Institutional Investors and ESG Preferences

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July 2022

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We study the effect of environmental, social and governance (ESG) scores on the portfolio allocations of institutional investors. Using a unique data set, we find that institutional investor holdings (as measured by 13F filings) are strongly driven by the ESG quality of companies. While investors are driven to add high quality ESG companies to their portfolios, there is a negative relationship to ESG when it comes to taking large ownership stakes. Blockholders appear much less motivated by ESG scores. Evaluating individual ESG scores, we find that the individual ESG governance score has the highest impact on institutional investor holdings, while E scores have the most negative effect. This is explained by risk and return measures. Higher E scores are correlated with negative alpha indicating such securities are overbought. Meanwhile G scores have a strong correlation with higher Sharpe ratios, indicating a more favorable risk-reward profile; G scores also indicate lower betas and therefore less exposure to systemic risk. The Bloomberg disclosure-based ESG scores are more significant determinants of investor holdings and risk-return measures than the subjective Sustainalytics ratings – suggesting that disclosure is the more important determinant for investors.

Keywords: ESG, Sustainable Finance, Institutional Investors, Financial Performance, Disclosure

JEL Classifications: G12, G14, G15, G23, G32, M1

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Institutional Investors and ESG Preferences

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Abstract:

We study the effect of environmental, social and governance (ESG) scores on the portfolio allocations of institutional investors. Using a unique data set, we find that institutional investor holdings (as measured by 13F filings) are strongly driven by the ESG quality of companies. While investors are driven to add high quality ESG companies to their portfolios, there is a negative relationship to ESG when it comes to taking large ownership stakes. Blockholders appear much less motivated by ESG scores. Evaluating individual ESG scores, we find that the individual ESG governance score has the highest impact on institutional investor holdings, while E scores have the most negative effect. This is explained by risk and return measures. Higher E scores are correlated with negative alpha indicating such securities are overbought. Meanwhile G scores have a strong correlation with higher Sharpe ratios, indicating a more favorable risk-reward profile; G scores also indicate lower betas and therefore less exposure to systemic risk. The Bloomberg disclosure-based ESG scores are more significant determinants of investor holdings and risk-return measures than the subjective Sustainalytics ratings – suggesting that disclosure is the more important determinant for investors.

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1. Introduction

Environment, social and governance (ESG) scores are important for the sustainability investment decisions of institutional investors. According to *Morningstar* (2020), the amount of ESG investments in the United States exceeded USD 120 billion in 2021. Data from the Global Sustainable Investment Alliance (2020) indicate that sustainable investment assets in the US increased from USD 12 trillion at start of 2018 to USD 17.1 trillion at the start of 2020. More generally, it is reported, as of July 20121 alone, the amount of global sustainable assets under management exceeded USD 35.3 trillion. Sustainable equity and bond funds have proved less risky recently than their tradition peer funds and the increasing cash flow into environment, social and governance (ESG) strategies. This highlights the central importance of investigating how the ESG factors influence portfolio allocations.

There is a large literature on the role of ESG on financial performance (see Whelan et al., 2021, for a review). A common explanation for increased investor demand focuses on the non-pecuniary component to investor utility functions (e.g., Fama and French, 2007; Riedl and Smeets, 2017; Renneboog et al., 2008a, 2008b). According to this literature, higher rated funds are more successful in attracting flow of funds than lower rated funds, but none of the high-sustainability funds outperformed low-sustainability funds (Hartzmark and Sussman, 2019). While some articles in this literature have touched on the link between ESG scores and the portfolio constructions of institutional investors (see for example Gibson et al., 2021), little is known about how the individual E, S and G factors influence the portfolio decisions of investors.

Using a unique dataset we examine the revealed preferences of institutional investors for ESG investments, which is primarily determined by their holdings in US-listed equities. In doing so, we test the hypothesis that among the ESG criteria, the governance factor is the most relevant to strategic asset allocation decisions of institutional investors. We then examine how ESG scores relate to financial performance measures. To the best of our knowledge, this is the first paper to investigate institutional holdings to shed light on the relative preferences of investors across the three ESG dimensions. Our holdings data is

derived from SEC 13F and 13D/G filings of institutional investors and blockholders of US equities in order to measure institutional investor interest in companies between 2013 and 2018. Using this sample on the number of investors, portfolio allocation of investors, and the holdings of blockholder investors, as well as the Big Three asset managers (Blackrock, Vanguard, and State Street), we find that most investors have significant preference for investing in firms with high governance quality. Meanwhile, investors tend to limit portfolio stakes in firms with high environmental scores. A notable exception is among the Big Three, which invest heavily in firms dependent on environmental criteria (see for example Azar et al. 2021).

This result is consistent with our findings with respect to ESG scores and financial performance. We find strong evidence that governance ratings have the most significant impact in increasing the Sharpe ratio of a firm's security implying a more favorable risk-return tradeoff. Higher governance scores are also related to decreased exposure to systematic risk as measured by a security's beta. Environmental scores on the other hand have limited impact on a security's Sharpe ratio or beta, however, we find a negative relationship between environmental scores and alpha. This is evidence that the securities of firms with high environmental scores are overbought and therefore overvalued by the market. This is likely due to the interest of the Big Three in these types of firms driven by the demand of many mutual fund investors in prioritizing non-financial incentives (Riedl and Smeets, 2017; Renneboog et al., 2008a, 2008b) and consequently contributing to the underperformance of ESG mutual funds (Renneboog et al., 2008a, 2008b; Hartzmark and Sussman, 2019).

Two opposing views can be distinguished with respect to the impact of a company's ESG ratings on corporate financial performance. The first view holds that the composite ESG score can show the relationship with financial performance. The second view goes further and holds that the composite ESG score and component E, S, and G ratings together can yield an accurate reflection of the impact of ESG on corporate financial performance. The second view leads us to expect that the analysis of the E, S and G subfactors can explain how each of the three dimensions separately contribute to firm value (Duque-Grisales and Aguilera-Caracuel, 2019 and Gibson et al. 2019) as well as ownership patterns.

In our analysis, we employ ESG rankings from Bloomberg and Sustainalytics. The Bloomberg ESG ratings are disclosure-based, measuring simply the amount of ESG data that companies disclose (i.e., companies with higher Bloomberg scores merely disclose more ESG data, but Bloomberg does not assess the data for quality). Sustainalytics ranks the actual quality of companies based on their ESG data. Both rating agencies provide a composite ESG ranking, as well as component rankings among the three ESG subcategories (E, S, and G). The rationale of such a strategy is to consider general investor preferences for ESG, as well as the relative preferences among the three components of ESG. Our empirical work focuses on the extent to which institutional investor allocations are driven by ESG rather than by financial characteristics of companies which have generally been shown to relate to financial performance (Fama and French, 1996, 2015; Carhart, 1997). We also control for general financial characteristics as well as industry effects in order to mitigate the effect of large index and tracking funds and still find statistically significant results. We provide two main points of evidence that the governance dimension of ESG has the highest impact on investor holdings.

In the first part of our empirical analyses, we distinguish investor preferences across the three dimensions of ESG. We calculate number of institutional investors and blockholders investing in a particular firm as well as the proportion of their total portfolios allocated to that firm in order to determine how their holdings are affected ESG characteristics. We also calculate the total ownership stake in the firm by the Big Three asset managers as well as the proportion of their portfolios allocated to the firm. Our evidence shows that institutional investors overall (as measured by data based on 13F filings) are strongly driven by the ESG quality of companies, and particularly the governance dimension, when deciding which companies to add to their portfolios.

We also study whether the holdings of blockholders are influenced by the component and composite ESG ratings. Using 13D/G data, we find that blockholders, in particular, seem much less motivated by ESG. Our findings generally support the theoretical argument that the vast majority of long-term passive investments of institutional investors are driven disproportionately by ESG over other financial data when simply selecting companies to add to a portfolio, whereas investors taking large ownership stakes and activist investors are

much less concerned with ESG. Conversely, we find that larger portfolio allocations are negatively correlated with composite and component ESG rankings, but significantly less so with the individual governance ratings. We also find that the Bloomberg disclosure scores have a more significant relationship than the Sustainalytics quality scores.

Second, we study the relationship between the individual ESG components and financial performance to provide evidence on whether institutional investors are overweighting ESG data due to the potential relationship of these data with financial performance. We find evidence that ESG is related to decreased risk and a more favorable risk-return tradeoff. These results are most significant for the governance score. There is evidence that higher environmental scores are related to overpriced securities. While the evidence is consistent with the prior literature on portfolio optimization benefits of ESG, our findings in this regard do not explain the high preference of institutional investors for companies with high ESG scores when controlling for other financial characteristics. Further, the data indicate that a large proportion of institutional investors are driven by ESG in deciding whether or not to invest in a company and how much of their portfolio to allocate to the company.

The evidence suggests that the Bloomberg disclosure ratings are more strongly correlated with increased financial performance than the subjective Sustainalytics quality ratings, and that better governance scores have the highest correlation with better Sharpe ratios and lower betas. Our findings highlight, among other things, disclosure ratings tend to be more significant than subjective quality ratings due to the importance of the amount of the information disclosed along each ESG dimension. Furthermore, we find evidence of a negative relationship between the size of ownership stake and ESG – companies underperforming with respect to ESG are also underperforming financially. Thus, it appears that these companies are potentially attractive to activist investors who are willing to take larger stakes in underperforming companies.

We also find a negative relationship between ESG ratings and systemic risk, as measured by beta. In this analysis, we find that the strongest relationship is for the governance criteria as measured by the disclosure scores. Our findings generally support the theoretical argument that that the companies that disclose more ESG data tend to disclose more information

generally, and this provides investors with more information and helps to explain portfolio allocation trends of institutional investors.

We also explore the association between ownership stakes of large investors and corporate carbon emissions. In this analysis, we study how institutional investors concerns with companies' greenhouse gas emissions of listed firms are affecting their holdings of high emissions stocks (Choi et al, 2020). We find that the Big Three asset managers own larger ownership stakes in companies with higher greenhouse gas emissions (in line with the findings of Azar et al., 2021); we additionally show that this relationship extends to the proportion of their total portfolios allocated to such firms.

