# ESG Skill of Mutual Fund Managers*

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**Abstract**

We propose a new measure of ESG-specific skill based on fund manager trades and ESG rating changes. We differentiate between proactive ESG managers, whose trades predict future changes in ESG ratings, reactive ESG managers, who change their portfolio allocation after a change in ESG ratings occurs, and non-ESG managers. The predictive ability of proactive managers is persistent in out-of-sample tests, consistent with manager skill. For identification, we rely on an exogenous methodology change of one ESG rating provider that redefined ESG ratings levels without releasing new information. Reactive managers significantly change their holdings in firms whose ESG ratings exogenously change, consistent with a lack of ESG skill. Proactive managers do not trade in the direction of the change, consistent with their trading no new ESG information. This ESG skill has economic implications: Investors in mutual funds with an explicit sustainability mandate reward proactive managers with 58bps higher average quarterly flows.

**Keywords:** ESG skill; mutual fund managers; investments; mutual funds.

**JEL classification:** F3, G0, G23

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# 1 Introduction

Measuring the investment skill of professional asset managers is a question that has been studied extensively in the finance literature. From multi-factor models (e.g., Fama and French (1992) and Carhart (1997)) to Morningstar fund ratings (Del Guercio and Tkac, 2008), a number of approaches have been proposed.[1] Much less attention has been given to measuring investment skill in the context of sustainable investing. This is surprising given that environmental, social, and governance (ESG) factors can be financially material and are taken into account by both institutional and retail investors when making financial decisions.[2]

Investors may value a proactive ESG investing approach for at least two reasons. The first is non-pecuniary: some investors derive utility from investing in companies that, in the future, will have a positive impact or avoid having a negative impact on society. Thus, a fund manager's ESG investing skill (e.g., the ability to generate private ESG information that enables a manager to avoid investing in companies with negative future ESG impact) would be valued by these investors (Barber, Morse, and Yasuda, 2021). The second is pecuniary:

[1] Coval and Moskowitz (2001) use local expertise; Kacperczyk, Sialm, and Zheng (2005) use industry concentration of fund manager's portfolio; Kacperczyk, Sialm, and Zheng (2008) use trading decisions between reporting quarters; Cremers and Petajisto (2009) use deviations from a fund's benchmark; Fang, Peress, and Zheng (2014) use fund managers' reliance on media outlets; Berk and Van Binsbergen (2015) use the value added of funds; Cici, Gehde-Trapp, Göricke, and Kempf (2018) use industry-specific human capital; Jiang and Zheng (2018) use trades around times when new information is released to the markets.

[2] Pástor, Stambaugh, and Taylor (2021a,b) show theoretically and empirically that ESG is a priced component in asset prices and Krüger (2015) and Serafeim and Yoon (2022) show how ESG news impacts returns. Specific to the "E" component, Ilhan, Sautner, and Vilkov (2021); Bolton and Kacperczyk (2021, 2023); Hsu, Li, and Tsou (2023) show that physical and transitional environmental risks are priced. Engle, Giglio, Kelly, Lee, and Stroebel (2020) and Alekseev, Giglio, Maingi, Selgrad, and Stroebel (2022) show how these risks can be hedged. Institutional investors deem climate risks as important (Krueger, Sautner, and Starks, 2020) and, in the context of mutual funds, they are a driver of portfolio allocations (Ceccarelli, Ramelli, and Wagner, 2023b). Investors in mutual funds have a preference for high ESG funds (Hartzmark and Sussman, 2019), which is driven by both ethical and financial motivations (Giglio, Maggiori, Stroebel, Tan, Utkus, and Xu, 2023; Degryse, Di Giuli, Sekerci, and Stradi, 2023).

incorporating firm ESG information to improve fund performance. If a fund manager's ESG insights enable their fund to invest in companies that profit from the trend towards greater ESG practices or reduce exposure to companies that will have costly ESG incidents, this would also be valued by investors.

This paper proposes a new way of measuring the ESG-specific skill of fund managers. Intuitively, the price level a fund manager pays when making an investment is uninformative of her investment skill. Instead, one ought to focus on the future changes in the values of the investment. A manager with investment skill will buy low and sell high. The main insight of this paper is to apply this intuition to the ESG ratings of a fund's investments. The methodology we propose infers ESG skill from how managers' trading decisions correlate with changes in the ESG scores of their portfolio holdings. We differentiate between "proactive" ESG fund managers – those whose trades predict changes in ESG scores, "reactive" ESG fund managers – those whose trades follow changes in ESG scores, and non-ESG fund managers.[3] Only proactive fund managers show persistent ESG skill in out of sample tests. First, their trades predict future changes in ESG scores across three different ratings providers: MSCI IVA, Sustainalytics, and RepRisk. Second, they do not rebalance their holdings after an exogenous but uninformative methodology change of one ESG rating provider, consistent with their reliance on private ESG information. In contrast, reactive ESG fund managers do rebalance their portfolios after this change.

The first step in identifying fund manager skill is measuring their investment decisions. Kacperczyk and Seru (2007) argue that skilled fund managers rely less on public information than unskilled managers. Similarly, Cremers and Petajisto (2009) argue that fund managers

[3]The non-ESG managers can be divided into two groups, ESG agnostic and ESG contrarian. While our ESG skill measures enable us to distinguish between these two types, in the later analysis we group them into a single non-ESG manager designation.

with superior information about a firm will adjust their portfolio weights to exploit this informational advantage: they will over-weight firms they believe to be under-valued. We hypothesize that the same intuition can be applied to sustainable investing. If a skilled fund manager actively assesses a firm's ESG performance, they would trade accordingly by buying firms where existing ESG ratings underestimate their true ESG performance. If the manager is skilled, her private ESG information will eventually be incorporated into firms' ESG ratings. Conversely, consider unskilled fund managers who also manage ESG funds. Since they do not possess any private information about a firm's ESG performance, they will base holding decisions exclusively on publicly available ESG ratings and rebalance their portfolios after a change in ESG ratings occurs.

To test this empirically, we construct a sample of US and European equity mutual funds from Morningstar from 2011, when ESG ratings began to have reliable coverage, to 2020. From Morningstar, we also obtain the funds' name, size, fund family, age, and performance. We match those to quarterly fund holdings and firm fundamentals from FactSet (see, e.g., Ferreira and Matos (2008) for a discussion about this data). To assess the sustainability performance of funds' holdings, we also add quarterly ESG ratings from MSCI IVA and Sustainalytics as well as the number of negative ESG incidents from RepRisk. Given the low correlation between individual ESG data providers, it is crucial to have different proxies for firms' sustainability performance (Berg, Koelbel, and Rigobon, 2022).[4] This leaves us with a sample of over 13,000 funds.

With this sample in hand, we examine how manager trades relate to future changes in ESG ratings for the firms traded as our proxy for ESG skill. Our approach to identifying

[4]Since our sample period is extensive, we decided against including other ESG rating providers like Bloomberg. We also refrained from using Asset4/Refinitiv given their issue of backfilling rating changes (Berg, Fabisik, and Sautner, 2021).

ESG skill relies on a joint assumption. First, that skilled fund managers will generate private information about firms' ESG characteristics and trade according to this information. Second, this private information will eventually become public and incorporated in ESG ratings. Under this joint assumption, the buy (sell) trades of ESG skilled managers will positively relate to future increases (decreases) in ESG ratings. We refer to these managers as "proactive." In contrast, some fund managers may not generate private ESG information but simply choose to use publicly available ESG information (i.e., ratings) for their trading decisions. These managers we refer to as "reactive." Finally, any managers whose trades are either uncorrelated or negatively correlated with ESG rating changes we categorize as non-ESG managers.

With these measures of manager ESG skill in hand, we examine their internal validity in three out-of-sample tests. First, we show that "proactive" fund managers' ability to predict changes in firms' ESG ratings is persistent. Estimating proactive and reactive managers over a rolling window of the previous five years, we find that proactive managers' trades continue to positively relate with future ESG ratings changes. If proactive managers were simply lucky, we would not have expected any persistence in their skill. On the other hand, the trades of reactive managers, i.e., those that "chase" ESG ratings in the estimation period, do not exhibit any positive relationship with future ratings changes going forward.

Second, we aggregate the three ESG rating-specific (i.e., IVA, Sustainalytics, and RepRisk) manager skill estimates into a single measure using the first principal component. Since different ESG ratings contain different information about firms' sustainability performance (Berg et al., 2022), we can obtain a more precise estimate of ESG skill by combining the estimates into a single measure.[5] We likewise combine the three reactive or contempora-

[5] An additional benefit of using a principal component analysis is that we remain agnostic of the relative importance of the three performance measures in identifying fund manager ESG skill.

neous ratings-specific estimates into a single measure. Repeating the previous analysis, we find that the trades of managers with higher estimation period proactive ESG skill continue to predict changes in all three ESG ratings. In contrast, the trades of estimation period reactive managers do not.

Last of all, we compare our ESG skill estimates with the response of mutual fund families to a survey administered by the UN's Principles for Responsible Investing (PRI). Fund families that decide to become signatories of the PRI must fill out an annual survey that details their sustainability practices and their allocation of resources to these efforts. PRI staff assess the responses to this survey and award scores to signatories (Ceccarelli, Glossner, and Homanen, 2023a). Treating these scores as an alternative proxy for the level of private ESG information production by fund families, we examine how this relates to our measure of ESG skill. Consistent with greater private ESG information production, we find that PRI signatories and, within the group of signatories, those with higher survey scores exhibit a higher degree of proactive ESG skill, but not so with reactive managers.

In a final external validity test, we examine how proactive and reactive managers respond to an exogenous, but uninformative shock to ESG ratings. Since 2016, Morningstar has assigned ESG "Globes" to funds based on the sustainability of their holdings (Hartzmark and Sussman, 2019). To assess a fund's sustainability, Morningstar uses ESG ratings provided by Sustainalytics, an ESG rating provider.[6] In September 2019, Morningstar switched from using ESG Scores to using ESG Risk Scores when computing the Globes (Morningstar, 2019b). This change consisted of two parts: first, a move from a positive to a negative scale, where higher ESG Risk Scores represent worse ESG performance, and second, a switch to a measure that is not industry-adjusted. The ESG scores of many firms changed, and,

[6]Morningstar, which had originally acquired a 40% ownership stake in Sustainalytics in 2017, acquired the remaining stake in July of 2020.

as a result, around 40% of funds experienced a change in their ESG ratings: most funds either gained or lost one globe after the event (Morningstar, 2019a). Importantly for our identification, the switch in ratings did not contain any new information about firms' ESG performance. In fact, the ESG risk scores were available from Morningstar in early 2019, approximately six months before the event.

We hypothesize that if proactive fund managers truly rely on private information to inform their investment decisions, they would not adjust their portfolio holdings following this uninformative methodology change. However, we expect the trades of uninformed, reactive fund managers to follow these ESG rating changes, even if the change in methodology is not associated with any new information. Our findings confirm these predictions. Around the exogenous shock, proactive funds did not rebalance their portfolios toward the ESG rating change. Reactive funds, on the other hand, did so by both buying firms whose ESG rating increased and selling those whose ESG rating decreased. This result serves as an important external validation of our measure for ESG skill.

The predictive relationship observed for managers with ESG skill could come about for two possible reasons. First, ESG rating providers do not incorporate all available firm ESG information, are backward looking, and focus on broad heuristics used to categorize many firms and industries as opposed to individualizing their ESG assessment. This is consistent with the evidence that ESG ratings are a poor predictor of future incidents (Yang, 2022) and the significant disagreement between individual ESG ratings (Berg et al., 2022). If the ESG information that skilled managers uncover and trade on is ultimately incorporated into the updated scores of rating agencies, we would observe a predictive relationship between manager trades and future ESG rating changes. Second, there is ample evidence that engagement can improve firms' ESG efforts (Dimson, Karakaş, and Li, 2015; Broccardo, Hart, and Zingales, 2022; Dimson, Karakaş, and Li, 2023). If the buys (sells) of skilled managers proxy for their efforts to begin (cease) engagement and such engagement from skilled managers generated improvements in ESG ratings over time, we would also observe a predictive relationship between trades and changes in ESG scores. While we cannot completely rule out the second channel, the first channel seems more likely for one primary reason: Our proxy for ESG skill relies on changes in firm ESG performance over a single quarter, which is usually too short for engagements to be effective.

