Positive versus negative ESG portfolio screening and investors' preferences

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Abstract

Environmental, Social, and Governance (ESG) practices have become an essential criterion for firm evaluation. While there is still no consensus on whether higher ESG scores are associated with better firm financial performance, ESG-conscious investors do screen their potential holdings for ESG performance. Investors can use negative or positive screening or a combination of the two. We examine which screening strategy is preferred by investors by examining flows to ESG mutual funds with positive, combined, and negative ESG screens. We find that positive screening has a positive association with dollar net fund flows relative to negative screening but no statistical difference with net flows as a percentage of total net assets. The result holds with control for the portfolio's ESG performance and disclosure scores. The net raw returns and 3-factor alphas of ESG mutual funds are not statistically different across funds with varying screening criteria. However, controlling for ESG performance scores and their E, S, and G pillars indicates that the negative screen strategy outperforms positive and, more so, combined screen portfolios. Controlling for ESG disclosure scores and their E, S, and G pillars shows better net raw returns for negative screen strategy relative to positive and combined screen portfolios, but not for alphas. This result is inconsistent with the behavioral/ethical explanation of investors' decisions but is more in line with modern portfolio theory.

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1. Introduction

Environmental, Social, and Governance (ESG) practices have become an important criterion for firm evaluation. While there is still no consensus on whether higher ESG scores are associated with better firm financial performance, ESG-conscious investors do screen their potential holdings for ESG performance. Investors can use negative or positive screening. Negative screening has a long history, dating to the 18th century when religious groups such as the Methodists and the Quakers codified how their beliefs should be applied to their business and investing decisions, such as shunning so-called sin stocks or businesses involved in tobacco, liquor, or gambling.[1] Thus, with negative screens, an investor would avoid all companies in a particular sector or doing a specific business. A BNP Paribas survey in 2021 reveals that more than half of individual and institutional investors still rely on negative screens.[2] However, negative screens may have only limited effect on risk and returns over the long haul and miss out on risk-adjusted outperformance of excluded 'sin' securities (Dimson et al., 2020). In addition, negative screening can create limits on the investable universe. For example, according to a partner at advisory firm Indefi, "only 15% of the stocks in the Russell 1000 index would qualify for inclusion in portfolios built using negative screens" (McGee, 2022). With positive screens, investors are more inclusive in forming their portfolios by searching for companies with high ESG criteria scores in the areas of investor interests. As a result, positive screening also leads to significant variation in investment strategies.

Both approaches have strengths and weaknesses and can result in portfolios with very different characteristics. Thus, negative versus positive screen is not just a matter of semantics but

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[1] One of the oldest mutual funds in the ESG universe, Pax World, was founded in 1971 when two United Methodist ministers designed a prototype negative screen whose primary goal was to exclude businesses profiting from the Vietnam War.

[2] https://www.theia.org/sites/default/files/2021-09/The%20ESG%20Global%20Survey%202021.pdf

a very diverse portfolio outcome in terms of composition and, as a result, performance measured with return and risk.

Berry and Junkus (2013) examine investors' preference for the ESG portfolio screening method by surveying a large sample of investors. They find that investors' preferences are more consistent with positive than negative portfolio ESG screening. However, to the best of our knowledge, no study directly examines investors' choice of ESG portfolio screening method by measuring investors' capital flows to portfolios that use different screening criteria. We test which screening strategy investors prefer by examining net flows to ESG mutual funds with positive, negative, or combined ESG screens. We also evaluate the performance of ESG mutual funds with different screening criteria.

Using a sample of the U.S. mutual funds with ESG investment objectives from 2002 to 2022, we find that positive screening is positively associated with net dollar fund flows relative to negative screening while controlling for the portfolio's net returns. However, we do not find such a difference based on percentage net flows relative to total net assets. This result is inconsistent with the behavioral explanation of investors' decision to do good by avoiding "sin" stocks and sacrificing returns and consistent with the rational framework of modern portfolio theory (Sharpe, 1964) to do good by choosing portfolios with better ESG characteristics and achieving a better return or diversification.

Our study contributes to the literature two-fold. The main contribution is to the literature on investors' preferences for mutual funds and, more specifically, for the types of ESG mutual funds. In a survey setting, Amel-Zadeh and Serafeim (2018) find that professional portfolio managers, regardless of their focus on ESG objectives, rank negative screening above positive screening in their use of ESG data for their investment process. Yet, the authors also find that

portfolio managers perceive negative screening to negatively affect portfolio performance, while positive screening improves portfolio performance. These two findings are puzzling as they contradict each other in a rational behavior framework. Additionally, the survey finds that the second-ranked motivator for portfolio managers to use ESG data in investment decisions is due to growing client/stakeholder demand (33.1% responses) but substantially outranked by reasoning that ESG information is material to investment performance (63.1% responses). However, the survey also reveals practitioners' perceptions about the future evolution of the field. Portfolio managers ranked positive screening as the most important strategy in the future, although its rating is not statistically higher than the ratings for active ownership (the second-ranked), negative screening (the third-ranked), and full integration (the fourth). These findings are important as they illustrate the supply side of the mutual funds industry in terms of ESG data use in the investment process. Our study examines the demand side of ESG mutual funds in an empirical setting. Berry and Junkus (2013) also look at the demand side of ESG mutual fund investing by examining investors' preferences over the ESG portfolio screening method. However, they do so by surveying investors on their preferences, whether they invest in ESG or non-ESG funds. We directly examine the investors' preferences in ESG mutual funds screening strategies, i.e., what they do and not what they say they would do, by evaluating the net flows to the funds with negative, combined, and positive ESG screening strategies.

The second contribution is to the literature on ESG's effect on mutual fund performance. Some prior studies look at ESG funds' performance relative to non-ESG funds' performance and do not find clear evidence that the former outperforms the latter (Goldreyer and Diltz, 1999; Statman, 2000; Bauer et al., 2005; Bello, 2005; Benson et al., 2006; Renneboog et al., 2011). Nofsinger & Varma (2014) and Leite & Cortez (2015) find that socially responsible mutual funds

tend to underperform in good times but outperform during market crises. Contrarily, Soler-Domínguez and Matallín-Sáez (2016) examine a mutual fund that invests in "sin" stocks (USA Mutuals Barrier Fund, previously the Vice Fund; VICEX) and find that the fund outperformed the market and a set of ESG mutual funds during good times but underperformed during bad times. More relevant to our study, several researchers examine differences in negative and positive screening on portfolios' characteristics, such as return, risk, diversification, and factor exposure, by benchmarking to non-screened portfolios (Alessandrini and Jondeau, 2020; Verheyden et al., 2016; Humphrey and Tan; 2014). Humphrey and Tan (2014) find that neither positive nor negative screening creates better or worse portfolio returns than no screening approach, while in substantial portfolios, intense screening may increase idiosyncratic risk. The authors do not find evidence for the assertion that negative screening significantly negatively impacts investments' returns or risks and that positive screening will result in higher returns and lower idiosyncratic risk. Alessandrini and Jondeau (2020) examine the effect of negative screening and find that this approach leads to improved ESG scores of otherwise standard or smart beta portfolios without deterioration of their risk-adjusted performance. However, the authors demonstrate that exclusion also implies regional and sectoral tilts and (possibly undesirable) risk exposures of the portfolios. Likewise, Verheyden et al. (2016) find almost no evidence that ESG negative screening reduces returns but find considerable evidence of reductions in risk. Our study is the first to directly compare the performance of ESG mutual funds based on their portfolio screening approach. We do not find evidence of mutual fund ESG screening approaches affecting the net raw or 3-factor risk-adjusted funds' returns. However, controlling for ESG performance scores and their E, S, and G pillars indicates that the negative screen strategy outperforms positive and, more so, combined screen portfolios. Controlling for ESG disclosure scores and their E, S, and G pillars shows better net raw

returns for negative screen strategy relative to positive and combined screen portfolios, but not for alphas.

The rest of the paper is organized as follows: Section 2 discusses the literature and the development of the hypotheses. Section 3 describes the data and sample. Section 4 presents empirical results, and Section 5 concludes.

2. Literature Review and Hypotheses Development

ESG literature has grown exponentially in the last decade (see, for example, Amel-Zadeh, 2018; Daugaard, 2020; Gillan, Koch, & Stark, 2021, for the literature review). This growth is mainly due to the expansion of ESG practices and investors' interest in those practices. A large pool of literature examines the effects of ESG practices on firm performance (Baron, 2007, 2008; Benabou & Tirole, 2010; Gillan et al., 2010; Fatemi et al., 2015; Khan, Serafeim, & Yoon, 2016; Albuquerque et al., 2019; Gillan, Koch, & Stark, 2021), cost of capital (Dhaliwal, Li, Tsang, & Yang, 2011), capital constraints (Cheng, Ioannou, & Serafeim, 2014), and other ESG effects on businesses (Gillan, Koch, & Stark, 2021). A smaller but closely related strand of literature focuses on ESG investing (see, for example, Amel-Zadeh, 2018; Daugaard, 2020 for the literature review), including examining the effects of ESG investing strategies on the performance of ESG portfolios.

2.1. ESG screening strategy and fund performance

Economic theory argues that, all else equal, high-ESG firms should have lower expected returns since socially-oriented investors require less compensation for holding high-ESG firms (e.g., Fama & French, 2007; Pedersen et al., 2020; Pastor et al., 2021). However, the empirical evidence on the effects of integrating ESG considerations into investment strategies is mixed. While some studies find that ESG involvement improves a firm's financial and operating performance (Gillan et al., 2010; Borghesi et al., 2014; Khan, Serafeim, & Yoon, 2016), no

conclusive evidence exists on ESG-focused investment strategies outperforming similar non-ESG portfolios (Bauer, Derwall, & Otten, 2007). For example, some studies find that portfolios that exclude certain companies based on ethical norms (Hong & Kacperczyk, 2009; Luo & Balvers, 2017; Bolton & Kacperczyk, 2021; Pastor et al., 2022) or are formed based on aggregate ESG measures (Brammer, Brooks, & Pavelin, 2006) underperform their peers; others find that portfolios formed after positively screening on material ESG issues (Khan, Serafeim, & Yoon, 2016) or based on individual ESG data points (Glossner, 2021), such as employee satisfaction (Edmans, 2011), outperform their peers. Given this disagreement in the empirical literature, it is explicable to see many fund managers who publicly commit to responsible investment goals do not improve the ESG performance of their portfolios (Gibson et al., 2022; Kim & Yoon, 2023).

There are a variety of approaches that institutional investors take when incorporating ESG strategies into mutual funds. Eccles et al. (2017) identify the most popular ESG investment strategies institutional investors use as exclusionary (negative) screening, full ESG integration (positive) screening, and active ownership (engagement) trading. Amel-Zadeh and Serafeim's (2018) survey of professional portfolio managers reveals that professional investors use ESG information predominantly (but not overwhelmingly) to engage with companies (engagement) (37.1% of responses), integrate into valuation models (full integration) (34.4%), and use for portfolio screening, particularly negative (30%) as opposed to positive (13.4%) or relative (9.2%) screening.

