Three Factor Fama-French Model in the Financials Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.927*** (0.0882)	0.928*** (0.0884)	0.930*** (0.0886)	0.922*** (0.0886)	0.934*** (0.0886)
SMB	0.616 (0.468)	0.610 (0.470)	0.611 (0.470)	0.638 (0.467)	0.562 (0.469)
HML	0.247* (0.146)	0.249* (0.146)	0.245* (0.147)	0.242* (0.145)	0.263* (0.146)
Dummy Cat. A	0.0387 (0.0339)	0.0536 (0.0425)	-0.0000553 (0.0239)	0.0243 (0.0319)	0.0166 (0.0290)
Dummy Cat. B	0.00633 (0.0240)	0.00114 (0.0245)	0.0449* (0.0244)	0.00975 (0.0272)	0.0152 (0.0228)
Dummy Cat. C	-0.0117 (0.0211)	-0.00953 (0.0208)	-0.0127 (0.0257)	-0.0133 (0.0250)	-0.00764 (0.0244)
Constant (Alpha)	0.0405* (0.0240)	0.0407* (0.0240)	0.0341** (0.0166)	0.0420 (0.0269)	0.0293 (0.0253)
<i>N</i>	810	810	810	810	810
<i>R</i> <sup>2</sup>	0.325	0.325	0.326	0.326	0.325

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 6B: Sharpe Ratio, Treynor Ratio and Volatility in the Financials Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.282 (1.089)	-0.282 (1.089)	-0.0966 (0.234)	-0.0966 (0.234)	-0.0928 (0.0689)	-0.0928 (0.0689)
Dummy Cat. B	0.362 (0.558)	0.362 (0.558)	0.0606 (0.142)	0.0606 (0.142)	-0.0670 (0.0537)	-0.0670 (0.0537)
Dummy Cat. C	0.340 (0.438)	0.340 (0.438)	0.0943 (0.121)	0.0943 (0.121)	-0.0719 (0.0582)	-0.0719 (0.0582)
Market Cap.	0.0000299*** (0.00000899)	0.0000299*** (0.00000899)	0.00000714*** (0.00000216)	0.00000714*** (0.00000216)	-0.00000104 (0.00000878)	-0.00000104 (0.00000878)
Debt per Equity	-0.0115 (0.0457)	-0.0115 (0.0457)	-0.00274 (0.00874)	-0.00274 (0.00874)	0.00354 (0.00240)	0.00354 (0.00240)
Revenue per Share	0.00267 (0.0113)	0.00267 (0.0113)	-0.000706 (0.00253)	-0.000706 (0.00253)	0.00126 (0.00117)	0.00126 (0.00117)
Current Ratio	-0.0127 (0.0479)	-0.0127 (0.0479)	0.000554 (0.0147)	0.000554 (0.0147)	0.0316*** (0.00440)	0.0316*** (0.00440)
F.E. Year 2016					0.0581** (0.0291)	0.0581** (0.0291)
F.E. Year 2017					-0.0358 (0.0270)	-0.0358 (0.0270)
F.E. Year 2018					-0.0119 (0.0204)	-0.0119 (0.0204)
F.E. Year 2019					0.0235 (0.0211)	0.0235 (0.0211)
Constant	0.139 (0.397)	0.139 (0.397)	0.0245 (0.101)	0.0245 (0.101)	0.203*** (0.0616)	0.203*** (0.0616)
N	77	77	72	72	78	78
R <sup>2</sup>	0.175	0.175	0.175	0.175		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 7A: Three Factor Fama-French Model in the Healthcare Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.487** (0.212)	0.491** (0.209)	0.493** (0.212)	0.457** (0.212)	0.457** (0.213)
SMB	0.353 (0.973)	0.347 (0.962)	0.346 (0.975)	0.482 (0.972)	0.491 (0.971)
HML	-0.443 (0.295)	-0.436 (0.292)	-0.443 (0.294)	-0.481 (0.295)	-0.500* (0.297)
Dummy Cat. A	0.0654 (0.0477)	0.0858* (0.0505)	0.0465 (0.0343)	0.0755 (0.0492)	0.0257 (0.0550)
Dummy Cat. B	-0.00766 (0.0480)	-0.00111 (0.0479)	0.00391 (0.0349)	0.00810 (0.0526)	0.0501 (0.0502)
Dummy Cat. C	-0.0213 (0.0528)	-0.0202 (0.0506)	-0.0271 (0.0520)	-0.0108 (0.0583)	0.0902 (0.0551)
Constant (Alpha)	0.0482 (0.0521)	0.0481 (0.0518)	0.0345 (0.0457)	0.0322 (0.0557)	0.000467 (0.0517)
N	377	377	377	377	377
R <sup>2</sup>	0.096	0.097	0.091	0.101	0.099