In the final section of the paper, we explore the economic implications of ESG-specific skill in terms of fund flows and financial returns. Hartzmark and Sussman (2019) and Ceccarelli et al. (2023b) show that mutual fund investors reward the level of sustainability of a fund's portfolio. However, to our knowledge, there is no evidence about whether mutual fund investors can detect ESG-specific skill, and, if they can, the extent to which they value this skill. On average, we find investor flow responds strongly to both proactive and reactive ESG managers. Given that our skill measure requires greater detail and understanding of ESG investing, for investors to be able to detect ESG skill they would likely need a greater ESG-focus. Consistent with this hypothesis, our results are even stronger for the sub-set of funds with an explicit ESG mandate, but only for the proactive ESG investment measure. The effect is economically significant: a one standard deviation increase in a manager's ESG proactive skill correlates with quarterly flows that are 66 basis points higher. This boost corresponds to almost half the effect from obtaining an additional performance "Star" and holds controlling for funds' lagged performance metrics, size, and funds' sustainability ratings provided by Morningstar, as well as category-by-quarter fixed effects. Overall, this suggests that investors in ESG funds assess the skill of managers in way consistent to or correlated with our proactive ESG skill measure.

Finally, should our proposed measure of ESG-specific skill be related to funds' abnormal returns? The answer to this question is not clear. On the one hand, the aggregate level of ESG taste in the economy, as well as changes thereof, will impact the (expected) returns of sustainable firms (Pástor et al., 2021a; Zerbib, 2022). If firms held by proactive funds experience further improvements in their ESG ratings, it will increase demand for their shares by other investors, potentially driving their stock price up (Brøgger and Kronies, 2023). On the other hand, not all sustainability factors are financially material (Khan, Serafeim, and Yoon, 2016), and, even if the sustainability factors were material, the market might not yet fully price them (Edmans, 2011). In our sample, we find no evidence that proactive or reactive ESG managers outperform.

The main contribution of our paper is to propose a novel measure of mutual fund manager skill that is specific to ESG. Using the dynamic relationship between fund managers' investment choices and changes in ESG ratings, we identify the predictive ability of fund managers concerning changes in firm-level ESG scores. We contrast this to fund managers who merely react to those changes. As the results of our exogenous and uninformative shock to ESG ratings show, this distinction lends important insight into distinguishing between "green" and "green-washing" managers. In particular, those reactive managers who engaged in ESG-meaningless trading around the Morningstar change, incurred costs borne by investors in what appears to be an effort to chase Morningstar Globes (Gantchev, Giannetti, and Li, 2024). Furthermore, because our measure does not focus on financial performance, but rather, ESG information, it provides a useful framework for investors whose ESG preference is independent of risk or return, but instead reflects their intrinsic desire to do good.

Our paper also contributes to the literature that studies how to measure fund manager skill. Several proxies for fund managers' ability to generate abnormal returns have been proposed, among those are deviations from specific benchmarks (Cremers and Pareek, 2016; Kacperczyk et al., 2005; Cremers, Riley, and Zambrana, 2023), reliance on private information (Kacperczyk and Seru, 2007), fund size (Berk and Van Binsbergen, 2015), or trading activity around earning releases (Jiang and Zheng, 2018). We add to this literature by developing a measure of skill that is specific to sustainable investing, namely the degree to which fund managers' trades relate to future innovations in ESG ratings.

Finally, our paper also proposes a novel identification strategy for fund manager ESG skill based on a methodology change implemented by Sustainalytics, which changed the level of ESG ratings without releasing any new information to market participants. Rzeźnik, Hanley, and Pelizzon (2022) use the same methodology change to study the firm-level return implications of changes in ESG ratings. Our approach is different as we use a lack of response to the shock to identify ESG skill.

## 2 Data

We start our sample construction with the full list of international mutual funds available on Morningstar from 2011, when ESG ratings started to have reliable coverage, to 2020. For this sample, we collect fund-level information, including monthly returns, the fund's inception date, and the fund family name. We follow Sirri and Tufano (1998) and compute fund flows as the percentage monthly growth of AUM, net of reinvested returns. We also retrieve Morningstar's proprietary performance ratings, i.e., the performance "Stars" and funds' ESG rating or sustainability "Globes." The performance stars are based on a risk-adjusted performance measure. Morningstar awards one to five stars, with more stars identifying better-performing funds (Del Guercio and Tkac, 2008). The ESG globes are based on the ESG ratings of funds' holdings as provided by Sustainalytics. Funds with better scores than their within-category peers will have more Globes (Hartzmark and Sussman, 2019). From Morningstar, we obtain an indicator variable identifying funds with an explicit ESG mandate ("ESG Fund") and compute the fraction of AUM of a fund family that stem from ESG funds ("AUM ESG Fund (%)"). From PRI, we obtain a list of all fund families that are PRI signatories and their respective ESG reporting scores (Ceccarelli et al., 2023a). All continuous variables are winsorized at the 1st and 99th percentile. Table 1 shows summary statistics for the variables at the fund level.

– Table 1 –

To compute funds' trading decisions, we require information about their holdings. To this end, we name-match the Morningstar sample to FactSet and obtain quarterly holdings (Ferreira and Matos, 2008). We also use FactSet for firm fundamentals, including the fraction of total trading on a given firm's stock in a given quarter, the firm's market capitalization, and quarterly returns.

To the sample of mutual fund holdings, we add firm-level ESG information from several sources: MSCI IVA, Sustainalytics, and RepRisk, which are available up to 2020. For both MSCI and Sustainalytics, we use scores at the quarterly frequency. For RepRisk, we count the number of negative reputational events a firm experiences over the course of a given quarter (Glossner, 2021). Using data from multiple ESG rating providers is important for at least two reasons. First, the low correlation between individual ESG rating agencies is partially driven by individual raters measuring different aspects of a firm's sustainability performance (Berg et al., 2022). Having multiple ESG scores gives us a more complete understanding of firms' sustainability. Second, it allows us to test if the skill of fund managers is rater-specific or independent of any given rating agency.

To measure mutual fund managers' ESG skill, we will test how their trades correlate with changes in portfolio firms' ESG scores. To focus on substantive changes in ESG performance and to make the changes in the two ESG rating providers more comparable, we define $\Delta IVA$ and $\Delta Sust$.[7] These variables are based on the distribution of changes in the raw ESG scores. We split the distribution into five parts. The largest part of the distribution, which covers no changes or very small changes, we code as zero (formally, this ranges from the 10th to the 90th percentile). We code as -2 the largest 5% of decreases (i.e., observations up to the 5th percentile) and -1 the following 5% of decreases (from the 5th up to the 10th percentile). Large increases in ESG ratings are coded symmetrically +1 (observations from the 90th up to the 95th percentile) and +2 (observations above the 95th percentile).

– Table 2 –

Table 2 shows summary statistics for the firm-level variables.

Finally, we divide the sample into two parts: an estimation period, which we use to compute the skill proxies, and a testing period, during which we test the validity of said proxies. The estimation period, which will be based on a rolling window, spans 5 years, with the initial window being from January 2011 to December 2015. The testing period starts in January 2016 and ends in December 2020.

# 3 Measuring the ESG skill of fund managers

This section develops our measure of fund manager ESG skill. We start by showing how we classify fund managers into proactive and reactive. Then, we probe the internal and

[7] All our results are robust to using the "raw" changes in the IVA ratings. IVA scores are rather coarse, ranging from 1 to 7, which means that a change in this score captures a significant change in a firm's sustainability. This is not true for Sustainalytics' ESG scores, since they range from 0 to 100.

external validity of our measure. For the former, we show that skill remains significant in out-of-sample tests and that it correlates with alternative proxies for ESG commitment. For the latter, we exploit an exogenous but uninformative change in the methodology of an ESG rating provider. Skilled managers should not react to such an event if they rely on private information.

## 3.1 Measuring ESG-specific skill

To measure manager investment skill, the basic approach for many of the proposed measures in the literature is similar: Past return data is assessed relative to some risk-adjusted point of comparison, and funds are ranked accordingly. Simply put, the intuition underlying these measures is that skilled managers, because of their private information production, buy undervalued securities at a low price. If the managers' information is correct, the market eventually recognizes and corrects the mispricing, allowing managers to then sell these securities at a higher price. Measuring the percentage change in the value of the managers' holdings over time (i.e., fund returns) would reveal such skill.

In contrast to this dynamic approach to measuring manager financial skill, the measures typically used by investors to infer a manager's commitment to ESG assess the fund in a static way, e.g., based on the ESG ratings of the fund's holdings. This static ESG characterization may correctly convey to investors the current assessment of the holdings' sustainability, according to third-party rating providers. However, does it measure a manager's efforts to identify and invest according to the company's future, but perhaps unrecognized, ESG performance? Put in the context of financial skill measures, is a skilled manager one who buys low and sells high, or one that just owns stocks when the price is high?

Grossman and Stiglitz (1980) define skill as the ability to pick stocks whose price will improve in the future. Similarly, we argue that fund managers who possess ESG skill can pick stocks whose ESG ratings will improve in the future. To do so, we develop a proxy for the predictive ability of managers to employ private ESG information in their trading strategy, defined as the sensitivity of deliberate trading decisions to future changes in ESG ratings. First, we argue that skill is positively correlated with the precision of fund managers' private information (Cohen, Coval, and Pástor, 2005; Kacperczyk and Seru, 2007). In our setting, this implies that the more skilled a fund manager is, the better her trades will predict future ESG rating changes.

Following the prior discussion, we define a skilled fund manager as one whose trades *predict* future ESG ratings changes, consistent with the use of private ESG information. Specifically, we count the number of buying decisions that are followed by an increase in the firm's ESG score during the next quarter. Similarly, we count the number of selling decisions that are followed by a decrease in the firm's ESG score. We weigh these transactions by the size of a given firm in the fund's portfolio. We do this separately for the ESG ratings by MSCI IVA and Sustainalytics. For RepRisk, we look only at selling decisions before negative reputational events. (The RepRisk index decays mechanically over time if there are no new incidents, which means that predicting decreases in the index is not a proxy for skill.). In a final step, we take a 5-year rolling window average of the individual skill signals, starting from three months before the current date. For example, the estimation period for the first quarter of 2016 will start in the first quarter of 2011 and end in the last quarter of 2015. Therefore, our testing sample will start in Q1-2016 and end in Q4-2020.

$$
\begin{aligned}
&Buy\ future\ increase\ IVA_{i,t} = \\
&= \frac{1}{20} \sum_{\tau=-20}^{-1} \left( \sum_{i,j} w_{i,j,\tau} \times Buy\ shares_{i,j,\tau} \times IVA\ Increase_{j,\tau+1} \right)
\end{aligned} \tag{1}
$$

Equation 1 summarizes the estimation of our skill signal for mutual fund $i$ in quarter $t$. $w_{i,j,\tau}$ represents fund's $i$ portfolio weight of firm $j$ in quarter $\tau$ and $Buy\ shares_{i,j,\tau}$ is an indicator equal to one if fund $i$ increases its holding in firm $j$ during quarter $\tau$. $IVA\ Increase_{j,\tau+1}$ is an indicator equal to one if the IVA rating of firm $j$ increased between quarter $\tau$ and $\tau+1$, i.e., if $\Delta\text{IVA}_{t+1} > 0$. The variables $Sell\ future\ decrease\ IVA_{i,t}$, $Buy\ future\ increase\ Sust_{i,t}$, $Sell\ future\ decrease\ Sust_{i,t}$, and $Sell\ future\ increase\ RR_{i,t}$ are constructed in a similar way.[8]

Our second measure of skill draws from the insight of Kacperczyk and Seru (2007) that fund managers who rely more on public information are less skilled. In our setting, concurrent ESG ratings represent the publicly available information on the ESG performance of firms. We call "reactive" fund managers whose portfolio holdings exhibit high sensitivities to changes in publicly available ESG ratings. We argue that reactive managers might have a preference for ESG stocks, but they do not possess ESG skill.[9] To identify such behavior, we estimate the sensitivity of fund managers to *contemporaneous* changes in ESG ratings. Reactive fund managers will buy shares of firms whose ESG ratings increase and sell shares of firms whose ESG ratings decrease.

$$\begin{aligned} &Buy\ contemporaneous\ increase\ IVA_{i,t} = \\ &= \frac{1}{20}\sum_{\tau=-20}^{-1}\left(\sum_{i,j} w_{i,j,\tau} \times Buy\ shares_{i,j,\tau} \times IVA\ Increase_{j,\tau}\right) \end{aligned} \tag{2}$$

[8]An alternative approach to measuring skill would be to estimate time-series correlations between changes in the ESG variables and trades. These "betas" would effectively be a weighted average between the different skill signals we are using. We resorted to buy and sell decisions for ease of interpretation. In untabulated tests, we confirm that all our results are consistent when using this alternative estimation approach.