Negative screening, historically the first approach to socially responsible investing (SRI), excludes all non-ESG-friendly companies or entire industries from a portfolio, commonly referred to as 'sin' stocks. Positive screening, a more recently adopted method for ESG investing, integrates ESG-friendly companies into a portfolio but does not necessarily exclude non-ESG-friendly

companies. Finally, there is the engagement strategy, which is a strategy where a mutual fund will utilize its shares in a company to promote ESG-friendly objectives. However, what is considered ESG friendly and where the line is drawn is not very well defined.

Several studies discuss how negative screening impacts portfolio performance in comparison to non-screened benchmarks. They generally conclude that excluding non-ESG-friendly stocks leads to lower expected returns (Statman & Glushkov, 2009; Blitz & Swinkels, 2020, 2021). Blitz & Swinkels (2020) analytically illustrate that exclusion strategies just lead to the transfer of ownership from socially oriented investors to those not socially oriented with no effect on frequently used arguments in favor of exclusion policies, including the effect on cost of capital and performance. However, Verheyden et al. (2016) find almost no evidence that ESG negative screening reduces returns but find considerable evidence of reductions in risk. Alessandrini and Jondeau (2020) find opposing to Blitz and Swinkels' (2021) and Statman and Glushkov's (2009) results. They find that negative screening improves ESG scores of otherwise standard or smart beta portfolios without deteriorating their risk-adjusted performance. However, Alessandrini and Jondeau (2020) demonstrate that exclusion also implies regional and sectoral tilts and (possibly undesirable) risk exposures of the portfolios.

Statman and Glushkov (2009) also look at positive screening and conclude that positive screening is beneficial to investors. Derwall et al. (2011) find that positive screening specifically increases short-term returns while having no significant impact on long-term investments.

However, Humphrey and Tan (2014) find that neither positive nor negative screening creates better or worse portfolio returns than no screening approach, while in very large portfolios, intense screening may increase idiosyncratic risk. The authors do not find evidence for the

assertion that negative screening significantly negatively impacts investments' returns or risks and that positive screening will result in higher returns and lower idiosyncratic risk.

None of the above-mentioned studies directly compare ESG funds' performance using negative versus positive screening of their ESG portfolios. In this study, we perform a direct empirical test of mutual fund performance that use negative versus positive screening. Based on existing theoretical models' predictions and empirical evidence on the issue, it is an empirical question on which, if any, screening strategies lead to better risk-adjusted performance. Our null hypothesis is that there is no significant difference between the performance of ESG mutual funds that employ negative versus positive screening of their portfolio holdings.

H1null: ESG screening criteria do not influence mutual fund performance.

The two-sided alternative hypothesis is that positive screening delivers better (risk-adjusted) returns than negative screening and vice versa.

H1a: ESG negative (positive) screening is positively (negatively) related to fund return.

H1b: ESG negative (positive) screening is negatively (positively) related to fund return.

2.1. ESG screening strategy and fund flows

By surveying institutional investors across all investment objectives (not limited to ESG strategies), Amel-Zadeh and Serafeim (2018) find that most of these investors implement ESG strategies because of "financial reasons rather than ethical reasons." Retail investors also choose to invest in ESG-friendly mutual funds due to "perceived financial quality" (Hauff & Nilsson, 2022). However, financial performance may not be the only factor that concerns investors interested in ESG strategies. Gutsche and Ziegler (2019) show that investors are also willing "to sacrifice returns for sustainable investment products." Kim and Yoon (2023) and Gibson et al.

(2022) show that investors do follow portfolio managers who indicate their commitment to ESG practices by documenting a significant increase in fund inflows of signatories of the U.N. Principles of Responsible Investment in the U.S. However, the authors find no improvement in the ESG scores of the portfolios' holdings of the signatories. Thus, investors' increased inflows to signatories' portfolios may be due to a belief in ethical reasons. Even if the investors believe in financial reasons for ESG investing beyond ethical reasons, a lack of due diligence in screening for ESG funds may lead to a break in the performance-flow relation, assuming a positive link between ESG scores and the performance of portfolio holdings.

The literature examines the benefits, as well as the detriments, of ESG strategies. One controversial topic discussed in the literature is whether overall portfolio performance and risk reduction improve due to ESG stocks' diversification. While some studies find that there is a statistical significance in performance and risk reduction in high-ESG scoring portfolios (Kempf & Osthoff, 2007; Verheyden et al., 2016; Fan & Michalski, 2020), others conclude that high-ESG scoring portfolios do not provide any significant advantage (Bello, 2005; Bauer et al., 2007; Halbritter & Dorfleitner, 2015; Revelli & Viviani, 2015; Auer & Schuhmacher, 2016).

Berry and Junkus (2013) examine through a survey of investors which one of the screening strategies investors tend to prefer. The study indicates that investors tend to "reward firms who display overall positive behavior" compared to the exclusion of certain funds, which suggests investors lean towards positive screening rather than negative screening.

Based on existing evidence that positive screening for ESG portfolio formation may be associated with higher returns, while negative screening may be associated with underperformance relative to both positive screening and non-ESG portfolios, a rational investor should select funds with a positive ESG screening approach over a negative one. However, if investors evaluate ESG

mutual funds based on non-performance criteria, such as ethical responsibility, then investors may prefer mutual funds with a negative screening strategy over a positive one, which can be explained by behavioral theories.

Thus, our second and main hypothesis in the null form is stated as follows:

H2null: ESG screening criteria do not influence mutual fund flows.

The alternative hypothesis is a two-sided one. A positive screening delivers higher net flows than a negative one, which is explained by rational investors' behavior to achieve better returns due to better performance of positive screening strategies. On the other hand, investors' flows are larger to ESG funds with negative screening than ESG funds with positive screening, explained by ethical reasons for investment avoidance in 'sin' companies.

H2a: ESG negative (positive) screening is positively (negatively) related to fund net flows, as explained by behavioral theories.

H2b: ESG negative (positive) screening is negatively (positively) related to fund net flows, as explained by the modern portfolio theory's rational behavior of investors.

Thus, it is an empirical question of whether rational or behavioral forces influence investors' preferences for ESG funds with negative or positive ESG screening strategies.

3. Data and Sample

We collect data from several sources for the period from 2002 to 2020. First, we obtain a list of mutual funds classified as socially responsible from the Forum for Sustainable and Responsible Investment (US SIF) website (https://charts.ussif.org/mfpc/), which utilizes Bloomberg data and classification of ESG mutual funds. The website contains a current list of 170 Sustainable Investment Mutual Funds and ETFs offered by institutional member firms.

The list provided by US SIF has information only about the currently active funds. To mitigate a survivorship bias in our analysis, we manually identified socially responsible mutual funds from the Center for Research in Security Prices (CRSP) Survivor-Bias-Free Mutual Fund Database. We follow Curtis et al. (2021) and screen funds based on their names and identified all mutual funds with the names containing one or more relevant keywords, such as "esg," "impact," "fossil," "responsible," "water," "social," "environment," "water," and "govern." We collect the sample funds' prospectuses from https://www.sec.gov/edgar/search-and-access and use them to identify information on the funds' portfolio holdings' screening criteria. We classify the ESG funds collected from CRSP as positive, combined, or negative. We follow Agapova and Kaprielyan (2023) to identify ETFs and ETNs in the list and exclude them. For our analysis, we exclude funds younger than two years and with a size (monthly TNA) of $2 million. After combining two lists and excluding bond mutual funds and balanced funds, we obtain 10,173 observations for 103 socially responsible mutual funds.

3.1. ESG mutual fund sample and screening strategy

Like Wimmer (2013), we select a sample of mutual funds with ESG investment strategy from the US SIF website (https://charts.ussif.org/mfpc/). We utilize the following procedure to identify the fund's selection criteria for its ESG strategy. First, we use Bloomberg's identification of the Environmental, Social, and Governance (ESG) strategy as positive, negative, or combined, which is listed on the US SIF website. Bloomberg identifies the strategy as positive (negative) if an ESG mutual fund used only positive (negative) screening for all the listed sectors. If an ESG fund uses a combination of positive and negative screening between the different sectors, then the fund's strategy is determined to be a combination of the strategies. We utilize the following approach for our sample funds. We collect a fund's reporting documentation from sec.gov and

search for a section titled "Principle Investment Strategies" or similar that describes the fund's investment strategy with respect to ESG requirements. Depending on the description of investment allocation provided within the section, we assign a 'positive' strategy to a fund if it requires more than half its holdings to be in ESG-friendly stocks. If a fund's criteria exclude stocks from specific industries, such as tobacco and weapons, we deem the fund's ESG selection criteria negative. If a fund investment strategy description contains both inclusion and exclusion, we assign the fund's ESG strategy as a combinatory strategy. Table A1 in the Appendix provides the samples of excerpts from funds' prospectuses that we classify as positive, negative, and combined. If the fund's information is unavailable in the Bloomberg dataset or on the SEC website, we search for the fund's data directly through internet searches and the fund's official website to collect information on the ESG selection strategy – positive, negative, or combinatory.

3.2. ESG scores, mutual fund flows, and control variables

3.2.1. ESG performance measures

Our firm-level measure of ESG performance of the fund's individual holdings is based on data obtained from Morgan Stanley Capital International's (MSCI) ESG (formally known as KLD Research & Analytics) for 1991–2019.[3] The MSCI ESG is the first ESG measure researchers have widely used to measure a firm's ESG/CSR performance (e.g., Tsai & Wu, 2022; Cui et al., 2018; Cho et al., 2013). The MSCI ESG measures a firm's ESG activities in 13 dimensions. The first seven are related to the environment, community, diversity, employee relations, human rights, product characteristics, and corporate governance. The MSCI ESG assigns a list of strengths and concerns within each dimension. A company receives a score of 1 for the presence of each of the

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[3] The MSCI ESG KLD STATS data set was created by KLD Research & Analytics, Inc. (KLD) in 1991. MSCI acquired KLD in 2010. The database has not been updated since 2019.

strengths (concerns) and 0 otherwise.[4] Following Kimbrough et al. (2022), we classify KLD's 80

strength and concern indicators, which can be grouped into three main ESG categories (i.e.,

environmental, social, and governance) among seven major qualitative issue areas: environment,

corporate governance, and (five) social pillars (community, diversity, employee relations, human

rights, and products). We follow Hillman and Keim (2001) and Cui et al. (2018), and for each

pillar – environment, social, and governance – and the total ESG score, we sum up all strengths

and subtract all concerns for each firm i in year t within each category. We standardize this measure

by adding the total number of concerns within the category in year t (to make the measure positive)

and dividing it by the sum of the total number of strengths and concerns within the category in

year t.[5]

To calculate the fund's ESG performance score, we calculate the fund TNA-weighted

average of individual firm ESG using the TNA of month $t-1$. We use the fund ESG score as a

proxy of the fund's ESG performance.