Our paper offers several implications of integration of the relative components ESG components into the portfolio allocation process. First, we contribute to the literature focusing on the role of ESG issues for the investment decisions of institutional investors (Barko et al., 2018; Amel-Zadeh and Serafeim, 2017; Eccles et al., 2011; Hanson et al., 2017; Gibson et al., 2021). There have been relatively few studies addressing the influence of institutional investor ownership on companies' ESG performance. Closer to this study is the work, Dyck et al. (2019), who examine the influence of institutional investor ownership on non-US companies' composite E&S performance over time. However, our paper is the first to account for institutional investors holdings in US equities and specifically how they are influenced by aggregate ESG scores and the individual effects of the ESG component scores. Our findings add further evidence as to the influence of ESG issues on blockholders and the size of the ownership stakes of institutional investors in relation to ESG.

Second, this study contributes to the body of literature examine the effects of ESG disclosure. Prior evidence on value-added role of ESG disclosure has largely been related to the positive effects on financial performance. Consequently, they rely on examining the extent of the different types of ESG disclosure as opposed to the actual ESG quality of the investment. The results of this study are consistent with the findings that the largest institutional investors are seldom supportive of shareholder proposals related to E&S, as suggested by Griffin (2020) and help shed light by showing that as the size of the ownership stake increases, investors care much less about ESG quality.

Third, our results are related to the literature examining the role of composite ESG scores and individual E, S, and G sub-dimensions on the financial performance of companies around the world. Prior evidence on the influence of ESG scores and the individual effects of the E, S, and G subfactors on financial performance of multinational firms in Latin America can be found in Duque-Grisales and Aguilera-Caracuel (2019). We contribute to these studies by using secondary data, rather than a global index, to study the effects of the individual E, S, and G dimensions on US companies. Additionally, Kotsantonis and Serafeim (2019) illustrate the difficulty in constructing consistent ESG ratings. Gibson et al (2019) attribute differences in ESG ratings subfactors to the legal origins of the countries where ratings providers are based, and Eccles and Stroehle (2018) argue that differences are inherent in the mission and goals of the ratings provider. Our paper contributes to these studies by analyzing ownership and financial performance.

The paper proceeds as follows. Section 2 reviews the ESG investment selection and performance literature. Section 3 introduces the data. Section 4 presents and analyzes the results of the relative preferences of institutional investors among the three dimensions of ESG. Section 5 concludes.

2. Motivation and literature review

This section provides an overview of the existing theoretical and empirical literature, as well as the motivation for this research and the hypothesis development.

The prevailing theory behind investors' consideration of ESG factors involves incorporating ESG as a non-pecuniary component of the utility functions for a subset of market participants (Fama and French, 2007). Goldstein et al. (2021) extend this model to specifically consider ESG and information quality related to security ESG criteria. Departing from the conventional risk-return tradeoff, these investors are willing to simply accept lower risk-adjusted returns in exchange for knowing that their investments have positive ESG qualities

(Riedl and Smeets, 2017). This is analogous to how some consumers will pay more for fair-trade coffee that, in all other respects, is identical to non-fair-trade coffee (see, for example, Hainmueller et al., 2015). Part of the utility that these consumers receive is the knowledge that the coffee they are consuming is fair-trade. This suggests that ESG-motivated investors are willing to sacrifice a degree of financial performance in exchange for knowing that their portfolio companies are green, environmentally "sustainable," and "socially responsible." In this new environment, they can signal that they engage in good corporate governance, environmental sustainability, and responsible investing—or some combination of these attributes.

Prior literature on ESG mutual funds and green bonds generally suggests that investors in these instruments have a preference or tastes tor a non-pecuniary component of utility. Renneboog et al. (2008b), for instance, show that ESG mutual funds generate subpar financial performance. Hartzmark and Sussman (2019) find that investment funds tend to flow out of mutual funds with poor ESG credentials and into funds with higher ESG quality. And, Baker et al. (2018) show how investors in green bonds are willing to pay a premium to invest in the bonds simply because they are certified as "green."

More broadly, there is evidence that institutional asset managers are widely incorporating ESG considerations into their portfolio management activities (Barko et al., 2018; Amel-Zadeh and Serafeim, 2017; Eccles et al., 2011; Hanson et al., 2017). Dyck et al. (2019) also link institutional investor ownership in companies to ESG. However, their study considers only the companies' composite E and S scores. Furthermore, by combining the Bloomberg and Sustainalytics scores, they do not differentiate between ESG quality and ESG disclosure characteristics of companies. Other literature focuses on the relationship between the ESG scores and individual E, S, and G subfactors in equal proportion and firm performance (Humphrey et al. 2012; Velte, 2017). Duque-Grisales and Aguilera-Caracuel (2019) document the influence of composite ESG scores and individual E, S, and G dimensions on the financial performance of multinationals in Latin America.

Despite the evidence that a subset of ESG investors are willing to accept lower returns, another strand of the literature argues that ESG factors can be utilized to construct portfolios

that can generate superior risk-adjusted returns (e.g., Sherwood and Pollard, 2018; Bannier et al., 2019 Hanson et al., 2017; Boze et al., 2019; Gibson et al., 2019; and Lopez de Silanes et al., 2019). The effect on financial performance is stronger on decreasing risk than increasing returns (Gibson et al., 2019 and Lopez de Silanes et al., 2019). In this regard, there is evidence that ESG firms are less exposed to extreme downside risk (Shafer and Szado, 2019 and Hoepner et al., 2019). Moreover, the market might expect that firms with higher ESG scores would have lower implied volatility under extreme circumstances, thus impacting the volatility smirks in the options markets for these securities demonstrating lowered perceived tail risk (Shafer and Szado, 2019). There is also evidence that activist funds may be able to identify underperforming companies based on ESG criteria (Barko et al., 2018). It is reasonable to expect that firms with lower ESG scores are more likely to be targets of activist campaigns by institutional investors. Hence, boards must realize this and, would align themselves with investors by adopting effective ESG strategies.

While firms' investments in ESG factors may erode profitability, there appear to be two ways in which such investments can benefit individual firms. One such mechanism involves the cost of capital. If a significant subset of investors is motivated by ESG factors, this can affect the cost of capital of good and bad ESG companies (Heinkel et al., 2001). As investors who care about ESG shun companies with poor ESG quality, fewer investors will be willing to hold stocks in these companies, and, therefore, those who are willing will have to hold more of the outstanding stock, making it more difficult for these investors to diversify away firm-specific risks. Consequently, these investors demand higher risk premia to hold a higher proportion of the outstanding shares, and this increases the cost of capital for such firms. Conversely, companies with good ESG metrics see their shares as more popular with investors regardless of the risk-return characteristics. Thus, this inflates the prices of these securities and lowers the cost of capital for ESG firms that perform well.

On the other hand, it is also possible that firms' investments in ESG may generate positive NPV and contribute to firm profitability. Some investments in ESG may create positive externalities for the firm. For example, firms investing in technological innovations can end up lowering their costs thanks to improved technology that may also be more environmentally friendly. This explains the positive relationship sometimes seen between

environmental factors and Tobin's Q (see, for example, Dowell et al., 2000 and Konar and Cohen, 2001). Hence, firms' investments in ESG factors may also generate positive NPV if such investments protect the firm from other risks. For example, investments in environmental sustainability can protect firms from regulatory risk by reducing or eliminating fines for polluting and helping firms to anticipate tougher future environmental regulations (Dasgupta et al., 2001; Dowell et al., 2000; Konar and Cohen, 2001). Firms' investments in social responsibility may similarly help them mitigate litigation risks and corporate scandals.

We now turn to explain the discrepancies between investors accepting subpar returns in exchange for positive ESG ratings, as well as the potential for ESG to have positive impacts on firm value and to be able to serve as screening criteria to create superior-performing portfolios. To do so, we conjecture that a large number of long-term, primarily passive, institutional investors encapsulate ESG as a non-pecuniary function of utility. This, in part, bids up the securities prices of some companies based solely on ESG considerations. At the same time, ESG can be related to the risks to which firms are exposed. This relationship opens up the possibility for ESG factors to be used to construct superior-performing portfolios for some investors whose utility functions do not consider (or at least underweight) ESG considerations. Alternatively, or additionally, some activist investors may use poor ESG performance as a way to identify companies which are also underperforming financially (Barko et al., 2018). Based on the subpar performance of ESG mutual funds, we conjecture that investors prefer strong ESG data to other financial data (i.e., ESG factors are their primary concern, followed by risk-return characteristics). Further, the collective actions of large numbers of institutional investors prioritizing ESG data should result in overvaluing securities relative to financial fundamentals. This leads open the opportunity for activist investors to take larger stakes in companies which underperform with respect to ESG.

3. Data and Measurement

This section describes our dataset construction and provides an overview of the summary statistics of our dataset.

Measuring ESG

In contrast to the previous empirical works discussed above, we construct our data set based on composite ESG as well as the three dimensions of ESG to analyze institutional holdings along with financial performance metrics. Much of the previous empirical literature related to ESG and corporate financial performance focuses on a granular analysis of specific ESG data within one of the dimensions of ESG (E, S, or G). Prior literature related to investment performance of ESG as a whole tend to use data related to ESG mutual funds. Dyck et al (2019) consider the relationship of the E and S dimensions to institutional investor holdings.

In this classification, we follow Duque-Grisales and Aguilera-Caracuel (2019) and Gibson et al. (2019) who analyze ESG as well as each of the three dimensions of ESG and compare these with financial performance data. Additionally, we also consider the relationship to investor holdings.

We obtain data for ESG composite ratings and the component ratings for each dimension – environmental, social, and governance – from two well-known data providers: Bloomberg and Sustainalytics.

The Bloomberg ESG disclosure score and the component scores (environmental, social, and governance) are not quality measures; these ratings measure only the extent of a company's ESG-related data disclosure. It is a Bloomberg proprietary score that ranges from 0.1 for companies that disclose a minimum amount of ESG data to 100 for those that disclose every ESG-related data point collected by Bloomberg. Bloomberg states that "each data point is weighted in terms of importance" and that "the score is also tailored to different industry sectors. In this way, each company is only evaluated in terms of the data that is relevant to its industry sector" (Bloomberg Financial Terminal).