[9]We would expect fund managers that are committed to ESG to reduce their holdings in firms that reveal themselves as being unsustainable, e.g., after a negative reputational shock. However, a fund manager with ESG skill should be better able to identify firms that are at risk of experiencing such negative events *before* these events materialize.

Equation 2 summarizes the estimation of our reactiveness signal. The main difference lies in the indicator $IVA\ Increase_{j,\tau}$, which captures an increase in firm's $j$ IVA rating between the quarters $\tau - 1$ and $\tau$. The variables *Sell contemporaneous decrease* $IVA_{i,t}$, *Buy contemporaneous increase* $Sust_{i,t}$, *Sell future contemporaneous* $Sust_{i,t}$, and *Sell contemporaneous increase* $RR_{i,t}$ are constructed analogously.

– Table 3 –

Table 3 shows summary statistics for the individual proxies for proactive and reactive trades using the testing sample from 2016 to 2020. Most fund managers possess no ESG skill: the 75th percentile is zero, or close to zero, across most measures of predictive trades. Starting from the 90th percentile, we observe positive skill proxies. A similar pattern emerges when looking at the contemporaneous trading of fund managers.

Appendix Table A2 shows the correlation between the individual proxies. While the correlations are all positive, they are far from perfect, with the vast majority being below 50%.

## 3.2 Internal validity

### Individual ESG skill proxies

In this section, we will show that our measures of ESG skill are internally valid. First, we want to show that ESG skill is persistent, that is, a manager we identify as being skilled in our estimation sample, is also skilled in our testing sample. If this were not the case, one could argue that proactive managers are simply lucky. More formally, to examine the internal validity of the skill proxies, we run a set of regressions, as shown below.

$$\Delta ESG_{j,t+1} = \beta_1 Buy\ future\ increase\ ESG_{i,t} + \Gamma_{j,t} + \sigma_j + \delta_t + \epsilon_{i,j,t} \tag{3}$$

The dependent variable in equation 3 captures the forward-looking change in the ESG rating of firm $j$ between quarters $t$ and $t+1$. $\beta_1$ is our main coefficient of interest and captures the out-of-sample correlation between the ESG skill of a mutual fund manager and changes in ESG ratings. $\Gamma_{j,t}$ is a vector of time-varying firm controls, which include past return, market cap, and total trading in a stock. $\sigma_j$ and $\delta_t$ are, respectively, firm and quarter fixed effects. $\epsilon_{i,j,t}$ is the error term clustered at the fund and quarter level to account for arbitrary correlation within a fund's portfolio firms and across portfolios within a single quarter. We run separate regressions for each skill signal and report the results in Panel A of Table 4 below.

– Table 4 –

All ESG proxies are statistically significant ($p < 0.001$) and point in the expected direction. For example, column 1 shows that fund managers whose buys successfully predict future increases in firms' IVA scores in the estimation sample, continue to do so out of sample. A one standard deviation increase in *Buy future increase - IVA* correlates with a 2.4bp higher future IVA rating (0.02*0.199=0.0024). This effect is economically meaningful when considering that ESG ratings are very persistent (the 75th percentile across all ESG rating changes is 0). Column 2 shows a similar finding when considering a different ESG skill proxy, *Sell future decrease - IVA*. Fund managers whose selling decisions predict decreases in firms' IVA scores in the estimation sample continue to do so in the testing sample. Columns 3 to 5 show analogous results for the skill proxies based on Sustainalytics ESG scores and RepRisk ESG incidents. Taken together, these findings show that the individual ESG skill proxies are persistent over time, consistent with the interpretation of a skill signal.

Panel B of Table 4 performs a similar exercise with the reactive trades measures, which should *not* capture ESG skill. Indeed, we find no significant association between the reactiveness proxies and future changes in ESG ratings. This is suggestive that fund managers that adjust their portfolios after ESG news, are not able to predict changes in the ESG ratings.

The number of observations varies across models for two reasons. First, the coverage of ESG ratings is different across providers. Second, the sample period for which we observe Sustainalytics is shorter (ends in June 2019). We chose to not use a common sample to leverage the maximum amount of information possible. However, we replicate our findings using a common sample, for which all ESG ratings are available. As Appendix Table A3 shows, our results are virtually unchanged, both in terms of magnitudes and statistical significance.

To make sure that unobservable fund characteristics are not affecting our results, Appendix Table A4 shows that our findings are robust to including a wide range of time-varying fund-level characteristics (flows, returns, assets under management, performance stars, and ESG globes) as well as fund family and category-by-month fixed effects.

**Proactive and reactive fund managers**

We have shown that each individual ESG skill proxy is internally valid. In this section, we propose a way to aggregate the individual skill signals into a single measure, which we use to identify proactive and reactive fund managers.

If the three ESG skill proxies were substitutes, one could use either as a proxy of ESG skill. We argue that this is unlikely in our setting. First, there are only small correlations between the individual measures (as can be seen from Table A2). Second, different ESG ratings measure different aspects of a firm's sustainability performance, limiting the insights that can be drawn from using a single rating (Berg et al., 2022).

To aggregate the individual proxies, we construct a composite index of ESG skill. We start by taking the average of each pair of ESG-specific proxies, e.g., for IVA we take the average of *Buy future increase - IVA* and $(-1)\times$*Sell future decrease - IVA*.[10] Then, we run a principal component analysis (PCA) of the three rating-specific proxies, as summarized in Table 5.

– Table 5 –

We chose to rely on the first principal component for three reasons. First, its eigenvalue is greater than one, implying that it captures sufficient variation in the three ESG rating-specific proxies. Second, each factor loading of Factor 1—-as an individual proxy for information symmetry—-has the same sign as the predicted sign of the ESG-specific skill measure. Third, the Kaiser-Meyer-Olkin (KMO) statistics measuring the sampling adequacy are sufficiently high for each factor loading and for the composite factor, with an overall value of 0.56. We will call the first principal component *ESG Proactiveness.* We perform the analogous analysis for the contemporaneous proxies and use the first principal component to measure *ESG Reactiveness.*

– Table 6 –

Next, we verify that the composite ESG skill measure is internally valid. Specifically, we test whether funds that show estimation period skill hold firms that, in the testing sample, improve their sustainability performance. If so, this should hold across all rating providers. Table 6 shows the results of these tests, where we regress changes in ESG ratings on the measure of *ESG Proactiveness.* We find that ESG skill is not rating-specific: The results

[10]We multiply the selling signal by minus one so that the expected direction of the combined skill proxy is the same.

shown in columns 1 to 3 show a consistent, significant relationship between skill, i.e., the degree of ESG proactiveness of a fund, and future changes in ESG ratings. Importantly, this holds for each of the three ESG ratings in our sample. For example, a one standard deviation increase in *ESG Proactiveness* correlates to about half a standard deviation increase in future IVA ratings (1.52*0.096/0.26=0.56).

In contrast, this is not the case for the level of ESG reactiveness of funds. The coefficients of interest in models 4 to 6 show that reactive funds do not have any skill in predicting future ESG rating changes. In the case of RepRisk, they even trade in the "wrong" direction, that is, buying before a reputaional incident occurs.

Appendix Table A5 shows that our results are qualitatively and quantitatively similar when using the common sample, where all ESG ratings are available, or when introducing a stricter battery of fixed effects and controls.

### ESG reporting scores

In this section, we test whether our measure of ESG skill correlates with an alternative proxy for fund families' private ESG information production. To this end, we exploit data from the United Nations-backed Principles of Responsible Investing (PRI).

Fund families that decide to become signatories of the PRI must, within one year of joining, fill out a yearly survey, the "Reporting and Assessment Framework," that details their sustainable investing practices. The survey consists of several modules, out of which we focus on those filled out by virtually all signatories: Strategy & Governance, Listed Equity Screening, Integration, and Active Ownership.[11] After completing the survey, PRI

[11]Many of the remaining modules are specific to individual asset classes, like fixed income or private equity. Since our study focuses on equity mutual funds, we chose not to include those. Ceccarelli et al. (2023a) provides a detailed discussion about the contents of the survey and its implications for mutual funds.

staff evaluates its content and gives signatories scores for each module ranging from "E" to "A+". We call *ESG reporting score* the average score the signatories receive across these four modules.

We define two variables: *PRI Member*, an indicator variable equal to one for fund families that are PRI signatories, and *High ESG reporting score*, an indicator variable equal to one if the ESG reporting score of a fund family is above the sample median.

$$\begin{aligned} PRI\ Member_{i,t} = &\ \beta_1 ESG\ Proactiveness_{i,t} \\ &+ \beta_2 ESG\ Reactiveness_{i,t} + \sigma_{i,t} + \Gamma_{i,t} + \epsilon_{i,t} \end{aligned} \tag{4}$$

Formally, we run regression 4, where *PRI Memebr*$_{i,t}$ is one if for fund $i$ is a PRI signatory in month $t$. $\sigma_{i,t}$ is a vector of time-varying fund level controls, including the logarithm of assets under management (AUM), the logarithm of family level AUM, fund age, 3-factor alphas over the past three years, the volatility of past returns, and the ESG globes of a fund. $\Gamma_{i,t}$ is a vector of category-by-quarter fixed effects. $\epsilon_{i,t}$ is the residual, clustered at fund-family level. We run a similar regression using *High ESG reporting score* as the dependent variable.

– Table 7 –

Table 7 presents the regression results. As hypothesized, proactive fund managers are significantly more likely to be part of families that are PRI signatories and also have higher ESG reporting scores. In contrast, *ESG Reactiveness* is, if anything, negatively correlated with the PRI variables.

### 3.3 Who are the skilled investors?

In this section, we present descriptive evidence about which funds tend to be managed by skilled managers.

To this end, we define two indicator variables for funds that have high ESG proactiveness and reactiveness, respectively. Since most funds are not skilled, we chose the 90th percentile as a cutoff.[12] We then regress different fund characteristics on this indicator. Appendix Table A6 shows the results.

First, Panel A shows that funds with an explicit sustainability mandate, i.e., ESG funds, are 3pp more likely to be skilled than other funds. A similar but quantitatively smaller effect Similarly stems from funds with a higher number of ESG globes. The economically largest difference is between European and US funds, consistent with ESG investing being more mainstream in Europe (Gibson, Glossner, Krueger, Matos, and Steffen, 2021). Funds whose financial performance is better, both in terms of Morningstar Stars as well as 3-factor alphas, are more likely to be skilled. One draws similar conclusions when looking at the joint importance of these factors.

The results shown in Panel B highlight the difficulty in identifying skilled funds. Virtually all relationships that hold for proactive funds also hold for reactive funds. In other words, one cannot draw conclusions about a fund's ESG skill from observable characteristics.

## 4 External validity – Exogenous change in ESG rating

In the previous section, we introduced a new measure of ESG-specific skill and showed that it is internally valid, i.e., persistent over time and consistent across different ESG rating

[12] All our results are consistent when using the continuous skill measures. We opt for an indicator variable to make interpretation easier.

providers. In this section, we will exploit exogenous variation in ESG ratings coming from a methodology change that did affect the level of the ratings without releasing any new information to market participants. This will serve as an external validity test of the ESG skill measure we developed.

We exploit the change in Sustainalytics' ESG rating methodology in September 2019 as an exogenous shock to the ESG rating of firms. Effectively, Morningstar announced that its fund-level measure of sustainability, the ESG Globes, will no longer be based on Sustainalytics's ESG ratings but instead on their ESG risk rating, which Sustainalytics introduced in 2018. The new rating is different from the old ESG score in two dimensions. First, the old rating assessed firms based on their "preparedness, disclosure, and performance" related to ESG (Morningstar, 2016). The new rating instead measures the "unmanaged ESG risk exposure of a company" (Morningstar, 2019a). Importantly for our purposes, the new ESG risk rating was already available to investors as early as 2018 (Kim, Li, and Wu, 2024).