3.2.2. ESG disclosure measures

We measure a firm's ESG disclosure with the Bloomberg ESG disclosure score, *Bloomberg*

ESG. Bloomberg ESG disclosure scores are widely used in previous studies (e.g., Buchanan et al.,

2018; Li et al., 2018; Eliwa et al., 2021; Christensen et al., 2022). The score is assigned based on

collected standardized data from annual reports, sustainability reports, corporate websites, and

other sources and ranges from 0.1 for companies with the minimum amount of ESG data to 100

for firms that disclose the complete set of indicators included in the Bloomberg ESG disclosure

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[4] The last six dimensions indicate if firms are involved in controversial businesses, including alcohol, gambling, tobacco, firearms, military, and nuclear power. For each dimension, a firm gets a score of 1 if its operation is involved in the indicated controversial business and 0 otherwise. We do not include these dimensions in the analysis to avoid biasing the focus of the research.

[5] Alternatively, as in Kimbrough et al. (2022), we compute the percentile rank of the KLD overall ESG score, and each pillar score based on the difference between strengths and concerns by year based on the entire KLD dataset. The results are the same as with the standardized measure and are not reported.

score. The Bloomberg disclosure score also allows for the evaluation of each of the ESG pillars: environmental, social, and governance. The environmental disclosure score includes (but is not limited to) the following dimensions: energy consumption, water use, methane emissions, and environmental fines. The social disclosure score is based on the number of employees, percentage of employees unionized, training policy, human rights policy, anti-bribery ethics policy, and U.N. Global Compact Signatory. The governance disclosure pillar includes the size of the board, the percentage of independent directors, the number of board meetings, and board meeting attendance.

As with the ESG performance portfolio score, we calculate the fund TNA-weighted average of individual firm ESG disclosure scores using the TNA of month *t-1*. We use the fund Bloomberg ESG score as a proxy of the fund's ESG disclosure.

3.2.3. Mutual fund performance, flows, and control variables

We use the CRSP mutual fund dataset to collect fund-level information on returns, total net assets (TNA), and fund characteristics. We extract fund characteristics, such as investment objective, expense ratio, fees, and loads, from CRSP Mutual Funds – Summary file. Monthly returns and TNA come from CRSP Mutual Funds – Monthly Returns and Net Asset Values file. In the CRSP Mutual Funds dataset, the data are on the share-class level. We first aggregate the data to the fund level for the management fees, expense ratio, turnover ratio, monthly returns, and monthly total net assets (TNA). We follow Berk and Van Binsbergen (2015) and Agapova and Kaprielyan (2023) to identify the funds for aggregation across share classes through name parsing of the fund name provided by CRSP. For funds with multiple share classes, we identify management fees, expense ratio, and turnover ratio as the weighted average variables calculated using each share class's last period's TNA. The information on expenses is provided at a year's

end. Since we analyze monthly data, we divide management and 12b-1 fees and expense and turnover ratios by 12 to obtain monthly values. Monthly fund return is the value-weighted average return of the share classes' returns calculated using the previous month's TNA of each share class. Monthly fund TNA is the sum of the monthly TNA for each share class.

We use two measures of mutual funds' performance in our multivariate performance analysis: raw net return (Return) of mutual funds as reported in the CRSP Mutual Funds database and Fama-French 3-factor risk-adjusted return (Alpha). Alpha is calculated as a difference between the fund's raw net return and the sum of the risk-free rate and cross product of the fund's betas and risk premiums from the Fama-French 3-factor model. We also calculate the monthly Sharpe Ratio of mutual funds for our univariate risk-adjusted performance analysis.

Our main variable, monthly fund flows, is calculated as follows: Following Sirri and Tufano (1998), we define *fund_flow* in millions of dollars for fund i in quarter t as:

$$fund\_flow_{i,t} = TNA_{i,t} - \left(1 + r_{i,t}\right) * TNA_{i,t-1} \quad (1)$$

where $TNA_{i,t}$ is fund i's Total Net Assets at the end of month t and $r_{i,t}$ is fund i's return in month t. We express fund flows in percentage of fund TNA for fund i in month t (Agapova, 2011) as:

$$fund\_flow\%_{it} = \frac{TNA_{it} - (1 + r_{it}) * TNA_{it-1}}{TNA_{it-1}} \quad (2)$$

Control variables include fund-level characteristics and performance. We run all models with controls for the lagged fund's size (lagged monthly TNA), the age of the fund in years, the monthly turnover ratio, and the monthly expense ratio.

3.2.4. Descriptive statistics of the sample

Figure 1 indicates a substantial growth in the number of ESG funds between 2002 and 2010, with an increase in the total number of funds and number of new funds, respectively. However, after 2010, the number of ESG funds plateaued. While new ESG funds were open after

2010, those openings were much smaller than in the prior period and were offset by some closures of the ESG funds. However, the assets under management by the ESG funds continued to grow, especially ESG funds with positive portfolio screening, as indicated by Figure 3.

<Insert Figure 1 here>

<Insert Figure 3 here>

Table 1 reports descriptive statistics of the dependent variables, i.e., monthly return and flows to fund i in month t, and main explanatory variables: indicators of positive, negative, and combined screening ESG screening strategy by fund i in month t, and fund ESG score and its pillars – environmental (E), social (S), and governance (G) of fund i, and control variables. While Dimson et al. (2020) find that exclusionary screening is the most prevalent approach to ESG investing in Europe (and worldwide), based on assets under management, most ESG mutual funds in our sample utilize a positive screening strategy (61.9%), followed by a combined screening (27.7%), and negative screening (10.4%).[6] Over the sample period, the ranking of screening strategies remained the same as the sample average. Over some periods, the number of positive screen funds first increased between 2002 and 2010 but then experienced some decline between 2011 and 2016 and further increased afterward (see Figure 1).

The sample funds, on average, had 0.76% monthly return, -0.153 % monthly 3-factor alpha, and 0.158 Sharpe ratio. The net monthly fund flows are, on average, $1.273 million or 0.661% of total net assets over the sample period. The fund ESG performance (KLS score) and disclosure (Bloomberg score) are somewhat low at 0.483 and 44.589, respectively, with the maximum possible score of 1.00 for KLD and 100 for Bloomberg. The governance (G) pillar score appears

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[6] Dimson et al. (2020) clarify that these different approaches in ESG investing are not mutually exclusive.

to be the highest among the three pillars of E, S, and G, especially for the Bloomberg ESG disclosure score.

The average ESG fund age is 11.773 years, and the median age is 10 years. The average monthly fund turnover is 3.93%, the management fee is 0.037%, the 12b-1fee is 0.023%, and the total expense ratio is 0.097%.

<center><Insert Table 1 here></center>

Table 2 presents the correlation coefficients between the variables. The correlation coefficients between the fund net flows and ESG screening strategy indicators are positive for the positive screening strategy and negative for the combined and negative strategies. While the coefficients are statistically significant, they are economically insignificant. We observe a significant correlation between the pillars of ESG KLD and Bloomberg scores, which is expected. We do not use the pillars in the same models. The rest of the variables used as controls in our multivariate models do not exhibit high correlations.

<center><Insert Table 2 here></center>

4. Empirical Analysis

4.1. Univariate analysis

Table 3 presents the univariate analysis of funds' ESG KLD and Bloomberg scores, raw and risk-adjusted returns, and net flows by ESG screening strategy. A negative strategy, on average, appears to have the best ESG performance score (KLD) of 0.495, followed by a combined strategy with a score of 0.485 and a positive strategy with a score of 0.480. However, the scores economically are not substantially different from each other, especially between combined and positive strategies. ESG disclosure Bloomberg scores, on average, appear to improve from positive strategy (the lowest among the three strategies) to negative strategy (middle) and combined

strategy (the highest). However, there is no statistical difference in ESG Bloomberg scores between negative and combined strategies.

Panel B of Table 3 shows no observable difference in raw return among funds with different screening strategies. However, funds with a negative screen strategy show better risk-adjusted performance, 3-factor alpha, than funds with a positive screen strategy. There is also some difference in the risk premium exposure among ESG funds with different screen strategies, but those differences are statistically insignificant. Figure 2 illustrates the time variation among ESG funds' strategies' performance. Based on the net raw return (Figure 2a), there is no consistent pattern in the dominance of any specific screen strategy. However, all three strategies tend to move in the same direction of the market performance in a given year. There is a noticeable difference in alphas of funds with different screen strategies before 2010 (Figure 2b). After 2010, funds with a positive screen strategy tend to be underperforming on a risk-adjusted basis relative to funds with a negative and combined strategy.

<Insert Table 3 here>

<Insert Figure 2 here>

The net dollar fund flows, on average, appear to be higher for positive screen funds, followed by the combined and negative screen funds, which is consistent with the rational behavior of ESG-conscious investors to do better while doing good through achieving higher returns. The net flows as a percentage of TNA, on average, appear to be the highest for positive screen strategy, followed by negative and combined screen strategies. Figure 4 indicates that the fund flow trends change over the sample period. While net dollar flows for positive screen funds prevailed for the 2002-2006 and 2015-2020 periods, negative and combined net dollar flows dominated between

2007 and 2014. The net fund flows as a percentage of TNA were the highest for the negative screen strategy between 2005 and 2009.

<Insert Figure 4 here>

There are also noticeable differences in the funds' characteristics among different portfolio screen strategies. As expected, funds with negative screen strategy are older at 15.17 years than funds with combined (11.748 years) and positive strategy (11.216 years). Funds with combined strategy have the highest expense ratio of 0.108%, followed by funds with negative (0.096%) and positive (0.092%) strategies. The turnover ratio ranking is highest for positive screen funds (4.234%), middle for combined (3.96%), and lowest for negative screen funds (2.036%). Next, we turn to multivariate analysis.

4.2. Multivariate analysis

4.2.1. Fund screening strategy and performance

Before testing the main hypothesis of the effect of portfolio ESG screening on fund flows with the model specified in eq. (3), we examine the effect of the ESG portfolio screening strategy on the fund's performance (*Perform*), measured with fund raw returns (*Ret*) and Fama-French 3-factor excess returns (*Alpha*). We use the following baseline empirical model using ordinary least square (OLS) regression on panel data:

$$Perform_{i,t} = \alpha + \beta_1 Strategy_{i,t} + \beta_2 ESG\ score_{i,t} + \beta_3 Perform_{i,t-1} + \theta X_{i,t-1} + \delta_i + \gamma_t + \varepsilon_{i,t}, (3)$$

where dependent variable $Perform_{i,t}$ is either the monthly fund raw return (*Ret*) or the Fama-French 3-factor model risk-adjusted return (*Alpha*) for fund *i* in month *t*. The main explanatory variable is an indicator variables that equal one if a fund uses positive screening for ESG strategy

20

investing, $Positive_{i,t}$, and combined screening, $Combined_{i,t}$, for fund i in month t and zero otherwise, with the negative strategy being a base. $X_{i,t-1}$ are the lagged fund-level characteristics, specifically, fund's monthly TNA, expense ratio or management fee and 12b-1 fee, portfolio turnover, and age. δ_t are CRSP fund investment objective (CRSP_obj_cd) fixed effects. γ_t are year-fixed effects. In all regressions, the robust standard errors ($\varepsilon_{i,t}$) are clustered by fund.