The Sustainalytics ESG quality ranking is "assigned to the company based on its environmental, social and governance (ESG) total score relative to its industry peers" (Bloomberg Financial Terminal). The ranking ranges from 0 for the poorest-ESG-quality companies to 100 for the best. The Sustainalytics ESG ranking is meant to encompass a

company's level of preparedness, disclosure and controversy involvement across all three ESG themes. The Sustainalytics component rankings similarly rank companies along each of the three ESG dimensions.

The Bloomberg ESG disclosure scores measure the amount of ESG data a company reports publicly and does not measure the quality of a company's performance on any data point. However, previous research has shown that part of being a high-quality ESG company is the transparency and disclosure of ESG quality. In a previous paper, we established that, given the largely voluntary nature of ESG disclosure requirements, as well as the lack of standardization, there exists a strong correlation between ESG disclosure and ESG quality (Lopez de Silanes et al., 2019).

In the context of our research question, the nature of the Bloomberg ESG disclosure score is more objective and transparent than that of the other ratings providers, as it does not assign subjective quality judgements to the individual ESG criteria, aside from the relative importance of the data point itself, and not what constitutes a “good” or “bad” quality. On the other hand, the Sustainalytics scores, while widely published and used by industry, contain significant value judgements as to what constitutes a company’s “good” or “poor” performance with regard to ESG.

Much of the early research sought to examine correlation or diversion among CSR ratings (Chatterji and Toffel, 2010). For instance, competing environmental ratings are strongly correlated (Delmas et al., 2013). Accounts along the same lines, such as Daines et al. (2010), find little predictive power of corporate governance ratings for performance, but slightly better for ratings based on financial disclosures rather than on qualitative information on corporate governance. Similarly, numerous researchers find that market intermediaries often influence ESG ratings and that changes in firm performance often precede the publication of a ratings change, thus making the rating less useful for investors since it conveys only information already absorbed by market prices (Doh et al., 2010).

More recently, Kotsantonis and Serafeim (2019) illustrate the difficulty in creating a standard and objective framework for reporting and evaluating ESG data metrics. While Eccles and

Stroehle (2018) argue that the differences in ratings can be attributable to the "mission" and origins of the rating provider (i.e. “values-oriented” versus “value-driven”), Gibson et al (2019) argue that disagreements among ESG ratings may be attributable to differences in the legal systems of the countries where ratings providers are based. This view, however, overlooks the globalized nature of the ESG ratings market and the cross-country nature of some ratings that are partnerships of rating providers located in different countries (e.g. the Robeco index is jointly managed by S&P and Robeco). Regardless of the origins of the differences, it is clear that divergence is a poignant issue when comparing ESG ratings data. Furthermore, any subsequent analysis may be highly sensitive to the ESG ratings provider being used. This is our motivation for using three data providers and demonstrating the sensitivity of results to the data provider used.

Dataset construction

This section describes our data collection methodology and our general description and summary of the data.

In constructing our dataset, we screened for US publicly listed companies for which composite and all three component ratings from two of the ESG data providers that were available for any of the years 2013-2018. Any company-year observation that did not have a complete set of ratings from all three providers was excluded. We also excluded any company-year observation that did not have complete financial and market information to calculate the control and independent variables used in our analyses.

We then accessed data from SEC 13F and 13D/G filings available through the Refinitiv Database to match institutional holding and blockholder holding data to each company-year observation. Any investment manager with at least USD 100 million in assets under management is required to file form 13F, listing their equity ownership stakes (17 CFR § 240.13f-1). Additionally, anyone with a beneficial ownership stake of more than 5% of a publicly traded company’s equity must file schedule 13D/G (17 CFR § 240.13d-1).

We use the number of 13F filers for a company to represent the number of institutional investors holding shares in that firm and the number of 13D/G filers to represent the number of blockholders. This is also the category into which activist shareholders would fall. We are careful to consider the ultimate or beneficial owner of the shares. This way, when an asset manager holds shares in the same company in different funds or managed accounts, we avoid double-counting the number of investors holding the company's shares. For our dataset all blockholders are also institutional investors who are also subject to file form 13F. We therefore label any institutional investor with a beneficial ownership stake of equal to or greater than 5% as a "blockholder" for the purpose of our analyses. In order to maintain a scale consistent with that of our other variables, we take the natural logarithm of the number of institutional investors and the natural logarithm of the number of blockholders plus one to account for firms with zero blockholders. This data also allow us to calculate the percentage of common shares held by the Big Three largest asset managers (Blackrock, State Street, and Vanguard).

We then use the percentage of each institutional investors portfolio allocated to a security, as reported in the Refinitiv database, to calculate the mean portion of the portfolio allocated by all asset managers holding that firm's security. Likewise, we filter for the Big Three asset managers and for investors with at least a 5% stake in order to calculate the mean portfolio allocation by the Big Three and blockholders respectively.

Table 1 contains full descriptions and definitions of all the variables used in our analyses. Table 2a contains the screening steps and breakdowns of observations and years, while Table 2b provides summary statistics for the variables used in our regressions.

4. Results

We begin our analysis by examining the relative preferences of institutional investors among the three dimensions of ESG. Specifically, we look at how investors allocate their capital among companies by considering financial characteristics as well as ESG criteria. In addition

to voice and complete exit, investors have the option to increase and decrease their holdings in response to the changing financial and ESG characteristics of their portfolio companies. Furthermore, we recognize the importance of voice to institutional investors (McCahery et al, 2016), and hypothesize that among ESG criteria strong governance structures are of paramount importance as governance is the mechanism by which investors can voice their preferences for firm policy while considering long-term value creation as well as social and environmental sustainability goals. Therefore, we expect the governance dimension to be the most important factor of how investors choose portfolio companies.

Across the two data providers we examine, we believe that the Bloomberg ESG disclosure indices are the most relevant. For one, it is the most objective set of ratings as the Bloomberg ratings simply measure how much data along each dimension of ESG a company discloses. Given the difficulty of relying on one particular ESG rating provider, companies that disclose the most data should be most attractive to investors who are interested in these data. Furthermore, we hypothesize that it in the absence of standardized and comparable ESG ratings, investors will prefer the optionality of being able to evaluate company ESG criteria themselves in order to supplement or complement third party ESG ratings. Additionally (or alternatively), in the absence of mandatory ESG disclosure guidelines and objective ESG ratings, investors may view companies which self-disclose high levels of ESG data as a signal of high quality. (We previously found evidence supporting this view in Lopez de Silanes et al, 2019).

Relative emphasis of ESG component rankings

Before we turn our attention to examining the relative impact of ESG components on institutional investor holdings, we recognize the divergence among ESG ratings and the difficulties of objectively measuring ESG (as discussed above). We therefore begin our analysis by looking at how the ratings providers in our sample set weight the three sub-dimensions of ESG and the relative emphasis attached to each component rating in calculating the composite ratings. In order to do this, we regress the three component rankings of each ESG index onto the composite ranking. We use dummy variables to control

for industry and year effects. This is particularly important because each of the ratings providers adjusts its ratings over time and tailors the ratings to each industry.

Table 3 presents the results of the regressions. The Bloomberg ratings show a clear emphasis on the environmental dimension and roughly equal weights on the social and governance dimensions. We find that the Bloomberg environmental rating accounts for twice as much as each of the social and governance dimensions in contributing to the composite ESG rating. On the other hand, the Sustainalytics ESG ratings emphasize the environmental and social dimensions equally, while attaching a weight to the governance dimension of about half of that applied to each of the other two dimensions.

The differences we find among the ratings illustrate the importance of, in the absence of a single objective measure for ESG criteria, considering multiple proxies in order to test the robustness of any analyses relying on one set of data concerning ESG (or any component dimension). We therefore continue with our analysis while looking across all three data providers.

Institutional investor holdings and ESG

The next step in our analysis is to distinguish among investor preferences across the three dimensions of ESG. To estimate these preferences, we regress composite ESG ratings from all three rating providers, as well the environmental, social, and governance component scores, onto the number of institutional investors and 5% blockholders, for the Big Three asset managers we consider the total percentage of outstanding shares owned by the Big Three. We also consider the average percentage portfolio allocations to each company by institutional investors generally and blockholders and the Big Three in particular. These tests are designed to test to what extent investors are drawn to firms based on each component of ESG, and whether and which ESG characteristics affect the relative portfolio allocations by investors.

We use a standard set of control variables. To control for firm size, we use the natural logarithm of the firm's market capitalization. To control for varying degrees of leverage, we use the ratio of total debt to assets. We use Tobin's Q as a control variable for the level of a firm's intangible assets, which previous research has shown to be correlated with a firm's environmental quality scores (see, for example, Dowell et al., 2000 and Konar and Cohen, 2001). Tobin's Q is also highly correlated with the firm's book-to-market ratio, which is a widely quoted financial metric and found to be related to financial performance (Fama and French, 1996, 2015; Carhart, 1997). We use return on assets as a measure of a firm's long-term profitability. We use dummy variables to control for industry-level and year effects. For details of the definitions and calculations of all variables, see Table 1.

Table 4 presents the results of our regressions on the total number of institutional investors and ESG scores. The most important finding is that investors have a significant preference for firms with high ESG rankings. We conjecture that the coefficients on the composite rankings should relate to institutional investors' relative preferences for the three dimensions of ESG. For the rankings, the Bloomberg ESG scores are more strongly correlated with holdings than are the Sustainalytics ratings, and the governance scores are strongest among the ESG dimensions.

The fact that Bloomberg disclosure scores have the strongest relation to holdings may indicate that investors prefer holding companies with strong ESG disclosure records. There may be several possible explanations for this result. First, since the Sustainalytics score also shows statistical significance, it may be the case that, second to ESG disclosure scores, investors prefer companies with high values-oriented qualities. Second, this supposition is reflected in the Sustainalytics rankings (see Eccles and Stroehle (2018) on the values-oriented versus value-based approach of ratings providers). Thus, the results are consistent with the relatively low impact of the financial metrics in our regressions on holdings data.

We compare next the coefficients on the component ratings in order to estimate the relative preferences of institutional investors among the three dimensions of ESG. First, for both the Bloomberg and Sustainalytics ratings, the highest impact on holdings is from the governance dimension. The coefficient on the Bloomberg governance rating is more than twice that of the

Bloomberg environment rating, while the coefficient of the social rating lacks statistical significance. Second, the coefficient on the Sustainalytics governance rating is slightly higher than that of the Sustainalytics social rating, which, in turn, is slightly higher than that of the Sustainalytics environment rating. Moreover, given the close range of the values of the coefficients on the Sustainalytics component ratings and the similar magnitudes of the standard deviations, one cannot clearly conclude that there is a relative preference among the ESG dimensions. Thus, the results from the Bloomberg ratings are quite clear – investors strongly prefer companies with high disclosure of governance data, followed by environmental data, and they appear indifferent to disclosure of social data.

We find a strong relationship between institutional holdings and a firm's combined environmental, social and governance ratings. This is consistent with the findings of Dyck et al. (2019), but our analysis extends beyond the E and S dimensions of ESG. Furthermore, our result regarding the overwhelming importance of G to institutional investors is not inconsistent with the premise of Dyck et al (2019) that institutional ownership drives E and S increases over time. In fact, our results so far can show that it is through investing in firms with high governance quality, that investors are able to effectively drive increased E and S performance.

Table 5 presents our findings of whether the holdings of blockholders are driven by the component and composite E, S and G ratings. We find that although the regressions on the number of blockholders lack statistical significance, this result suggests there are likely to be differences between institutional investors generally and blockholders involving ESG issues. First, institutional investors generally are more likely to be strongly driven by ESG ratings. Consistent with our expectations, large blockholders and activist investors are less motivated by these ratings. To be sure, there is prior evidence which indicates that some activist investors are driven by ESG and are able to create value by following an ESG-focused strategy (see Barko et al. (2018)). However, it may be that our sample set is not representative of such investors, who may be in the vast minority of activist investors. Alternatively, it may be that such investors tend to rely more on their proprietary collection and evaluation of ESG data and less on the publicly disclosed ESG data and rankings. On the other hand, our results are consistent with Griffin (2020) who finds that the largest

institutional investors are rarely supportive of shareholder proposals related to improving a firm's E and S quality, thus supporting the proposition that large investors care much less about ESG.

Table 6 presents our findings with respect to the ownership stakes of the Big Three asset managers. The trend is consistent with what we see from institutional investors generally. While the Big Three are drawn to all firms with higher ESG scores, they are most significanty drawn to firms with high G scores. Furthermore, the Bloomberg disclosure-based ESG scores are more significant than the Sustainalytics scores in determining the Big Three ownership stakes.

In Table 7, Table 8, and Table 9, we regress on the mean portfolio allocation of institutional investors generally (Table 7), blockholders (Table 8), and the Big Three asset managers. While, Table 8 shows no convincing evidence that blockholder stakes are related to ESG, Table 9 shows a statistically significant negative relationships between E ratings and the size of the ownership stake taken by institutional investors. Table 10 meanwhile shows that the Big Three asset managers actually invest more in companies with high E ratings.

Generally, the results of our regressions on numbers of institutional investors and portfolio allocations suggest that while institutional investors are strongly motivated to invest in companies with high quality ESG, this does not correlate to making large portfolio allocations. Those investors interested in taking a larger ownership stake are actually demotivated by high ESG scores, particularly E scores, with the exception of the Big Three asset managers. This result may indicate the efforts of activist and value investors identifying undervalued companies with poor ESG performance (as described by Barko, et al. 2018), or overpricing of companies with high ESG ratings driven by attention from very large investors, or this trend may be reflective of the phenomenon studied by Griffin (2020) where very large institutional investors fail to support efforts to increase the environmental and social performance of their portfolio companies.

Relationship of ESG with financial performance and systemic risk

We turn next to the effect of ESG factors on financial performance in order to examine if this explains the trends we notice with respect to ownership. In this section, we assess the relationship between ESG composite and component scores against several measures of financial performance.

As discussed in Section 2, a factor likely to influence the link between ESG ratings and investor holdings is the degree to which a subsector of investors has a non-pecuniary component of utility (Fama and French, 2007). On the other hand, it may be that these investors are motivated not purely by ESG considerations but also by the possibility that ESG is correlated with firm financial performance. Indeed, the survey literature suggests that most institutional investors consider ESG factors because they believe them to be linked to financial performance (Amel-Zadeh and Serafeim, 2017). It is therefore important that we understand how each component dimension of ESG correlates with financial performance.

One possibility is that company investments in ESG criteria may have positive externalities affecting financial performance, or, conversely, investments with a pure profit motivation may have positive ESG-related externalities. An example of the first case would be if a firm invests in energy-saving technologies to reduce its carbon footprint, and this creates a positive externality of lowering the firm's energy costs. In the second case, it is possible, and perhaps even more likely, that a firm may invest in green technologies with the purely financial motive of reducing costs, but the investment may coincidentally improve its environmental rating. Investors can recognize such effects and see ESG characteristics as proxies for gauging a firm's financial prospects. Dowell et al. (2000) argue that investors see positive environmental performance as a sign of a high-quality company. Evidence also suggests that firms with better environmental performance have higher intangible-asset valuations, which may indicate positive technological spillover from green investments (Konar and Cohen, 2001).

Another possible link between ESG and firm financial performance may be the combined effects of a sufficiently large number of investors acting on non-financial motives to slant their portfolios towards firms with strong ESG criteria and away from firms with poorer ESG

quality. While these investors are motivated, at least in part, by non-financial factors, if a sufficiently large number of investors act in a similar fashion, there will be fewer investors willing to hold poor-quality ESG firms. As a result, it will be harder to diversify the risk of holding these poor-quality ESG firms, and those remaining investors willing to hold these firms' securities will demand higher risk premia to compensate them for reduced diversification possibilities. The subset of investors acting this way needs to be just large enough to raise the cost of capital for firms with poor ESG quality in order to provide a financial incentive to invest in improving ESG quality and, thus, to attract a larger number of investors (see Heinkel et al., 2001).

A third explanation for a positive relationship between ESG and financial performance involves considering the risk benefits that may accrue to individual firms due to their ESG characteristics, as well as the diversification benefits related to firm ESG characteristics. This would explain the results of some strands of the literature that argue for the need to consider the financial performance impacts of ESG factors at the portfolio level. Some of this literature argues that portfolio performance depends on how ESG is used in constructing an investment portfolio (Statman and Glushkov, 2008). These studies find that improved financial performance depends on how the portfolio manager uses ESG screenings. Barnett and Salomon (2006), for example, find that the link between performance and ESG depends on how a fund manager applies ESG criteria; they also find that positive returns depend on using ESG considerations to weight portfolios away from poor-quality ESG companies rather than using ESG as an absolute screening method to completely exclude them. Sherwood and Pollard (2018) and Hanson et al. (2017) argue that ESG can be used to diversify risks in portfolio construction. Consistent with that view, Barnett and Salomon (2006), Shafer and Szado (2019), and Hanson et al. (2017) find evidence that ESG can be important in managing tail risks. Hoepner et al. (2019) and Bialkowski and Starks (2016) also find some evidence that ESG factors are negatively related to extreme downside risks. This is also consistent with the evidence from Gisbon et al. (2019) and Lopez de Silanes et al. (2019) showing that the relationship between ESG and financial performance is primarily attributable to decreased risk of securities with high ESG scores.

What explains the relevance of ESG factors to a company's risk exposure? A company may invest in lowering its carbon footprint and improving its environmental impact as a way to avoid environmental fines and regulations in the present. However, by investing to improve its environment credentials even further, the company is also hedging against the possibility of more stringent future environmental regulations. In the same vein, similar to the relationship between a firm's environmental quality and performance, a firm may be able to generate positive financial returns, or at least hedge against potential risks, by investing in improving "social" criteria. Doing so would help the firm avoid or limit the risk of controversy and poor publicity (i.e., reputational risk), as well as litigation risk related to negative "social" behavior, such as discriminatory employment practices, health and safety violations, and labor law violations. Similarly, a firm's investments in better corporate governance structures and mechanisms may enhance its financial performance by reducing the risks of agency problems and rent-seeking behavior by management, as well as the possibility of corporate fraud and other scandals, through improved firm governance and oversight.

In order to tease out these multiple effects on financial performance, we test the relationship between ESG composite and component scores against several measures of financial performance. In Table 10, we examine the relationship between ESG and a security's risk-return tradeoff, as measured by its Sharpe ratio. Table 11 examines security's exposure to systemic risk, as measured by CAPM beta. And Table 12 examines to what extent ESG ratings may be related to a security being undervalued or overvalued based on the security's alpha.

For all regressions, we use the following independent variables: to control for size, we use the natural logarithm of the firm's market capitalization; to control for varying degrees of leverage, we use the ratio of total debt to assets. We use Tobin's Q as a control variable for the level of a firm's intangible assets, which previous research has shown to be correlated with a firm's environmental quality scores (see, for example, Dowell et al., 2000; and Konar and Cohen, 2001). This relationship between intangible assets and environmental quality is due, in part, to firms in certain industries (e.g., internet companies) incidentally having a lower carbon footprint because of the nature of their operations. Furthermore, firms that

invest in more-efficient technologies often develop technologies that are not only more cost-effective, but that also have smaller carbon footprints. We use dummy variables to control for industry-level and year effects. This is particularly important, as ESG ratings are adjusted periodically and adapted for each industry.

The regression results on Sharpe ratios in Table 10 show generally positive relationships with ESG, though the relationship is greatest and most statistically significant with the governance dimension. The relationship with Bloomberg ESG disclosure ratings is stronger than with the subjective Sustainalytics ratings. This trend is largely consistent with what we have seen previously when looking at investor preferences across E, S, and G.

Table 11 considers whether there is a correlation between ESG and general market risk or systemic risk, as measured by CAPM beta. The main point here is that there is strong evidence of a statistically significant negative relationship between ESG and systemic risk, primarily along the governance dimension, but also along the social dimension. While this result is robust for both the Bloomberg and Sustainalytics ratings, the results are stronger for the Bloomberg ratings. This is perhaps because these ratings are a measure of information content and because of the relative objectivity of these ratings. It could also be that the companies that disclose more ESG data, as measured by the Bloomberg ratings, happen to disclose more information generally, and this provides investors with more information and helps to minimize exposure to risk (see Lopez de Silanes et al., 2019).

Next, we turn to investing the potential relationship between ESG and alpha in order to determine if ESG is correlated with a security being undervalued or overvalued. By regressing on alpha, we find evidence that securities with high E ratings tend to have lower alphas implying that they are relatively overvalued, while securities with high G and S ratings tend to have higher alphas and are relatively undervalued.

These findings help to explain the portfolio allocations of investors. They prefer G because it is most correlated with superior risk return tradeoffs (high Sharpe ratios), low exposure to systemic risk (low betas) and are potentially undervalued (high alphas). Meanwhile investors move away from companies with high E because they are relatively overvalued (low alphas).

The exception is the Big Three asset managers, who actually invest more in E which actually may be creating the overvaluations since they are such large investors.

In general, our results on the connections between ESG and financial performance in Tables 10, 11, and 12 support the portfolio-optimization strand of the literature, which argues that ESG filters can help to construct a portfolio with superior financial performance (Sherwood and Pollard, 2018; Bannier et al., 2019 Hanson et al., 2017; and Boze et al., 2019).

Furthermore, our evidence suggests that the effect seems to be most pronounced on the risk side – volatility and beta – and this is consistent with the literature suggesting that ESG is a hedge against extreme events. As Hoepner et al. (2019) show, ESG investing helps limit downside risk in extreme situations. Similarly, Shafer and Szado (2019) show, by analyzing volatility surfaces, that options markets price with a lower probability that firms with better ESG quality are exposed to "left-tail" events and extreme downside risk. This is likely because firms' investments in ESG can provide a "hedge" against regulatory risk (more-stringent standards help prevent future environmental and health and safety issues); litigation risk (by having a more diverse workforce and better governance oversight); reputational risk (thanks to an enhanced public image through supporting environmental and social sustainability causes); and the risk of corporate scandals (strong corporate governance mechanisms in place can help to deter and catch fraud and malfeasance).

An interesting question remains about whether there is a relation between corporate carbon emissions and large shareholders. From a policy standpoint, this question is important whether institutional investors' ownership can affect the carbon emissions of investee companies. There are a number of reasons why we may expect a different effect for large shareholders. One possibility is that the holdings of large investors might, indirectly, influenced firms' efforts to reduce carbon emissions (Gianfrante et al., 2021). Another reason that we might expect to see holdings related to carbon emissions is that if investors hold a significant ownership stake, it may be possible that they can reduce the carbon emissions of investee companies (Azar et al., 2021). The results, presented in Table 13, show that there is no evidence of a statistically significant connection between carbon emissions and institutional investors generally or blockholders in particular, however there is a positive

relationship with ownership by the Big Three asset managers. The fact that the Big Three own large stakes in high carbon producing firms is consistent with findings of Azar et al (2021). The results may be explained by the limited ability of large shareholders' ownership stakes to influence the carbon emissions of their investee companies (Gianfrante et al., 2021).

Finally, the evidence in this section highlights the relationship with financial performance and in part explains the large ESG-driven nature of institutional holdings, despite the fact that governance is the most significant sub-dimension when analyzing holdings and financial performance and that ESG disclosure is generally more significant than ESG quality. While a large number of these investors appear to be driven by non-financial, ESG considerations, the situation can clearly arise in which these investors overinflate the price of securities with high ESG characteristics. This lowers the firms' cost of capital (Heinkel et al., 2001) but can contribute to an unsustainable bubble if it is detached from financial performance considerations. This would especially be the case if investors' preferences for ESG characteristics is cyclical and income-elastic (as suggested by Bansal et al. 2018, who argue that ESG investing is a luxury good and that investor demand for ESG is dependent on disposable income levels), then the shares of such companies are particularly exposed to devaluation in the case of a recession. On the other hand, the fact that portfolio allocations of institutional investors are negatively correlated with ESG criteria leads support to the argument that activist investors may seek out companies with poor ESG criteria as a way to find companies who are also underperforming financially (Barko, et al., 2018). This, too, is consistent with the empirical findings of Griffin (2020).

5. Conclusion

In this paper, we examine the financial and non-pecuniary, ESG preferences of institutional investors. Using a unique dataset, we focus our analysis on the SEC 13F and 13D/G filings of institutional investors and blockholders of US equities to test institutional investors' interest in companies. Moreover, we examine the extent to which institutional investors' allocations are driven by ESG versus companies' financial characteristics. The results show that institutional investors have a strong preference for investing in firms with strong ESG rankings relative to other financial metrics and proxies for financial performance. The

findings also show that when it comes to the size of the ownership stake the relationship with ESG quality is negative. This study further suggests that high quality ESG companies, particularly companies with high ratings in the environmental dimension, receive too much attention from large institutional investors and are in danger of being overvalued. These results lend support to the claims that activist investors are increasing their stakes in companies with poor ESG performance and large institutional investors are seldom interested in advancing environmental- and social- related shareholder proposals.

We also find that institutional investors have a preference for ESG disclosure over actual ESG quality of portfolio companies. Blockholders on the other hand, appear much less interested in ESG than institutional investors generally. We also find no evidence of a relationship between the holdings of large shareholders and carbon emissions. Upon considering the three dimensions of ESG, we find that governance factors trump social and environmental factors in determining institutional investor interest. Again, company disclosure of governance criteria appears more important than actual governance quality rankings.

Second, we examine the relationship between ESG and financial performance to determine whether institutional investors are, to an extent, overweighting ESG data. We find statistically significant evidence to support the view that ESG, and particularly the governance dimension, is related to decreased risk. Again, ESG disclosure scores are more strongly correlated with decreased risk than subjective quality ESG quality rankings. We also show that the correlation between decreased risk and better governance ratings is stronger than for the social and environmental dimensions of ESG; furthermore, the governance disclosure scores are more strongly correlated than the governance quality rankings. This positive relationship between financial performance and ESG supports the argument that activist investors prefer to find value in companies which are underperforming financially and with respect to ESG; this helps to explain why ownership stake size is negatively correlated with high quality ESG.

Overall, our results support recent evidence of the portfolio-optimization benefits of ESG. We also help to bridge a gap in the literature by showing the relative impact of each of the

three subfactors of ESG and clearly distinguishing between the disclosure and quality of ESG. The results of this paper contribute to the literature by shedding light on the ESG preferences of institutional investors.

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Appendix

Table 1 – variable definitions

This table provides definitions of the variables used in our data analyses.

Variable	Definition
BBG_ESG	This is a proprietary Bloomberg score based on the extent of a company's publicly disclosed ESG data. Scores range from 0.1 for companies that disclose a minimum amount of ESG data to 100 for those that disclose every data point collected by Bloomberg. Bloomberg tailors the scoring to different industries. In this way, each company is only evaluated in terms of the data that is relevant to its industry sector. This score measures the amount of ESG data a company reports publicly and does not measure the company's performance on any data point. We divide this variable by 100 to facilitate comparisons in our models. Bloomberg field: "ESG_DISCLOSURE_SCORE"
BBG_environ	This is a proprietary Bloomberg score based on the extent of a company's environmental disclosure as part of ESG data. The score ranges from 0.1 for companies that disclose a minimum amount of ESG data related to the environment to 100 for those that disclose every data point collected by Bloomberg related to the environmental component of ESG. Bloomberg tailors the score to particular industries. In this way, each company is only evaluated in terms of the data that is relevant to its industry sector. This score measures the amount of environmental data a company reports publicly and does not measure the company's performance on any data point. We divide this variable by 100 to facilitate comparisons in our models. Bloomberg field: "ENVIRON_DISCLOSURE_SCORE"
BBG_social	This is a proprietary Bloomberg score based on the extent of a company's social disclosure as part of ESG data. The score ranges from 0.1 for companies that disclose a minimum amount of ESG data related to the social component of ESG to 100 for those that disclose every data point collected by Bloomberg related to social factors of ESG. Bloomberg tailors the score to particular

	industries. In this way, each company is only evaluated in terms of the data that is relevant to its industry sector. This score measures the amount of social data a company reports publicly and does not measure the company's performance on any data point. We divide this variable by 100 to facilitate comparisons in our models. Bloomberg field: "SOCIAL_DISCLOSURE_SCORE"
BBG_govn	This is a proprietary Bloomberg score based on the extent of a company's governance disclosure as part of ESG data. The score ranges from 0.1 for companies that disclose a minimum amount of ESG data related to governance to 100 for those that disclose every data point collected by Bloomberg related to the governance component of ESG. Bloomberg tailors the score to particular industries. In this way, each company is only evaluated in terms of the data that is relevant to its industry sector. This score measures the amount of governance data a company reports publicly and does not measure the company's performance on any data point. We divide this variable by 100 to facilitate comparisons in our models. Bloomberg field: "GOVNCE_DISCLOSURE_SCORE"
Beta	Beta measures the percentage price change of the security given a one percent change in a representative market index - here the S&P 500 index is used. The beta value is determined by comparing the price movements of the security and the S&P 500 index for the past two years of weekly data. Bloomberg field: "EQY _BETA"
Alpha	Indication of the degree to which a stock is undervalued or overvalued in relation to other stocks with similar systematic risk. Bloomberg field: “EQY_ALPHA”
log (blockholders+1)	This is the natural logarithm of the number of 13D/G filers who have a beneficial ownership of at least 5% of a security plus one in order to account for firms with zero blockholders. The ultimate beneficial owner is used in order to avoid double counting in such cases when a security is held in multiple separate accounts.
mean proportion of blockholder portfolio	This represents the average proportion of blockholders portfolios (in percentage terms) invested in a company.
log (institutional_investors)	This is the natural logarithm of the number of 13F filers who disclose ownership of a company's common stock. An asset manager with at least USD 100 million in assets under management is required to disclose the securities it manages. We use asset managers name in order to avoid double counting in cases when one asset manager holds securities in multiple separate accounts or funds.

mean proportion of institutional investor portfolio	This is average proportion of institutional investor portfolios (in percentage terms) invested in the company.
Total Big 3 ownership	This is the percentage of all outstanding shares in a company owned by the Big Three asset managers (Blackrock, Vanguard, and Statestreet).
Big 3 mean proportion of portfolio	This is average proportion of portfiolios of the Big Three (in percentage terms) invested in the company.
log_mktcap	We use the natural logarithm of a company's market capitalization in order to control for relative size in our analyses. This corresponds to the natural logarithm of the Bloomberg field "HISTORICAL_MARKET_CAP".
ROA	As a control variable for company profitability, we use return on total assets. ROA is calculated as: (Trailing 12M Net Income / Average Total Assets). Bloomberg field: "RETURN_ON_ASSET"
Sharpe ratio	This variable represents the risk return tradeoff of a security by considering the reward per unit of risk. It divides the return of the fund earned in excess of the risk free rate by the standard deviation of the fund over a one year time period. Bloomberg field: "EQY_SHARPE_RATIO"
Sustainalytics_ESG	Sustainalytics assigns a rank to the company based on its total ESG quality relative to its industry peers. Scores range from 0 to 100. Aggregate ESG performance encompasses a company's level of preparedness, disclosure and controversy involvement across all three ESG themes. Bloomberg field: "SUSTAINALYTICS_RANK"
Sustainalytics_environ	Sustainalytics assigns a rank for the company's management of its environmental record in relation to industry peers. Scores range from 0 to 100. Environmental performance is determined by the level of environmental preparedness and disclosure in addition to environmental controversies. Bloomberg field: "SUSTAINALYTICS_ENVIRONMENT_PCT"
Sustainalytics_social	Sustainalytics assigns a rank for the company's management of its social impact relative to industry peers. Scores range from 0 to 100. Social performance is determined by the quality of policies, programs and management systems concerning employees, suppliers, customers and society in addition to related controversies. Bloomberg field: "SUSTAINALYTICS_SOCIAL_PERCENTILE"
Sustainalytics_govn	Sustainalytics assigns a rank for the company's management of its governance activities in relation to

	industry peers. Scores range from 0 to 100. Bloomberg field: "SUSTAINALYTICS_GOVERNANCE_PCT"
Tobin_Q	We use Tobin's Q to control for the level of a firm's intangible assets. It is the ratio of the market value of a firm to the replacement cost of the firm's assets. The ratio is computed by Bloomberg as: (Market Cap + Total Liabilities + Preferred Equity + Minority Interest) / Total Assets. Bloomberg field: "TOBIN_Q_RATIO"
totDebt_to_assets	In order to control for leverage, we calculate the ratio of firm debt to market capitalization. This corresponds to the quotient of the Bloomberg fields "SHORT_AND_LONG_TERM_DEBT" / " BS_TOT_ASSET ".
Industry	In our regressions, we use industry dummies based on the first digit of the company's primary Standard Industrial Classification (SIC) code. Bloomberg field: "EQY_SIC_CODE".
Log_GHG_emissions	We use the natural log of the total greenhouse gas (GHG) emissions of the company in metric tons. Greenhouse gases are defined as those gases which contribute to the trapping of heat in the Earth's atmosphere and include Carbon Dioxide (CO2), Methane, and Nitrous Oxide. This includes scope 1 and scope 2 emissions. Scope 1 emissions are direct GHG emissions from sources that are owned or operated by the company. Sources include combustion facilities, company owned or operated transportation, and physical or chemical processes. Scope 2 emissions are indirect GHG emissions that are caused by the company through the consumption of imported heat, electricity, cooling, or steam. Bloomberg field: "TOTAL_GHG_CO2_EMISSIONS".

Table 2a – dataset summaries

This table the screening steps used in compiling our data and a breakdown of the observations by firms and years.

sample selection	distinct companies	firm-year observations
firms with all four Sustainalytics ESG ratings over 2013-2018	987	4297
remove frims missing any of the four Bloomberg ratings	658	3158
remove firms with incomplete or missing ownership data	549	2927
remvoe firms with incomplete or missing accounting or market data	523	2876

	number of companies	years per company	total observations
	17	3	51
	33	4	132
	145	5	725
	328	6	1968
total:	523		2876

Table 2b – summary statistics

This table presents summary statistics for all variables used in the analyses with the exception of year and industry dummy variables (n=2876 distinct company-year observations).

Variable	Mean	Minimum	Maximum	Std. Dev.
number of institutional investors	1034	433	3258	557.980
number of blockholders	3	0	8	1.205
mean proportion of total portfolio	4.381	0.436	27.586	7.345
mean proportion of blockholder portfolio	0.781	0.518	2.675	0.164
total Big 3 ownership	20.012	0.000	46.968	5.990
Big 3 mean proportion of portfolio	0.059	0.000	0.477	0.068
log_mktcap	9.980	7.036	13.580	1.038
Tobin_Q	2.182	0.626	9.985	1.256
totDebt_to_assets	0.304	0.000	0.847	0.159
ROA	0.057	-0.301	0.368	0.068
BBG_ESG	0.356	0.132	0.711	0.134
BBG_environ	0.267	0.014	0.736	0.180
BBG_social	0.317	0.031	0.734	0.143
BBG_govn	0.597	0.268	0.857	0.071
Sustainalytics_ESG	0.528	0.000	1.000	0.261
Sustainalytics_environ	0.506	0.000	1.000	0.282
Sustainalytics_social	0.510	0.000	1.000	0.270
Sustainalytics_govn	0.566	0.000	1.000	0.250
Sharpe ratio	0.754	-2.333	5.501	1.041
beta	1.029	-0.531	4.708	0.538
alpha	-0.040	-3.639	2.298	0.457
log_GHG_emissions	13.522	8.749	18.668	2.086

Table 2c – correlation matrix

This table shows correlation coefficients for all eight ESG composite and sub-indices. Statistical significance is denoted at the *10 percent, **5 percent, and ***1 percent levels. Definitions of all variables along with relevant calculations appear in Table 1.

	BBG ESG	BBG environ	BBG social	BBG govn	Sustainalytics ESG	Sustainalytics environ	Sustainalytics social	Sustainalytics govn
BBG ESG	-	0.9771***	0.8505***	0.7688***	0.6044***	0.5192***	0.5349***	0.4497***
BBG environ		-	0.738***	0.6979***	0.5915***	0.518***	0.5234***	0.4177***
BBG social			-	0.6126***	0.5064***	0.4046***	0.4642***	0.4272***
BBG govn				-	0.4326***	0.3694***	0.3719***	0.3541***
Sustainalytics ESG					-	0.8726***	0.8566***	0.6357***
Sustainalytics environ						-	0.6269***	0.4342***
Sustainalytics social							-	0.4327***
Sustainalytics govn								-

Table 3 – ESG composite and component rankings

This table shows the relative importance that each data provider gives the three components of ESG in their composite ESG rankings. We regress the component rankings of each ESG data provider onto the composite ranking. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable:	BBG_ESG		Sustainalytics_ESG
BBG_environ	0.5239***	Sustainalytics_environ	0.4631***
	(0.0017)		(0.0090)
BBG_social	0.2426***	Sustainalytics_social	0.4259***
	(0.0020)		(0.0095)
BBG_govn	0.2264***	Sustainalytics_govn	0.2366***
	(0.0036)		(0.0091)
Year effects	yes	Year effects	yes
Industry effects	yes	Industry effects	yes
n	2876	n	2876
R-squared	0.9786	R-squared	0.9392

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 4 – ESG and institutional investors

This table shows how the holdings of institutional investors are related to ESG scores and financial data. We regress component and composite ESG scores along with common financial data of companies onto the natural logarithm of the number of institutional investors. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: log number of institutional investors										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	0.3818***	0.3814***	0.3894***	0.3824***	0.3848***	0.3868***	0.3864***	0.3932***	0.3789***	0.3889***
	(0.0110)	(0.0109)	(0.0105)	(0.0111)	(0.0105)	(0.0107)	(0.0104)	(0.0101)	(0.0112)	(0.0108)
Tobin_Q	-0.0387***	-0.0388***	-0.0391***	-0.0382***	-0.0425***	-0.0417***	-0.0411***	-0.0429***	-0.0387***	-0.0430***
	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0117)	(0.0117)	(0.0117)
totDebt_to_assets	-0.0719	-0.0721	-0.0723	-0.0839	-0.0786	-0.0711	-0.0758	-0.0991	-0.0795	-0.0935
	(0.0678)	(0.0677)	(0.0683)	(0.0681)	(0.0677)	(0.0681)	(0.0678)	(0.0683)	(0.0681)	(0.0685)
ROA	0.3875*	0.3950**	0.3587*	0.3710*	0.3769*	0.3790*	0.3920**	0.3254	0.4016**	0.3575*
	(0.1990)	(0.1990)	(0.2000)	(0.1991)	(0.1985)	(0.2002)	(0.1991)	(0.1986)	(0.1994)	(0.2001)
BBG_ESG	0.2167**									
	(0.0880)									
BBG_environ		0.1662**							0.1732*	
		(0.0646)							(0.0954)	
BBG_social			0.0892						-0.1057	
			(0.0794)						(0.1086)	
BBG_govn				0.3710**					0.2102	
				(0.1700)					(0.2255)	
Sustainalytics_ESG					0.1191***					
					(0.0455)					
Sustainalytics_environ						0.0692				0.0039
						(0.0430)				(0.0508)
Sustainalytics_social							0.1057**			0.0658
							(0.0428)			(0.0529)
Sustainalytics_govn								0.1160***		0.0851*
								(0.0429)		(0.0487)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.8366	0.8369	0.8343	0.836	0.837	0.8349	0.8366	0.8372	0.8376	0.8381

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 5 – ESG and blockholders

This table shows how the holdings of blockholders with a minimum 5% stake in a company are related to ESG scores and financial data. We regress component and composite ESG scores along with common financial data of companies onto the natural logarithm of the number of investors with at least a 5% ownership stake. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: log number of blockholders

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	-0.0731***	-0.0739***	-0.0724***	-0.0807***	-0.0733***	-0.0738***	-0.0744***	-0.0754***	-0.0794***	-0.0737***
	(0.0121)	(0.0121)	(0.0115)	(0.0121)	(0.0116)	(0.0118)	(0.0115)	(0.0112)	(0.0123)	(0.0120)
Tobin_Q	0.0305***	0.0307***	0.0300***	0.0326***	0.0310***	0.0312***	0.0310***	0.0311***	0.0319***	0.0311***
	(0.0110)	(0.0110)	(0.0109)	(0.0110)	(0.0109)	(0.0109)	(0.0109)	(0.0109)	(0.0110)	(0.0109)
totDebt_to_assets	-0.0192	-0.0196	-0.0175	-0.0248	-0.0182	-0.0193	-0.02	-0.0185	-0.0226	-0.0192
	(0.0724)	(0.0724)	(0.0724)	(0.0724)	(0.0724)	(0.0724)	(0.0724)	(0.0729)	(0.0723)	(0.0731)
ROA	-0.5160***	-0.5165***	-0.5150***	-0.5205***	-0.5108**	-0.5154***	-0.5157***	-0.5125**	-0.5208***	-0.5148**
	(0.1992)	(0.1992)	(0.1991)	(0.1991)	(0.1994)	(0.1992)	(0.1992)	(0.2002)	(0.1988)	(0.2005)
BBG_ESG	-0.0465									
	(0.0942)									
BBG_environ		-0.0227							-0.0348	
		(0.0697)							(0.1062)	
BBG_social			-0.0904						-0.183	
			(0.0850)						(0.1197)	
BBG_govn				0.2022					0.4703**	
				(0.1794)					(0.2361)	
Sustainalytics_ESG					-0.03					
					(0.0461)					
Sustainalytics_environ						-0.0192				-0.0161
						(0.0432)				(0.0557)
Sustainalytics_social							-0.015			-0.0047
							(0.0444)			(0.0568)
Sustainalytics_govn								-0.0103		-0.0009
								(0.0457)		(0.0520)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.1379	0.1377	0.1388	0.139	0.1381	0.1378	0.1378	0.1377	0.1433	0.1378

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 6 – ESG and ownership by the Big Three

This table shows how ownership by the Big Three asset managers (Blackrock, Vanguard, and Statestreet) is related to ESG scores. We regress component and composite ESG scores along with common financial data of companies onto the total percentage of outstanding shares owned by the Big Three combined. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: total Big 3 ownership										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	-1.7002***	-1.7095***	-1.4134***	-1.8040***	-1.4825***	-1.3157***	-1.4637***	-1.2142***	-1.9005***	-1.2797***
	(0.3219)	(0.3211)	(0.3102)	(0.3231)	(0.3103)	(0.3188)	(0.3060)	(0.2986)	(0.3276)	(0.3197)
Tobin_Q	-0.047	-0.0529	-0.0545	-0.0098	-0.1822	-0.1222	-0.1474	-0.1915	-0.0232	-0.1588
	(0.3431)	(0.3427)	(0.3476)	(0.3413)	(0.3468)	(0.3511)	(0.3449)	(0.3473)	(0.3409)	(0.3461)
totDebt_to_assets	2.1472	2.1394	2.1515	1.4936	1.9126	2.104	1.989	1.2925	1.6084	1.3585
	(1.9909)	(1.9887)	(2.0159)	(1.9828)	(2.0066)	(2.0288)	(2.0007)	(2.0260)	(1.9861)	(2.0200)
ROA	0.8266	1.1274	-0.3822	0.3086	0.1188	-0.2482	0.8076	-1.4899	1.1567	-0.5595
	(5.8468)	(5.8452)	(5.9074)	(5.8008)	(5.8833)	(5.9597)	(5.8792)	(5.8905)	(5.8129)	(5.8987)
BBG_ESG	9.4596***									
	(2.5858)									
BBG_environ		7.1372***							4.7924*	
		(1.8958)							(2.7797)	
BBG_social			5.1392**						-3.0729	
			(2.3444)						(3.1657)	
BBG_govn				20.9631***					16.6938**	
				(4.9535)					(6.5732)	
Sustainalytics_ESG					3.8428***					
					(1.3468)					
Sustainalytics_environ						0.9544				-2.0103
						(1.2793)				(1.4978)
Sustainalytics_social							3.5488***			3.9092**
							(1.2722)			(1.5588)
Sustainalytics_govn								3.9868***		2.5385*
								(1.2633)		(1.4346)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.176	0.1779	0.1554	0.1865	0.1635	0.1448	0.1679	0.1627	0.1937	0.1782

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 7 – ESG and portfolio allocations of institutional investors

This table shows how the portfolio allocations of institutional investors in companies is related to ESG characteristics. We regress component and composite ESG scores along with common financial data of companies onto the mean percentage of institutional investor portfolios invested in the companies. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: mean proportion of total portfolio										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	-0.4015***	-0.3919***	-0.4320***	-0.4231***	-0.4088***	-0.3960***	-0.4187***	-0.4317***	-0.3995***	-0.3943***
	(0.0396)	(0.0394)	(0.0379)	(0.0402)	(0.0378)	(0.0383)	(0.0376)	(0.0366)	(0.0402)	(0.0391)
Tobin_Q	0.0352	0.0348	0.0385	0.0371	0.0461	0.0504	0.0411	0.0415	0.0411	0.0499
	(0.0422)	(0.0420)	(0.0425)	(0.0425)	(0.0423)	(0.0421)	(0.0423)	(0.0426)	(0.0418)	(0.0424)
totDebt_to_assets	0.0642	0.0512	0.0956	0.0967	0.089	0.0592	0.0867	0.1148	-0.0921	-0.1022
	(0.2763)	(0.2752)	(0.2775)	(0.2773)	(0.2755)	(0.2744)	(0.2766)	(0.2783)	(0.2435)	(0.2472)
ROA	-0.0735	-0.1273	0.0208	0.0063	-0.0468	-0.1303	-0.0572	0.0488	-0.2392	-0.1809
	(0.7193)	(0.7169)	(0.7215)	(0.7217)	(0.7173)	(0.7150)	(0.7215)	(0.7218)	(0.7127)	(0.7219)
BBG_ESG	-0.6091*									
	(0.3181)									
BBG_environ		-0.5964**							-1.2353***	
		(0.2325)							(0.3408)	
BBG_social			0.0271						0.8246**	
			(0.2864)						(0.3881)	
BBG_govn				-0.2731					0.7884	
				(0.6165)					(0.8059)	
Sustainalytics_ESG					-0.3487**					
					(0.1643)					
Sustainalytics_environ						-0.4364***				-0.4557**
						(0.1535)				(0.1833)
Sustainalytics_social							-0.2164			-0.0048
							(0.1551)			(0.1908)
Sustainalytics_govn								-0.1103		0.0597
								(0.1560)		(0.1756)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.3535	0.359	0.3467	0.3471	0.3553	0.3617	0.3504	0.3478	0.342	0.3317

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 8 – ESG and portfolio allocations of blockholders

This table shows how the portfolio allocations of blockholders in companies is related to ESG characteristics. We regress component and composite ESG scores along with common financial data of companies onto the mean percentage of blockholder portfolios invested in the companies. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: mean proportion of blockholder portfolio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	-0.0492***	-0.0496***	-0.0504***	-0.0503***	-0.0509***	-0.0507***	-0.0517***	-0.0525***	-0.0498***	-0.0505***
	(0.0058)	(0.0058)	(0.0055)	(0.0058)	(0.0056)	(0.0056)	(0.0056)	(0.0053)	(0.0060)	(0.0057)
Tobin_Q	0.0061	0.0062	0.0062	0.0063	0.0069	0.007	0.0069	0.0069	0.0061	0.0071
	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0051)	(0.0051)	(0.0051)	(0.0051)	(0.0052)	(0.0051)
totDebt_to_assets	0.0648*	0.0647*	0.0649*	0.0647*	0.0649*	0.0646*	0.0636*	0.0642*	0.0651*	0.0635*
	(0.0341)	(0.0341)	(0.0341)	(0.0341)	(0.0341)	(0.0341)	(0.0341)	(0.0344)	(0.0341)	(0.0344)
ROA	-0.0487	-0.0495	-0.0493	-0.0498	-0.0456	-0.048	-0.0499	-0.0495	-0.049	-0.0503
	(0.0956)	(0.0956)	(0.0956)	(0.0956)	(0.0958)	(0.0957)	(0.0957)	(0.0961)	(0.0957)	(0.0962)
BBG_ESG	-0.0402*									
	(0.0218)									
BBG_environ		-0.0409							-0.014	
		(0.0333)							(0.0508)	
BBG_social			-0.0583						-0.0455	
			(0.0404)						(0.0570)	
BBG_govn				-0.0804					-0.0041	
				(0.0855)					(0.1135)	
Sustainalytics_ESG					-0.0215					
					(0.0219)					
Sustainalytics_environ						-0.021				-0.0246
						(0.0205)				(0.0267)
Sustainalytics_social							-0.0111			0.0019
							(0.0212)			(0.0273)
Sustainalytics_govn								-0.0047		0.0058
								(0.0216)		(0.0246)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.1724	0.1725	0.1717	0.1715	0.1759	0.1749	0.1748	0.1743	0.1737	0.1726

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 9 – ESG and portfolio allocations of the Big Three

This table shows how the portfolio allocations of the Big Three asset managers (Blackrock, Vanguard, and Statestreet) in companies is related to ESG characteristics. We regress component and composite ESG scores along with common financial data of companies onto the mean percentage of portfolios of the Big Three invested in the companies. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: Big 3 mean proportion of portfolio										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log_mktcap	0.0505***	0.0498***	0.0517***	0.0518***	0.0508***	0.0506***	0.0514***	0.0516***	0.0505***	0.0513***
	(0.0024)	(0.0024)	(0.0023)	(0.0024)	(0.0023)	(0.0023)	(0.0022)	(0.0022)	(0.0024)	(0.0023)
Tobin_Q	-0.0009	-0.0009	-0.0011	-0.0011	-0.0013	-0.0014	-0.0011	-0.0014	-0.0013	-0.0017
	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)
totDebt_to_assets	-0.0185	-0.0177	-0.0198	-0.0195	-0.0194	-0.0186	-0.0195	-0.022	-0.0159	-0.0217
	(0.0165)	(0.0164)	(0.0165)	(0.0165)	(0.0165)	(0.0165)	(0.0165)	(0.0165)	(0.0164)	(0.0166)
ROA	0.0855**	0.0887**	0.0821*	0.0819*	0.0844**	0.0863**	0.0827*	0.0788*	0.0936**	0.0783*
	(0.0429)	(0.0428)	(0.0429)	(0.0429)	(0.0429)	(0.0429)	(0.0430)	(0.0428)	(0.0426)	(0.0432)
BBG_ESG	0.0202									
	(0.0190)									
BBG_environ		0.0255*							0.0645***	
		(0.0139)							(0.0204)	
BBG_social			-0.007						-0.0418*	
			(0.0170)						(0.0232)	
BBG_govn				-0.0103					-0.0671	
				(0.0366)					(0.0480)	
Sustainalytics_ESG					0.0108					
					(0.0098)					
Sustainalytics_environ						0.0114				0.0122
						(0.0092)				-0.011
Sustainalytics_social							0.0009			(0.0125)
							(0.0092)			-0.0114
Sustainalytics_govn								0.0146		0.0157
								(0.0092)		(0.0105)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.646	0.6483	0.645	0.6449	0.646	0.6464	0.6448	0.6474	0.6532	0.6471

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 10 – ESG and risk-return tradeoffs (Sharpe ratios)

This table shows the relationship between ESG scores and the risk-return tradeoff of a company's security measured by the Sharpe ratio. We regress component and composite ESG scores onto Sharpe ratios while controlling for common financial characteristics. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: Sharpe ratio										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tobin_Q	0.1425***	0.1411***	0.1447***	0.1423***	0.1406***	0.1404***	0.1400***	0.1399***	0.1425***	0.1378***
	(0.0272)	(0.0272)	(0.0271)	(0.0272)	(0.0269)	(0.0270)	(0.0269)	(0.0270)	(0.0272)	(0.0270)
log_mktcap	0.1604***	0.1654***	0.1552***	0.1609***	0.1689***	0.1646***	0.1758***	0.1667***	0.1662***	0.1731***
	(0.0333)	(0.0333)	(0.0317)	(0.0332)	(0.0320)	(0.0324)	(0.0317)	(0.0306)	(0.0339)	(0.0329)
totDebt_to_assets	-0.3056	-0.303	-0.3123	-0.3069	-0.3001	-0.3045	-0.2967	-0.3185	-0.3092	-0.3287
	(0.2005)	(0.2005)	(0.2003)	(0.2006)	(0.2007)	(0.2006)	(0.2003)	(0.2017)	(0.2005)	(0.2017)
BBG_ESG	0.5471**									
	(0.2452)									
BBG_environ		0.3499*							-0.3397	
		(0.1827)							(0.2931)	
BBG_social			0.5498**						0.5983*	
			(0.2308)						(0.3284)	
BBG_govn				0.9969**					0.1031	
				(0.4587)					(0.6309)	
Sustainalytics_ESG					0.2090*					
					(0.1251)					
Sustainalytics_environ						0.0793				0.1175
						(0.1219)				(0.1519)
Sustainalytics_social							0.1092			-0.252
							(0.1286)			(0.1550)
Sustainalytics_govn								0.2824**		0.1462
								(0.1158)		(0.1421)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.2429	0.2426	0.2445	0.2428	0.2426	0.2427	0.2434	0.243	0.2457	0.2453

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 11 – ESG and systemic risk (beta)

This table shows the relationship of ESG scores and a security's exposure to systemic risk as measured by beta. We regress component and composite ESG scores along with common financial characteristics of companies onto a security's beta. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: beta										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tobin_Q	-0.0627***	-0.0619***	-0.0634***	-0.0629***	-0.0598***	-0.0595***	-0.0602***	-0.0589***	-0.0633***	-0.0595***
	(0.0152)	(0.0152)	(0.0152)	(0.0152)	(0.0151)	(0.0151)	(0.0151)	(0.0151)	(0.0152)	(0.0151)
log_mktcap	-0.0308	-0.0334*	-0.0307*	-0.0298	-0.0346*	-0.0369**	-0.0350**	-0.0406**	-0.0318*	-0.0387**
	(0.0187)	(0.0187)	(0.0178)	(0.0186)	(0.0180)	(0.0182)	(0.0178)	(0.0172)	(0.0190)	(0.0184)
totDebt_to_assets	-0.2916***	-0.2927***	-0.2880**	-0.2883**	-0.2895**	-0.2931***	-0.2936***	-0.2742**	-0.2866**	-0.2772**
	(0.1124)	(0.1125)	(0.1122)	(0.1125)	(0.1125)	(0.1126)	(0.1124)	(0.1130)	(0.1123)	(0.1132)
BBG_ESG	-0.2147									
	(0.1442)									
BBG_environ		-0.1215							0.158	
		(0.1074)							(0.1645)	
BBG_social			-0.3024**						-0.3608*	
			(0.1294)						(0.1844)	
BBG_govn				-0.4436*					-0.281	
				(0.2692)					(0.3543)	
Sustainalytics_ESG					-0.0974					
					(0.0707)					
Sustainalytics_environ						-0.054				0.0327
						(0.0665)				(0.0852)
Sustainalytics_social							-0.1245*			-0.073
							(0.0698)			(0.0871)
Sustainalytics_govn								-0.1333**		-0.1074
								(0.0657)		(0.0799)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.1068	0.1059	0.1101	0.1073	0.1065	0.1053	0.1067	0.1078	0.1112	0.1085

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 12 – ESG and alpha

This table shows the relationship of ESG scores and a security's alpha, which measures to what extent a security is undervalued or overvalued. We regress component and composite ESG scores along with common financial characteristics of companies onto a security's alpha. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variable: Alpha										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tobin_Q	0.1140***	0.1132***	0.1164***	0.1138***	0.1144***	0.1144***	0.1142***	0.1163***	0.1137***	0.1131***
	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0121)	(0.0121)	(0.0121)	(0.0121)	(0.0122)	(0.0121)
log_mktcap	0.0801***	0.0830***	0.0727***	0.0807***	0.0784***	0.0800***	0.0814***	0.0730***	0.0856***	0.0850***
	(0.0150)	(0.0150)	(0.0143)	(0.0150)	(0.0144)	(0.0146)	(0.0143)	(0.0142)	(0.0152)	(0.0148)
totDebt_to_assets	-0.1949**	-0.1933**	-0.2007**	-0.1941**	-0.1960**	-0.1946**	-0.1942**	-0.1961**	-0.1957**	-0.2150**
	(0.0901)	(0.0901)	(0.0900)	(0.0902)	(0.0902)	(0.0902)	(0.0901)	(0.0899)	(0.0898)	(0.0906)
BBG_ESG	-0.0275									
	(0.1156)									
BBG_environ		-0.1772**							-0.2815**	
		(0.0896)							(0.1315)	
BBG_social			0.1638						0.4341***	
			(0.1038)						(0.1474)	
BBG_govn				-0.0747					-0.1252	
				(0.2158)					(0.2832)	
Sustainalytics_ESG					0.0047					
					(0.0566)					
Sustainalytics_environ						-0.0139				-0.0211
						(0.0533)				(0.0682)
Sustainalytics_social							-0.039			-0.0806
							(0.0546)			(0.0697)
Sustainalytics_govn								0.0774		0.1302**
								(0.0593)		(0.0639)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.1911	0.1915	0.1933	0.1912	0.1911	0.1911	0.1915	0.1035	0.211	0.207

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

Table 13 – GHG emissions and holdings data

This table shows the relationship of company greenhouse gas (GHG) emissions to various institutional investor holdings characteristics and financial performance measures. The dependent variables in each model are various measure of institutional investor holdings – the log number of institutional investors in column 1, log number of blockholders in column 2, total Big Three ownership in column 3, mean portfolio allocation of institutional investors in column 4, mean portfolio allocation of blockholders in column 5, mean portfolio allocation of the Big Three in column 6, Share ratio in column 7, beta in column 8, and alpha in column 9. The independent variables are the natural log of GHG emissions along with common financial characteristics of companies as control variables. Dummy variables are used to control for year and industry effects. Coefficients are shown with asterisks denoting statistical significance, and standard errors appear in parentheses below coefficients. Definitions of all variables along with relevant calculations appear in Table 1.

dependent variables:	log number of institutional investors	log number of blockholders	total Big 3 ownership	mean proportion of total institutional investor portfolio	mean proportion of blockholder portfolio	mean proportion of Big 3 portfolio	Sharpe ratio	Beta	Alpha
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
log_mktcap	0.3711***	-0.0686***	-2.0594***	-0.4374***	-0.0547***	0.0553***	0.0678	-0.0192	-0.0192
	(0.0145)	(0.0155)	(0.4084)	(0.0493)	(0.0054)	(0.0034)	(0.0425)	(0.0220)	(0.0220)
Tobin_Q	-0.0285*	0.0356**	0.4598	0.0261	0.0084	-0.0034	0.1772***	-0.0406**	-0.0406**
	(0.0151)	(0.0150)	(0.4264)	(0.0515)	(0.0051)	(0.0036)	(0.0370)	(0.0191)	(0.0191)
totDebt_to_assets	0.0441	-0.2214**	-1.244	-0.1643	0.0476	-0.0285	-0.5411**	-0.4646***	-0.4646***
	(0.0884)	(0.0958)	(2.4977)	(0.3014)	(0.0329)	(0.0210)	(0.2691)	(0.1390)	(0.1390)
ROA	0.4653*	-0.5592**	1.5565	0.625	-0.1164	0.1397**			
	(0.2501)	(0.2705)	(7.0686)	(0.8530)	(0.0947)	(0.0595)			
log_GHG_emissions	0.0058	-0.0009	0.5641**	0.0293	0.0003	-0.0012	0.0698**	0.0119	0.0119
	(0.0095)	(0.0105)	(0.2691)	(0.0325)	(0.0036)	(0.0023)	(0.0284)	(0.0147)	(0.0147)
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
n	2876	2876	2876	2876	2876	2876	2876	2876	2876
R-squared	0.828	0.1862	0.187	0.3924	0.3108	0.6466	0.256	0.1632	0.1908

Standard errors in parentheses

Statistical significance is denoted at the *10%, **5%, and ***1% levels

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