Second, before the methodology change, Sustainalytics ranked each company in terms of its ESG rating relative to its industry group peers and assigned it to one of five groups: Industry Leader, Outperformer, Average Performer, Underperformer, and Industry Laggard, where Laggard denotes a company that scores well below average relative to its peer group, and Leader indicates a company that scores well above average relative to its peer group. After the adoption, Morningstar removed the industry peer effect in the rating, with the new risk rating measuring material ESG risks on the same scale across all sectors. The new risk rating consists of five categories: Negligible, Low, Medium, High, and Severe, where Negligible denotes a company with a very low ESG risk rating (between 0 and 10), and Severe indicates a firm with a very high ESG risk rating (above 40).

– Figure 1 –

Figure 1 shows that this shock significantly changed the ESG ratings of mutual funds. Panel A plots changes in the quarter before the event (April to June 2019), Panel B in the quarter of the event (July to September 2019), and Panel C in the quarter after the event (October to December 2019). Both before and after the event, most funds do not change their ESG rating. However, after the change in methodology, a significant number of funds either gain or lose one or even two globes. This is an economically sizable effect, as the ESG rating of over 40 percent of funds changes.

Interestingly, the change in rating methodology was not accompanied by any change in firm ESG fundamentals, allowing us to isolate the specific information generated by the ratings themselves from their reflection of firm characteristics. This shock allows us to disentangle funds that rely on ESG rating changes to react from those that do not. In other words, we can differentiate between funds that are reactive to the observable (but uninformative) rating change of stocks from those that are proactive and rely on their private information. We expect that proactive fund managers will not react to the rating methodology change given the absence of new underlying ESG information. On the other hand, reactive funds should adjust portfolio holdings around the shock in the direction of ESG rating adjustment.

To test this empirically, we run a regression of quarterly trades on our measure of ESG skill interacted with indicator variables for exogenous changes in ESG ratings. This is summarized below.

$$\begin{aligned}\Delta Holding_{i,j,t} = {} & \beta_1 ESG\ Proactiveness_{i,t} \times Sust.\ Increase_{j,t} + \\ & \beta_2 ESG\ Proactiveness_{i,t} + \beta_3 Sust.\ Increase_{j,t} + \Gamma_{i,t} + \sigma_j + \delta_t + \epsilon_{i,j,t}\end{aligned} \tag{5}$$

The dependent variable, $\Delta Holding_{i,j,t}$, measures the trading of mutual fund $i$, in firm $j$, during quarter $t$. *Sust. Increase*$_{j,t}$ takes the value of one if the ESG score of a portfolio firm

$j$ improved after the methodology change, i.e., between September and December 2019. The variable is set to zero in the quarter before the event. The main independent variable is the interaction between *ESG Proactiveness*$_{i,t}$ and *Sust. Increase*$_{j,t}$. It captures the additional trading of proactive funds in firms whose ESG rating increases exogenously. $\Gamma_{i,t}$, $\sigma_j$, and $\delta_t$ are the same controls and fixed effects from regression 3. $\epsilon_{i,j,t}$ is the error term, clustered at the fund level.

– Table 8 –

Table 8 shows the regression results. Columns 1 and 2 show that, around the shock, proactive funds do not significantly change their holdings of treated firms, i.e., firms whose ESG ratings change exogenously. Notably, the results in columns 3 and 4 show that reactive fund managers increase holdings following exogenous rating increases and decrease holdings following exogenous rating decreases.[13] This is in line with reactive funds not correctly interpreting the (lack of) ESG information inherent in the rating methodology change: Fund managers buy firms whose ESG ratings increase and sell those whose ratings decrease after the event. Skilled, proactive fund managers, on the other hand, do not adjust their holdings after the event, which is again consistent with them basing their trading decisions on information. These tests serve as an external validity check of our ESG skill measures.

[13]Interestingly, the effect seems stronger for selling decisions than it is for buying decisions. This is in line with professional asset managers "selling fast" and "buying slow" (Akepanidtaworn, Mascio, Imas, and Schmidt, 2023). An alternative explanation is that market participants react more strongly to negative than positive ESG news (Krüger, 2015).

# 5 Economic implications of ESG skill

## 5.1 Fund flows

It is a well established fact in the mutual fund industry that investors chase past returns (Chevalier and Ellison, 1997). However, past returns are a limited proxy for skill, and a rational investor would also reward skill, in addition to past returns (Kacperczyk and Seru, 2007). While better financial performance is universally valued by all investors, this is not necessarily the case for ESG skill. We hypothesize that investors who have an ESG preference will be more likely to value ESG-specific skill. Moreover, our measure is relatively complex to compute since it requires access to both quarterly holdings and ESG ratings. Therefore, we expect institutional investors, given their higher degree of sophistication, to be better equipped to detect this skill (Evans and Fahlenbrach, 2012).

To test if mutual fund investors value ESG skill, we regress quarterly flows on our measures of fund managers' ESG proactiveness and reactiveness. We run these regressions at the fund-by-quarter level and control for additional fund-level characteristics that might affect flows, i.e., fund size, age, past returns, and category-by-quarter fixed effects, as well as Morningstar performance stars (Del Guercio and Tkac, 2008) and sustainability globes (Hartzmark and Sussman, 2019). Moreover, we interact the proxies of ESG skill with two indicator variables, one for ESG funds and one for ESG funds specifically targeted at institutional investors. Mutual funds that have an explicit ESG mandate are identified by Morningstar through fund names and prospectus information. We classify as institutional funds those whose majority of assets under management stem from institutional share classes.

– Table 9 –

Table 9 shows the regression results. From column 1, it seems that both proactiveness and reactiveness are valued by mutual fund investors. A one standard deviation increase in *ESG Proactiveness* correlates with 0.66pp higher quarterly flows (or 8.3% of a standard deviation). In monetary terms, this corresponds to about USD 1.5m for the average fund. This effect is significantly stronger for ESG funds, as shown in column 2: A similar increase in *ESG Proactiveness* relating to 0.87pp higher quarterly flows. In column 3, we find a positive but statistically insignificant interaction between *ESG Proactiveness* and the indicator for institutional ESG funds.

All in all, we find that the average mutual fund investor values both ESG Proactiveness and Reactiveness. However, investors in socially conscious funds seem to additionally reward skilled, proactive fund managers.

## 5.2 Financial performance

Our final set of tests examines if fund managers that have ESG skill also generate abnormal returns. Even if our measure correctly captures a fund manager's ESG investing skill, the answer to this question is not obvious at first glance.

On the one hand, ESG-skilled fund managers might be able to outperform if the firms they invest in appreciate not only in their sustainability as predicted by the manager but also in prices due to unexpected positive shifts in investors' taste for firms with a high sustainability performance (Pástor et al., 2021a).[14] Alternatively, the firms in which ESG-skilled managers invest could be undervalued if the market ignores ESG information that is material to the firm value. In this case, firms' value will increase once the market learns about the firms' true ESG performance and realizes its effect on firm performance (Pedersen, Fitzgibbons, and Pomorski, 2021; Edmans, 2011). On the other hand, if there are no sustainable demand

[14] Brøgger and Kronies (2023) argue that firms with increases in their ESG score might also appreciate in value if their prices are bid up by institutional investors with strict ESG mandates (e.g., pension funds).

shocks and if the market correctly prices material ESG information, then we should not necessarily expect to see an overperformance of investors who can successfully predict changes in ESG ratings. Therefore, the existence and direction of the relationship between ESG skill and financial performance is an empirical question.

In the following, we compute several measures of performance based on fund managers' holdings: monthly CAPM alphas as well as alphas from Fama-French three-factor model (Fama and French, 1992). We construct each performance proxy over different horizons, namely, one quarter, one year, and four years (i.e., the entire testing sample). All alphas are estimated using 36-month rolling window regressions, with a minimum of 24 monthly observations. We regress these alphas on our measures of ESG skill as well as fund-level controls and fund category-by-month fixed effects. The results are shown in Table 10.

– Table 10 –

The relationship between both ESG Proactiveness and Reactiveness and financial performance is insignificant across both shorter and longer time horizons. Thus, ESG skill seems to not translate into stronger financial performance for fund managers.

# 6 Conclusion

Practitioners and academics often equate holding high-ESG stocks with having ESG skill. This paper argues that this view ignores the inherently dynamic nature of skill: a skilled mutual fund manager will buy firms that are undervalued to then sell them later at a profit. The same logic applies to ESG-specific skill: a manager is not skilled only because she holds high-ESG firms but rather because she holds firms that the market eventually recognizes as being sustainable.

This paper applies this dynamic view to develop two measures of ESG investing: proactiveness and reactiveness. A proactive fund manager is one who buys firms whose ESG ratings later improve and sells those whose ESG ratings worsen. By contrast, a reactive fund manager is one who "chases" ESG ratings, i.e., trades in reaction to changes in ESG ratings. The former type shows ESG skill while the latter does not. We use an international sample of mutual fund managers to estimate these measures and show that they are internally valid: ESG skill is a feature of fund managers that is persistent over time and across different ESG rating providers. For identification, we exploit an exogenous change in ESG ratings to show that our measures are also externally valid. After an exogenous (but uninformative) change in firms' ESG ratings, reactive fund managers rebalance their portfolios, buying firms whose ratings improve and selling those whose ratings worsen. Proactive funds, on the other hand, do not rebalance their portfolios, consistent with them basing their trading decisions on private ESG information generated by the manager.

# References

Akepanidtaworn, K., Mascio, R. D., Imas, A., Schmidt, L. D., 2023. Selling fast and buying slow: Heuristics and trading performance of institutional investors. The Journal of Finance 78, 3055–3098.

Alekseev, G., Giglio, S., Maingi, Q., Selgrad, J., Stroebel, J., 2022. A quantity-based approach to constructing climate risk hedge portfolios. Working paper .

Barber, B. M., Morse, A., Yasuda, A., 2021. Impact investing. Journal of Financial Economics 139, 162–185.

Berg, F., Fabisik, K., Sautner, Z., 2021. Is history repeating itself? the (un)predictable past of ESG ratings. Working paper .

Berg, F., Koelbel, J. F., Rigobon, R., 2022. Aggregate confusion: The divergence of ESG ratings. Review of Finance 26, 1315–1344.

Berk, J. B., Van Binsbergen, J. H., 2015. Measuring skill in the mutual fund industry. Journal of Financial Economics 118, 1–20.

Bolton, P., Kacperczyk, M., 2021. Do investors care about carbon risk? Journal of Financial Economics 142, 517–549.

Bolton, P., Kacperczyk, M., 2023. Global pricing of carbon-transition risk. The Journal of Finance 78, 3677–3754.

Broccardo, E., Hart, O., Zingales, L., 2022. Exit versus voice. Journal of Political Economy 130, 3101–3145.

Brøgger, A., Kronies, A., 2023. Skills and sentiment in sustainable investing. Working Paper .

Carhart, M. M., 1997. On persistence in mutual fund performance. The Journal of Finance 52, 57–82.

Ceccarelli, M., Glossner, S., Homanen, M., 2023a. Catering through transparency: Voluntary ESG disclosure by asset managers and fund flows. Working paper .

Ceccarelli, M., Ramelli, S., Wagner, A. F., 2023b. Low Carbon Mutual Funds. Review of Finance 28, 45–74.

Chevalier, J., Ellison, G., 1997. Risk taking by mutual funds as a response to incentives. Journal of Political Economy 105, 1167–1200.

Cici, G., Gehde-Trapp, M., Göricke, M.-A., Kempf, A., 2018. The Investment Value of Fund Managers' Experience outside the Financial Sector. The Review of Financial Studies 31, 3821–3853.

Cohen, R. B., Coval, J. D., Pástor, L., 2005. Judging fund managers by the company they keep. The Journal of Finance 60, 1057–1096.

Coval, J. D., Moskowitz, T. J., 2001. The geography of investment: Informed trading and asset prices. Journal of Political Economy 109, 811–841.

Cremers, K. J. M., Petajisto, A., 2009. How active is your fund manager? a new measure that predicts performance. Review of Financial Studies 22, 3329–3365.