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 7B: Sharpe Ratio, Treynor Ratio and Volatility in the Healthcare Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	0.600** (0.248)	0.752*** (0.278)	0.0423 (0.0619)	0.0727 (0.0617)	-0.0639** (0.0303)	-0.0668** (0.0280)
Dummy Cat. B	0.343* (0.176)	0.325* (0.174)	0.0955* (0.0551)	0.0940* (0.0556)	-0.0225 (0.0254)	-0.0256 (0.0257)
Dummy Cat. C	0.133 (0.161)	0.118 (0.158)	0.0277 (0.0594)	0.0244 (0.0587)	0.0000189 (0.0248)	0.00122 (0.0247)
Market Cap.	0.00000120 (0.00000111)	0.00000208** (0.000000960)	0.000000566* (0.000000299)	0.000000563** (0.000000248)	-0.000000777*** (0.000000258)	-0.000000895*** (0.000000229)
Debt per Equity	-0.0433*** (0.0139)	-0.0430*** (0.0138)	-0.0146*** (0.00268)	-0.0145*** (0.00265)	0.00537*** (0.00132)	0.00540*** (0.00134)
Revenue per Share	-0.000989 (0.000685)	-0.000893 (0.000708)	-0.000214 (0.000214)	-0.000186 (0.000220)	-0.0000203 (0.000141)	-0.0000295 (0.000144)
Current Ratio	0.00538 (0.0296)	0.00488 (0.0294)	0.0314** (0.0135)	0.0313** (0.0135)	0.0181*** (0.00604)	0.0184*** (0.00592)
F.E. Year 2016					0.00111 (0.0145)	-0.000262 (0.0145)
F.E. Year 2017					-0.0347*** (0.0129)	-0.0348*** (0.0128)
F.E. Year 2018					0.0277 (0.0170)	0.0273 (0.0169)
F.E. Year 2019					0.0910*** (0.0188)	0.0885*** (0.0181)
Constant	0.377** (0.181)	0.374** (0.180)	0.0327 (0.0644)	0.0322 (0.0644)	0.280*** (0.0305)	0.282*** (0.0300)
N	333	333	324	324	337	337
R <sup>2</sup>	0.091	0.099	0.103	0.104		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 8A: Three Factor Fama-French Model in the Industrials Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	1.345*** (0.115)	1.345*** (0.115)	1.338*** (0.114)	1.343*** (0.114)	1.341*** (0.114)
SMB	1.010* (0.583)	0.999* (0.581)	1.006* (0.582)	1.000* (0.582)	0.983* (0.580)
HML	0.108 (0.179)	0.109 (0.179)	0.108 (0.179)	0.112 (0.179)	0.119 (0.178)
Dummy Cat. A	-0.0109 (0.0366)	0.0218 (0.0406)	0.0296 (0.0298)	0.0118 (0.0292)	-0.00158 (0.0334)
Dummy Cat. B	-0.0260 (0.0255)	-0.0292 (0.0256)	-0.00566 (0.0208)	-0.0298 (0.0238)	0.00695 (0.0295)
Dummy Cat. C	-0.0299 (0.0248)	-0.0230 (0.0246)	-0.0443** (0.0214)	-0.00608 (0.0235)	0.0382 (0.0307)
Constant (Alpha)	0.0339 (0.0260)	0.0301 (0.0256)	0.0233 (0.0211)	0.0215 (0.0245)	-0.00132 (0.0311)
<i>N</i>	1182	1182	1182	1182	1182
<i>R</i> <sup>2</sup>	0.325	0.325	0.327	0.325	0.326

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 8B: Sharpe Ratio, Treynor Ratio and Volatility in the Industrials Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	0.282 (0.204)	0.444** (0.222)	0.0718 (0.0538)	0.115* (0.0614)	-0.0825*** (0.0154)	-0.0866*** (0.0165)
Dummy Cat. B	0.127 (0.114)	0.138 (0.111)	0.0219 (0.0302)	0.0231 (0.0294)	-0.0568*** (0.0123)	-0.0605*** (0.0133)
Dummy Cat. C	0.174* (0.0946)	0.169* (0.0937)	0.0227 (0.0263)	0.0244 (0.0260)	-0.0239** (0.00973)	-0.0324*** (0.0109)
Market Cap.	0.000000785*** (0.00000143)	0.000000771*** (0.00000136)	0.000000978*** (0.000000258)	0.000000979*** (0.000000235)	-0.000000869*** (0.000000218)	-0.000000943*** (0.000000215)
Debt per Equity	-0.0146*** (0.00456)	-0.0143*** (0.00452)	-0.00263* (0.00154)	-0.00250 (0.00153)	0.000173 (0.000800)	0.000157 (0.000805)
Revenue per Share	-0.00150** (0.000647)	-0.00154** (0.000643)	-0.000521*** (0.000176)	-0.000523*** (0.000174)	0.000152 (0.000115)	0.000145 (0.000117)
Current Ratio	-0.0133 (0.0246)	-0.0124 (0.0246)	-0.00681 (0.00594)	-0.00654 (0.00592)	-0.00458 (0.00511)	-0.00444 (0.00512)
F.E. Year 2016					0.0616*** (0.00864)	0.0631*** (0.00880)
F.E. Year 2017					-0.0248*** (0.00851)	-0.0232*** (0.00862)
F.E. Year 2018					0.0308*** (0.00874)	0.0318*** (0.00873)
F.E. Year 2019					0.103*** (0.00964)	0.104*** (0.00979)
Constant	0.409*** (0.102)	0.405*** (0.100)	0.129*** (0.0287)	0.127*** (0.0283)	0.312*** (0.0166)	0.316*** (0.0170)
N	1074	1074	1046	1046	1093	1093
R <sup>2</sup>	0.049	0.051	0.022	0.024		

Standard errors in parentheses

\* p &lt; 0.10, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

TABLE 9A: Three Factor Fama-French Model in the Real Estate Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	1.221*** (0.0991)	1.220*** (0.0991)	1.234*** (0.0996)	1.227*** (0.0986)	1.215*** (0.0983)
SMB	-2.258*** (0.488)	-2.253*** (0.488)	-2.342*** (0.488)	-2.189*** (0.487)	-2.212*** (0.492)
HML	0.952*** (0.146)	0.951*** (0.146)	0.975*** (0.146)	0.937*** (0.145)	0.947*** (0.146)
Dummy Cat. A	-0.0316 (0.0420)	-0.0345 (0.0429)	-0.0593** (0.0293)	-0.0306 (0.0358)	-0.0547* (0.0307)
Dummy Cat. B	-0.0422* (0.0217)	-0.0420* (0.0216)	-0.0325* (0.0192)	-0.0636** (0.0280)	-0.0143 (0.0255)
Dummy Cat. C	-0.0142 (0.0206)	-0.0141 (0.0206)	-0.0262 (0.0205)	-0.0247 (0.0275)	-0.0283 (0.0267)
Constant (Alpha)	-0.0404* (0.0237)	-0.0402* (0.0237)	-0.0478*** (0.0168)	-0.0243 (0.0300)	-0.0359 (0.0292)
N	685	685	685	685	685
R <sup>2</sup>	0.298	0.298	0.300	0.302	0.298