Table 4 presents the results of the fund performance analysis measured with the net raw return (models (1)-(3)) and the Fama-French 3-factor model risk-adjusted return *Alpha* (models (4)-(6)). We find that the ESG screening strategy choice does not significantly relate to the fund's performance. The net raw returns and 3-factor alphas of ESG mutual funds are not statistically different across funds with different screening criteria. However, controlling for ESG performance scores and their E, S, and G pillars indicates that the negative screen strategy outperforms positive and, more so, combined screen portfolios. Controlling for ESG disclosure scores and their E, S, and G pillars shows better net raw returns for negative screen strategy relative to positive and combined screen portfolios, but not for alphas.

<Insert Table 4 here>

4.2.2. Fund screening strategy and flows

To control for confounding effects of fund characteristics, while we test our main hypothesis of whether positive versus negative ESG screening attracts more investors' flow, we use the following baseline empirical model using ordinary least square (OLS) regression on panel data:

$$Flow_{i,t} = \alpha + \beta_1 Strategy_{i,t} + \beta_2 ESG\ score_{i,t} + \beta_3 Flow_{i,t-1} + \theta X_{i,t-1} + \delta_i + \gamma_t + \varepsilon_{i,t}, (4)$$

where dependent variable $Flow_{i,t}$ is the monthly net flow, dollar, Flow, \$, or percentage of TNA, Flow, %, to ESG fund i in month t. The main explanatory variable is an indicator variables that

equal one if a fund uses positive screening for ESG strategy investing, $Positive_{i,t}$, and combined screening, $Combined_{i,t}$ for fund i in month t and zero otherwise, with negative strategy being a base. $X_{i,t-1}$ are the lagged fund-level characteristics, such as fund's monthly TNA, expense ratio or management fee and 12b-1 fee, portfolio turnover, age, and fund return. δ_t are CRSP fund investment objective (CRSP_obj_cd) fixed effects. γ_t are year-fixed effects. In all regressions, the robust standard errors ($\varepsilon_{i,t}$) are clustered by fund. If investors react to screening criteria based on behavioral biases, we expect β_1 to be negative. However, if investors' choices of ESG funds are based on rational behavior explained by modern portfolio theory (Sharpe, 1964) and are driven by the fund's performance and not purely ethical reasons, then we expect β_1 to be positive.

Table 5 reports the results of the model in equation (4). Panel A reports results for dollar flow (models (1)-(3)) and percentage flow (Models (4)-(6)), with total ESG scores. Panels B and C include E, S, and G pillars for KLD scores and Bloomberg scores, respectively. In Table 5, Panel A, models (1)-(3), the coefficient on *Positive* is positive and statistically significant, at least at a 1% level. In model (3), the coefficient on *Combined* is positive and statistically significant, at least at a 1% level. Thus, net dollar flows increase with less restricting screening strategies of portfolio holdings in ESG funds. However, the coefficients of *Positive* and *Combined* variables in models with *Flow, %* as a dependent variable (models (4)-(6)) are statistically insignificant, indicating that percentage flows are not related to the ESG screen strategy. The result holds with control for the portfolio's ESG performance and disclosure scores.

<Insert Table 5 here>

5. Conclusion

While ESG investing has been of great attention to academics and practitioners in the past few years, the question of how investors select ESG products remains largely unanswered. The current practice of how ESG mutual fund managers select holdings for their portfolios is based on (1) the exclusion of 'sin' stocks, i.e., negative screening, (2) the inclusion of high ESG score stocks, i.e., positive screening, and (3) a combination of the positive and negative approaches. Based on existing surveys (e.g., Amel-Zadeh & Serafeim, 2018), professional portfolio managers, regardless of their focus on ESG objectives, rank negative screening above positive screening. However, the survey also reveals that portfolio managers perceive negative screening to negatively affect the portfolio's performance, while positive screening improves the portfolio's performance. These portfolio managers' preferences for negative screening while acknowledging the better performance of positive screen portfolios are puzzling. The survey of investors by Berry and Junkus (2013) reveals that investors lean towards positive screening rather than negative screening of ESG investments. Thus, based on the surveys, the supply and demand of ESG investment products have different preferences. While surveys are informative, they do not measure the actual choices people make. Thus, to reconcile the differences in investment choices of providers and consumers of ESG investment portfolios, we examine the effect of ESG mutual fund screening strategies, negative, combine, and positive, on net fund flows.

We find that positive screening has a positive association with net dollar fund flows relative to screening that involves excluding criteria, controlling for portfolio holdings' ESG performance and disclosure scores. However, there is no statistical difference in net flows as a percentage of total net assets among ESG mutual funds with different screen strategies of their portfolio holdings. This result is inconsistent with the behavioral/ethical explanation of investors' decisions but is

more in line with modern portfolio theory (Sharper, 1964) of maximizing return through diversification yet selecting stocks with better ESG scores. We evaluate the performance of ESG mutual funds with different screening criteria and find no significant difference in ESG fund performance based on ESG screening criteria.

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Figure 1: Number of total and new ESG Funds by Screening Strategy by year

1a: Number of ESG Funds by Screening Strategy

combined strategy ■ negative strategy ■ positive strategy

1b: Number of New ESG Funds by Screening Strategy

new combined funds ■ new negative funds ■ new positive funds
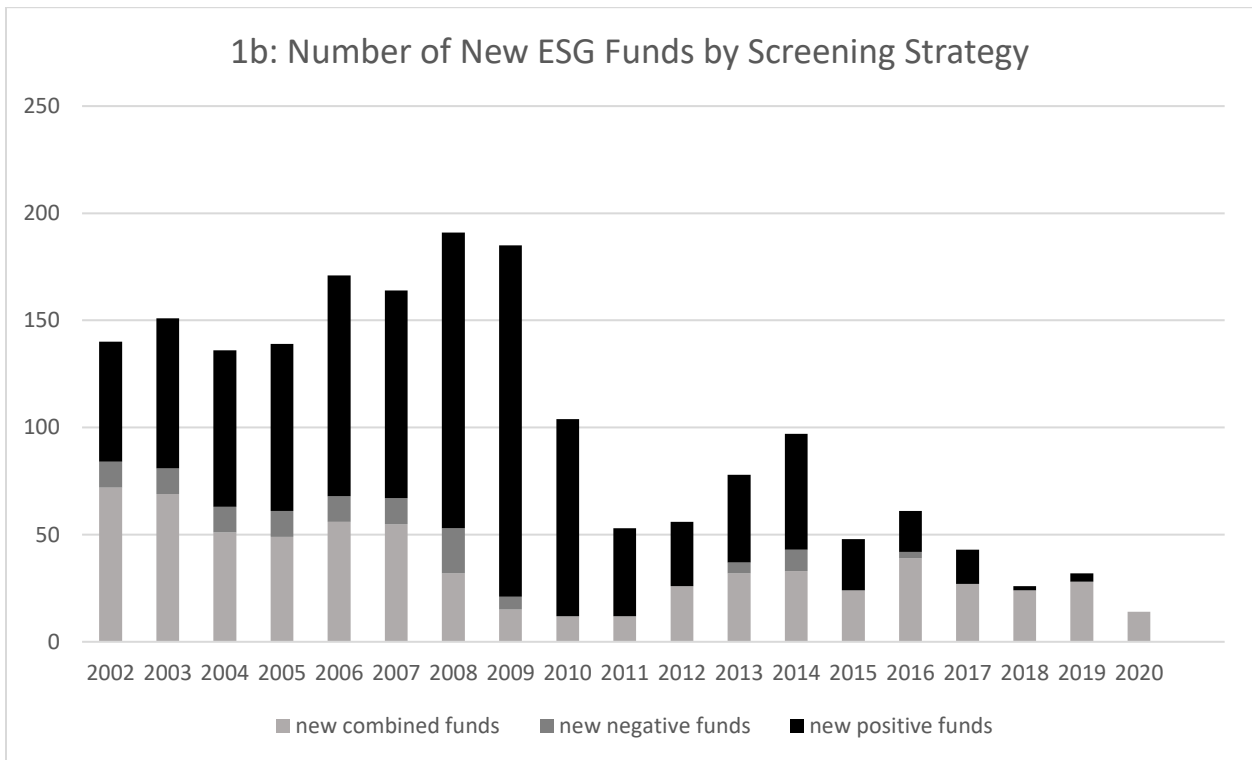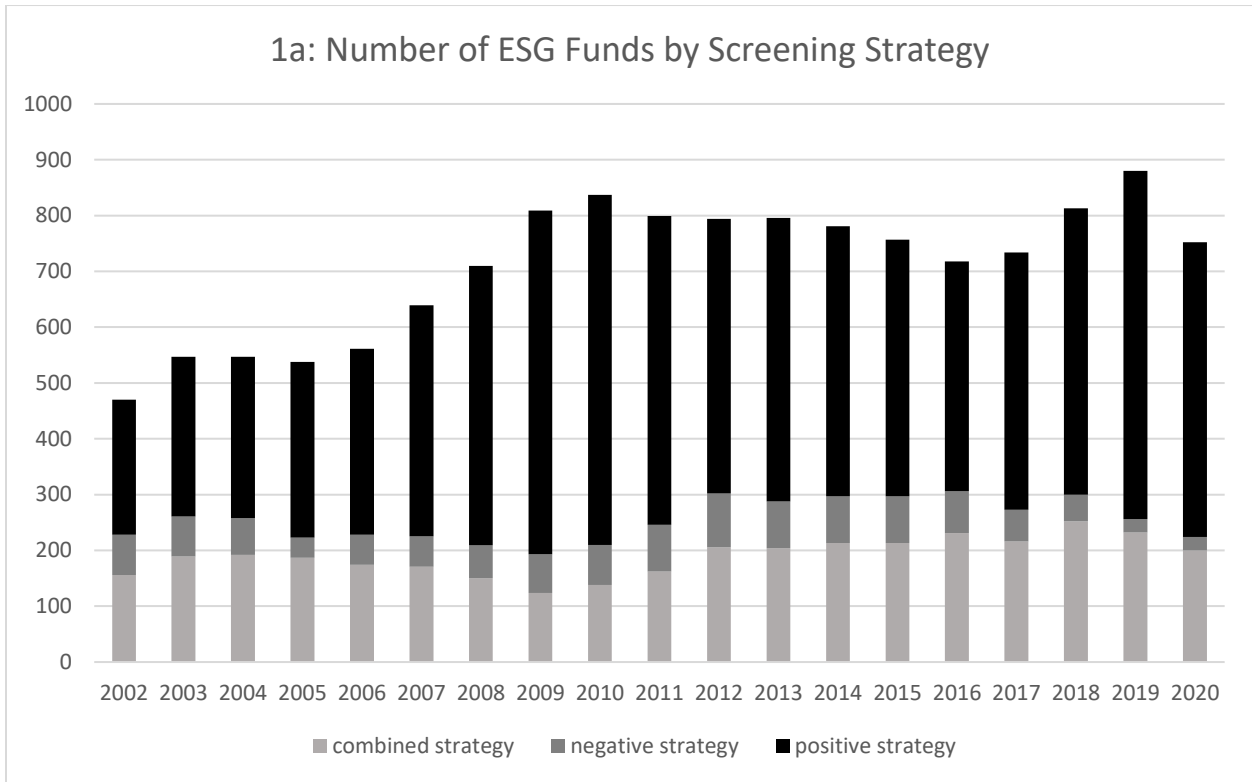
Figure 2: ESG Funds' Raw and Excess Return by Screening Strategy by Year

2a: ESG Fund Monthly Returns (%)

combined   negative   positive

2b: ESG Fund Excess Returns (%)

combined   negative   positive
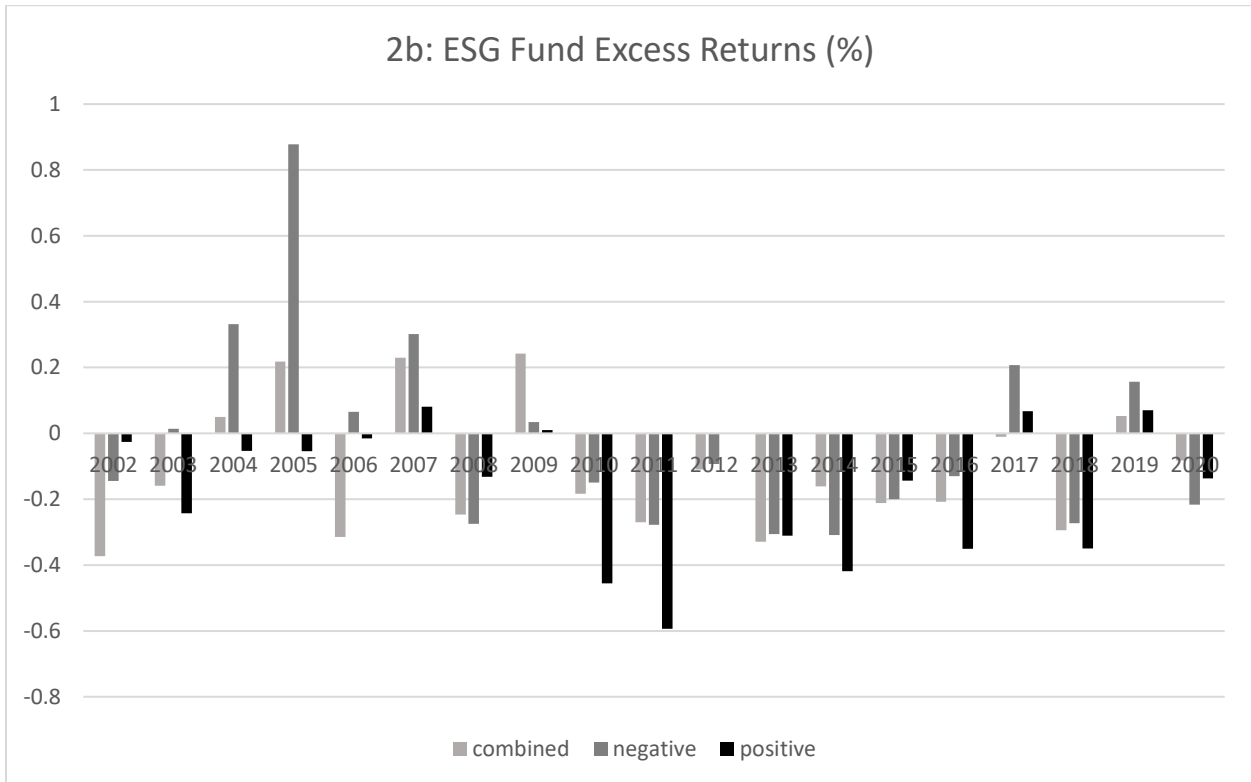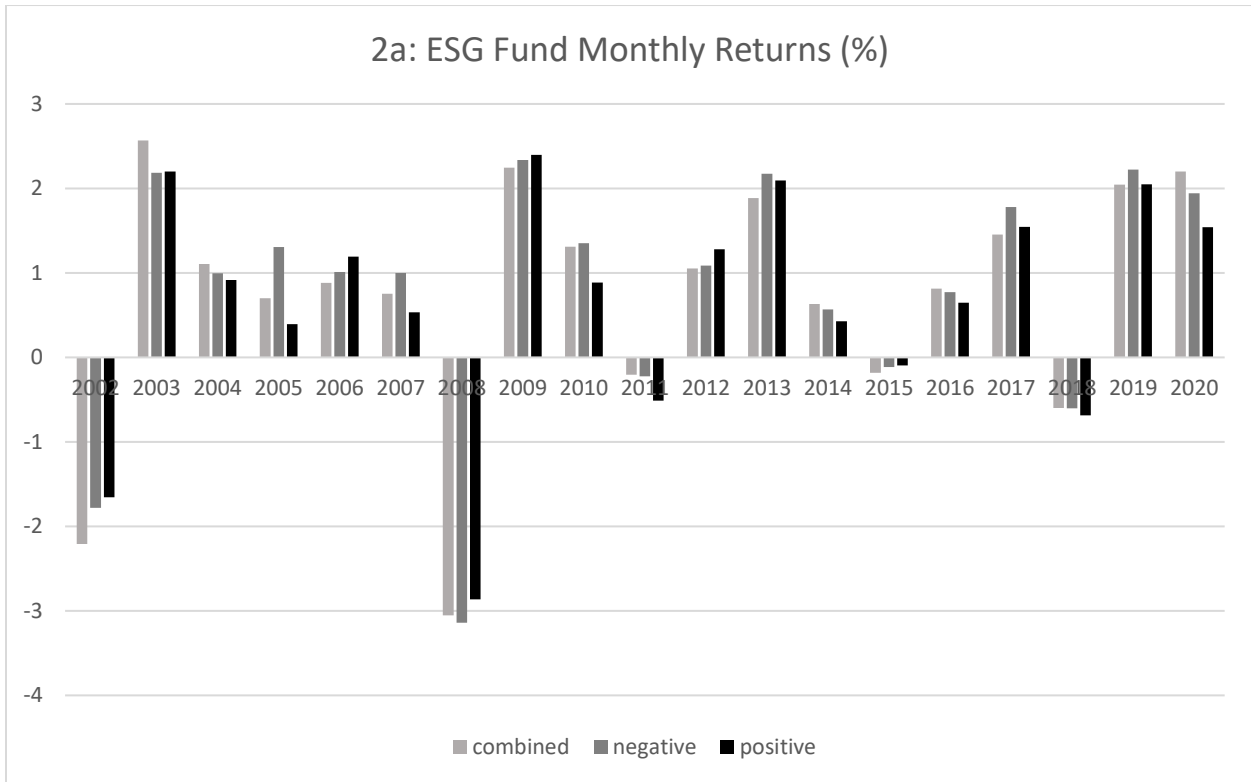
Figure 3: ESG Funds' TNA by Screening Strategy by Year

3.a: ESG Fund TNA by Screening Strategy, $, mln.

combined TNA — negative TNA — positive TNA
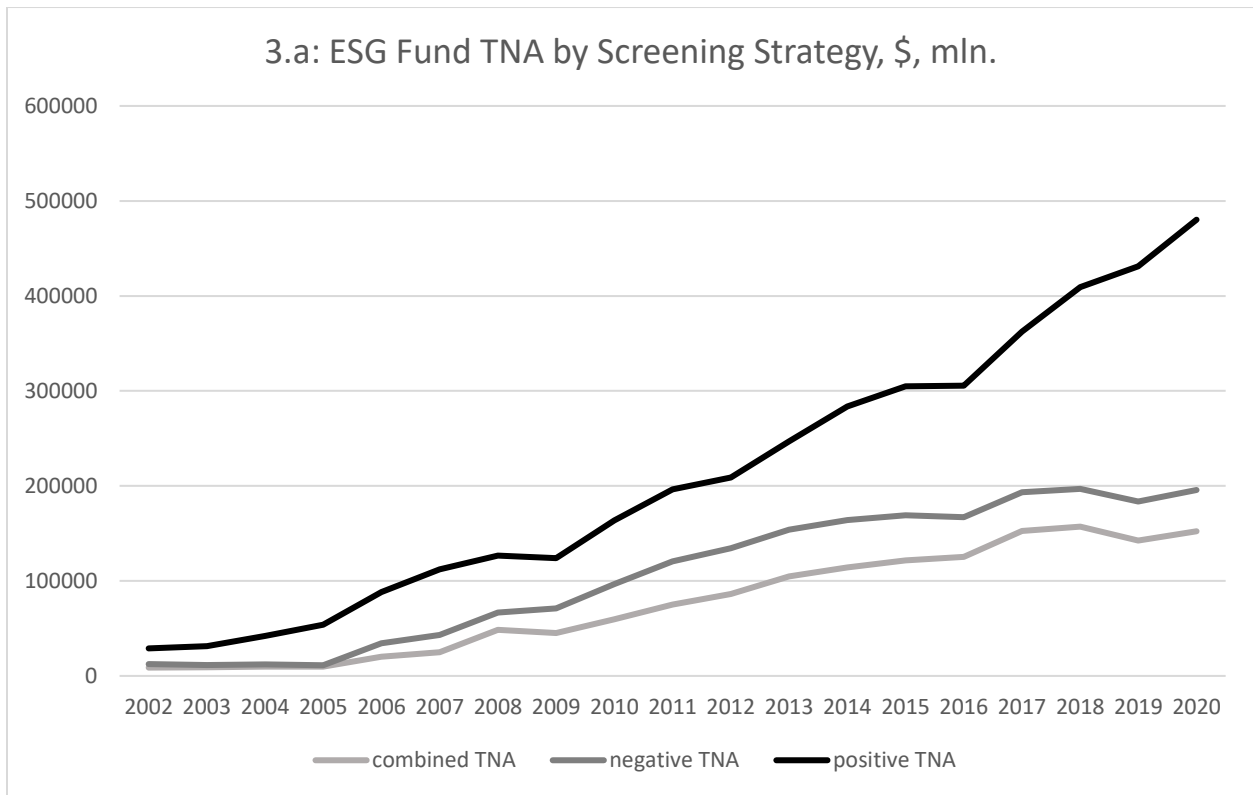
Figure 4: ESG Funds' Flows by Screening Strategy by Year

ESG Fund Net Flow ($,mln.) by Screening Strategy

combined net flows · negative net flows · positive net flows

ESG Fund Net Flow (%) by Screening Strategy

combined percentage flows · negative percentage flows · positive percentage flows
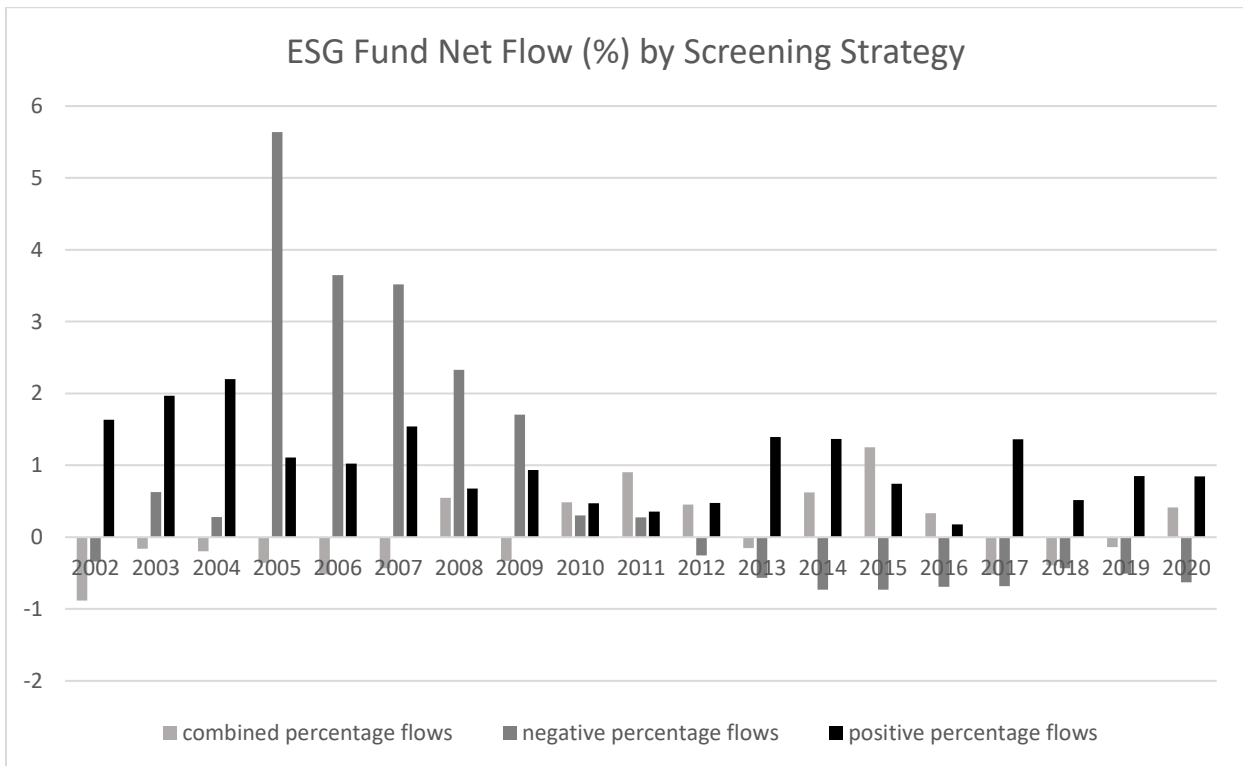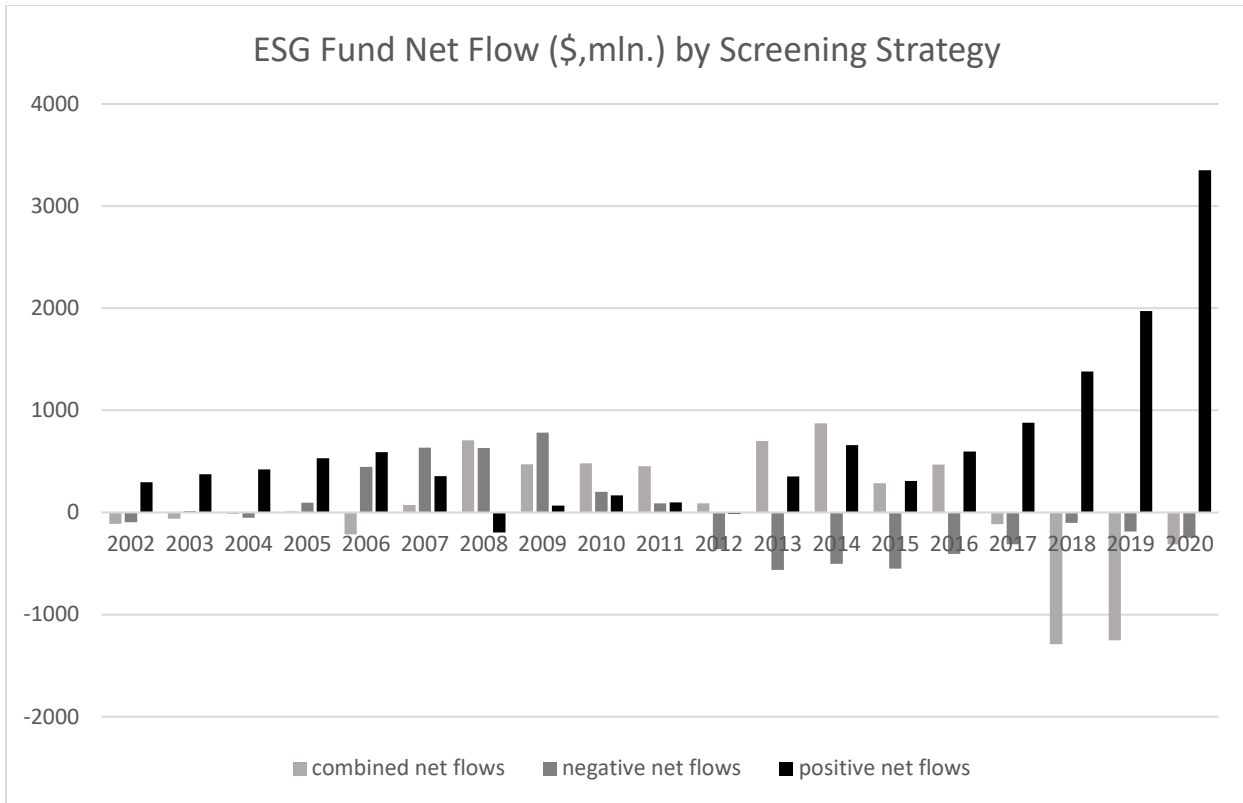
Table 1: Descriptive Statistics
The table reports descriptive statistics of the main and control variables. The frequency of the data is monthly.

Main Variables	N	Mean	Median	Std.dev	Min	Q1	Q3	Max
Fund Monthly Return, %	10,173	0.760	1.068	4.359	-12.52	-1.441	3.335	11.580
Sharpe Ratio	10,173	0.158	0.241	0.959	-2.625	-0.364	0.751	2.451
Alpha return CAPM, %	10,173	-0.153	-0.119	1.606	-5.337	-0.895	0.648	4.711
Alpha 3-factor model, %	10,173	-0.147	-0.104	1.482	-5.172	-0.809	0.597	4.191
Fund Flow, $ million	10,173	1.273	0.047	14.453	-55.13	-0.913	1.177	80.205
Fund Flow, %	10,173	0.661	0.120	3.808	-11.84	-0.853	1.585	18.740
ESG score E	4,446	0.469	0.421	0.119	-3.188	0.391	0.555	0.811
ESG score S	4,446	0.474	0.471	0.045	0.175	0.450	0.499	0.649
ESG score G	4,446	0.635	0.657	0.340	0.266	0.623	0.676	22.610
Total ESG score	4,446	0.483	0.473	0.042	0.316	0.457	0.494	0.981
Bloomberg ESG score E	4,071	26.246	27.892	27.951	-26.99	16.981	34.788	1590.255
Bloomberg ESG score S	4,071	21.436	21.948	10.624	-331.2	15.578	28.240	69.682
Bloomberg ESG score G	4,071	85.974	85.208	3.848	-12.11	83.209	88.979	97.544
Total Bloomberg ESG score	4,071	44.598	45.162	10.137	19.789	39.025	50.541	415.386
Strategy Positive	10,173	0.619	1	0.486	0	0	1	1
Strategy Combined	10,173	0.277	0	0.448	0	0	1	1
Strategy Negative	10,173	0.104	0	0.305	0	0	0	1
Controls								
Monthly TNA	10,173	393.3	101.5	784.2	2.7	31.8	294.2	4964.8
Monthly Management fee, %	10,173	0.037	0.054	0.062	-0.283	0.024	0.067	0.122
Monthly Turnover ratio, %	10,173	3.930	3.083	3.103	0.000	1.583	5.500	14.698
Monthly Expense ratio, %	10,173	0.097	0.094	0.041	0.021	0.071	0.123	0.223
Monthly Fee 12B1, %	7,835	0.023	0.020	0.019	0.000	0.010	0.028	0.083
Age, years	10,173	11.773	10.000	8.102	2.000	5.000	17.000	38.000
Number of ESG MFs	103							

Table 2: Screening strategy and fund flows

The table reports descriptive statistics of the main variables by ESG screening strategy: negative (N), combined (C), and positive (P). *, **, *** indicate significance at 10, 5, and 1 percent, respectively.

| | Strategy | | | | | | | |
	Negative (N)	Combined (C)	Positive (P)	C&N	Diff (N - C)	Diff (N - P)	Diff (C-P)	Diff (N&C - P)
Panel A: ESG scores								
ESG score E	0.501	0.463	0.467	0.474	0.038***	0.034***	-0.004	0.007*
ESG score S	0.481	0.480	0.470	0.480	0.001	0.011***	0.010***	0.001***
ESG score G	0.620	0.634	0.638	0.630	-0.014***	0.018	-0.004	-0.008
Total ESG score	0.495	0.485	0.480	0.488	0.010***	0.015***	0.005***	0.008***
# of observations	423	1,132	2,891					
Bloomberg ESG score E	29.425	28.780	24.836	28.965	0.646	4.589***	3.944***	4.129***
Bloomberg ESG score S	22.776	23.583	20.444	23.351	-0.807*	2.332***	3.139***	2.907***
Bloomberg ESG score G	85.815	87.071	85.592	86.709	-1.255***	-0.223	1.478***	1.117***
Bloomberg Total ESG score	46.006	46.532	43.674	46.380	-0.526	2.332***	2.858***	2.706***
# of observations	400	990	2,681					
Panel B: Fund Performance								
Fund Monthly Return, %	0.723***	0.809***	0.745***	0.786	-0.087	-0.022	0.065	0.041
Sharpe Ratio	0.159***	0.172***	0.151***	0.169	-0.014	0.008	0.021	0.018
Alpha CAPM, %	-0.043	-0.134***	-0.18***		0.091*	0.136**	0.045	
Alpha 3-factor model, %	-0.063	-0.126***	-0.17***		0.063	0.108**	0.045	
# of observations	1,054	2,819	6,300					
beta MRP CAPM	0.900***	0.913***	0.924***		-0.013	-0.024	-0.011	
beta MRP	0.901***	0.897***	0.919***		0.005	-0.017	-0.022	
beta SMB	0.026	0.074**	0.066**		-0.048	-0.040	0.008	
beta HML	0.005	0.008	-0.012		-0.004	0.016	0.020	
# observations/funds for betas	12	36	75					
Panel C: Fund Flows								
Fund Monthly Flow, $	-0.459	0.442	1.936***	0.196	-0.901	-2.395***	-0.820***	- 1.739***
Fund Monthly Flow, %	0.475***	0.116*	0.936***	0.214	0.359***	-0.461***	-1.494***	-0.723***
# of observations	1,054	2,819	6,300					
Panel D: Fund Characteristics								
Monthly TNA	540.602	520.650	311.591	526.080	19.952	229.011***	209.059***	214.489***
Monthly Management fee, %	0.051	0.047	0.030	0.048	0.004**	0.021***	0.017***	0.018***
Monthly Turnover ratio, %	2.036	3.960	4.234	3.436	-1.924***	-2.198***	-0.274***	-0.797***
Monthly Expense ratio, %	0.095	0.108	0.092	0.104	-0.013***	0.003*	0.015***	0.012***
Monthly Fee 12B1, %	0.020	0.028	0.021	0.025	-0 .008***	0.001**	0.006***	0.004***
Age, years	15.170	11.748	11.216	12.679	3.422***	3.954***	0.532***	1.463***
# of observations	1,054	2,819	6,300					

Table 3 Correlation

The table reports the correlation coefficient of the main and explanatory variables. The numbers in bold indicate statistical significance at less than a 5 percent significance level.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Alpha Return	(1)																		
Raw Return	(2)	**0.33**																	
Flow, $	(3)	0.01	**0.03**																
Flow, %	(4)	**0.05**	**0.04**	**0.47**															
Positive	(5)	**-0.02**	-0.01	**0.06**	**0.09**														
Negative	(6)	0.02	0.00	-0.04	-0.02	**-0.43**													
Combine	(7)	0.01	0.01	-0.04	-0.09	**-0.79**	**-0.21**												
KLD ESG E	(8)	-0.02	0.01	-0.02	-0.01	-0.03	**0.09**	-0.03											
KLD ESG S	(9)	**0.05**	**0.13**	-0.02	0.02	**-0.11**	0.05	**0.08**	0.05										
KLD ESG G	(10)	**0.05**	-0.01	0.002	-0.01	0.01	-0.01	0.00	**-0.55**	-0.03									
KLD ESG	(11)	-0.01	**0.08**	-0.03	-0.00	**-0.09**	**0.10**	0.03	**0.45**	**0.74**	**0.20**								
Bloomb E	(12)	0.03	0.01	-0.03	-0.03	-0.07	0.04	0.05	-0.10	**0.21**	0.04	0.09							
Bloomb S	(13)	**0.07**	0.03	-0.03	-0.04	**-0.13**	0.04	**0.12**	**-0.26**	**0.39**	0.09	**0.13**	-0.08						
Bloomb G	(14)	**0.09**	0.03	-0.02	-0.03	**-0.14**	-0.01	**0.16**	**-0.45**	**0.30**	**0.10**	-0.08	-0.02	**0.84**					
Bloomb ESG	(15)	**0.06**	0.02	-0.04	-0.05	**-0.13**	0.05	**0.11**	**-0.24**	**0.37**	0.08	**0.12**	**0.89**	**0.38**	**0.40**				
Fund TNA	(16)	**0.03**	**0.04**	**0.08**	-0.03	**-0.13**	0.06	**0.10**	-0.09	**0.2**	0.03	**0.1**	**0.1**	**0.17**	**0.19**	**0.17**			
Mngt fee	(17)	-0.02	-0.03	0.01	-0.07	**-0.14**	**0.08**	**0.1**	0.03	**-0.14**	0.01	-0.07	-0.05	**-0.15**	**-0.18**	**-0.12**	**0.1**		
Turnover	(18)	-0.04	-0.02	-0.05	-0.02	**0.13**	**-0.21**	0.01	0.00	**-0.24**	-0.03	**-0.19**	**-0.15**	**-0.27**	**-0.21**	**-0.26**	**-0.13**	**-0.08**	
Expense	(19)	**-0.06**	**-0.04**	**-0.05**	**-0.09**	**-0.14**	-0.02	**0.16**	**0.23**	**-0.34**	-0.05	**-0.11**	**-0.16**	**-0.37**	**-0.41**	**-0.33**	**-0.18**	**0.41**	**0.28**

Table 4 Mutual fund ESG screening strategy and fund performance.

The table presents results for the panel data ordinary least squares (OLS) regressions of monthly fund performance, raw return (Return), models (1) – (3), and 3-factor risk-adjusted return (Alpha), models (4) – (6), on ESG fund screening strategy indicator: Positive (Combined) equal 1 if fund portfolio screen strategy is positive (combined) and zero otherwise. Other explanatory variables are lagged mutual fund portfolio KLD and Bloomberg ESG score and lagged funds characteristics: total net assets (TNA), Expense Ratio, portfolio turnover ratio (Turnover), fund age (Age), and dependent variable. Panel A includes total ESG scores, and Panels B and C include E, S, and G pillars for KLD and Bloomberg scores, respectively. All models control for a year and fund investment objective (CRSP_obj_cd) fixed effects. The robust standard errors are clustered by the fund. t-statistics are in parentheses. *, **, *** indicate significance at 10, 5, and 1 percent, respectively.

Panel A	Return			Alpha		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	-0.000	-0.303**	-0.278**	-0.032	-0.087	-0.044
	(-0.005)	(-2.157)	(-2.659)	(-0.380)	(-1.676)	(-0.590)
Combined	0.085	-0.363***	-0.339***	0.010	-0.073	0.026
	(0.705)	(-3.729)	(-3.468)	(0.119)	(-1.563)	(0.275)
KLD ESG		-0.050			-0.148**	
		(-0.627)			(-2.317)	
Bloomberg ESG			0.006			0.002
			(0.101)			(0.060)
TNA	-0.063***	-0.085***	-0.077**	-0.018	-0.002	-0.009
	(-3.282)	(-3.751)	(-2.353)	(-1.130)	(-0.162)	(-0.688)
Expense Ratio	-1.599	-3.847*	-4.970**	-1.690	-2.699*	-2.580
	(-1.674)	(-2.084)	(-2.715)	(-1.760)	(-1.937)	(-1.693)
Turnover ratio	-0.017	-0.053*	-0.059**	-0.011	-0.027**	-0.029*
	(-1.208)	(-1.836)	(-2.287)	(-1.279)	(-2.293)	(-1.907)
Age	0.012***	0.008	0.004	0.002	-0.001	0.000
	(3.831)	(1.392)	(0.435)	(0.780)	(-0.215)	(0.138)
DepVariable t-1	-0.028***	-0.057***	-0.064***	0.047**	0.029	0.033
	(-3.851)	(-7.189)	(-7.305)	(2.866)	(1.214)	(1.064)
Intercept	1.129***	2.083***	2.187***	0.149	0.263**	0.222
	(8.467)	(13.550)	(11.209)	(0.917)	(2.283)	(1.631)
Observations	10169	4446	4071	10070	4424	4051
Adjusted R^2	0.0857	0.1004	0.1047	0.0252	0.0346	0.0322

Table 4 cont'd

Panel B	Return			Alpha		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	-0.309**	-0.302**	-0.308**	-0.103**	-0.095*	-0.101**
	(-2.176)	(-2.188)	(-2.168)	(-2.552)	(-2.035)	(-2.510)
Combined	-0.366***	-0.362***	-0.365***	-0.080	-0.075	-0.079
	(-3.690)	(-3.742)	(-3.706)	(-1.518)	(-1.520)	(-1.630)
KLD_E	0.201			0.689		
	-0.458			(0.799)		
KLD_S		-1.04			-1.304	
		(-0.547)			(-0.804)	
KLD_G			-0.051			-0.247***
			(-1.672)			(-13.769)
TNA	-0.087***	-0.085***	-0.087***	-0.008	-0.005	-0.007
	(-3.947)	(-3.670)	(-3.942)	(-0.478)	(-0.308)	(-0.416)
Expense Ratio	-3.790*	-3.864*	-3.789*	-2.522	-2.624*	-2.517
	(-2.025)	(-2.074)	(-2.040)	(-1.658)	(-1.776)	(-1.716)
Turnover ratio	-0.051	-0.053*	-0.052	-0.022*	-0.024*	-0.024*
	(-1.730)	(-1.851)	(-1.737)	(-1.925)	(-2.051)	(-2.032)
Age	0.007	0.007	0.007	-0.002	-0.001	-0.001
	-1.337	-1.353	-1.355	(-0.475)	(-0.350)	(-0.402)
Dep Variable t-1	-0.057***	-0.057***	-0.057***	0.033	0.032	0.032
	(-7.265)	(-7.216)	(-7.262)	(1.343)	(1.280)	(1.299)
Intercept	1.995***	2.578**	2.120***	-0.041	0.891	0.431**
	-6.463	-2.693	-13.039	(-0.091)	(1.086)	(2.883)
Observations	4446	4446	4446	4424	4424	4424
Adjusted R^2	0.1004	0.1004	0.1004	0.0322	0.0319	0.0346

Panel C	Return			Alpha		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	-0.278**	-0.278**	-0.277**	-0.043	-0.045	-0.044
	(-2.635)	(-2.665)	(-2.580)	(-0.589)	(-0.628)	(-0.615)
Combined	-0.339***	-0.339***	-0.338***	0.025	0.025	0.024
	(-3.471)	(-3.444)	(-3.388)	(0.273)	(0.276)	(0.259)
Bloom_E	0.000			-0.000		
	(0.248)			(-0.561)		
Bloom_S		-0.000			0.002	
		(-0.008)			(0.642)	
Bloom_G			-0.012			0.010
			(-0.552)			(0.953)
TNA	-0.078**	-0.078**	-0.078**	-0.010	-0.009	-0.009
	(-2.398)	(-2.315)	(-2.387)	(-0.687)	(-0.654)	(-0.683)
Expense Ratio	-4.976**	-4.986**	-5.041**	-2.594	-2.526	-2.536
	(-2.818)	(-2.723)	(-2.810)	(-1.698)	(-1.673)	(-1.679)
Turnover ratio	-0.059**	-0.059**	-0.060**	-0.029*	-0.028*	-0.029*
	(-2.267)	(-2.297)	(-2.297)	(-1.964)	(-1.853)	(-1.891)
Age	0.004	0.004	0.005	0.000	0.000	0.000
	(0.462)	(0.435)	(0.489)	(0.160)	(0.018)	(0.069)
Dep Variable t-1	-0.064***	-0.064***	-0.064***	0.033	0.033	0.033
	(-7.306)	(-7.307)	(-7.336)	(1.062)	(1.063)	(1.063)
Intercept	2.183***	2.190***	3.197	0.229	0.175	-0.677
	(10.899)	(8.188)	(1.723)	(1.664)	(1.396)	(-0.758)
Observations	4071	4071	4071	4051	4051	4051
Adjusted R^2	0.1047	0.1047	0.1047	0.0322	0.0323	0.0325

Table 5 Mutual fund ESG screening strategy and fund flows.