Cremers, K. J. M., Riley, T. B., Zambrana, R., 2023. The complex materiality of ESG ratings: Evidence from actively managed esg funds. Working paper .

Cremers, M., Pareek, A., 2016. Patient capital outperformance: The investment skill of high active share managers who trade infrequently. Journal of Financial Economics 122, 288–306.

Degryse, H., Di Giuli, A., Sekerci, N., Stradi, F., 2023. Sustainable investments: One for the money, two for the show. Working paper .

Del Guercio, D., Tkac, P. A., 2008. Star power: The effect of Monrningstar ratings on mutual fund flow. Journal of Financial and Quantitative Analysis 43, 907–936.

Dimson, E., Karakaş, O., Li, X., 2015. Active ownership. Review of Financial Studies 28, 3225–3268.

Dimson, E., Karakaş, O., Li, X., 2023. Coordinated engagements. Working paper .

Edmans, A., 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. Journal of Financial Economics 101, 621–640.

Engle, R. F., Giglio, S., Kelly, B., Lee, H., Stroebel, J., 2020. Hedging climate change news. Review of Financial Studies 33, 1184–1216.

Evans, R. B., Fahlenbrach, R., 2012. Institutional investors and mutual fund governance: Evidence from retail–institutional fund twins. Review of Financial Studies 25, 3530–3571.

Fama, E. F., French, K. R., 1992. The cross–section of expected stock returns. The Journal of Finance 47, 427–465.

Fang, L. H., Peress, J., Zheng, L., 2014. Does media coverage of stocks affect mutual funds' trading and performance? Review of Financial Studies 27, 3441–3466.

Ferreira, M. A., Matos, P., 2008. The colors of investors' money: The role of institutional investors around the world. Journal of Financial Economics 88, 499–533.

Gantchev, N., Giannetti, M., Li, R., 2024. Sustainability or performance? ratings and fund managers' incentives. Journal of Financial Economics 155, 103831.

Gibson, R., Glossner, S., Krueger, P., Matos, P., Steffen, T., 2021. Do responsible investors invest responsibly? Working Paper .

Giglio, S., Maggiori, M., Stroebel, J., Tan, Z., Utkus, S. P., Xu, X., 2023. Four facts about ESG beliefs and investor portfolios. Working paper .

Glossner, S., 2021. ESG incidents and shareholder value. Working paper .

Grossman, S. J., Stiglitz, J. E., 1980. On the impossibility of informationally efficient markets. The American Economic Review 70, 393–408.

Hartzmark, S. M., Sussman, A. B., 2019. Do investors value sustainability? a natural experiment examining ranking and fund flows. The Journal of Finance 74, 2789–2837.

Hsu, P.-H., Li, K., Tsou, C.-Y., 2023. The pollution premium. The Journal of Finance 78, 1343–1392.

Ilhan, E., Sautner, Z., Vilkov, G., 2021. Carbon tail risk. The Review of Financial Studies 34, 1540–1571.

Jiang, H., Zheng, L., 2018. Active fundamental performance. The Review of Financial Studies 31, 4688–4719.

Kacperczyk, M., Seru, A., 2007. Fund manager use of public information: New evidence on managerial skills. The Journal of Finance 62, 485–528.

Kacperczyk, M., Sialm, C., Zheng, L., 2005. On the industry concentration of actively managed equity mutual funds. The Journal of Finance 60, 1983–2011.

Kacperczyk, M., Sialm, C., Zheng, L., 2008. Unobserved actions of mutual funds. Review of Financial Studies 21, 2379–2416.

Khan, M., Serafeim, G., Yoon, A., 2016. Corporate sustainability: First evidence on materiality. The Accounting Review 91, 1697–1724.

Kim, S., Li, T., Wu, Y., 2024. Carbon offsets: Decarbonization or transition-washing? Working paper .

Krueger, P., Sautner, Z., Starks, L. T., 2020. The importance of climate risks for institutional investors. Review of Financial Studies 33, 1067–1111.

Krüger, P., 2015. Corporate goodness and shareholder wealth. Journal of financial economics 115, 304–329.

Morningstar, 2016. Morningstar sustainability rating.

Morningstar, 2019a. Morningstar sustainability rating methodology.

Morningstar, 2019b. Morningstar sustainability ratings: The impact.

Pástor, L., Stambaugh, R. F., Taylor, L. A., 2021a. Sustainable investing in equilibrium. Journal of Financial Economics 142, 550–571.

Pástor, L., Stambaugh, R. F., Taylor, L. A., 2021b. Dissecting Green Returns. National Bureau of Economic Research .

Pedersen, L. H., Fitzgibbons, S., Pomorski, L., 2021. Responsible investing: The ESG-efficient frontier. Journal of Financial Economics 142, 572–597.

Rzeźnik, A., Hanley, K. W., Pelizzon, L., 2022. Investor reliance on ESG ratings and stock price performance. Working paper .

Serafeim, G., Yoon, A., 2022. Stock price reactions to ESG news: the role of ESG ratings and disagreement. Review of Accounting Studies .

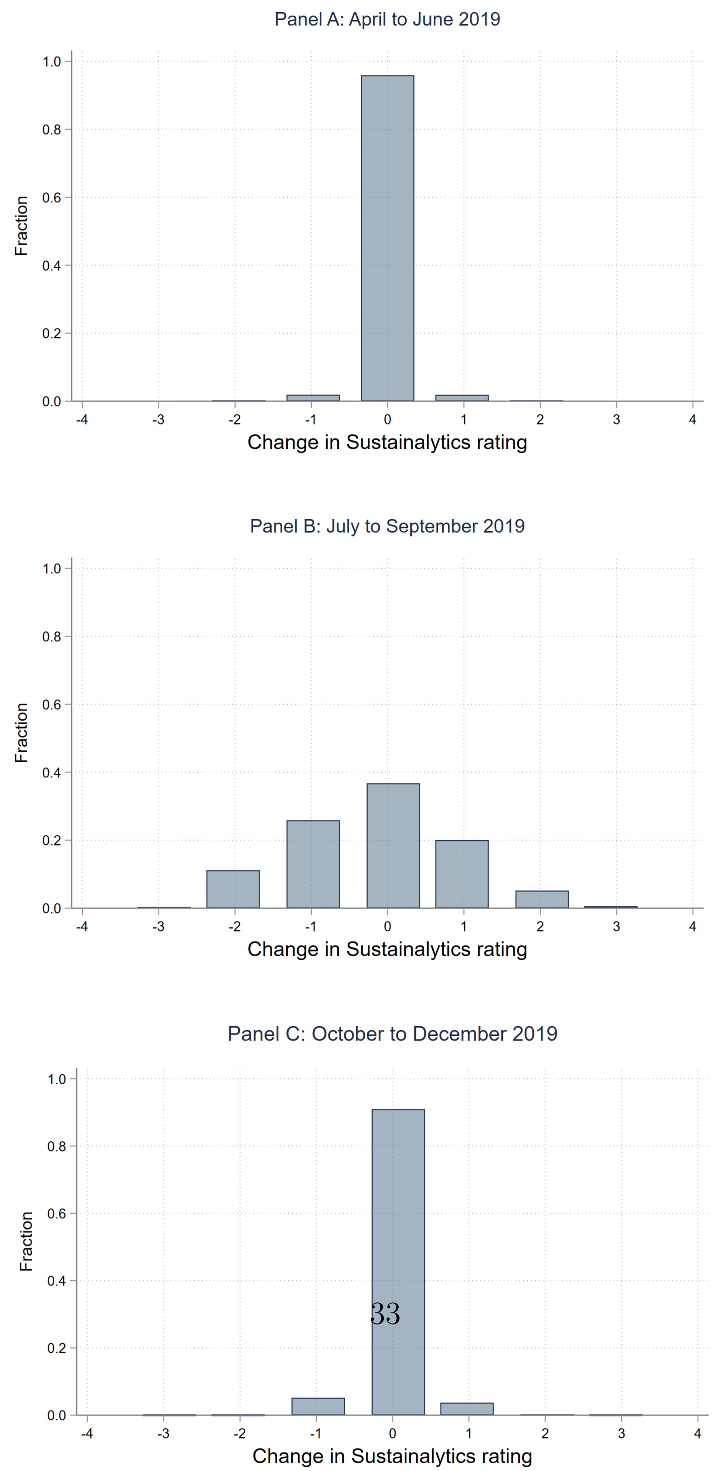
Sirri, E. R., Tufano, P., 1998. Costly search and mutual fund flows. The Journal of Finance 53, 1589–1622.

Yang, R., 2022. What do we learn from ratings about corporate social responsibility? new evidence of uninformative ratings. Journal of Financial Intermediation 52, 100994.

Zerbib, O. D., 2022. A sustainable capital asset pricing model (S-CAPM): Evidence from green investing and sin stock exclusion. Review of Finance 26, 1345–1388.

# Figures

**Figure 1: Morningstar Globe Ratings Changes**
This figure shows the histogram of changes in mutual funds' ESG "Globe" ratings, as provided by Morningstar. Panels A, B, and C show, respectively, changes for the quarter before, after, and during the methodology change.



# Tables

**Table 1: Summary statistics - Fund level measures**
This table shows summary statistics for the fund-level variables. The sample is at the fund-quarter level and spans from 2016 to 2020. Variables are defined as in Appendix Table A1.

| | N | p25 | mean | p50 | p75 | p90 | p95 | max | sd |
|---|---|---|---|---|---|---|---|---|---|
| Quartelry flows | 110,371 | -4.22 | -0.72 | -1.23 | 1.69 | 7.41 | 13.33 | 43.83 | 7.98 |
| Log Fund assets | 110,371 | 17.90 | 19.16 | 19.16 | 20.41 | 21.52 | 22.17 | 23.37 | 1.81 |
| Log Fund family assets | 110,371 | 22.07 | 23.40 | 23.70 | 24.92 | 25.68 | 26.50 | 27.97 | 2.17 |
| Fund age | 110,371 | 6.13 | 12.80 | 11.51 | 18.48 | 23.98 | 27.35 | 31.42 | 7.72 |
| FF-3 alphas$_{t-36,t}$ | 110,371 | -0.06 | -0.02 | -0.01 | 0.02 | 0.07 | 0.12 | 0.24 | 0.08 |
| Volatility of FF-3 alphas$_{t-36,t}$ | 110,371 | 3.24 | 3.57 | 3.60 | 3.97 | 4.30 | 4.53 | 5.38 | 0.66 |
| Stars | 110,371 | 3.00 | 3.23 | 3.00 | 4.00 | 5.00 | 5.00 | 5.00 | 1.06 |
| ESG Globes | 110,371 | 2.00 | 2.62 | 3.00 | 4.00 | 4.00 | 5.00 | 5.00 | 1.48 |
| No ESG Globes | 110,371 | 0.00 | 0.15 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.35 |
| ESG Fund | 110,371 | 0.00 | 0.17 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.37 |
| AUM ESG Funds (%) | 110,371 | 0.00 | 16.15 | 1.02 | 15.18 | 66.45 | 98.77 | 100.00 | 29.02 |
| Institutional ESG fund | 110,371 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.22 |
| PRI Member | 110,371 | 0.00 | 0.56 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.50 |
| High ESG reporting score | 110,371 | 0.00 | 0.33 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.47 |

**Table 2: Summary statistics - Firm level measures**
This table shows summary statistics for the firm-level variables. The sample is at the firm-quarter level and spans from 2016 to 2020. Sustainalytics' ESG ratings end in June 2019, after which the ESG Risk ratings were introduced. Variables are defined as in Appendix Table A1.