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 9B: Sharpe Ratio, Treynor Ratio and Volatility in the Real Estate Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	0.141 (0.383)	0.0838 (0.388)	-0.0511 (0.102)	-0.0671 (0.101)	-0.0380 (0.0299)	-0.0372 (0.0270)
Dummy Cat. B	0.448 (0.320)	0.484 (0.321)	0.0641 (0.104)	0.0735 (0.104)	-0.0370 (0.0277)	-0.0291 (0.0270)
Dummy Cat. C	0.0420 (0.306)	0.0494 (0.301)	0.0260 (0.106)	0.0279 (0.104)	0.0449 (0.0393)	0.0414 (0.0385)
Market Cap.	0.0000268*** (0.00000480)	0.0000266*** (0.00000488)	0.0000114*** (0.00000299)	0.0000114*** (0.00000305)	-0.00000285** (0.00000114)	-0.00000282** (0.00000110)
Debt per Equity	-0.155*** (0.0550)	-0.158*** (0.0560)	-0.0486 (0.0358)	-0.0491 (0.0361)	0.00111 (0.00821)	0.000176 (0.00812)
Revenue per Share	-0.000739 (0.000887)	-0.000789 (0.000840)	-0.000254 (0.000226)	-0.000274 (0.000214)	0.0000288 (0.0000715)	0.0000455 (0.0000663)
Current Ratio	-0.0770 (0.0630)	-0.0806 (0.0631)	-0.0191 (0.0189)	-0.0199 (0.0189)	-0.0114 (0.00952)	-0.0117 (0.00914)
F.E. Year 2016					0.0887* (0.0502)	0.0876* (0.0506)
F.E. Year 2017					0.00912 (0.0387)	0.00770 (0.0389)
F.E. Year 2018					-0.00593 (0.0294)	-0.00761 (0.0292)
F.E. Year 2019					0.127** (0.0565)	0.121** (0.0574)
Constant	0.122 (0.327)	0.135 (0.328)	0.0392 (0.121)	0.0425 (0.120)	0.295*** (0.0462)	0.296*** (0.0447)
N	84	84	78	78	85	85
R <sup>2</sup>	0.255	0.260	0.352	0.357		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 10A: Three Factor Fama-French Model in the Technology Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.743*** (0.271)	0.742*** (0.269)	0.764*** (0.270)	0.722*** (0.268)	0.744*** (0.275)
SMB	0.955 (1.399)	0.996 (1.401)	0.823 (1.384)	0.978 (1.385)	0.904 (1.385)
HML	-0.452 (0.436)	-0.456 (0.437)	-0.406 (0.430)	-0.451 (0.431)	-0.429 (0.429)
Dummy Cat. A	-0.0311 (0.0869)	-0.0413 (0.111)	-0.121** (0.0574)	-0.0506 (0.0858)	0.0251 (0.0737)
Dummy Cat. B	-0.0201 (0.0574)	-0.0231 (0.0578)	-0.0647 (0.0530)	0.0557 (0.0784)	-0.0806 (0.0567)
Dummy Cat. C	0.0473 (0.0559)	0.0635 (0.0537)	-0.120** (0.0592)	-0.00358 (0.0754)	-0.0394 (0.0600)
Constant (Alpha)	0.102* (0.0589)	0.0937 (0.0576)	0.152*** (0.0496)	0.107 (0.0801)	0.150** (0.0587)
<i>N</i>	314	314	314	314	314
<i>R</i> <sup>2</sup>	0.107	0.111	0.118	0.108	0.110

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 10B: Sharpe Ratio, Treynor Ratio and Volatility in the Technology Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	0.0588 (0.405)	0.0934 (0.553)	-0.0520 (0.0891)	-0.0123 (0.109)	-0.0560 (0.0695)	-0.0796 (0.0560)
Dummy Cat. B	0.118 (0.217)	0.149 (0.214)	0.0203 (0.0679)	0.0241 (0.0671)	-0.0803*** (0.0273)	-0.0827*** (0.0272)
Dummy Cat. C	0.253 (0.175)	0.266 (0.171)	0.0611 (0.0592)	0.0648 (0.0579)	-0.0395 (0.0279)	-0.0353 (0.0266)
Market Cap.	0.000000132*** (0.000000479)	0.000000115*** (0.000000424)	0.0000000195* (0.000000114)	0.0000000115 (0.000000101)	-0.0000000152** (7.68e-08)	-0.0000000181*** (5.95e-08)
Debt per Equity	-0.0605*** (0.0151)	-0.0624*** (0.0148)	-0.0180*** (0.00342)	-0.0185*** (0.00335)	0.00152 (0.00195)	0.00121 (0.00201)
Revenue per Share	-0.000466 (0.000972)	-0.000484 (0.000970)	-0.000247 (0.000333)	-0.000257 (0.000333)	-0.000317*** (0.0000926)	-0.000302*** (0.0000874)
Current Ratio	0.00121 (0.0348)	0.00466 (0.0350)	0.00286 (0.00957)	0.00372 (0.00975)	0.00892** (0.00443)	0.00859* (0.00439)
F.E. Year 2016					0.0431** (0.0200)	0.0430** (0.0196)
F.E. Year 2017					-0.0603*** (0.0172)	-0.0614*** (0.0169)
F.E. Year 2018					0.0364 (0.0241)	0.0369 (0.0241)
F.E. Year 2019					0.0905*** (0.0254)	0.0888*** (0.0243)
Constant	0.554*** (0.177)	0.536*** (0.178)	0.164*** (0.0608)	0.159*** (0.0611)	0.352*** (0.0288)	0.352*** (0.0288)
N	294	294	284	284	299	299
R <sup>2</sup>	0.047	0.048	0.034	0.033		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 11A: Three Factor Fama-French Model in the Telecommunications Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.193 (0.578)	0.255 (0.579)	0.265 (0.576)	0.189 (0.615)	0.212 (0.577)
SMB	0.781 (2.466)	0.545 (2.463)	0.285 (2.379)	0.624 (2.608)	0.549 (2.533)
HML	0.348 (0.717)	0.415 (0.720)	0.458 (0.700)	0.393 (0.771)	0.400 (0.755)
Dummy Cat. A	-0.104 (0.108)	-0.150 (0.104)	-0.0780 (0.0856)	-0.0578 (0.115)	-0.239* (0.133)
Dummy Cat. B	-0.244*** (0.0846)	-0.264*** (0.0967)	-0.114 (0.0720)	-0.141* (0.0821)	-0.131 (0.106)
Dummy Cat. C	-0.149 (0.105)	-0.156 (0.0945)	0.0961 (0.103)	-0.127 (0.125)	-0.0668 (0.118)
Constant (Alpha)	0.289*** (0.106)	0.279** (0.106)	0.165* (0.0848)	0.228** (0.0956)	0.253* (0.134)
<i>N</i>	75	75	75	75	75
<i>R</i> <sup>2</sup>	0.163	0.158	0.116	0.122	0.129

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 11B: Sharpe Ratio, Treynor Ratio and Volatility in the Telecommunications Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.931*** (0.327)	-0.854*** (0.318)	-0.370* (0.204)	-0.350* (0.199)	-0.137*** (0.0331)	-0.134** (0.0331)
Dummy Cat. B	-0.808** (0.376)	-0.625* (0.370)	-0.379* (0.192)	-0.341* (0.185)	-0.0590*** (0.0227)	-0.0490** (0.0227)
Dummy Cat. C	-0.0375 (0.368)	-0.124 (0.350)	-0.182 (0.186)	-0.206 (0.184)	-0.0105 (0.0232)	-0.0150 (0.0236)
Market Cap.	0.00000449** (0.00000203)	0.00000211 (0.00000202)	0.00000160** (0.000000601)	0.00000100 (0.000000609)	-0.000000515*** (0.000000126)	-0.000000668*** (0.000000105)
Debt per Equity	-0.0720 (0.0708)	-0.0566 (0.0696)	-0.0282 (0.0256)	-0.0236 (0.0246)	0.0225*** (0.00489)	0.0235*** (0.00479)
Revenue per Share	0.00865* (0.00476)	0.00953** (0.00473)	0.00499** (0.00226)	0.00525** (0.00222)	-0.00113*** (0.0000999)	-0.00108*** (0.0000928)
Current Ratio	0.0438 (0.0921)	0.0631 (0.0881)	0.0286 (0.0270)	0.0339 (0.0264)	0.000847 (0.00577)	0.00200 (0.00571)
F.E. Year 2016					0.00359 (0.0309)	0.00286 (0.0313)
F.E. Year 2017					-0.0323 (0.0335)	-0.0320 (0.0340)
F.E. Year 2018					0.00765 (0.0412)	0.00524 (0.0444)
F.E. Year 2019					0.0502 (0.0382)	0.0512 (0.0372)
Constant	0.363 (0.490)	0.249 (0.475)	0.161 (0.266)	0.130 (0.259)	0.324*** (0.0300)	0.318*** (0.0289)
N	62	62	59	59	62	62
R <sup>2</sup>	0.205	0.182	0.263	0.256		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 12A: Three Factor Fama-French Model in the Utilities Industry

	ESG Excess Return	ESG Combined Excess Return	E Excess Return	S Excess Return	G Excess Return
Market-Rf	0.482*** (0.139)	0.490*** (0.138)	0.473*** (0.139)	0.496*** (0.137)	0.485*** (0.140)
SMB	1.265 (0.770)	1.249* (0.748)	1.384* (0.766)	1.224 (0.749)	1.336* (0.765)
HML	0.0201 (0.243)	0.0257 (0.233)	-0.0121 (0.242)	0.0241 (0.235)	-0.00220 (0.239)
Dummy Cat. A	-0.000232 (0.0689)	0.0828 (0.0751)	-0.0203 (0.0443)	-0.0543 (0.0640)	-0.0280 (0.0372)
Dummy Cat. B	0.0375 (0.0277)	0.0328 (0.0279)	0.0312 (0.0239)	0.0286 (0.0310)	-0.0302 (0.0327)
Dummy Cat. C	0.0462 (0.0297)	0.0323 (0.0305)	-0.00252 (0.0280)	0.0363 (0.0282)	-0.0469 (0.0375)
Constant (Alpha)	0.0715** (0.0321)	0.0707** (0.0319)	0.101*** (0.0281)	0.0805** (0.0333)	0.133*** (0.0363)
<i>N</i>	262	262	262	262	262
<i>R</i> <sup>2</sup>	0.276	0.276	0.275	0.281	0.271

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 12B: Sharpe Ratio, Treynor Ratio and Volatility in the Utilities Industry

	ESG Sharpe Ratio	ESG Combined Sharpe Ratio	ESG Treynor Ratio	ESG Combined Treynor Ratio	ESG Volatility	ESG Combined Volatility
Dummy Cat. A	-0.380 (0.296)	-0.0194 (0.320)	-0.367*** (0.140)	-0.259* (0.134)	0.0249 (0.0357)	-0.0444 (0.0319)
Dummy Cat. B	0.0284 (0.195)	0.0816 (0.197)	0.0279 (0.0884)	0.0387 (0.0903)	-0.000356 (0.0139)	-0.0130 (0.0145)
Dummy Cat. C	0.179 (0.188)	0.123 (0.187)	0.0717 (0.0807)	0.0483 (0.0811)	0.00546 (0.0123)	0.0103 (0.0135)
Market Cap.	0.0000166*** (0.00000522)	0.0000128** (0.00000498)	0.0000106*** (0.00000285)	0.00000906*** (0.00000273)	-0.00000160* (0.000000848)	-0.00000103** (0.000000475)
Debt per Equity	-0.109** (0.0518)	-0.134** (0.0525)	-0.0506** (0.0203)	-0.0594*** (0.0214)	0.0377** (0.0149)	0.0414*** (0.0160)
Revenue per Share	-0.00549 (0.00517)	-0.00726 (0.00522)	0.000175 (0.00252)	-0.000559 (0.00254)	0.000462 (0.000554)	0.000764 (0.000616)
Current Ratio	0.121 (0.184)	0.123 (0.185)	-0.0745 (0.0930)	-0.0723 (0.0931)	0.00556 (0.0101)	0.00582 (0.0101)
F.E. Year 2016					0.00485 (0.0104)	0.00476 (0.0101)
F.E. Year 2017					-0.0602*** (0.0114)	-0.0611*** (0.0114)
F.E. Year 2018					-0.00937 (0.0118)	-0.00776 (0.0127)
F.E. Year 2019					0.00376 (0.0168)	0.00127 (0.0155)
Constant	0.711*** (0.257)	0.809*** (0.259)	0.386*** (0.115)	0.424*** (0.117)	0.134*** (0.0330)	0.120*** (0.0369)
N	254	254	241	241	257	257
R <sup>2</sup>	0.087	0.074	0.138	0.117		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$