DETERMINING THE EFFECTS OF AGGREGATE AND DISAGGREGATE ESG RATINGS ON ABNORMAL STOCK RETURNS

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ABSTRACT

This paper examines the effects of Environmental, Social, and Governance (ESG) ratings and their component parts on excess stock returns for 719 firms in the S&P 1500. Although no relationship was found between aggregate ESG ratings and excess returns, novel findings between the disaggregated ESG score and excess returns were identified, including a negative relationship for the Environmental (E) score, a positive relationship for the Social (S) score, and a statistically insignificant relationship for the Governance (G) score. The effects of firm size on these relationships were also analyzed, yielding no significant results for small firms. However, the relationship between excess returns for large firms and ESG ratings yielded similar results to the overall sample size. Finally, this paper confirms the positive relationship between firm size and aggregate ESG ratings and expands upon this notion by determining significantly positive correlations between the E and S score and firm size, and a marginally significant positive relationship for the G score. This paper contributes to extant literature by examining the underlying factors effecting the ambiguous relationship between aggregate ESG scores and excess returns.

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For my parents,

Rob and Sarah Woodings

1. Introduction

This paper explores the growing movement toward sustainable investing, which is broadly defined as the use of environmental, social, and governance (ESG) factors in screening investment opportunities. Despite the global COVID-19 Pandemic, the 2020 Principles for Responsible Investment (PRI) report showed an increased signatory base of 20%,[1] bringing the total assets under management for firms following PRI to $103.4 trillion (PRI, 2020). Additionally, media outlets and the public continue to demand more information regarding the ESG performance of firms, with the total media coverage of sustainable investment increasing 75% from 2019 to 2020 (Schubin, 2021). Although ESG performance has become an increasingly important focus for firms, there is still a lack of consensus on which specific factors should be used to measure a firm's ESG performance, with over 100 organizations providing ESG ratings and research (SICM, 2016). This density of ratings and lack of consensus over the outcomes of ESG investing has raised the following question: Can investors expect to earn excess returns through stock screening based on ESG principles? Three main schools of thought have developed around this question. First, investors can outperform the market and other investment strategies through the use of ESG principles screening (Friede, Busch, and Bassen, 2015; Galema, Plantinga, and Scholtens, 2008). Second, investors should not expect to earn excess returns through the use of ESG screening, but they can invest based on these values and expect to earn average market returns (Halbritter and Dorfleitner, 2015; Humphrey, Lee, and Shen, 2012). Third, investors should expect to sacrifice average market returns in exchange for

[1] PRI signatories publicly commit themselves to pursuing ESG responsible investments in order to further a more sustainable financial system, as well as voluntarily disclosing the extent of their ESG activities to the public annually.

investing based on ESG principles (Lee, Faff, and Langfield-Smith, 2009; Brammer, Brooks, and Pavelin, 2006).

While these papers have explored the relationship between aggregate ESG ratings and excess returns, leading to a continued lack of agreed upon results, they do not seek to determine the relationship between the underlying factors such as the individual E, S, and G pillar scores in isolation, and how firm size plays a role in the effect of ESG ratings on returns. In their secondary findings, Humphrey et al. (2012) noted that larger firms tended to have higher ESG rankings and Brammer et al. (2006) concluded their findings by saying that there is a need for further research on the effects of individual ESG pillar scores on excess returns. The effect on returns of the individual ESG pillar scores, as well as a further examination of the auxiliary findings on the relationship between firm size, ESG pillar scores, and excess returns, are the main focus of this paper. My findings add to a better understanding of the underlying determinants and ultimate outcomes of ESG investing.

ESG ratings data were hand collected for 719 firms in the S&P 1500 from FTSE Russell's Mergent Online Sustainability database for eight quarters between 2018 and 2020. I regress excess returns on aggregate ESG ratings and the individual E, S, and G pillar scores, and include a number of control variables. I then test to determine whether the results differ for larger firms.

Similar to the findings of Halbritter and Dorfleitner (2015), I find no statistically significant relationship between the aggregate ESG scores and excess returns. However, a disaggregation into pillar scores yielded novel results. There is a significant negative relationship between the E score and excess returns, and a significant positive relationship between the S score and excess returns. I find no relationship between the G score and

excess returns. I also find that the results are relatively similar for larger firms—the E score is negatively and significantly associated with excess returns. The positive relationship of excess returns and the S score is positive, but not statistically significant. No significant association is found between the G score and excess returns. For smaller firms in the sample, however, all results are statistically insignificant.

I then examine the association between accounting performance and both the aggregate and component ESG scores. Using ROA as a measure of accounting performance, I find no relationship between accounting performance and the aggregate ESG score, E score, or G score, and a marginally significant and positive relationship between the S score and ROA for all firms. Breaking the results down between larger and smaller firms, I find no significant relationship between ROA and any of the pillar scores or the aggregate ESG score for smaller firms. However, for larger firms, there was a significant positive relationship between ROA and the ESG score, E score, and S score, and a significant negative relationship with the G score.

Finally, expanding upon the auxiliary findings of Humphrey et al. (2006), this paper confirms the positive relationship between firm size and aggregate ESG ratings. Furthermore, I build upon this notion with the disaggregation of the ESG score and find significantly positive correlations between the E and S score and firm size, and a marginally significant positive relationship between firm size and the G score.

These results contribute to extant literature by examining the underlying factors affecting the ambiguous relationship between aggregate ESG scores and excess returns, such as firm size and individual pillar scores. Additionally, these findings confirm previous hypotheses concerning the relationship between firm size and ESG ratings, as well as

provide novel findings on the relationship between firm size and disaggregated ESG pillar scores. However, these results are limited by several factors including sample size, time span, and number of unique ESG ratings and measures of accounting performance used. Therefore, future literature should seek to determine whether these relationships persist over a longer time period and larger sample size, as the trend toward a focus on ESG investing continues. Additional research should also seek to determine whether these relationships exist between firm size and excess returns for other ESG ratings providers such as Sustainalytics and Thomson Reuters, as well as other accounting performance measures.