| | N | min | p25 | mean | p50 | p75 | max | sd |
|---|---|---|---|---|---|---|---|---|
| Firm return$_{t-1}$ | 148,745 | -2.14 | 0.83 | 1.52 | 1.67 | 2.35 | 3.56 | 1.19 |
| Log of firm market cap$_{t-1}$ | 297,148 | 4.52 | 6.26 | 8.61 | 8.56 | 10.52 | 16.58 | 2.82 |
| Total trading in firm$_{t-1}$ | 324,342 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.01 |
| IVA ESG Rating$_t$ | 142,718 | 1.00 | 3.00 | 3.73 | 4.00 | 5.00 | 7.00 | 1.44 |
| Sust ESG Rating$_t$ | 82,522 | 31.00 | 48.00 | 55.72 | 54.00 | 63.00 | 98.00 | 10.35 |
| Sust ESG Risk Rating$_t$ | 40,677 | 6.15 | 23.63 | 34.78 | 31.91 | 45.00 | 93.00 | 14.43 |
| RepRisk #Incidents$_t$ | 36,986 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 21.00 | 0.29 |
| $\Delta IVA_{t+1}$ | 139,486 | -2.00 | 0.00 | 0.02 | 0.00 | 0.00 | 2.00 | 0.26 |
| $\Delta Sust_{t+1}$ | 110,974 | -2.00 | 0.00 | 0.03 | 0.00 | 0.00 | 2.00 | 0.41 |
| $\Delta RepRisk_{t+1}$ | 426,984 | -19.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 | 0.10 |

**Table 3: Summary statistics - Individual skill proxies**

This table shows summary statistics for the skill proxies of mutual funds. The sample is at the fund-quarter level and spans from 2016 to 2020. Variables are defined as in Appendix Table A1.

| | N | p25 | mean | p50 | p75 | p90 | p95 | max | sd |
|---|---|---|---|---|---|---|---|---|---|
| Predictive trades | | | | | | | | | |
| Buy future increase – IVA | 168,326 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.04 | 0.68 | 0.02 |
| Sell future decrease – IVA | 168,326 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.32 | 0.01 |
| Buy future increase – SUST | 168,326 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.05 | 0.70 | 0.02 |
| Sell future decrease – SUST | 168,326 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.97 | 0.02 |
| Sell future increase – RepRisk | 168,326 | 0.00 | 0.02 | 0.00 | 0.02 | 0.09 | 0.14 | 1.00 | 0.05 |
| Contemporaneous trades | | | | | | | | | |
| Buy contemp. increase – IVA | 168,326 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.04 | 0.33 | 0.02 |
| Sell contemp. decrease – IVA | 168,326 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.23 | 0.01 |
| Buy contemp. increase – SUST | 168,326 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.06 | 0.97 | 0.05 |
| Sell contemp. decrease – SUST | 168,326 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.39 | 0.02 |
| Sell contemp. increase – RepRisk | 168,326 | 0.00 | 0.07 | 0.00 | 0.09 | 0.23 | 0.33 | 1.00 | 0.12 |

**Table 4: Internal validity of ESG skill – Individual proxies**

This table shows results from linear regressions of future changes in the ESG rating of a portfolio firm on proxies for fund managers' ESG skill. The dependent variable captures large changes in ESG ratings over the next quarter as provided by IVA (columns 1 and 2), Sustainalytics (columns 3 and 4), or RepRisk (column 5). The RepRisk score is the change in severe, negative reputational incidents. The main explanatory variables in Panel A are proxies for ESG proactiveness, while those in Panel B are proxies for ESG reactiveness, defined in Equation 1. All regressions control for firm and quarter fixed effects as well as time-varying firm characteristics (past return, logarithm of market cap, and total trading in the stock). The sample is at the fund-firm-quarter level and runs from 2016 to 2020. For columns 3 and 4, the 3rd quarter of 2019, when Sustainalytics' methodology changed, is dropped. All variables are defined in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

**Panel A:** Proactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta IVA_{t+1}$ | | $\Delta Sust_{t+1}$ | | $\Delta RepRisk_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy future increase – IVA | 0.119*** | | | | |
| | (6.76) | | | | |
| Sell future decrease – IVA | | -0.161*** | | | |
| | | (-3.36) | | | |
| Buy future increase – SUST | | | 0.253*** | | |
| | | | (7.48) | | |
| Sell future decrease – SUST | | | | -0.169*** | |
| | | | | (-3.74) | |
| Sell future increase – RepRisk | | | | | 0.013*** |
| | | | | | (4.01) |
| Firm $return_{t-1}$ | -0.001 | -0.001 | 0.001 | 0.001 | 0.001* |
| | (-0.63) | (-0.65) | (0.36) | (0.36) | (1.78) |
| Log of firm market $cap_{t-1}$ | 0.004 | 0.004 | 0.014 | 0.014 | 0.004 |
| | (0.58) | (0.59) | (0.94) | (0.95) | (1.03) |
| Total trading in $firm_{t-1}$ | 0.354** | 0.357** | 0.263 | 0.263 | -0.084** |
| | (2.37) | (2.40) | (0.53) | (0.53) | (-2.10) |
| Observations | 5,825,358 | 5,825,358 | 3,626,633 | 3,626,633 | 7,101,875 |
| R-squared | 0.14 | 0.14 | 0.16 | 0.16 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes |

**Panel B:** Reactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta \text{IVA}_{t+1}$ | | $\Delta \text{Sust}_{t+1}$ | | $\Delta \text{RepRisk}_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy contemp. increase – IVA | -0.001 | | | | |
| | (-0.05) | | | | |
| Sell contemp. decrease – IVA | | -0.012 | | | |
| | | (-0.30) | | | |
| Buy contemp. increase – SUST | | | -0.020* | | |
| | | | (-1.78) | | |
| Sell contemp. decrease – SUST | | | | 0.030 | |
| | | | | (1.18) | |
| Sell contemp. increase – RepRisk | | | | | 0.001 |
| | | | | | (0.63) |
| Firm return$_{t-1}$ | -0.001 | -0.001 | 0.001 | 0.001 | 0.001* |
| | (-0.61) | (-0.61) | (0.36) | (0.36) | (1.78) |
| Log of firm market cap$_{t-1}$ | 0.004 | 0.004 | 0.014 | 0.014 | 0.004 |
| | (0.60) | (0.60) | (0.94) | (0.94) | (1.03) |
| Total trading in firm$_{t-1}$ | 0.340** | 0.341** | 0.263 | 0.263 | -0.084* |
| | (2.35) | (2.36) | (0.53) | (0.53) | (-2.09) |
| Observations | 5,825,358 | 5,825,358 | 3,626,633 | 3,626,633 | 7,101,875 |
| R-squared | 0.14 | 0.14 | 0.16 | 0.16 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes |

**Table 5: Aggregating individual ESG skill proxies**

This table summarizes the principal component analysis of the individual ESG proactiveness and reactiveness proxies. Panel A shows the eigenvectors, eigenvalues, explained variance, and the Kaiser-Meyer-Olkin (KMO) statistics for the praoctiveness proxies. Panel B shows the same information for the reactiveness proxies. Panel C shows the summary statistics for the resulting aggregated ESG skill proxies, based on the first principal component. For Panels A and B, the sample is at the fund-firm-quarter level, while in Panel C, it is at the fund-quarter level. The sample runs from 2016 to 2020. All variables are defined in Appendix Table A1.

**Panel A:** PCA – Proactiveness proxies

| Variable | Component 1 | Component 2 | KMO |
|---|---|---|---|
| IVA Proactiveness | 0.633 | -0.363 | 0.538 |
| Sust. Proactiveness | 0.655 | -0.219 | 0.534 |
| RepRisk Proactiveness | 0.412 | 0.906 | 0.669 |
| Eigenvalue | 1.483 | 0.905 | |
| Explained variance | 0.494 | 0.302 | |

**Panel B:** PCA – Reactiveness proxies

| Variable | Component 1 | Component 2 | KMO |
|---|---|---|---|
| IVA Reactiveness | 0.619 | -0.435 | 0.536 |
| Sust. Reactiveness | 0.662 | -0.160 | 0.530 |
| RepRisk Reactiveness | 0.423 | 0.886 | 0.629 |
| Eigenvalue | 1.480 | 0.908 | |
| Explained variance | 0.493 | 0.303 | |

**Panel C:** Summary statistics

| | N | min | p25 | mean | p50 | p75 | max | sd |
|---|---|---|---|---|---|---|---|---|
| ESG Proactiveness | 168,326 | -44.37 | -0.06 | -0.01 | -0.06 | -0.06 | 27.26 | 1.56 |
| ESG Reactiveness | 168,326 | -17.18 | -0.16 | -0.04 | -0.04 | -0.04 | 17.21 | 1.56 |

**Table 6: Internal validity of ESG skill – Aggregated skill measures**

This table shows results from linear regressions of future changes in the ESG rating of a portfolio firm on proxies for fund managers' ESG skill. The dependent variable captures large changes in ESG rating over the next quarter as provided by IVA (columns 1 and 4), Sustainalytics (columns 2 and 5), or RepRisk (columns 3 and 6). The RepRisk score is the change in severe, negative reputational incidents. The main explanatory variable in columns 1 to 3 is the level of ESG Proactiveness of a fund manager, while in columns 4 to 6, it is the level of ESG Reactiveness. All regressions control for firm and quarter fixed effects as well as time-varying firm characteristics (past return, logarithm of market cap, and total trading in the stock). The sample is at the fund-firm-quarter level and runs from 2016 to 2020. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund and month, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

| Dep. variable (%): | Future change in ESG rating | | | | | |
|---|---|---|---|---|---|---|
| | $\Delta\text{IVA}_{t+1}$ | $\Delta\text{Sust}_{t+1}$ | $\Delta\text{RepRisk}_{t+1}$ | $\Delta\text{IVA}_{t+1}$ | $\Delta\text{Sust}_{t+1}$ | $\Delta\text{RepRisk}_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ESG Proactiveness | 0.095*** | 0.198*** | -0.036* | | | |
| | (3.18) | (5.63) | (-1.97) | | | |
| ESG Reactiveness | | | | -0.001 | -0.017 | 0.052*** |
| | | | | (-0.06) | (-0.43) | (3.77) |
| Observations | 5,825,358 | 3,626,633 | 7,101,875 | 5,825,358 | 3,626,633 | 7,101,875 |
| R-squared | 0.14 | 0.16 | 0.10 | 0.14 | 0.16 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

**Table 7: Internal validity of ESG skill – Alternative proxies of ESG information production**

This table shows results from linear regressions of alternative proxies of ESG information production on fund managers' ESG skill. The dependent variable in column 1 is an indicator for funds that are signatories of the Principles for Responsible Investing (PRI). In column 2, it is the average ESG reporting score obtained by signatories in the Reporting and Assessment survey administered by the PRI. The main explanatory variables are the level of ESG Proactiveness and ESG Reactiveness. All regressions control for category-by-quarter fixed effects as well as time-varying fund characteristics (logarithm of assets under management of a fund and of a family, fund age, past return, return volatility, and ESG Globes). The sample is at the fund-quarter level and covers the period from January 2016 to December 2020. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund family, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

| Dep. variable (%): | PRI Member | High ESG reporting score |
|---|---|---|
| | (1) | (2) |
| ESG Proactiveness | 0.385*** | 0.609*** |
| | (2.89) | (4.61) |
| ESG Reactiveness | -0.267* | -0.217 |
| | (-1.75) | (-1.44) |
| Observations | 110,890 | 110,890 |
| R-squared | 0.27 | 0.18 |
| Category×Quarter FE | Yes | Yes |
| Controls | Yes | Yes |

**Table 8: External validity of ESG skill - Sustainalytics rating methodology change**

This table shows results from linear regressions of quarterly position changes (in basis points) on proxies for fund managers' ESG skill interacted with an indicator for exogenous changes in Sustainalytics' ESG rating. The sample spans from April to December 2019, i.e., one quarter before to one quarter after the change in methodology. The indicator is set to zero in the quarter before the event. All regressions control for lagged fund characteristics, lagged firm-level controls, as well as firm and year-quarter fixed effects. The sample is at the fund-firm-quarter level. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

| Dep. variable (bp): | $\Delta$Holdings | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Sust. increase × ESG Proactiveness | 0.509 | | | |
| | (0.69) | | | |
| Sust. decrease × ESG Proactiveness | | -0.518 | | |
| | | (-0.93) | | |
| Sust. increase × ESG Reactiveness | | | 1.018* | |
| | | | (1.76) | |
| Sust. decrease × ESG Reactiveness | | | | -1.025*** |
| | | | | (-2.61) |
| ESG Proactiveness | 0.003 | 0.029 | | |
| | (0.01) | (0.14) | | |
| ESG Reactiveness | | | -0.620*** | -0.535*** |
| | | | (-3.56) | (-2.99) |
| Sust. increase | -0.594 | | -0.708 | |
| | (-0.29) | | (-0.34) | |
| Sust. decrease | | -1.052* | | -0.768 |
| | | (-1.75) | | (-1.27) |
| Observations | 503,547 | 503,547 | 503,547 | 503,547 |
| R-squared | 0.06 | 0.06 | 0.06 | 0.06 |
| Firm FE | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |

**Table 9: ESG skill and fund flows**

This table shows results from linear regressions of quarterly flows (in %) on proxies for fund managers' ESG skill. Columns 2 and 3 add interactions with indicators for funds with an explicit ESG mandate (*ESG fund*) and ESG funds targeted at institutional investors (*Institutional ESG fund*). All regressions control for lagged fund characteristics and category-by-quarter fixed effects. The sample is at the fund-quarter level and runs from 2016 to 2020. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

| Dep. variable (%): | Quarterly flow | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| ESG Proactiveness | 0.444*** | 0.413*** | 0.436*** |
| | (12.04) | (11.02) | (11.34) |
| ESG Reactiveness | 0.506*** | 0.508*** | 0.520*** |
| | (11.12) | (11.38) | (11.28) |
| ESG Fund × ESG Proactiveness | | 0.165** | |
| | | (2.24) | |
| ESG Fund × ESG Reactiveness | | -0.015 | |
| | | (-0.26) | |
| Institutional ESG fund × ESG Proactiveness | | | 0.328 |
| | | | (1.51) |
| Institutional ESG fund × ESG Reactiveness | | | 0.043 |
| | | | (0.24) |
| ESG Fund | | 0.287*** | |
| | | (3.05) | |
| Institutional ESG fund | | | 0.400** |
| | | | (2.85) |
| Observations | 43,919 | 43,919 | 43,825 |
| R-squared | 0.62 | 0.62 | 0.64 |
| Category×Quarter FE | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes |

**Table 10: ESG skill and fund returns**

This table shows results from linear regressions of returns (in bp) on proxies for fund managers' ESG skill. Returns are measured as CAPM or Fama-French 3-factor (FF-3) alphas at the quarterly, yearly, or 4-year horizon. All regressions control for lagged fund characteristics and category-by-quarter fixed effects. The sample is at the fund-quarter level and runs from 2016 to 2020. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

| Dep. variable (bp): | Quarterly | | 1 Year | | 4 Years | |
|---|---|---|---|---|---|---|
| | (1) CAPM | (2) FF-3 | (3) CAPM | (4) FF-3 | (5) CAPM | (6) FF-3 |
| ESG Proactiveness | 0.486 | 0.340 | 0.745 | -0.048 | -1.896 | -1.804 |
| | (0.29) | (0.25) | (0.21) | (-0.02) | (-0.24) | (-0.19) |
| ESG Reactiveness | -1.171 | -1.683 | -1.355 | -2.100 | -2.991 | -2.819 |
| | (-0.65) | (-1.23) | (-0.33) | (-0.58) | (-0.60) | (-0.57) |
| Observations | 99,686 | 99,686 | 93,631 | 93,631 | 22,982 | 22,982 |
| R-squared | 0.30 | 0.26 | 0.30 | 0.24 | 0.36 | 0.21 |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

Internet Appendix for
" ESG Skill of Mutual Fund Managers"

# Appendix Tables

## Table A1: Variable definitions

| **ESG skill characteristics** | |
|---|---|
| Buy future (contemp.) increase – IVA | For each quarter, we compute the value-weighted number of stocks that are both bought by a fund manager and whose IVA ESG rating increases in the following (current) quarter. Then, this is averaged over a 5-year rolling window. |
| Sell future (contemp.) decrease – IVA | For each quarter, we compute the value-weighted number of stocks that are sold by a fund manager and whose IVA ESG rating decreases in the following (current) quarter. Then, this is averaged over a 5-year rolling window. |
| Buy future (contemp.) increase – SUST | For each quarter, we compute the value-weighted number of stocks that are both bought by a fund manager and whose Sustainalytics ESG rating increases in the following (current) quarter. Then, this is averaged over a 5-year rolling window. |
| Sell future (contemp.) decrease – SUST | For each quarter, we compute the value-weighted number of stocks that are sold by a fund manager and whose Sustainalytics ESG rating decreases in the following (current) quarter. Then, this is averaged over a 5-year rolling window. |
| Sell future (contemp.) increase - RepRisk | For each quarter, we compute the value-weighted number of stocks that are both sold by a fund manager and whose RepRisk severe incident number increases in the following (current) quarter. Then, this is averaged over a 5-year rolling window. |
| ESG Proactiveness | The first principal component of the three rating-specific proactive ESG proxies. These proxies are the average of "*Buy future increase*" and minus one times "*Sell future decrease,*" separately for each ESG rating. |
| ESG Reactiveness | The first principal component of the three rating-specific reactive ESG proxies. These proxies are the average of "*Buy contemp. increase*" and minus one times "*Sell contemp. decrease,*" separately for each ESG rating. |

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| **Fund characteristics** | |
|---|---|
| Quarterly flows | Percentage of quarterly growth of assets under management, net of reinvested returns. |
| Log Fund assets | Natural logarithm of a fund's total assets under management, in USDmm. The assets under management are computed as the sum of the assets across all share classes. |
| Fund family assets | Natural logarithm of a fund family's total assets under management, in USDmm. |
| Fund age | The number of years since the fund inception date |
| Performance Stars | Morningstar's proprietary assessment of the fund's performance, the so-called "Stars". They are based on risk-adjusted returns over various time frames. This performance rating goes from 1 (lowest) to 5 (highest). (Morningstar) |
| ESG Globes | Morningstar's proprietary sustainability ratings, the Globes, capture the weighted average of the ESG scores of a fund's holdings. The Globes are based on ESG scores from Sustainalytics. The globes range from a scale from 1 (lowest) to 5 (highest) and are awarded by ranking funds within their peer group, i.e., funds with a similar investment strategy. |
| No Globes | Indicator variable for fund-quarters with missing ESG globes. |
| FF-3 alphas$_{t-36,t}$ | Fund cumulative returns from monthly Fama-French 3-factor risk-adjusted returns in the 36 months prior to the observation month. |
| Volatility of FF-3 alphas$_{t-36,t}$ | The standard deviation of monthly fund returns in the 36 months prior to the observation month. |
| **Firm characteristics** | |
| Firm return | Quarterly returns of a firm. |
| Firm market cap | Quarterly market capitalization of a firm. |
| Total trading in firm | Quarterly total stock trading by all funds in a given firm stock, as a percentage of total shares outstanding. |
| Sust. increase (decrease) | Indicator variable that captures an increase (decrease) in Morningstar's ESG Rating following the change in methodology in September 2019. The increase (decrease) means that the firm-level ESG rating improves (worsens) during the quarter after the change relative to the extant classification. |

**Table A2: Correlations**

This table reports correlations between the individual proxies for ESG proactiveness and reactiveness. Variables are defined as in Appendix Table A1. * indicate that the parameter estimate is significantly different from zero at the 1% level.

| | Buy increase | | Sell decrease | | Sell increase | Buy increase | | Sell decrease | | Sell increase |
|---|---|---|---|---|---|---|---|---|---|---|
| | IVA | SUST | IVA | SUST | RepRisk | IVA | SUST | IVA | SUST | RepRisk |
| Buy future increase – IVA | 1.00 | | | | | | | | | |
| Buy future increase – SUST | 0.41* | 1.00 | | | | | | | | |
| Sell future decrease – IVA | 0.10* | 0.05* | 1.00 | | | | | | | |
| Sell future decrease – SUST | 0.06* | 0.11* | 0.26* | 1.00 | | | | | | |
| Sell future increase – RepRisk | 0.12* | 0.06* | 0.49* | 0.34* | 1.00 | | | | | |
| Buy contemp. increase – IVA | 0.48* | 0.46* | 0.07* | 0.05* | 0.09* | 1.00 | | | | |
| Buy contemp. increase – SUST | 0.44* | 0.61* | 0.05* | 0.13* | 0.07* | 0.45* | 1.00 | | | |
| Sell contemp. decrease – IVA | 0.10* | 0.07* | 0.38* | 0.31* | 0.46* | 0.08* | 0.06* | 1.00 | | |
| Sell contemp. decrease – SUST | 0.07* | 0.11* | 0.30* | 0.30* | 0.34* | 0.07* | 0.09* | 0.31* | 1.00 | |
| Sell contemp. increase – RepRisk | 0.14* | 0.10* | 0.53* | 0.45* | 0.88* | 0.12* | 0.10* | 0.52* | 0.44* | 1.00 |

**Table A3: Robustness - Internal validity of ESG skill – Individual proxies - Common sample**

This table shows results from linear regressions of future changes in the ESG rating of a portfolio firm on proxies for fund managers' ESG skill. The dependent variable in the change in ESG rating over the next quarter as provided by IVA (columns 1 and 2), Sustainalytics (columns 3 and 4), or RepRisk (column 5). The main explanatory variables in Panel A are proxies for ESG proactiveness while those in Panel B proxy for ESG reactiveness, as shown in Equation 1. All regressions control for firm and quarter fixed effects, as well as time-varying firm characteristics. The sample is at the fund-firm-quarter level, starts in 2016 and ends in June 2019. We keep only observations for which all ESG ratings are available. All variables are defined in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

**Panel A:** Proactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta IVA_{t+1}$ | | $\Delta Sust_{t+1}$ | | $\Delta RepRisk_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy future increase – IVA | 0.116***<br>(4.40) | | | | |
| Sell future decrease – IVA | | -0.157***<br>(-3.02) | | | |
| Buy future increase – SUST | | | 0.234***<br>(8.81) | | |
| Sell future decrease – SUST | | | | -0.184***<br>(-3.79) | |
| Sell future increase – RepRisk | | | | | 0.016***<br>(2.94) |
| Observations | 3,332,140 | 3,332,140 | 3,332,140 | 3,332,140 | 3,332,140 |
| R-squared | 0.18 | 0.18 | 0.16 | 0.16 | 0.14 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes |

**Panel B:** Reactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta$IVA$_{t+1}$ | | $\Delta$Sust$_{t+1}$ | | $\Delta$RepRisk$_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy contemp. increase – IVA | -0.016 | | | | |
| | (-0.75) | | | | |
| Sell contemp. decrease – IVA | | -0.023 | | | |
| | | (-0.61) | | | |
| Buy contemp. increase – SUST | | | -0.006 | | |
| | | | (-0.59) | | |
| Sell contemp. decrease – SUST | | | | 0.030 | |
| | | | | (1.04) | |
| Sell contemp. increase – RepRisk | | | | | 0.001 |
| | | | | | (0.84) |
| Observations | 3,332,140 | 3,332,140 | 3,332,140 | 3,332,140 | 3,332,140 |
| R-squared | 0.18 | 0.18 | 0.16 | 0.16 | 0.14 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes |

**Table A4: Robustness - Internal validity of ESG skill – Individual proxies - Fund-level controls**

This table shows results from linear regressions of future changes in the ESG rating of a portfolio firm on proxies for fund managers' ESG skill. The dependent variable in the change in ESG rating over the next quarter as provided by IVA (columns 1 and 2), Sustainalytics (columns 3 and 4), or RepRisk (column 5). The main explanatory variables in Panel A are proxies for ESG proactiveness while those in Panel B proxy for ESG reactiveness, as shown in Equation 1. All regressions control for firm, category-by-quarter, and fund family fixed effects, as well as time-varying fund and firm characteristics. The sample is at the fund-firm-quarter level, starts in 2016 and ends in 2020. For columns 3 and 4, the months after June 2019, when Sustainalytics' methodology changed, are dropped. All variables are defined in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