The table presents results for the panel data ordinary least squares (OLS) regressions of monthly net fund flows in dollar amount (Flow, $) and as a percentage of TNA (Flow, %) on ESG fund screening strategy indicator: Positive (Combined) equal 1 if fund portfolio screen strategy is positive (combined) and zero otherwise. Other explanatory variables are lagged mutual fund portfolio KLD and Bloomberg ESG score and lagged funds characteristics: total net assets (TNA), Expense Ratio, portfolio turnover ratio (Turnover), fund age (Age), raw net return (Return), and dependent variable. Panel A reports results for dollar flow (models (1)-(3)) and percentage flow (Models (4)-(6)), with total ESG scores. Panels B and C include E, S, and G pillars for KLD scores and Bloomberg scores, respectively. All models control for a year and fund investment objective (CRSP_obj_cd) fixed effects. The robust standard errors are clustered by the fund. t-statistics are in parentheses. *, **, *** indicate significance at 10, 5, and 1 percent, respectively.

Panel A	Flow, $			Flow, %		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	1.177***	2.810***	2.894***	0.288	0.267	0.201
	(4.593)	(6.480)	(6.066)	(1.183)	(1.207)	(1.240)
Combined	0.810	0.820	0.869**	-0.114	-0.278**	-0.267
	(1.164)	(1.680)	(2.593)	(-0.620)	(-2.196)	(-1.610)
KLD ESG		-0.023			-0.064	
		(-0.068)			(-0.661)	
Bloomberg ESG			0.067			-0.055
			(0.905)			(-0.810)
TNA	0.324**	0.046	-0.090	-0.031	-0.019	-0.060
	(2.430)	(0.102)	(-0.214)	(-0.666)	(-0.399)	(-1.310)
Expense Ratio	-5.600	-14.524	-17.517	-7.089***	-11.185***	-10.167***
	(-1.436)	(-0.914)	(-1.028)	(-4.299)	(-7.798)	(-3.776)
Turnover ratio	-0.106***	-0.236***	-0.247***	-0.008	-0.017	-0.027
	(-5.054)	(-4.857)	(-4.814)	(-0.276)	(-0.571)	(-0.823)
Age	-0.081***	-0.083	-0.076*	-0.040***	-0.047***	-0.044***
	(-3.292)	(-1.511)	(-1.800)	(-3.671)	(-5.407)	(-4.791)
Return	0.013	-0.042	-0.050*	0.034***	-0.001	-0.005
	(1.122)	(-1.712)	(-1.923)	(3.539)	(-0.086)	(-0.302)
Lagged flow	0.636***	0.598***	0.581***	0.391***	0.365***	0.341***
	(32.507)	(24.279)	(38.099)	(11.500)	(10.135)	(9.587)
Intercept	-0.062	1.297	1.940	1.543***	1.997***	2.181***
	(-0.060)	(0.456)	(0.677)	(4.493)	(4.453)	(4.671)
Observations	10070	4424	4051	10070	4424	4051
Adjusted R^2	0.4239	0.4072	0.3743	0.2066	0.2182	0.1905

Table 5 Cont'd.

Panel B	Flow, $			Flow, %		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	2.807***	2.832***	2.807***	0.261	0.268	0.260
	(6.625)	(6.433)	(6.620)	(1.229)	(1.214)	(1.235)
Combined	0.819	0.834	0.819	-0.282**	-0.277**	-0.282**
	(1.708)	(1.710)	(1.703)	(-2.246)	(-2.188)	(-2.249)
KLD_E	0.354			-0.665		
	(0.255)			(-1.006)		
KLD_S		-3.977			-1.357	
		(-0.474)			(-0.516)	
KLD_G			0.069			0.032
			(0.466)			(1.164)
TNA	0.045	0.052	0.045	-0.021	-0.019	-0.021
	(0.098)	(0.115)	(0.098)	(-0.442)	(-0.398)	(-0.459)
Expense Ratio	-14.495	-14.778	-14.504	-11.122***	-11.209***	-11.114***
	(-0.925)	(-0.909)	(-0.925)	(-7.626)	(-7.880)	(-7.662)
Turnover ratio	-0.235***	-0.239***	-0.235***	-0.016	-0.017	-0.015
	(-5.273)	(-5.104)	(-5.337)	(-0.528)	(-0.577)	(-0.502)
Age	-0.083	-0.083	-0.083	-0.046***	-0.047***	-0.047***
	(-1.541)	(-1.511)	(-1.538)	(-5.354)	(-5.484)	(-5.453)
Return	-0.042	-0.042	-0.042	-0.001	-0.001	-0.001
	(-1.715)	(-1.733)	(-1.713)	(-0.076)	(-0.081)	(-0.074)
Lagged flow	0.598***	0.598***	0.598***	0.365***	0.365***	0.366***
	(24.421)	(24.033)	(24.432)	(10.058)	(10.123)	(10.014)
Intercept	1.135	3.170	1.256	2.311***	2.641**	1.982***
	(0.399)	(0.486)	(0.439)	(4.868)	(2.229)	(4.506)
Observations	4424	4424	4424	4424	4424	4424
Adjusted R^2	0.4072	0.4073	0.4072	0.2182	0.2182	0.2181

Table 5 Cont'd.

Panel C	Flow, $			Flow, %		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive	2.896***	2.891***	2.899***	0.199	0.200	0.201
	(3.074)	(3.056)	(3.076)	(1.255)	(1.254)	(1.255)
Combined	0.869	0.867	0.873	-0.267	-0.266	-0.262
	(0.752)	(0.750)	(0.754)	(-1.623)	(-1.615)	(-1.574)
Bloom_E	0.001			-0.001		
	(0.467)			(-0.784)		
Bloom_S		0.007			-0.002	
		(0.460)			(-0.250)	
Bloom_G			-0.027			-0.029
			(-0.487)			(-0.840)
TNA	-0.092	-0.089	-0.092	-0.059	-0.059	-0.059
	(-0.438)	(-0.424)	(-0.441)	(-1.286)	(-1.316)	(-1.271)
Expense Ratio	-17.655**	-17.487**	-17.831**	-10.064***	-10.065***	-10.158***
	(-2.378)	(-2.351)	(-2.416)	(-3.698)	(-3.749)	(-3.814)
Turnover ratio	-0.248***	-0.247***	-0.250***	-0.026	-0.026	-0.027
	(-3.856)	(-3.790)	(-3.860)	(-0.786)	(-0.794)	(-0.798)
Age	-0.075*	-0.076*	-0.074*	-0.044***	-0.044***	-0.044***
	(-1.884)	(-1.860)	(-1.856)	(-4.779)	(-4.992)	(-4.694)
Return	-0.050	-0.050	-0.050	-0.005	-0.005	-0.005
	(-0.941)	(-0.941)	(-0.943)	(-0.301)	(-0.301)	(-0.306)
Lagged flow	0.581***	0.581***	0.581***	0.341***	0.341***	0.340***
	(18.672)	(18.670)	(18.675)	(9.557)	(9.565)	(9.556)
Intercept	1.927	1.785	4.282	2.199***	2.207***	4.665
	(1.340)	(1.279)	(0.911)	(4.782)	(4.881)	(1.622)
Observations	4051	4051	4051	3145	3145	7347
Adjusted R^2	0.3743	0.3743	0.3743	0.1837	0.1847	0.0941

Appendix

Table A1. Prospectuses' samples of ESG funds with negative, positive, and combined screening

Negative screen strategy **Delaware Group Equity Funds II – Social Awareness Fund** In addition, as a matter of non-fundamental policy, Delaware Social Awareness Fund will adhere to a Social Criteria strategy: The Manager will utilize the Social Investment Database published by KLD in determining whether a company is engaged in any activity precluded by the Fund's Social Criteria. The Social Investment Database reflects KLD's determination of the extent to which a company's involvement in the activities prohibited by the Social Criteria is significant enough to merit a concern or a major concern. Significance may be determined on the basis of percentage of revenue generated by, or the size of the operations attributable to, activities related to such Social Criteria, or other factors selected by KLD. The social screening undergoes continual refinement and modification. Pursuant to the Social Criteria presently in effect, the Fund will not knowingly invest in or hold securities of companies which engage in: 1. Activities which result or are likely to result in damage to the natural environment; 2. The production of nuclear power, the design or construction of nuclear power plants, or the manufacture of equipment for the production of nuclear power; 3. The manufacture of, or contracting for, military weapons; 4. The alcoholic beverage, tobacco or gambling industries; or 5. Conducting animal testing for cosmetic or personal care products.
Positive screen strategy **FundX Investment Trust – FundX Sustainable Impact Fund** Principal Investment Strategies The Sustainable Impact Fund is a fund-of-funds, which invests in mutual funds and ETFs ("Underlying Funds"). Sustainable impact investing incorporates non-financial performance indicators that measure a company's management of risks associated with environmental sustainability, social concerns, and corporate governance ("ESG Factors") in an effort to generate long-term competitive investment performance and positive societal impact. <…> The Sustainable Impact Fund seeks to invest substantially all and, under normal circumstances, at least 80% of its net assets, plus borrowings for investment purposes, in sustainable impact investments. Sustainable impact investments are the following: • Underlying Funds that self-identify as socially responsible impact ("SRI") funds or environmental, social and governance ("ESG") funds (collectively, "ESG Funds"); and • Underlying Funds that have a better-than-average Portfolio Sustainability Rating ("Sustainability Rating"), as calculated by Morningstar , as described below. ESG Funds: The Advisor employs a process of assessing Underlying Funds that self-identify as ESG Funds. The Advisor reviews an Underlying Fund's policies, actions and effectiveness with respect to the Underlying Fund's use of proxy votes and access to corporate management. The Advisor evaluates how an Underlying Fund uses proxy votes and access to corporate management to improve resource utilization, reign in excessive executive compensation, address climate change and other environmental, social and governance concerns. This process may include interviews with an Underlying Fund's management and an examination of an Underlying Fund's proxy voting records, prospectus and other published reports. The Advisor approves a select group of these ESG Funds for potential inclusion in the Sustainable Impact Fund's portfolio regardless of their ESG Rating. <…> The Advisor uses the data provided by Morningstar to screen Underlying Funds and identify those that have a base currency in U.S. dollars and have a better-than-average Sustainability Rating.
Combined screen strategy **Epiphany funds - Epiphany FFV Fund** The screening criteria of FFV Scorecard® is based on the principals of Biblically Responsible Investing and the moral and social justice teachings of the Catholic Church as outlined by the U.S. Conference of Catholic Bishops Socially Responsible Investment Guidelines. The criteria are reviewed from time to time by Trinity's Advisory Board. According to the FFV Scorecard®, companies will generally be excluded that are known to: - Directly participate in abortion; - Manufacture contraceptives; - Produce pornographic media content; - Engage in scientific research on human fetuses or embryos; - Have recent material fines or legal judgments relating to employee discrimination or human rights abuses, employee health or safety or environmental violations; - Manufacture nuclear weapons, biological or chemical weapons, indiscriminate weapons of mass destruction or anti-personnel landmines; - Use company assets to advocate for or against any of the issues listed above as well as other political issues that are not directly related to the company's primary service or product. Eligible companies are further evaluated and an assessment is made concerning their record on human rights, environment and corporate governance, **both positive and negative**. The FFV Scorecard® is designed to measure a company's impact on people, communities and the market and is an integral part of the investment process.