The remainder of this paper is structured as follows. Section 2 presents the motivation of the study. This section provides a review of the literature and lays out my broad predictions. Section 3 outlines the methodology. Section 4 reviews the results of my tests and presents the discussion of findings. Section 5 concludes the paper.

2. Motivation and Predictions

Environmental, social, and governance (ESG) investing is an investment strategy in which investors consider not only a target firm's financial returns, but also the firm's record and performance in terms of its reported impact on the environment and on society, as well as the strength of its corporate governance structures and attributes. I review the literature on ESG investing, and motivate my predictions below.

2.1. History of ESG Investing

ESG investing has risen to the forefront of investing strategies over the past decade in the United States and it took hold in Europe even earlier. However, ESG investing, also known as Socially Responsible Investing (SRI) at its inception (and also used interchangeably with sustainable investing),[2] is not a novel concept. Its origins date back over 200 years to when religious groups such as Quakers and Muslims would avoid investing in companies or ventures known as "sin stocks" that did not act in accordance with their beliefs (Liu, 2020). ESG investing did not evolve into its next stage until 1932 when Adolf Berle and Gardiner Means' book, *The Modern Corporation, and Private Property* shed light on stakeholder capitalism and the way in which managers should take into consideration public policy, as well as maximizing profits for their shareholders (Denning, 2020). By the 1960s and 1970s, SRI started to pick up speed as groups of investors against the Vietnam War banded together to boycott investment in companies responsible for producing Agent Orange and napalm. Despite its increased visibility and

[2] It is important to note that while ESG investing has its origins in SRI, there is a nuanced difference between the two terms. SRI is grounded in older views that an investor should not support a company that does not align with their values, while ESG investing did not reach mainstream usage until the mid 2000s. ESG is considered to be a component of sound financial investing as a means of mitigating risk in addition to supporting causes that aligns with an investor's values. For the purposes of readability and in keeping with the modern usage, this paper will focus solely on ESG investing.

popularity, SRI was still decried as fundamentally contradictory to the goals of a company by many including Nobel Prize winner Milton Friedman in an article he wrote for *The New York Times Magazine* promoting shareholder capitalism, as well as supporters of Markowitz's 1952 paper, "Portfolio Selection", which introduced Modern Portfolio Theory (Townsend, 2020). 1973 gave rise to the first SRI stock tracker under *New York Times* journalist Milton Moskowitz, but it was not until the mid-2000s that SRI investing found its first mainstream home in the modern age in Europe.

After the Exxon Valdez oil spill in 1989, world organizations such as the United Nations Environmental Program (UNEP) began to take a more active role in advocating for SRI. By 2005, UNEP commissioned a report from the London law firm Freshfields Bruckhaus Deringer that was the first comprehensive investment policy covering SRI (Townsend, 2020). The report sought to determine if the integration of ESG principles into investment policy was voluntarily permitted, legally required, or limited by law and regulation in major European and US markets. The conclusion of the report, specifically as it pertained to US markets, was that ESG principles were the fiduciary duty of firms and ignoring them could lead to long terms risks (Townsend, 2020).

While climate change was a major driver of SRI in Europe, poor corporate governance was the ultimate catalyst for the arrival of ESG investing in the United States. In the wake of the 2008 financial crisis, US investors needed a more comprehensive lens with which to view companies' behavior to mitigate the risks of poor management or business practices. Thus, they acquired the ESG strategies that European investors began using almost a decade earlier (Townsend, 2020). However, investors were left wanting in terms of positive outcomes based on governance-driven investing, as there was

inconclusive data to support not only what good governance was in practice, but also a lack of consensus on its definition among ratings agencies (Snyder, 2009). Instead, the government stepped in to reconcile many of the pre-crisis governance concerns with the 2010 Dodd–Frank Act and the focus of ESG investing in the US reverted back to the initial European focus on the environment. In the succeeding decade, support from investors and governments, especially focused on the environment, grew rapidly with notable events such as the SEC's first offered guidance on climate change in 2010, the Paris Agreement in 2016, and most recently the Business Roundtable's 2019 adoption of new business principles. These new principles departed from the old mindset of maximizing shareholder value and instead tasked corporations with looking out for all stakeholders (Business Roundtable, 2019).

Although its proponents argue ESG investing has a long way to go before it is properly measured by ratings agencies and enforced by governments, it has gained increasing popularity among retail and institutional investors alike. Investment products linked to ESG in 2019 had a total global value of $31 trillion--$12 trillion of which are found in the US, with another $14 trillion originating in Europe (Dimson, Marsh, and Staunton, 2020). While ESG investing as a whole is growing, the 2020 US trends report by The Forum for Sustainable and Responsible Investment (US SIF) shows that there are varying degrees of focus on each individual ESG component (US SIF, 2020). According to the report, in asset-weighted terms, money managers took social factors into account slightly more than environmental or governance factors at an increase of 49% from 2018, but environmental criteria grew faster than social or governance as a whole at 57% from 2018. Although the governance factor of executive pay saw the highest growth of 122%

from 2018, the most of any single ESG factor, climate change was still the largest considered factor on an asset weighted basis with investments totaling $4.2 trillion. On the other hand, conflict risk was the largest social criterion totaling $1.8 trillion in assets under management, but this was a decrease of 22% from 2018 (US SIF, 2020). The ultimate conclusion from this report was that while the overall trend toward ESG investing continues to increase, professional money managers and institutional investors whose ESG investments now account for 33% of all investments under professional management (US SIF, 2020) are more focused on environmental and governance factors.

The understood definition and urgency for environmentally responsible investing has become clearer with an increased focused on climate change research and media coverage in recent years. This has contributed to a larger concentration of investments into specific environmental factors such as sustainable natural resources and carbon emissions control. Conversely, governance investing continues to show a widening gap in its scope and lacks a universally accepted definition, which is evidenced by less concentrated investments across a larger number of loosely defined G factors such as anti-corruption and board issues. This is largely due to the fact that there are over 100 organizations that provide ESG ratings and research, according to Sustainable Insight Capital Management (SICM, 2016). These organizations not only use a wide range of factors or themes for their governance score, but they also consider the sub factors used to calculate the aforementioned themes' proprietary information, making it difficult for money managers to identify a discernible overlap and consequent investment strategy for governance investing.

This brief history of ESG investing has covered its inception of primary values-based SRI up until its present-day evolution into a strategy where investors utilize nonfinancial factors related to a firm's impact on all of its stakeholders in order to identify risk and growth opportunities that will earn them excess returns. Although this history shows that ESG investing has gained significant buy in from governments, NGOs, and large institutional investors, it is clear that a consensus has yet be reached on what ESG metrics investors should factor into their analyses. This has led to a growing body of research regarding the viability of ESG investing as a whole, which is the focus of this paper.

2.2. Impact of ESG Ratings

Despite the fact that ESG investing in its modern form has been around for almost 15 years, the jury is still divided on whether or not it is a viable investing strategy. The extant research has shown three main schools of thought on the subject. First, ESG investing outperforms broad market indices and other investment strategies (Friede, Busch, and Bassen, 2015; Galema, Plantinga, and Scholtens, 2008). Second, ESG investing does not yield excess returns, but rather it performs in line with average market returns and as such can be considered "good" because investors do not have to sacrifice returns for the sake of their values (Halbritter and Dorfleitner, 2015; Humphrey, Lee, and Shen, 2012). Finally, ESG investing earns investors a lower rate of return than other strategies (Lee, Faff, and Langfield-Smith, 2009; Brammer, Brooks, and Pavelin, 2006).

A recent study supporting the first school of thought reviewed over 2000 empirical studies on ESG investing and financial performance, starting in the 1970s and ending in 2015, and concluded that a positive relationship exists between ESG investing and market

outperformance. Additionally, they concluded that the outperformance opportunities are mainly focused in North America, emerging markets, and nonequity assets (Friede et al., 2015). They believe that this positive relationship has remained stable since the 1990s. Galema et al. (2008) critically review studies on ESG investing that do not find an empirical relationship between excess returns and companies with high ESG ratings. They argue that this statistical phenomenon occurs because the majority of these research papers control for risk using Fama-French regressions with the HML factor. The use of this particular control results in lower book to market ratios, and consequently eliminates the statistical observability of positive alphas for stocks with high ESG ratings. They provide evidence that outside of this particular design choice, there is ultimately a positive relationship between ESG and excess returns.

In regards to the second school of thought, Halbritter and Dorfleitner (2015) argue that there is no evidence of excess returns in a portfolio of investments with high ESG ratings compared to ones composed of firms with low ESG ratings. Furthermore, Halbritter and Dorfleitner (2015) believe that any such evidence of significantly higher returns in an ESG portfolio is highly dependent on specific ratings and the time period for which the analyses was conducted. Although they acknowledge large influence of some ESG variables on financial performance, Halbritter and Dorfleitner's (2015) research covering the time period 1991 to 2012 with multiple ESG rankings shows that investors should not expect excess returns through ESG investing as it has become more prominent in the past decade and the positive effects are already priced in. These results are in contradiction with papers prior to 2007 that showed excess returns. In a more region-specific approach, Humphrey et al. (2012) studied the risk adjusted stock performance of UK firms,

differentiating between low and high ESG ratings, and found no significant variation in the market performance of these firms. Their study concluded that investors should not be concerned about sacrificing returns for socially responsible investing. They also made a notable discovery that companies with higher ESG rankings tended to be larger, but did not hypothesize potential explanations for these results. I explore this question further in this paper.

Contrary to the previous two viewpoints, Lee et al. (2009) found that there is a negative relationship between high ESG ratings and high corporate financial performance (CFP), and that there is no relationship between ESG ratings and CFP on an accounting basis. They asserted that their findings are based on the fact that firms with high ESG ratings trade at a premium relative to similar firms with lagging ESG performance because investors bid up their price. This suggests that investors do value firms who participate in ESG activities, but are willing to accept lower returns because it is already priced in. Lee et al. (2009) also notes that high ESG firms may be able to obtain a lower cost of capital because leading ESG firms are also leading disclosure firms, which typically results in a lower cost of capital. Brammer et al. (2006) analyzed UK listed companies and found that firms achieving high ESG scores were more likely to achieve lower returns, while firms with a ESG score of zero outperformed the market. They also determined that there is a negative correlation between environmental and community factors, while employment has a low positive correlation. Although Brammer et al. (2006) only used one ESG measure, they added the caveat that ESG factors need to be analyzed in isolation, which is further motivation for the disaggregation of ESG measures in this current study.

2.3. Predictions

Although debates persist in all countries over whether or not ESG principles are components that should drive managements decisions or government regulation, this philosophical argument is outside the scope of this paper. Rather, I explore two main questions and present empirical evidence regarding ESG ratings.

First, how do a firm's aggregate ESG ratings, as well as the individual environmental, social, and governance components of the ratings, impact market returns and accounting performance? As suggested by Brammer et al. (2006), ESG factors need to be disaggregated and analyzed in isolation to determine which variables, if any, are most closely related to higher returns. Given the mixed results in the literature thus far, I do not make a directional prediction regarding how aggregate ESG ratings are associated with market returns and accounting performance.

Regarding the individual components, I predict that the social component of ESG ratings is most likely to increase the returns of a firm, while the environmental and governance elements are likely to have no effect on the returns of the firm. The previous history of ESG investing outlined above alludes to the main reasoning behind this prediction. Modern ESG investing after the antiwar social movement in the 1960s and 1970s largely evolved to focus on environmental factors with increasing media, scientific, and governmental focus on climate change. I argue that investors have come to expect environmentally responsible behavior from firms, especially in the past decade. Thus, the market's expectations regarding environmental factors are higher, so any environmental actions are likely to be already incorporated into the stock price in relatively efficient markets.

Drawing on the findings of Brammer et al. (2006) it is likely that social scores, whose calculations are largely weighted toward employment practices and labor standards, have a positive impact on returns, as these practices improve the operations of a firm, as well as its public perception. Additionally, this relationship is less likely to be priced in for two reasons. First, as discussed earlier in Section 2.1 on the history of ESG investing, investing solely based on social factor screening is still a relatively new phenomenon and thus is earlier in its development, which means that all of its positive effects on firms are not yet accounted for. Second, the themes for the calculation of the FTSE Russell social score in this paper are heavily skewed toward employment practices, which is not the case with all other ESG ratings providers. Therefore, investors using S score metrics that are closely correlated with employment practices such as FTSE Russell's may be able to capture positive alphas that are found in other ESG ratings providers' S scores.

Further, in academic, legal, and practical contexts, there are a variety of definitions of governance and no clear consensus of what good governance entails. Differing combinations of various governance mechanisms are used by ESG ratings firms. Consequently, there are also mixed empirical results regarding the long- and short-term market effects of good governance (Maher and Andersson, 2000; McRitchie, 2020; Diavatopoulos and Fodor, 2010).

The second question this paper seeks to answer is whether or not the size of a company impacts the correlation between ESG scores and both market returns and accounting performance. Humphrey et al. (2012) found that companies with a positive correlation between high ESG rankings and positive returns tended to be larger. However, this was not the main focus or conclusion of their paper. I build upon this result and

investigate how size is associated with each individual ESG component. I then examine whether size differentially affects the association between disaggregated components of ESG scores and both market returns and accounting performance.[3]

[3] Note that as discussed later, my sample is taken from the S&P 1500, which denotes that the sample consists of relatively larger public firms. Thus, even firms that are designated as relatively smaller within my sample are still among the large publicly listed firms.

3. Research Design

To examine how ESG scores are associated with both market returns and accounting performance, I run the regressions presented in Equations (1) and (2) below. In addition, I cluster standard errors by firm to account for any correlation in the data within firms.

$$Dependent\ Variable = a + b\,ESG\ Rating + Controls \quad (1)$$

$$Dependent\ Variable = a + b_1\,E\ Rating + b_2\,S\ Rating + b_3\,G\ Rating + Controls \quad (2)$$

A summary of the variable definitions can be found in the Appendix.

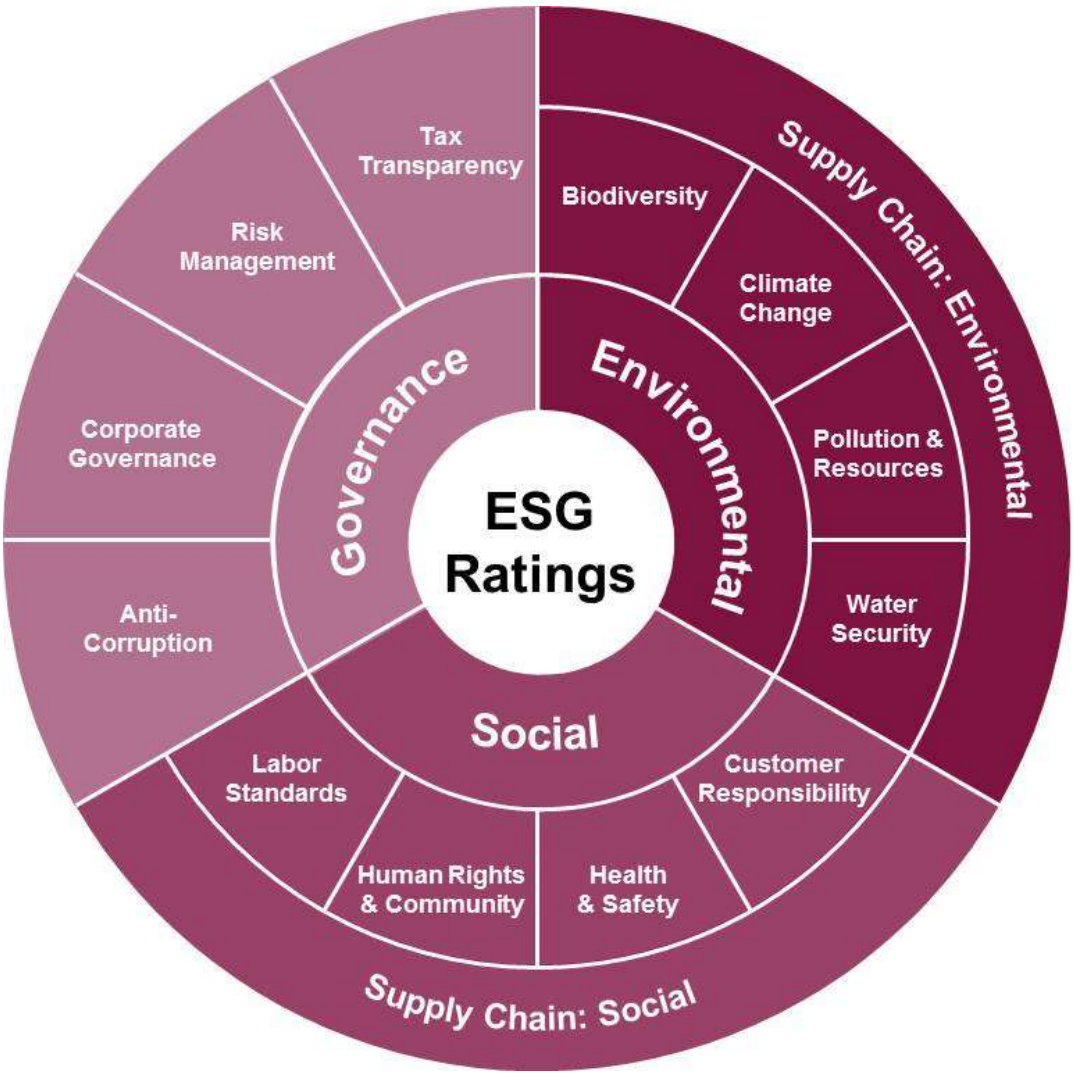
I use both one-quarter forward excess returns (as a measure of market reactions to ESG ratings and rating components) as well as current period return on assets (as a measure of accounting performance) as the Dependent Variable in both regressions. Forward excess returns were calculated using the Beta Suite on the WRDS database. The primary measure of excess forward returns was calculated using the Fama-French 3 Factor model and is measured one quarter after the disclosure of ESG scores.[4] Regressions were run using the forward excess returns as the firm returns are most likely to be affected after the disclosure of new ESG ratings. Accounting performance is calculated as the same-quarter return on assets (ROA). Data used in the ROA calculation, as well as other quarterly accounting control variables for total assets, long term debt, net income, revenue, and shareholders' equity were collected from the Compustat database. Combining control methods from previous research (Ahmed, Abdullah, and Ahmed, 2017; Luo, Wang, Raithel, and Zheng, 2014; Werner, 2017; Shrivastava and Tamvada, 2017, Lee et al., 2009; Humphrey et al.,

[4] In unreported analyses, I also use forward buy-and-hold returns, and find similar results as those reported in this paper.

2012), I control for net income and total assets (scaled by sales), as well as debt-to equity. I also include a control for a firm's beta, which is a proxy for risk.

The ESG Rating variable and the separate E, S, and G scores are taken from the FTSE Russell's Mergent Online Sustainability database. The database's ESG ratings and data model assesses operational ESG risks and performance, and scores are determined by an independent external committee of NGOs, unions, academics, and business and investment experts. Furthermore, all ESG ratings are aligned with the 17 UN Sustainable Development Goals. The ESG data consists of four levels, the first being an overall ESG rating. The main level is further split into the three E, S, and G pillars which can be subdivided in 14 main themes and 300+ indicators (see Figure 1 for illustrative diagram from FTSE Russell). The ratings are determined on an exposure-weighted average, with the most material ESG issues weighted the heaviest in determining the aggregate score. Although the underlying determinants of the theme scores are not accessible to the public due to their proprietary nature, the theme scores are first calculated from 10 to 35 indicators, which are then used to calculate the pillar scores (an average of 125 indicators are applied per company). The pillar scores are defined by FTSE Russell as a measure of the quality of a company's management of issues related to each pillar on an exposure weighted average, with 0 being the lowest score and 5 being the highest. The individual pillar scores are then aggregated into the absolute ESG rating on the same scale, which is defined as the measure of the overall quality of a company's management of ESG issues.

FIGURE 1
FTSE Russell ESG Pillars and Themes



Source: https://www.ftserussell.com/data/sustainability-and-esg-data/esg-ratings

4. Results and Discussion

4.1. Sample

I hand collected ESG ratings data for 719 equity securities distributed throughout the S&P 1500, using FTSE Russell's Mergent Online Sustainability database. The quarterly data was highly concentrated in mega and large caps stocks ranging from Q3 2018 through Q3 2020. Descriptive statistics for the entire sample are presented in Table 1. (Variables are defined in the Appendix.)

The average aggregate ESG rating for the sample was 2.79 (range of 0.6 to 4.8), while the average scores for each of the pillars were 2.20 (range of 0 to 5) for E, 2.36 (range of 0 to 5) for S, and 3.83 (range of 2 to 5) for G. The average total assets of firms in the sample was $55.14 million. Sample firms also reported ROA that ranged from -6.81% to 44.83% and averaged 1.45%.[5] The average leverage ratio was 0.30. The average asset turnover of the sample was 0.17.

In terms of market data, the average beta for the sample ranged from -0.24 to 2.54 and averaged 0.983. The average raw cumulative return was 2.60% and firm cumulative returns ranged from -83.54% to 223.91%. The average cumulative excess return was negative (-2.01%) for firms during the sample period, and these excess returns ranged from -73.67% to 134.14%.

[5] As previously mentioned, my sample consists of firms chosen from the S&P 1500. As a result, the firms included in my sample are larger and more profitable than the average firm listed on Compustat. For the same time period, the average asset size of a firm on Compustat is $15.9 million, and average ROA amounted to approximately -12% (untabulated). Thus, I acknowledge the limitation that the results of this study may not generalize to smaller firms outside of the S&P 1500.

TABLE 1
Descriptive Statistics

Variable	n	Mean	Median	Std Dev	Min	Max
ESG Rating	5,465	2.79	2.80	0.81	0.6	4.8
E Score	5,465	2.20	2.00	1.46	0	5
S Score	5,465	2.36	2.40	1.05	0	5
G Score	5,465	3.83	4.00	0.66	2	5
Total Assets ($000)	5,464	55,140	13,630	201,003	291	3,246,076
ROA	5,464	1.41%	1.15%	2.91%	-68.14%	38.29%
Leverage	5,450	0.01	0.70	27.30	(1,346)	354
Asset Turnover	5,156	0.17	0.14	0.15	0.00	1.20
Beta	5,465	0.98	0.98	0.36	(0.24)	2.54
Quarterly Returns	5,465	2.60%	4.03%	22.07%	-83.54%	223.91%
Quarterly Excess Returns	5,465	-2.01%	-1.69%	14.72%	-73.67%	134.14%

4.2. ESG Scores and Forward Excess Returns

Regressions on forward excess returns on overall ESG ratings and the component E, S, and G pillars are presented in Table 2.

TABLE 2
Regressions of Excess Returns on ESG Ratings and Components

	(1)	(2)
VARIABLES	Fwd Excess Ret	Fwd Excess Ret
ESG Rating	-0.003	
	(0.326)	
E Score		-0.008***
		(0.000)
S Score		0.007**
		(0.015)
G Score		0.002
		(0.596)
ROA	-0.214	-0.217
	(0.258)	(0.254)
Leverage	0.000	0.000
	(0.612)	(0.594)
Asset Turnover	0.021	0.015
	(0.213)	(0.411)
Beta	0.027***	0.026***
	(0.001)	(0.001)
Constant	0.009	-0.007
	(0.447)	(0.698)
Observations	4,518	4,518
R-squared	0.003	0.004

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results in Table 2, Column 1 shows a statistically insignificant relationship between aggregate ESG scores and forward excess returns. In Column 2, the disaggregation of the ESG score into its pillar components of E, S, and G shows a

significant negative relationship between the E score and forward excess returns, as well as a significant positive correlation between the S score and forward excess returns. The relationship between forward excess returns and the G score is negative, but statistically insignificant.

Like similar studies on ESG scores and returns, I find no statistical association between returns and overall ESG scores. One potential reason behind the lack of statistical significance is the countervailing effects of the different pillars that make up the ESG score. The combination of all three pillars into an aggregate score, given their individual relationships with returns, effectively cancels out any discernible relationship between the aggregate ESG score and returns. I discuss my findings on each individual pillar score below.

4.2.1. Environmental Scores

The theoretical grounding for the line of reasoning that the environmental factor likely negatively influences a firm's market performance comes from Milton Friedman's view of shareholder capitalism that businesses should only focus on maximizing profits (Friedman, 1970). Whitehead and Walley (1994) came to a less critical conclusion of environmental spending. They argue that while there is potential to have win-win situations with increased firm performance and environmental spending, the number of win-win opportunities drastically decreases as time goes on. They found that companies such as 3M were able to easily and cheaply reduce pollution in the late 1900s, but as time progressed it became incrementally more expensive for companies to spend on environmental initiatives. Thus, they argue that firms must take a value-based approach when determining how much to spend on environmental initiatives in a way that weighs the internal costs of

environmental spending with the external value created through the public's positive perception of a company. Given the fact that the value created through positive perceptions is extremely difficult to estimate, my results are consistent with the conjecture that firms overestimate the value provided by environmental spending, thus reducing firm value and returns overall. Furthermore, the potential positive impacts of environmental spending on a firm's returns may fall prey to social expectations theory, in that a firm's responsibility to the environment has come to be expected in today's society. This implies that firms, especially the larger ones comprising this sample, are in a lose-lose situation where any amount of spending they do for the environment, although increasing their E score, will not be seen as enough by investors. Barnett (2007) defines this phenomenon as the "Paradox of Performance", where firms with strong CFP perform well in ESG scores, but their strong CFP that allows them to be able to spend on these ESG activities, is ultimately perceived poorly by the public. Barnett (2007) includes anecdotal evidence from Alsop (2002), where he quotes a stakeholder outlining the "no-win situation" of Microsoft noting that "I also think they donate far less than they could given Bill Gates's billions". Conversely, Alsop (2002) also remarks that a smaller firm giving a small donation of even $1 million may trigger a favorable response, because their level of profitability is not as high or observable (highly covered in mainstream media) as Microsoft.

4.2.2. Social Scores

The social component of the ESG score is similar to the E score in that it is extremely prevalent in the media and public today, especially with the larger firms of this sample size. However, it differs with regards to public expectations, because as described in the history above, environmental issues such as the Exxon Valdez oil spill in 1989 and

the 2005 UNEP SRI report focused largely on environmental issues, which was the initial catalyst for the growth in modern day ESG investing (Townsend, 2020). This is further evidenced by the trends in the US SIF reports from 2016 to 2020, where institutional investment based on environmental factors began much earlier and on a larger scale than social factors (US SIF 2020). A 2019 study by Allianz Life also shows that investors are increasingly more likely to focus on social factors as opposed to environmental or governance factors when considering where to invest, leaving firms to benefit more greatly from positive displays of social spending as opposed to the other two areas (Allianz, 2019). Furthermore, Peiris and Evans (2010) found that elements of the social score directly related to employees and other aspects of stakeholder management demonstrate higher opinions of management and the outlook of the firm from the public's point of view. Therefore, the two themes going into the S pillar of labor standards and health & safety should prove to have a positive correlation with excess returns, while the customer responsibility theme is also expected to be positively correlated because investors are likely to put their money into products they personally trust or have had positive experiences with. The final theme of human rights and community falls into a more ambiguous category similar to the those of the governance themes (see next section), and its effect is determined by the observability and specificity of the firm's commitments. Peiris and Evans (2010) show that broad statements about not engaging in certain activities such as weapons or tobacco sales are less likely to impact a firm's returns than specific commitments to initiatives such as increasing the minimum wage. Therefore, the fact that at least three out of the four themes positively contribute to a firm's public perception helps explain the result that a firms S score and excess returns are positively correlated.

4.2.3. Governance Scores

The effect of the governance score on returns is unclear because of the relatively subjective nature of its measurement and the ambiguity of its inputs. The two themes of tax transparency and anti-corruption that FTSE Russell uses as inputs for corporate governance are strongly supported by third parties such as audit agencies and regulatory bodies, albeit with some variability on what constitutes good anti-corruption measures. However, the other two theme inputs for the governance score are risk management and corporate governance itself. The definition and operationalization of these two constructs are not only disagreed upon and wildly debated in academia; there is even less consensus on how to define or implement these constructs in practice (Snyder, 2009). Any two ratings agencies or investment firms can have vastly different definitions of how good governance is measured, so while one firm may invest in a company because they believe it has "good governance," another may consider selling the same company because their definition says that it has "bad governance." In this way a large sample of firms and returns such as this may not show any significant results between governance and returns due to the lack of clear and agreed upon definition of what good governance entails, as well as inconclusive results as to the positive or negative effects of specific governance mechanisms used in practice (de Villiers and Dimes, 2020; Daines, Gow, and Larcker, 2010).

4.3. ESG Scores and Firm Size

In Table 3, I present regressions to determine whether there was a relationship between the size of firms, measured in total assets, and their respective ESG ratings or pillar scores.

TABLE 3
Regressions of ESG Ratings and Components on Total Assets

VARIABLES	(1) ESG Rating	(2) E Score	(3) S Score	(4) G Score
Total Assets ($M)	0.001***	0.002***	0.001***	0.000*
	(0.000)	(0.000)	(0.000)	(0.066)
Constant	2.734***	2.085***	2.309***	3.828***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5,464	5,464	5,464	5,464
R-squared	0.059	0.084	0.032	0.001

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These results showed a significant positive correlation between the size of firms and their overall ESG rating, as well as significant positive relationships between the E and S scores and firm size. There was a positive correlation between the G score and firm size, but it was only marginally significant, with a p value of 0.066. These results are consistent with above hypothesis for two reasons. First, smaller firms are often transitory mid- and small-cap stocks, that receive less coverage from ESG ratings agencies because they are young in their firm life cycle and cannot provide enough relevant data to the ratings agencies (Drempetic, Klein, and Zwergel, 2019).[6] Second, larger firms are not only more capable of spending excess earnings on ESG activities, resulting in higher scores; they also face increased public scrutiny and higher political cost compared to smaller firms for failing to engage in these activities which in turn further incentivizes larger firms to increase their ratings (Gan, 2006; Verrechia, 2001).

[6] Even within my large-firm S&P 1500 sample, I argue that firms with higher assets receive more coverage from ESG rating agencies than those with less assets.

I ran separate regressions for larger (defined as firms with $15 million or more of reported total assets) and smaller (less than $15 million of total assets), and present results in Table 4.

TABLE 4
Regressions of Excess Returns on ESG Ratings and Components for Smaller vs. Larger Firms

	(1)	(2)	(3)	(4)
	Smaller Firms	Larger Firms	Smaller Firms	Larger Firms
VARIABLES	Fwd Excess Ret	Fwd Excess Ret	Fwd Excess Ret	Fwd Excess Ret
ESG Rating	0.003	-0.006		
	(0.601)	(0.422)		
E Score			-0.005	-0.007**
			(0.184)	(0.028)
S Score			0.007	0.007
			(0.135)	(0.104)
G Score			0.007	-0.005
			(0.269)	(0.381)
ROA	-0.316	0.006	-0.318	-0.004
	(0.279)	(0.983)	(0.278)	(0.989)
Leverage	0.000	0.000	0.000	0.000
	(0.606)	(0.989)	(0.630)	(0.904)
Asset Turnover	0.025	0.004	0.021	0.001
	(0.415)	(0.791)	(0.515)	(0.972)
Beta	0.029**	0.022**	0.026**	0.021*
	(0.015)	(0.049)	(0.028)	(0.074)
Constant	-0.003	0.015	-0.024	0.018
	(0.863)	(0.466)	(0.326)	(0.430)
Observations	2,515	2,003	2,515	2,003
R-squared	0.004	0.002	0.005	0.003

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

My sample included 324 larger firms and 395 smaller firms. Similar to the findings in Table 2, aggregate ESG scores are not statistically significant in the return regressions, regardless of firm size. Results are more consistent (albeit weaker) with larger firms, but are insignificant with smaller firms in the sample.

My findings suggest that the relationship between ESG scores (both in total and disaggregated) are higher for larger firms. First, smaller—often less mature firms—likely do not have the excess earnings needed to spend on ESG activities outside their core business model. Second, these smaller firms do not have the excess earnings required to compile and disclose the data necessary for ESG ratings to the ratings agencies. The opposite is true for larger firms. Drempetic et al. (2019) find that larger firms have an advantage over smaller firms when investors screen for ESG metrics because larger firms have more resources to provide the ratings agencies with ESG data. Gan (2006) uses court cases and news articles, to which larger firms were more exposed, as proxies for public scrutiny. The author finds that the number of court cases and news articles are positively associated with corporate philanthropy. This result is further supported by Verrechia (2001), which suggests that a firm's level of scrutiny is endemic to larger firms. For these larger firms, costs are higher when they do not disclose information, thus increasing the likelihood that they will choose to voluntary disclose information to the public. Furthermore, they have excess capital to spend on activities that are likely to increase their ESG ratings.

4.4. ESG Scores and Accounting Performance

In order to determine the effects of ESG ratings on firm accounting performance, I regress ROA, which is a proxy for accounting performance, and aggregate ESG scores, as well as individual pillar scores. I present these results in Table 5.

TABLE 5
Regressions of ROA on ESG Ratings and Components

VARIABLES	(1) ROA	(2) ROA
ESG Rating	0.001	
	(0.338)	
E Score		-0.000
		(0.482)
S Score		0.001*
		(0.065)
G Score		-0.001
		(0.156)
Leverage	-0.000	-0.000
	(0.432)	(0.501)
Asset Turnover	0.047***	0.047***
	(0.000)	(0.000)
Beta	-0.007***	-0.008***
	(0.000)	(0.000)
Constant	0.012***	0.017***
	(0.000)	(0.000)
Observations	5,142	5,142
R-squared	0.064	0.065

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

I find no significant association between ROA and aggregate ESG scores. Likewise, the E score and G scores yielded statistically insignificant results, but there was a marginally significant positive correlation between the S score and ROA (p-value = 0.065).

These results were then further broken down by firm size, with large firms defined as those with more than $15 million in assets. These regressions are presented in Table 6.

TABLE 6
Regressions of ROA on ESG Ratings and Components for Smaller vs. Larger Firms

VARIABLES	(1) Smaller Firms ROA	(2) Larger Firms ROA	(3) Smaller Firms ROA	(4) Larger Firms ROA
ESG Rating	0.000	0.004***		
	(0.755)	(0.000)		
E Score			-0.001	0.002***
			(0.218)	(0.007)
S Score			0.002	0.002**
			(0.109)	(0.034)
G Score			-0.001	-0.003***
			(0.363)	(0.001)
Leverage	-0.000	0.000	-0.000	0.000
	(0.199)	(0.848)	(0.198)	(0.687)
Asset Turnover	0.063***	0.025***	0.063***	0.026***
	(0.000)	(0.002)	(0.000)	(0.001)
Beta	-0.008***	-0.007***	-0.009***	-0.008***
	(0.005)	(0.003)	(0.004)	(0.000)
Constant	0.013***	0.001	0.018***	0.016***
	(0.001)	(0.688)	(0.002)	(0.000)
Observations	2,857	2,285	2,857	2,285
R-squared	0.076	0.058	0.078	0.072

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For smaller firms, there was no significant relationship between ROA and the aggregate ESG score or any of the E, S, and G pillars. However, for larger firms there was a significant positive relationship between ROA and the aggregate ESG score, significant positive relationships with the E and S scores, and a significant negative relationship with the G score.

The results of the analysis on the relationship between ESG ratings (along with the individual component parts) and accounting performance can be explained by two reasons. First, there is a higher concentration of larger firms in the sample due to the nature of ESG ratings in that the ratings agencies cover these firms to a higher degree than small cap or mid cap firms that are often transitory or do not have a significant number of financial statements. Therefore, the positive relationship between the S score and ROA for larger firms exerts undue influence when the regression is run for all firms, resulting in a marginally significant relationship despite the fact there was no relationship between ROA and respective pillar scores for smaller firms. This second phenomenon where there is no relationship between ESG pillar scores and ROA for smaller firms, but a positive relationships for the E and S score with a negative G relationship for larger firms, is also consistent with the above hypothesis and the findings of Drempetic et al. (2019). This occurrence is potentially an instance of reverse causality because as mentioned above, larger, more profitable firms are more capable of spending excess earnings on ESG activities, resulting in higher scores. Larger firms also have a higher incentive to spend on ESG because of increased political cost (Gan, 2006, Verrechia, 2001). Additionally, the E and S scores are positively correlated with the ROA of large firms, while the G score is negatively correlated because of the ambiguity and lack of consensus around the definition of good governance as discussed above. This positive relationship can be further explained in the context of the S and E score, because firms that are more heavily engaged in these activities are more likely to attract customers who are becoming increasingly focused on the ESG ratings (Unnikrishnan, Biggs, and Singh, 2020), increasing sales and positively impacting ROA. This same result may apply to firms attracting the best, most qualified

talent and improving their performance through prosocial motivation because these employees want to work for a firm that is engaged in environmentally and socially conscious behavior (Grant, 2008).

5. Conclusion

This paper expanded upon extant literature by examining Mergent's composite ESG rating, and its disaggregated components, for 719 firms in the S&P 1500 in order to determine how each of these ratings are associated with excess returns, firm size, and accounting performance. Analysis of the relationship between the aggregate ESG score and excess returns confirmed the insignificant relationship found by Halbritter and Dorfleitner (2015). However, the disaggregation of the ESG score showed novel results including a significant negative relationship between the E score and excess returns, significant positive relationship between the S score and excess returns, and an insignificant relationship between the G score and excess returns.

In examining the association between size and ESG ratings, I find results that are consistent with the positive relationship between firm size and ESG rating proposed by Humphrey et al. (2006). I also find significantly positive relationships between size and the individual E, S and G scores. Moreover, no statistically significant relationship is found between the ESG score or its component pillars and excess returns for smaller firms. These same relationships were found for large firms except for the E score, which yielded a significant negative relationship. Accounting performance analysis for the entire sample size showed no relationship between the aggregate ESG score, E score, or G score, with only a marginally significant relationship between the S score and ROA for all firms. No significant correlation was found between ROA and the pillar scores or the aggregate ESG score for small firms. However, the ROA of large firms is positively correlated with their aggregate ESG score, E score, and S score, while it is negatively correlated with their G score.

These results build on and contribute to prior research by confirming the existence of relationships between firm size, ESG ratings, and excess returns, as well as finding novel results on the relationship between the aforementioned factors and individual ESG pillar scores. The exploration of these disaggregated relationships will provide investors with a better understanding of which specific ESG component parts to consider when screening firms for non-financial performance. Additionally, the relationships discovered between ROA and pillar scores will help firms determine which specific ESG related activities can improve firm performance. Although the results of this paper have contributed novel findings to a body of growing research on ESG investing, they are limited in their scope by the number of firms included, the time period covered, and the number of different ESG ratings and measures of accounting performance analyzed. Consequently, future research should focus on a longer time period of ESG data, which will be available as the trends toward ESG investing and ESG coverage of firms gains traction. Additional research should also determine whether the relationship between firm size and excess returns persist given a larger sample of firms and ESG ratings providers. Lastly, further research needs to be conducted on the relationships found between ROA and the pillar scores of large firms in order to better understand what is driving the positive relationships between the E and S scores.

APPENDIX

APPENDIX

Variable Definitions

Variable	Definition and Sources
Fwd Excess Ret	One-quarter ahead excess returns, calculated using the Fama-French 3-factor model. Obtained from Beta Suite by WRDS
ESG Rating	Measure of the overall quality of a company's management of ESG (Environmental, Social and Governance) issues, with ratings ranging from 0 (worst) to 5 (best). Obtained from FTSE Russell's Mergent Sustainability database
E Score	Measure of the quality of a company's management of Environmental issues, with ratings ranging from 0 (worst) to 5 (best). Obtained from FTSE Russell's Mergent Sustainability database
S Score	Measure of the quality of a company's management of Social issues, with ratings ranging from 0 (worst) to 5 (best). Obtained from FTSE Russell's Mergent Sustainability database
G Score	Measure of the quality of a company's management of Governance issues, with ratings ranging from 0 (worst) to 5 (best). Obtained from FTSE Russell's Mergent Sustainability database
Total Assets	Total Assets (ATQ). Obtained from Compustat
ROA	Net Income (NIQ) / Total Assets (ATQ). Obtained from Compustat
Leverage	Long-Term Debt (DLTTQ) / Total Stockholders' Equity (TEQQ). Obtained from Compustat
Asset Turnover	Sales (SALEQ) / Total Assets (ATQ). Obtained from Compustat
Beta	Market Beta. Obtained from Beta Suite by WRDS

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