**Panel A:** Proactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta IVA_{t+1}$ | | $\Delta Sust_{t+1}$ | | $\Delta RepRisk_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy future increase – IVA | 0.130*** | | | | |
| | (6.15) | | | | |
| Sell future decrease – IVA | | -0.243*** | | | |
| | | (-4.44) | | | |
| Buy future increase – SUST | | | 0.243*** | | |
| | | | (5.02) | | |
| Sell future decrease – SUST | | | | -0.189*** | |
| | | | | (-6.82) | |
| Sell future increase – RepRisk | | | | | 0.009*** |
| | | | | | (2.97) |
| Firm return$_{t-1}$ | -0.000 | -0.000 | 0.001 | 0.001 | 0.001 |
| | (-0.21) | (-0.21) | (0.41) | (0.41) | (1.56) |
| Log of firm market cap$_{t-1}$ | 0.005 | 0.006 | 0.016 | 0.016 | 0.003 |
| | (0.61) | (0.61) | (0.87) | (0.87) | (0.53) |
| Total trading in firm$_{t-1}$ | 0.359** | 0.359** | 0.436 | 0.436 | -0.105 |
| | (2.83) | (2.84) | (0.80) | (0.80) | (-1.65) |
| Fund flows$_{t-1}$ | -0.000 | -0.000 | -0.000*** | -0.000** | 0.000 |
| | (-1.51) | (-0.92) | (-3.44) | (-2.33) | (1.33) |
| Fund returns$_{t-13,t-1}$ | -0.004 | -0.004 | -0.005 | -0.006 | -0.002 |
| | (-0.42) | (-0.43) | (-0.39) | (-0.45) | (-0.36) |
| Log of fund assets$_{t-1}$ | 0.000 | 0.000 | -0.000 | -0.000 | -0.000* |
| | (0.74) | (1.60) | (-0.81) | (-0.08) | (-1.96) |
| Performance stars | -0.000* | -0.000* | -0.001 | -0.001 | -0.000 |
| | (-1.96) | (-1.81) | (-1.59) | (-1.62) | (-0.71) |
| ESG Globes | -0.001 | -0.000 | -0.002** | -0.002** | 0.000 |
| | (-1.67) | (-1.60) | (-2.71) | (-2.50) | (1.34) |
| Observations | 3,374,058 | 3,374,058 | 2,176,017 | 2,176,017 | 4,144,025 |
| R-squared | 0.16 | 0.16 | 0.18 | 0.18 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Fund family FE | Yes | Yes | Yes | Yes | Yes |

**Panel B:** Reactive trades

| Dep. variable: | Future change in ESG rating | | | | |
|---|---|---|---|---|---|
| | $\Delta$IVA$_{t+1}$ | | $\Delta$Sust$_{t+1}$ | | $\Delta$RepRisk$_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) |
| Buy contemp. increase – IVA | -0.018 | | | | |
| | (-1.02) | | | | |
| Sell contemp. decrease – IVA | | -0.012 | | | |
| | | (-0.41) | | | |
| Buy contemp. increase – SUST | | | -0.011 | | |
| | | | (-1.21) | | |
| Sell contemp. decrease – SUST | | | | 0.046** | |
| | | | | (2.30) | |
| Sell contemp. increase – RepRisk | | | | | -0.001 |
| | | | | | (-0.41) |
| Firm return$_{t-1}$ | -0.000 | -0.000 | 0.001 | 0.001 | 0.001 |
| | (-0.21) | (-0.21) | (0.41) | (0.41) | (1.56) |
| Log of firm market cap$_{t-1}$ | 0.006 | 0.006 | 0.016 | 0.016 | 0.003 |
| | (0.61) | (0.61) | (0.87) | (0.87) | (0.53) |
| Total trading in firm$_{t-1}$ | 0.359** | 0.359** | 0.436 | 0.436 | -0.105 |
| | (2.83) | (2.83) | (0.80) | (0.80) | (-1.64) |
| Fund flows$_{t-1}$ | 0.000 | 0.000 | -0.000 | -0.000 | 0.000 |
| | (0.47) | (0.11) | (-1.02) | (-0.82) | (0.34) |
| Fund returns$_{t-13,t-1}$ | -0.004 | -0.004 | -0.006 | -0.005 | -0.002 |
| | (-0.43) | (-0.43) | (-0.41) | (-0.38) | (-0.38) |
| Log of fund assets$_{t-1}$ | 0.000 | 0.000 | -0.000 | -0.000 | -0.000* |
| | (1.41) | (1.32) | (-0.13) | (-0.28) | (-1.82) |
| Performance stars | -0.000 | -0.000* | -0.001 | -0.001 | -0.000 |
| | (-1.74) | (-1.77) | (-1.61) | (-1.61) | (-0.58) |
| ESG Globes | -0.000 | -0.000 | -0.002** | -0.002** | 0.000 |
| | (-1.54) | (-1.57) | (-2.49) | (-2.55) | (1.38) |
| Observations | 3,374,058 | 3,374,058 | 2,176,017 | 2,176,017 | 4,144,025 |
| R-squared | 0.16 | 0.16 | 0.18 | 0.18 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Fund family FE | Yes | Yes | Yes | Yes | Yes |

**Table A5: Robustness - Aggregated skill measure – Common sample and fund-level controls**

This table shows results from linear regressions of future changes in the ESG rating of a portfolio firm on proxies for fund managers' ESG skill. The dependent variable in the change in ESG rating over the next quarter as provided by IVA (columns 1 and 4), Sustainalytics (columns 2 and 5), or RepRisk (column 3 and 6). The main explanatory variable in columns 1 to 3 is the ESG proactiveness of a fund, while in columns 4 to 6, it is the ESG reactiveness. In Panel A, only observations where all ESG ratings are available are kept. In Panel B, all regressions additionally control for category-by-quarter, and fund family fixed effects, as well as time-varying fund and firm characteristics. The sample is at the fund-firm-quarter level and runs from 2016 to 2020. All variables are defined in Appendix Table A1. t-statistics, based on standard errors clustered around fund and quarter, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

**Panel A:** Keeping only the common sample

| Dep. variable (%): | Future change in ESG rating | | | | | |
|---|---|---|---|---|---|---|
| | $\Delta \text{IVA}_{t+1}$ | $\Delta \text{Sust}_{t+1}$ | $\Delta \text{RepRisk}_{t+1}$ | $\Delta \text{IVA}_{t+1}$ | $\Delta \text{Sust}_{t+1}$ | $\Delta \text{RepRisk}_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ESG Proactiveness | 0.059*** | 0.156*** | -0.019 | | | |
| | (4.08) | (5.88) | (-0.87) | | | |
| ESG Reactiveness | | | | 0.013 | -0.000 | 0.014 |
| | | | | (1.35) | (-0.01) | (0.67) |
| Observations | 1,996,289 | 1,996,289 | 1,996,289 | 1,996,289 | 1,996,289 | 1,996,289 |
| R-squared | 0.19 | 0.18 | 0.14 | 0.19 | 0.18 | 0.14 |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

**Panel B:** Controlling for additional fund characteristics

| Dep. variable: | Future change in ESG rating | | | | | |
|---|---|---|---|---|---|---|
| | $\Delta\text{IVA}_{t+1}$ | $\Delta\text{Sust}_{t+1}$ | $\Delta\text{RepRisk}_{t+1}$ | $\Delta\text{IVA}_{t+1}$ | $\Delta\text{Sust}_{t+1}$ | $\Delta\text{RepRisk}_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ESG Proactiveness | 0.079*** | 0.170*** | -0.020 | | | |
| | (5.04) | (5.81) | (-1.25) | | | |
| ESG Reactiveness | | | | 0.002 | 0.002 | 0.032* |
| | | | | (0.14) | (0.07) | (1.86) |
| Firm return$_{t-1}$ | -0.032 | 0.141 | 0.116 | -0.032 | 0.141 | 0.116 |
| | (-0.21) | (0.41) | (1.56) | (-0.21) | (0.41) | (1.56) |
| Log of firm market cap$_{t-1}$ | 0.551 | 1.619 | 0.332 | 0.551 | 1.619 | 0.332 |
| | (0.61) | (0.87) | (0.53) | (0.61) | (0.87) | (0.53) |
| Total trading in firm$_{t-1}$ | 35.908** | 43.594 | -10.456 | 35.907** | 43.589 | -10.453 |
| | (2.84) | (0.80) | (-1.64) | (2.83) | (0.80) | (-1.64) |
| Fund flows$_{t-1}$ | -0.002 | -0.010*** | 0.001 | 0.000 | -0.004 | -0.001 |
| | (-1.19) | (-3.13) | (1.26) | (0.15) | (-1.11) | (-0.84) |
| Fund returns$_{t-13,t-1}$ | -0.381 | -0.572 | -0.161 | -0.377 | -0.566 | -0.165 |
| | (-0.44) | (-0.41) | (-0.37) | (-0.43) | (-0.40) | (-0.38) |
| Log of fund assets$_{t-1}$ | 0.005 | -0.004 | -0.008* | 0.005 | -0.002 | -0.008* |
| | (1.09) | (-0.31) | (-1.89) | (1.29) | (-0.21) | (-1.97) |
| Performance stars | -0.019 | -0.085 | -0.006 | -0.020* | -0.086 | -0.005 |
| | (-1.71) | (-1.61) | (-0.63) | (-1.79) | (-1.61) | (-0.55) |
| ESG Globes | -0.049 | -0.169** | 0.037 | -0.049 | -0.168** | 0.037 |
| | (-1.58) | (-2.59) | (1.36) | (-1.57) | (-2.54) | (1.37) |
| Observations | 3,374,058 | 2,176,017 | 4,144,025 | 3,374,058 | 2,176,017 | 4,144,025 |
| R-squared | 0.16 | 0.18 | 0.10 | 0.16 | 0.18 | 0.10 |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Fund family FE | Yes | Yes | Yes | Yes | Yes | Yes |

**Table A6: Which fund managers are skilled?**
This table shows results from linear regressions of an indicator for funds with high ESG proactiveness (Panel A) and high ESG reactiveness (Panel B) on several fund characteristics. The dependent variable is equal to one for the top decile of funds. AUM is the logarithm of assets under management of a fund. All regressions control for category-by-quarter fixed effects. The sample runs from 2016 to 2020. Variables are defined as in Appendix Table A1. t-statistics, based on standard errors clustered around fund family, are reported in parentheses. ***, **, and * indicate that the parameter estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively.

**Panel A:** Proactive funds

| Dep. variable (%): | High ESG Proactiveness | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ESG Fund | 3.09*** | | | | | | | 1.86*** |
| | (3.72) | | | | | | | (3.14) |
| ESG Globes | | 0.40*** | | | | | | 0.17 |
| | | (2.93) | | | | | | (1.41) |
| Europe | | | 16.95*** | | | | | 17.52*** |
| | | | (37.22) | | | | | (33.24) |
| Institutional fund | | | | -1.25* | | | | 0.80 |
| | | | | (-1.88) | | | | (1.56) |
| AUM | | | | | 0.23 | | | 0.47*** |
| | | | | | (1.47) | | | (4.27) |
| Stars | | | | | | 2.21*** | | 1.41*** |
| | | | | | | (10.81) | | (8.49) |
| FF3-Alpha 3yr | | | | | | | 14.27*** | 11.95*** |
| | | | | | | | (6.10) | (6.17) |
| Observations | 137,244 | 119,297 | 137,244 | 137,244 | 137,244 | 121,043 | 136,899 | 106,001 |
| R-squared | 0.07 | 0.07 | 0.10 | 0.07 | 0.07 | 0.07 | 0.07 | 0.12 |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

**Panel B:** Reactive funds

| Dep. variable (%): | High ESG Reactiveness | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ESG Fund | 3.43*** | | | | | | | 2.05*** |
| | (4.11) | | | | | | | (3.54) |
| ESG Globes | | 0.70*** | | | | | | 0.39*** |
| | | (5.04) | | | | | | (3.21) |
| Europe | | | 16.45*** | | | | | 16.91*** |
| | | | (36.97) | | | | | (31.70) |
| Institutional fund | | | | -1.15* | | | | 0.76 |
| | | | | (-1.70) | | | | (1.39) |
| AUM | | | | | 0.24 | | | 0.47*** |
| | | | | | (1.57) | | | (4.38) |
| Stars | | | | | | 2.19*** | | 1.40*** |
| | | | | | | (10.75) | | (8.12) |
| FF3-Alpha 3yr | | | | | | | 12.68*** | 11.12*** |
| | | | | | | | (5.29) | (4.93) |
| Observations | 137,244 | 119,297 | 137,244 | 137,244 | 137,244 | 121,043 | 136,899 | 106,001 |
| R-squared | 0.07 | 0.07 | 0.10 | 0.07 | 0.07 | 0.08 | 0.07 | 0.12 |
| Category×Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |