Rotterdam School of Management
Erasmus University

Erasmus Platform for Sustainable Value Creation

Working paper

Sustainability preferences under stress

Evidence from mutual fund flows during COVID-19

Robin Döttling & Sehoon Kim

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Robin Döttling
Rotterdam School of Management, Erasmus University
Erasmus Platform for Sustainable Value Creation

Sehoon Kim
Warrington College of Business, University of Florida

Executive summary

Recent academic research has increasingly focused on sustainable investing. However, little is known about the rationale for sustainable investing, and how fragile investor ESG preference could be during economic downturns and recessions. This study aims to fill this gap by investigating how ESG preferences respond to the outbreak of the novel coronavirus and the subsequent economic crisis that began in February 2020.

Changes in the dynamics of retail fund flows

The COVID-19 shock is a useful laboratory to study shifts in preferences for sustainable investments, as it is an unexpected shock that has triggered the first major economic crisis of its magnitude since the substantial growth in sustainable investing in recent years. Using this shock, we analyze investments by retail investors into U.S. open-end equity mutual funds, using data on fund flows and sustainability ratings from Morningstar.

While funds with high Morningstar sustainability ratings (i.e., high ESG funds) receive higher than average weekly retail fund flows prior to the COVID-19 crisis, these relatively high flows disappear after the onset of the pandemic-induced market crash that began during the week of February 22. As a result, high ESG flows converge to the level of funds with low sustainability ratings. This shift in preferences persists not only during the market crash weeks between February 22 and March 21, but also during the weeks between March 28 and April 25, when the stock market rebounds but economic conditions continue to deteriorate.

Our results are not driven by investment style, time effects, fund size or age, star ratings, past returns, or investors buying the dip during the crash. While we are unable to fully rule out explanations based on time varying growth expectations coinciding with the COVID-19 crisis, our results are most consistent with models in which investor decisions incorporate preference or taste for ESG, a perceived luxury good that investors no longer find affordable under financial and economic stress induced by the COVID-19 shock. This interpretation is supported by internet search traffic data that shows falling interest in sustainability topics and rising interest in economic topics during the pandemic.

The fragility of retail SRI preferences

To shed more light on why retail investor preferences may have shifted away from sustainable investments in response to the COVID-19 crisis, we contrast our main results based on retail flows with those based on institutional flows.

In contrast to retail flows, institutional flows to high ESG funds do not decline disproportionately during the COVID-19 crisis and remain higher compared to low ESG institutional fund flows throughout both the market crash and subsequent rebound. These differences support our interpretation of a preference shift away from sustainability by retail investors driven by economic distress. Many institutional investors have a strong public commitment to ESG, have deeper pockets than retail investors, and are more sophisticated in their investment strategies. For these reasons, institutional investors are more likely to continue making sustainable investments during an economic downturn, and are less susceptible to an economic shock-driven preference shift.

To further corroborate our results, we explore sample extensions to non-US funds and reopening periods in May and June. Across the world, high ESG funds suffer a similar drop in retail flows, indicating that the main results are not driven by US-specific factors, and consistent with a universal shift in retail preferences in response to a global economic shock. We also find that high ESG fund flows recover in May and June, after lockdowns are lifted in many U.S. states and unemployment begins to stabilize, underlining the role of economic distress driving shifts in sustainability preferences.

E-mail addresses: doettling@rsm.nl & sehoon.kim@warrington.ufl.edu
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Abstract

We investigate investor ESG preferences during economic distress revealed by US retail mutual fund flows. Using the COVID-19 pandemic as an unexpected shock to the economy, we show that "high ESG" funds with five-globe Morningstar sustainability ratings – which receive higher than average fund flows during normal times – experience a sharper decline in flows compared to other funds during the crisis. Consequently, high and low ESG fund flows converge as a percentage of assets under management. This effect is significant not only during the market crash weeks between February 22 and March 21, but also during the post-stimulus recovery weeks between March 28 and April 25. The results are not driven by style, time effects, fund size or age, star ratings, past returns, or investors buying the dip during the crash. Based on markedly different responses by institutional fund flows, our results are consistent with a shift in sustainability preference among retail investors under economic distress. We corroborate our findings with an inspection of internet search traffic data that shows falling interest in sustainability topics during the pandemic, as well as sample extensions covering non-US funds and state reopening periods. Our study highlights retail ESG fund flows as a potential source of fragility for sustainable investing.

Keywords: COVID-19, Mutual Fund Flows, Sustainable Investing, ESG, SRI
JEL classifications: D62, G11, G14, G23, G41, I10, M14

1 Introduction

Sustainable investing has been one of the fastest growing areas in the asset management industry, and also one of the most heatedly debated investment strategies over the recent decade.[1] While industry leaders have risen as vocal proponents of sustainability, regulatory authorities have been eyeing their investment criteria and applications with scrutiny.[2] It is no surprise that recent academic research has increasingly focused on understanding investor preference for sustainable investments and their performance. While much of the current understanding of investor ESG preference is in its infancy, particularly little is known about its behavior during economic downturns and recessions, partly due to the short history of its buoyancy. Our study aims to fill this important gap by investigating the fragility or "sustainability" of ESG preference revealed by retail mutual fund flows in the face of a large economic shock.

As an ideal setting to study this question, we focus on the outbreak of the novel coronavirus and the subsequent economic crisis that began in February 2020 to study the impact of a sharp and unexpected deterioration in economic and market conditions on retail mutual fund flows. The COVID-19 shock is particularly meaningful as a laboratory to study preference for sustainable investments, as it has triggered the first major economic crisis of its magnitude and importance since the substantial growth in sustainable investing in recent years.[3] Using this shock, we study the response of investments by retail investors in sustainable mutual funds as a measure of revealed preference for sustainability, motivated by previous findings that retail investors actively reallocate capital across different funds and are

[1] According to its biannual trend report, US SIF Foundation reported that US sustainable investments stood at $12 trillion as of 2018, nearly 38% higher compared to 2016 and over five-fold compared to 2010.

[2] In January, 2020, BlackRock CEO Larry Fink issued a letter committing to take a tougher stance on companies regarding their climate risk disclosures (see WSJ article "BlackRock to hold companies and itself to higher standards on climate risk", January, 2020). The SEC, on the other hand, has been scrutinizing asset managers touting sustainable investment products, investigating firms for concrete information on ESG criteria and how they are applied to investment recommendations and selections (see WSJ article "ESG funds draw SEC scrutiny", December, 2019).

[3] See Baker et al. (2020) and Ramelli and Wagner (2020), for example, for recent studies documenting the exogenous and unprecedented nature of the COVID-19 shock

reactive to shifts in sentiment and preference (see Frazzini and Lamont, 2008; Del Guercio and Tkac, 2008; Ben-Rephael et al., 2012; Wang and Young, 2020; Ceccarelli et al., 2020). Retail investors are also economically important, dominating the mutual fund space both in terms of total net assets (i.e., over 61% of aggregate net assets) and dollar net flows (i.e., on average, close to 80% of aggregate absolute net flows).[4] While recently popularized descriptive evidence of aggregate quarterly fund flows during COVID-19 suggests continued SRI demand, the same is yet to be shown in comprehensive quasi-experimental analysis on a granular time scale within and across specific investor classes.[5]

In a difference-in-differences framework using retail fund flow and sustainability rating data from Morningstar, we find that investor preference for sustainability significantly weakens under economic and market stress. While funds with high Morningstar sustainability ratings (i.e., high ESG funds) receive higher than average weekly retail fund flows prior to the COVID-19 crisis − consistent with Hartzmark and Sussman (2019) and Ceccarelli et al. (2020) −, these relatively high flows disappear after the onset of the pandemic-induced market crash that began during the week of February 22. In fact, high ESG funds are significantly more likely to see net retail outflows than the average fund during the COVID-19 crisis period compared to before. Moreover, this shift in flow persists into the weeks from March 28 to April 25, when the market rebounded dramatically while the economy continued to deteriorate after the US stimulus package was announced on March 23. Our main result is illustrated in Figure 1, where we plot weekly average retail fund flows over the sample period from January 4 to April 25 for funds with different sustainability ratings.

We hypothesize that this key result is driven by shifts in investor preferences or attention away from sustainable investments in the face of financial and economic stress, and explore potential channels that may alternatively explain our finding. We find supporting evidence of shifts in internet search traffic from topics related to sustainability to topics related to the economy, consistent with our hypothesis (see Figure 3). We exclude expla-

[4]See Figure A.1

[5]See Morningstar 2020 Q1/Q2 reports and media coverage (e.g., CNBC, FT) on these reports.

nations based on conventional factors that are known to explain fund flows, such as fund style, age, size, expense ratios, past returns, Morningstar star ratings, and common trends by directly controlling for a host of variables, including a rich combination of fixed effects, and ensuring robustness to adjusting flows for heterogeneity in fund size. We also show the results are robust within and across fund quintiles formed on risk-adjusted past returns or past flows, further solidifying that they are not driven by ex-ante differences in performance or popularity across funds with different sustainability ratings. Furthermore, we contrast the persistent decline of flows to sustainable funds during both the post-COVID crash and rebound periods with their transitory outperformance during the crash and their subsequent underperformance during the rebound, indicating that "buying the dip" behavior or increased risk tolerance are unlikely to fully explain our results. From recent evidence showing ESG stock return resilience to the COVID-19 market downturn (see Albuquerque et al., 2020; Ding et al., 2020), we also conjecture that increased risk aversion is not a likely driver for our findings. Overall, we find our evidence consistent with non-financial motivations for sustainable investments by retail investors that are adversely impacted by a large economic shock.

To shed more light on why retail investor preferences may have shifted away from sustainable investments in response to the COVID-19 crisis, we contrast our main results based on retail flows with those based on institutional flows. Differences between mutual fund investment behavior by retail and institutional investors provide important clues to explaining retail flow responses. For example, institutional share classes of mutual funds are sold with high minimum investment requirements (e.g., $200,000 or more) to institutional investors who are more sophisticated and less financially constrained compared to retail investors, and typically have substantially lower expense ratios. Consistent with institutional investors acting as sophisticated monitors, Evans and Fahlenbrach (2012) show that twin funds offered to both retail and institutional investors perform better. Moreover, institutional investors are likely to have strong ESG mandates, drive corporate social responsibility and ESG dis-

closures, and perform ESG shareholder engagements (see Dyck et al., 2019; Krueger et al., 2020; Hoepner et al., 2020; Ilhan et al., 2020; Barko et al., 2018).[6] Such investors are less likely to shift flows away from sustainable investments in response to market signals (see Cao et al., 2020). Finally, institutional mutual fund flows include investments by 401(k) participants who exhibit lower investment turnover rates than retail mutual fund investors (see Blanchett et al., 2020).

Consistent with these previously documented differences, we find that institutional flows into high ESG funds do not show sharp reductions in response to the COVID-19 shock, in contrast to retail flows. In fact, we find that institutional flows drop sharply but temporarily during the early crash period only for low ESG funds. These results further indicate that our evidence on retail flows are consistent with a shift away from sustainability preference, a perceived luxury good that investors no longer find affordable under financial and economic stress induced by the COVID-19 shock.

While we are unable to fully rule out explanations based on time varying growth expectations coinciding with the COVID-19 crisis, it must not only be true that such shifts are negatively correlated between high and low sustainability assets, but also that they differ significantly across retail and institutional investors for such explanations to fully account for our results. Our findings are also not inconsistent with an attention-based explanation where retail investors become less cognizant of sustainability under a much more salient shock. However, the results are most consistent with models in which the investor's decision incorporates preference or taste for ESG (see Pastor et al., 2020; Pedersen et al., 2020), suggesting that the pursuit of such taste is not costless and subject to financial constraints.

To further generalize our US-based findings, we extend our sample to include non-US open-end funds, and show that our results are robust across different geographical subsamples including Europe, all regions outside the US, and the full global sample as well. In addition,

[6]Many institutional investors make ESG commitments publicly, for example by becoming signatories for the Principles for Responsible Investment (PRI), the world's leading network of proponents of responsible investing (see Gibson et al., 2020).

we also extend our sample period beyond the four month window around the onset of the COVID-19 crisis, including subsequent months after April (i.e., May and June 2020) when the crisis evolved amid state reopenings. While the main sample period covering the first few months of the crisis is more useful for identifying the impact of an unexpected economic shock, this additional extension helps us further delineate the ESG preference shift channel driven by economic strain. Consistent with this channel, we find that funds with high sustainability ratings recover their fund flows during these later months when economies start to reopen and employment begins to stabilize.[7]

Our study is closely related to the growing literature on socially responsible investments (SRI) in mutual funds that has evolved around the debate on whether sustainable investment flows are driven by financial or non-pecuniary objectives. Many studies have recently presented evidence supporting the latter, for example that sustainable fund flows are less volatile and less sensitive to past negative returns (see Bollen, 2007; Renneboog et al., 2011), that social preferences and signals outweigh financial motives in SRI decisions (see Riedl and Smeets, 2017; Bauer et al., 2020), and that salient information on sustainability attracts flows (see Hartzmark and Sussman, 2019; Ceccarelli et al., 2020). We contribute to this line of work by highlighting the importance of market stress and economic uncertainty in the sustainability of such SRI preferences. In this context, contemporaneous work demonstrates that investors in aggregate seem to continue valuing sustainability after the COVID-19 shock (see Pastor and Vorsatz, 2020). Our findings complement this study by emphasizing the implications of important investor heterogeneity, namely that retail investor preferences for sustainability are more fragile than institutional preferences.[8]

Our work also contributes to the broader literature on corporate social responsibility, which has highlighted the role of social capital in mitigating firm downside risk (see Lins et al., 2017; Albuquerque et al., 2019). In particular, a number of recent studies document that

[7] See monthly total non-farm employment reported by US Bureau of Labor Statistics.

[8] Consistent with our results, another contemporary study by Glossner et al. (2020) documents that retail stock investors invest very differently from institutional investors during the COVID-19 crash, in particular exhibiting reduced interest in environmental and social stocks.

stocks of firms with higher ESG ratings and CSR activities experience relatively less negative returns during the COVID-19 market crash (see Albuquerque et al., 2020; Ding et al., 2020), as do funds with higher sustainability ratings (see Pastor and Vorsatz, 2020). In particular, Albuquerque et al. (2020) show that a customer loyalty channel explains the return resilience of ESG stocks. Building on these findings, our results can be interpreted as an investor preference channel that is driven by a shift in taste, and highlights the non-pecuniary motives for sustainable investing by retail investors and their responses to constraints imposed by market stress and uncertainty.

Finally, our study provides a stepping stone to understanding investor preferences for sustainable investments. In particular, our results highlight a source of fragility in ESG preference stemming from retail investors. A long-term implication of our finding is a potentially broader shift in investor preferences under prolonged economic distress, due to potential externalities from retail flows that may impede the efficacy of institutional ESG ownership and engagement.[9] Our work underscores the importance of studies of optimal SRI systems under scarce socially responsible capital, heterogeneous investors, and time-varying preferences (see Pastor et al., 2020; Pedersen et al., 2020; Oehmke and Opp, 2020; Humphrey et al., 2020).

The remainder of the paper is organized as follows. In the following section, we begin with a brief overview of our setting, the COVID-19 crisis, and how it relates to our study. Next, we describe the construction of our sample and variables. We then present our main results as well as additional analysis, and provide our interpretations. Finally, we conclude with a summary of our study and brief discussion.

2 The COVID-19 Crisis

In early 2020, the coronavirus pandemic, or COVID-19, brought a major shock to the global stock market and economy. Within a few months, what started in January as a regional

[9]Consistent with this idea, Albuquerque et al. (2020) find only a weak relationship between institutional ESG preferences and ESG stock resiliency during COVID-19.

health crisis in Wuhan, China, spread into a global crisis, disrupting the real economy and financial markets with unprecedented speed, and culminating in a stock market crash that began on February 20 (see Baker et al., 2020; Ramelli and Wagner, 2020). Over the past several months, numerous studies have shown the substantial impact of COVID-19 on asset prices and investor expectations in great detail, both during the market crash and after stimulus policy interventions announced on March 23 (see Alfaro et al., 2020; Croce et al., 2020; Fahlenbrach et al., 2020; Giglio et al., 2020; Gormsen and Koijen, 2020).

In the face of such turmoil, the implications of the COVID-19 crisis on ESG investing − one of the fastest growing investment areas in recent years − have garnered much attention in the media and among practitioners. Given the ramifications of the COVID-19 pandemic for healthcare and labor as well as the contemporaneous rise in social unrest, many anticipate an even faster growth in sustainable investing in the post-COVID era.[10] Some recent evidence supports this idea, for example that socially responsible stocks and mutual funds have outperformed others during the crisis (see Albuquerque et al., 2020; Ding et al., 2020; Ferriani and Natoli, 2020; Pastor and Vorsatz, 2020). However, we hypothesize that the unique nature of the COVID-19 crisis has adverse implications for sustainable preferences by retail mutual fund investors, who comprise a significant fraction of the investor base for mutual funds (see Figure A.1).

One of the most unique aspects of the COVID-19 crisis, in contrast to previous financial crises such as the great recession of 2008, is that it originated outside the financial sector and had an immediate impact on the real economy by directly affecting consumption and therefore business revenues through quarantines and lockdowns (see Baker et al., 2020a; Fahlenbrach et al., 2020; Horvath et al., 2020). Consequently, it affected employment demand in the labor market, resulting in job losses from layoffs and furloughs (see Cajner et al., 2020; Coibion et al., 2020b; Forsythe et al., 2020; Cajner et al., 2020). In turn, consumers experienced substantial income and wealth shocks, which further impacted their consumption

[10]See comments by industry leaders such as BlackRock, JPMorgan, Morgan Stanley, and UBS. Also see media coverage by CNBC, Forbes, the Wall Street Journal, and Morningstar Q1/Q2 reports.

behavior as well as expectations about future employment and consumption (see Baker et al., 2020b; Coibion et al., 2020a; Granja et al., 2020; Hanspal et al., 2020). It has been widely documented that consumers curtailed spending most dramatically in non-essential areas such as travel and clothing. All the while, perceived economic uncertainty, which skyrocketed early during the crisis, remained at historically high levels (see Altig et al., 2020).

An important implication of the nature of the COVID-19 shock is that it heavily affects preferences for costly goods with benefits that are not deemed essential. It therefore provides a laboratory for testing whether retail investors view sustainable investments as luxury goods reflecting their social values, rather than necessities or financially motivated investments, and whether the crisis dampens investor appetite for such investments. One would expect a large and negative impact on flows into such non-financially driven investments, especially given the disproportionate impact of COVID-19 on the job losses of gender and racial minorities who are more likely than others to carry such social values (see Fairlie et al., 2020; Montenovo et al., 2020). On the other hand, if investors value sustainable investments for financial reasons, such as their resilience against downside risk (see Albuquerque et al., 2020; Ding et al., 2020), one would expect that investors would invest even more rather than withdraw from SRI in response to the crisis.

To examine these predictions regarding the impact of the COVID-19 shock, we focus on the response of retail mutual fund flows as a proxy for investor appetite for socially responsible investments. In the following section, we describe how we collect our data and construct our sample.

3 Data and Sample Overview

3.1 Data

We obtain data for all open-end domestic US equity mutual funds from a survivorship-bias-free database provided by Morningstar Direct, which contains a rich array of information on

funds such as fund flows, returns, net assets, expense ratios, Morningstar star ratings, and most importantly, Morningstar sustainability ratings. To construct our sample, we begin with all funds during the period from January 2019 to April 2020. We first collect daily data on fund returns, total net assets, and dollar net flows, and aggregate them to weekly values to reduce noise in the daily series by taking the latest total net asset value of the week and summing returns and net flows over the week. We also compute prior month's and previous 12 months' returns, as well as Fama and French (2015) five-factor adjusted alphas over 12 month rolling windows. We also obtain information on the fund's Morningstar global category, star rating, age (i.e., years since inception date), expense ratio, and an indicator variable for whether the fund share class is offered to institutional investors.

Important to our analysis is the measurement of the perceived sustainability of funds by investors. We rely on the Morningstar sustainability rating, a monthly reported moving average of the trailing 12 months' portfolio level sustainability score, computed as the weighted average of firm level ESG Risk Ratings provided by Sustainalytics.[11] Morningstar assigns funds a discrete "globe rating", which ranges from one globe (lowest sustainability) up to five globes (highest sustainability).[12] This sustainability rating, which was introduced in 2016, is prominently displayed to investors in Morningstar's reports and has been shown to attract fund flows (see Hartzmark and Sussman, 2019). We identify funds with five globes as a "high ESG fund" and funds with one globe as a "low ESG fund". We also collect information on the previous 12 months' historical sustainability score, which is the continuous score used to assign the discrete globe ratings.

As additional measures of fund sustainability to validate the globe ratings, we also obtain a host of alternative variables including the fund's ESG Risk percentage ranking within its global category across each of its environmental, social, and governance aspects. In addition, we collect indicator variables for whether the fund has explicit mandates related

[11] Sustainalytics ESG Risk Ratings measure a firm's unmanaged exposure to ESG risks, such that firms with better ESG practices and less controversial business models obtain better scores. See Sustainalytics website.

[12] See Morningstar Sustainability Rating Methodology.

to various aspects of sustainable investing, such as environmental concerns, carbon footprint reduction, renewable energy, gender issues, community development, or ESG shareholder engagement. We use these dummy variables as well as fund names to identify whether funds have "ESG prospectuses".[13] We additionally source data on Morningstar low carbon designations, which are based on historical portfolio fossil fuel involvement and carbon risk scores from Sustainalytics (see Ceccarelli et al., 2020).

To arrive at our main sample, we apply a number of screens to the data. We first retain funds that have at least one non-missing daily flow value during a given week. Following Kacperczyk et al. (2014) and Franzoni and Schmalz (2017), we further exclude funds that hold less than 80% of their assets in stocks in the previous quarter to remove balanced funds, and also drop funds with less than $5 million in assets under management at the end of the previous week to avoid incubation bias. For funds that have multiple share classes, we aggregate the data and retain one observation per fund-week (see Kacperczyk et al., 2014; Hartzmark and Sussman, 2019). Total net assets and dollar net flows are summed across share classes. Returns are computed as the weighted average, weighted by the previous week's share level net assets. Expense ratio, prior month's and previous 12 months' returns, and alphas are calculated as their means. The fund's global category and age are based on the oldest share class. Morningstar star ratings, sustainability ratings, and other sustainability metrics are those of the largest share class. If the fund offers both retail and institutional share classes, we aggregate share level information for each of the retail and institutional classes, and treat them as two separate funds (i.e., one retail fund and one institutional fund). All continuous variables are winsorized at the extreme 1% levels to remove the effects of outliers. After retaining funds with valid Morningstar sustainability ratings, our final sample consists of 2,720 retail funds and 2,421 institutional funds over the period from the week ending January 4, 2020 to the week ending April 25, 2020. The main focus of our study throughout the paper is on the sample of retail mutual funds.

[13] We flag funds with names that include the following strings: "SUSTAIN", "GREEN", "ESG", "CSR", "RESPONSIB", "CLIMATE", "WARMING", "ENVIRONMENT", "SOCIAL", and "GOVERNANCE".

3.2 Sample Overview and Preliminary Results

Table 1 provides a summary of our sample of retail mutual funds. Our main variable is net flow, which is computed weekly as the percentage of dollar net flows as a fraction of the fund's total net assets in the previous week. Alternatively, normalized net flow is constructed as the percentage ranking of flows of a fund within its fund size sorted decile in a given week, and is used to ensure robustness against noise and outliers in raw net flows, as well as to systematic heterogeneities in flows across funds with different size (see Spiegel and Zhang, 2013; Hartzmark and Sussman, 2019).

Panel A describes how the data is distributed. Panel B breaks down the sample of funds into groups according to their Morningstar sustainability ratings: High (5 globes), above average (4 globles), average (3 globes), below average (2 globes), and low (1 globe). For each sustainability ranking, the mean for each variable is shown at the top of the panel. We also report the difference of means between high and low sustainability funds for each variable, along with the t-statistic associated with the difference. The high−low spreads are shown for the full sample period from the week ending January 4 to the week ending April 25, and for three sub-periods: The "pre-COVID" period which starts at the beginning of the year and ends in the week prior to the onset of the stock market crash on February 20; the "post-COVID crash" period from the week of February 20 to March 21 before the approval of the COVID-19 stimulus package by the US government; and the "post-COVID stimulus" period after the announcement of the coronavirus rescue package.

Unconditionally, high ESG funds tend to attract higher weekly fund flows compared to low ESG funds, consistent with Hartzmark and Sussman (2019). High ESG funds also have superior past performance, based on prior month's returns, average monthly returns during the previous 12 months, risk-adjusted monthly returns based on Fama and French (2015) five-factor alphas over the previous 12 months, or Morningstar star ratings. Compared to low ESG funds, high ESG funds also tend to be smaller in size, cheaper in terms of expenses, and younger in age. Consistent with their status as socially responsible funds and validating

the globe ratings as measures of fund sustainability, high ESG funds rank lower in their ESG risk scores within their Morningstar global categories, particularly on environmental aspects, and are more likely to state ESG mandates in their prospectuses or fund names and have low carbon designations from Morningstar.

Among the ex-ante distinctions between high and low sustainability funds, their flow differentials disappear after the beginning of the market crash induced by the COVID-19 breakout, while other characteristics maintain the direction and significance of their differences. For example, high ESG funds receive 0.2 percentage point greater net flows per week compared to low ESG funds prior to the COVID-19 shock, significant with a t-statistic of 5.8. However, the difference becomes indistinguishable from zero, both economically and statistically, after the market crash begins in the week of February 20. This marked shift in net flow also persists into the post-COVID period after the stimulus package approval. The same pattern is observed based on normalized net flows as well.

This key preliminary result is cleanly illustrated in Figure 1, where we plot weekly average (a) net flows and (b) normalized net flows of retail funds with high, average, and low sustainability ratings as of December 2019. Parallel flow trends across sustainability rating groups prior to the shock and the effects of the shock in the post-COVID periods are clearly observed.[14]

Overall, the preliminary findings suggest a clear shift in investor preference away from socially responsible funds among retail mutual fund investors. This interpretation of a change in "taste" is all the more bolstered by the fact that the positive high−low sustainability return spread widens even more after the onset of the crisis, consistent with ESG return resilience (see Albuquerque et al., 2020). In the next section, we investigate this channel and other potential explanations more rigorously in difference-in-differences analyses with a host of controls and fixed effects.

[14]Qualitatively similar patterns are observed in weekly weighted-average retail fund flows (see Figure A.2).

4 Results

4.1 Main Results

To test whether flows into funds with higher sustainability ratings are disproportionately affected by the COVID-19 crisis, we estimate the following difference-in-differences specification:

$$\begin{aligned} Flow_{i,t} = \beta_1 \cdot HighESG_i \times COVID_t + \beta_2 \cdot LowESG_i \times COVID_t \\ + \beta_3 \cdot HighESG_i + \beta_4 \cdot LowESG_i + \gamma' \cdot X_{i,t} + \mu_{j,t} + \eta_{y,t} + \epsilon_{i,t} \end{aligned} \tag{1}$$

The dependent variable, $Flow_{i,t}$, is either net flow or normalized net flow of fund i in week t. $HighESG_i$ and $LowESG_i$ are dummies that indicate whether a fund has a high (= 5 globes) or low (= 1 globe) sustainability rating as of December 2019, respectively.[15] The key parameters of interest are β_1 and β_2, which capture the interaction effects of the ESG ratings with a dummy $COVID_t$ that is equal to 1 starting in the week ending on February 22 and 0 otherwise. These coefficients estimate how much more flows high or low sustainability funds receive after the onset of the COVID-19 shock relative to before, as compared to the average fund. The vector $X_{i,t}$ collects fund-level controls (past returns, log of total net assets, expense ratio, and star rating upgrades and downgrades). We control for a fund's age, style and group-specific time effects by including vintage year-by-week fixed effects $\eta_{y,t}$, as well as fund category-by-week fixed effects $\mu_{j,t}$.

Table 2 presents results from estimating Equation (1). Columns 1−5 in Panel A report results from regressions with net flows as the dependent variable, while results with normalized net flows are reported in columns 6−10. The main parameter of interest are the interaction terms $HighESG \times COVID$ and $LowESG \times COVID$. Across specifications, we find a negative and statistically significant coefficient on $HighESG \times COVID$, indicating

[15] Sustainability ratings are relatively sticky, consistent with Hartzmark and Sussman (2019), and the results are robust to using a fund's sustainability rating lagged by one month.

that mutual funds with the highest sustainability rating receive lower net inflows during the COVID crisis compared to pre-COVID, relative to funds with average ratings. In the main sample (i.e., columns 2−4), the estimates imply approximately 0.2 percentage point lower weekly net flows for high ESG funds. Given flows are measured at weekly frequency and relative to total net assets, this is an economically large effect. Column 1 shows a slightly smaller but relatively similar-in-magnitude point estimate when comparing post-COVID flows to a longer pre-COVID period starting in November 2019. Interpreted together with the coefficient on $HighESG$, the results suggest that high ESG funds lose their luster during the COVID crisis. In contrast, the coefficient on $LowESG \times COVID$ is economically and statistically indistinguishable from zero, indicating that the COVID-19 shock asymmetrically impacts flows to high ESG funds.

By directly controlling for their interactions with the COVID dummy, columns 3−5 show that the results are not driven by differences in factors such as past returns or Morningstar star ratings, which are known to be important determinants of retail investment flows (see Sirri and Tufano, 1998; Del Guercio and Tkac, 2008; Pastor and Vorsatz, 2020). In column 3, past returns are measured over the previous month, while columns 4 and 5 consider past 12-month returns. Column 4 includes star rating levels rather than upgrades and downgrades, and column 5 also includes interactions of the star rating with the COVID dummy.

In Panel B of Table 2, we further split the COVID period into two sub-periods to disentangle responses during the market crash period from February 22 to March 21, when the S&P 500 declined in value by more than 30%, from the subsequent market rebound through April 25 following the passing of the CARES Act on March 23 that provided a $2.2 trillion stimulus to the US economy. The results in Panel B show that the drop in net flows into high ESG funds relative to other funds persists during both the crash and the stimulus period, consistent with a fundamental shift in retail preference for sustainability that is not merely driven by the ubiquitous selloff during the market crash.

Fund Flow Dynamics Around the COVID-19 Shock

Table 3 complements the difference-in-differences results with the following OLS regressions of net flows on sustainability ratings, splitting the sample into different sub-periods to examine the dynamics of relative flows across different sustainability fund groups.

$$Flow_{i,t} = \beta_1 \cdot HighESG_i + \beta_2 \cdot AboveAvgESG_i + \beta_3 \cdot BelowAvgESG_i + \beta_4 \cdot LowESG_i + \gamma' \cdot X_{i,t} + \mu_{j,t} + \eta_{y,t} + \epsilon_{i,t} \tag{2}$$

Columns 1 and 2 show that, compared to average (i.e., 3 globes) funds, high ESG funds received relatively higher weekly net flows of $0.11-0.16$ percentage points during the pre-COVID period, consistent with previous findings that socially responsible funds attract more flows (see Hartzmark and Sussman, 2019). In contrast, columns 3 and 4 show that the high ESG dummy is statistically insignificant with a negative point estimate during both the post-COVID crash and stimulus periods. These patterns are consistent with those in Figure 1 and highlight the disappearance of the fund flow advantages of high ESG funds. Columns $6-8$ show that this conclusion is robust to using normalized net flows. Illustrating this in more granular fashion, Figure 2 presents the coefficients on $HighESG$ and $LowESG$ (i.e., β_1 and β_4) from week-by-week estimations of Equation (2).[16] The weekly coefficients depict a similar trend as described above and as aforementioned in Figure 1.

Further corroborating the fund flow dynamics, we estimate the effects of the COVID-19 shock on funds within a given sustainability rating group, by splitting the sample globe by globe and running the following regression of net flows on an indicator for the post-COVID period without week fixed effects.

$$Flow_{i,t} = \beta_1 \cdot COVID_t + \gamma' \cdot X_{i,t} + \mu_j + \eta_y + \epsilon_{i,t} \tag{3}$$

[16] Table A.1 tabulates the week-by-week regression results. Category-by-week and vintage year-by-week fixed effects are loosened to category and vintage year fixed effects, respectively.

Table 4 presents these results. The full-sample estimates in column 1 of Panel A show a 0.22 percentage point drop in weekly flows for the average fund, unconditional of their sustainability rating, indicating an overall decline in fund flows after COVID-19 hit. Columns 2−6 display a remarkably monotonic pattern when splitting the sample by globe rating: The COVID-19 shock has the strongest effect on flows to high ESG funds with five globes (i.e., −0.36 percentage points per week), the second strongest effect on above average ESG funds (i.e., −0.32 percentage points), followed by the third strongest on average funds (i.e., −0.19 percentage points), the second smallest on below average funds (i.e., −0.18 percentage points) and the weakest effect on low ESG funds with one globe rating (i.e, −0.16 percentage points).

Panel B of Table 4 enriches this exercise with separate dummies for the crash and stimulus post-COVID sub-periods. As shown in column 1, weekly flows for the average fund drop by 0.21 percentage points during the crash period, but strongly recover during the post-stimulus market rebound, with flows of 0.21 percentage points higher compared to the pre-COVID period.[17] Columns 2−6 estimate these effects separately for funds in each globe rating group. The most striking fact is that high ESG funds not only suffer the largest drop in flows during the crash, but also experience the weakest recovery relative to their pre-COVID levels. In fact, high ESG fund flows as a fraction of total net assets are no different during the rebound period from the pre-COVID period, indicating that their dollar flows do not recover to pre-COVID levels. Fund flows drop monotonically less during the crash the lower the fund's sustainability rating, with the smallest drop of −0.17 percentage points for low ESG funds. On the other hand, the rebound in flows are monotonically larger and more significant for funds with lower sustainability ratings, with the low ESG funds enjoying the largest rebound of 0.36 percentage points relative to the pre-COVID period.[18]

Overall, these results validate the diff-in-diff assumptions and complement the main results by illuminating detailed flow dynamics around the COVID-19 crisis.

[17]This does not mean that dollar flows are as high as before, as net flows are computed as a fraction of the previous week's total net assets.

[18]We also confirm that these results are robust to using normalized net flow as the dependent variable (See Table A.2).

Outflows from High ESG Funds

Does the COVID-19 crisis cause a retail "outflow" from sustainable mutual funds? While the results so far establish that the COVID-19 crisis has a disproportionate effect on the net flows of high ESG funds compared to their pre-COVID flows and also compared to other funds, this does not tell us whether high ESG funds experience more outflows or less inflows. Yet, this is an important question when it comes to assessing the implications of COVID-19 for the fragility of sustainable fund flows (see Edelen, 1999; Coval and Stafford, 2007; Chen et al., 2010).

To address this question, we analyze how COVID-19 affects the likelihood of a fund to suffer negative net flows, in other words for their outflows to exceed inflows. We estimate Equation (1), replacing the continuous net flow dependent variable with an indicator variable equal to one if weekly net flow is negative, and zero otherwise. Table 5 shows that, relative to funds with average sustainability ratings, the likelihood of experiencing negative flows increases by 8 percentage points more for high ESG funds and 4 percentage points less for low ESG funds. Panel B of Table 5 also shows that the relatively higher likelihood of negative flows for high ESG funds persists during both the crash and stimulus periods, consistent with the results on net flows in Table 2. Given the unconditional probabilities of high and low ESG funds to see outflows relative to the average fund (i.e., -4.7% and 3.9%, respectively), the results imply that high ESG funds become more likely to experience outflows, whereas low ESG funds become unlikely to suffer outflows relative to other funds.[19]

Taken together, funds with high sustainability ratings experience a disproportionate drop in net flows and an increased likelihood of outflows. While these funds attract higher flows before the COVID-19 crisis (consistent with results in Hartzmark and Sussman, 2019), this advantage fully disappears after the onset of the market crash. Flows into high ESG funds converge to the level of lower-rated funds throughout the COVID-19 crisis and do not re-

[19] In Table A.3, we also show that high ESG funds experience both greater outflows and smaller inflows after the COVID-19 shock relative to before, by interacting the diff-in-diff regressors with a negative net flow dummy.

cover their advantage during the post-stimulus market rebound. Based on this evidence, we conclude that high ESG fund flows are less resilient to the COVID-19 shock. The following subsections explore possible channels that could explain these results.

4.2 Potential Channels

Changes in Preferences and Taste

Our interpretation of the results is that they are consistent with a change in preference away from sustainability, which retail investors view as a luxury good that becomes unaffordable under financial and economic stress. Consistent with this view, we find supporting evidence from internet search traffic data. Figure 3 plots weekly moving averages of Google search trends on topics related to sustainability (e.g., sustainability, global warming, ESG) and economics (e.g., stock market, furlough, financial crisis), against search trends for the coronavirus. It is strikingly clear that internet search traffic for sustainability related topics plummeted around the onset of the COVID-19 crisis, coinciding with a surge in interest on the coronavirus as well its economic ramifications. The trends are consistent with the idea that interest in sustainability has paled in response to the COVID-19 shock. However, this is not the only possible interpretation of our results. Below we explore several alternative hypotheses.

Ex-Ante Differences between Funds with Different Sustainability Ratings?

In our main analysis, we carefully control for the effects of past returns, Morningstar star ratings, fund style, time effects, fund size, fund age, and the interactive effects of these ex-ante factors and the COVID-19 shock through a host of explicit control variables, fixed effects, and a net flow variable adjusted for fund size. We also confirm that the results are not driven by funds that have a particularly large exposure to "brown" firms, which we define as funds that have more than 50% of their holdings concentrated in basic materials, energy,

industrials, and utilities.[20] In short, we set a high bar for ex-ante fund characteristics to be able to account for our findings.

To further rule out these cases, we also conduct additional "within"-characteristic analysis, where we examine the effects of sustainability ratings on flow responses to COVID-19 within groups of funds first sorted on measures of ex-ante risk-adjusted performance and popularity. Table 6 reports results from this analysis. In Panels A and B, we first sort funds on their Fama and French (2015) five-factor alphas, computed using the previous 12 months' returns on a rolling window basis. Subsequently, funds are sorted into their globe rating groups (Panel A) or historical sustainability score quintiles (Panel B) within each of their alpha quintiles. We then examine the difference in weekly flows between high and low ESG funds within each alpha quintile, and report the mean and t-statistic of the difference. Conducting this exercise over the pre-COVID and post-COVID periods, we find robust evidence indicating that high ESG funds attract more flows than low ESG funds prior to the COVID-19 shock within all alpha quintiles, and that this differential all but disappears after the crash and stimulus. In Panels C and D, we repeat this exercise replacing alphas with past 12-month fund flows as the initial sorting variable, to examine whether the impact of the COVID-19 shock on sustainable fund flow is restricted to "hot" funds that had previously attracted abnormally high flows. We find that this is not the case, and similarly find that the ESG flow impact of COVID-19 is robust within and across all past flow quintiles.

Buying the Dip?

An alternative explanation for the disproportionate drop in high ESG flows could be that retail investors follow a "buying the dip" strategy, where investors buy into funds that depreciate sharply in value in anticipation of higher future expected returns. Some recent evidence points in this direction, showing that stocks and mutual funds with high ESG ratings performed relatively better during the COVID-19 crisis (Albuquerque et al., 2020;

[20] The results are also robust to dropping funds with more than 50% of their holdings concentrated in basic materials, energy, and utilities.

Ding et al., 2020; Pastor and Vorsatz, 2020).

We argue this explanation is unlikely to be driving our results, for two reasons. First, our results are robust to controlling for differential responses to the COVID-19 shock depending on the previous month's return (see Table 2). Second, an analysis of the impact of COVID-19 on weekly fund returns reveals that fund returns during the post-stimulus market rebound are inconsistent with flows following a "buying the dip" strategy. In Table 7 we show that, while high ESG funds earn relatively higher returns during the market crash (consistent with Albuquerque et al., 2020; Ding et al., 2020), the reverse is true for the post-stimulus rebound period (see columns 1 and 2). This stands in sharp contrast to fund flows, which are substantially lower for high ESG funds during both the market crash and rebound (see Panel B of Table 2). If flows are driven by the motive to buy the worst-performing funds, one would expect that flows also reverse during the rebound. Additionally, we find in columns 3 and 4 that the relative performance differences between funds with different sustainability ratings disappear once we control for the interactions between past returns and the COVID dummy.[21] This again stands in contrast to the flow results in Table 2, which are robust to controlling for COVID $\times$ past returns.

Changes in Risk-Preferences or Growth Expectations?

Another factor that may confound our interpretation of a change in sustainability preference is that the COVID-19 shock may also introduce a simultaneous change in investor risk preference or growth expectations. While we cannot directly test or refute that there could be such an impact, we argue that it is unlikely that our results are driven by it. Suppose that retail investors invest in ESG funds strictly trading off risk and return, rather than for social preferences. On the one hand, it is possible that retail investors become more risk loving after the COVID-19 shock and invest in stocks that have fallen sharply in anticipation of higher expected returns. This leads to a "buying the dip" behavior, which we have examined

[21] In Table A.4, we also show that pooling the crash and stimulus periods together, we do not see a difference in performance with respect to sustainability.

above. While such behavior can explain the ESG flow patterns during the early part of the crisis, it cannot explain why retail flows into high ESG funds remain suppressed during the market recovery. Another possibility is that investors become more risk averse and seek safer assets as a response to heightened uncertainty and fear (see Wang and Young, 2020). Given that high ESG assets have been shown to have less downside risk, one would expect increased risk aversion to induce more flows into high ESG funds in response to the crisis (see Lins et al., 2017; Albuquerque et al., 2019, 2020; Ding et al., 2020; Pastor and Vorsatz, 2020). Our findings show the opposite, inconsistent with this hypothesis.

While we find our results most consistent with an investor preference shift, we acknowledge that we cannot completely rule out the possibility that, for example, differential changes in investors' growth expectations for high and low ESG assets contribute to our findings. In the following subsection, we provide some additional evidence comparing retail and institutional fund flows to solidify our interpretation.

4.3 Retail vs. Institutional Fund Flows

To further understand what drives the substantial decline in high ESG retail fund flows, we contrast retail fund flows to institutional fund flows. This comparison is useful because retail and institutional investors are distinct in a number of ways that have important implications for their sustainable investment behavior. First of all, many institutional investors have a strong public commitment to ESG, often having a formal ESG mandate baked into their charter. For example, many institutional investors have recently become signatories for the Principles for Responsible Investment (PRI), the world's leading network of proponents of responsible investing (see Gibson et al., 2020). As part of their stated strategy, they often drive shareholder ESG engagement and influence ESG disclosure decisions (see Dyck et al., 2019; Krueger et al., 2020; Hoepner et al., 2020; Ilhan et al., 2020; Barko et al., 2018). Retail investors typically do not share this distinction. Institutional investors also have much deeper pockets than retail investors, and are more sophisticated in their investment

strategies (see Evans and Fahlenbrach, 2012). Thus, they are less likely to become financially constrained and more likely able to continue focusing on ESG even during market turbulence and economic downturns. Therefore, if it is the combination of COVID-19 induced financial stress and a resulting change in preference that drives the reduction in retail ESG fund flows, one would expect that institutional fund flows do not respond in the same fashion.

Consistent with these notions, Figure 4 shows that, in contrast to retail fund flows, institutional flows to high ESG funds do not decline significantly during the COVID-19 crisis and remain higher compared to low ESG institutional fund flows throughout both the market crash and subsequent rebound. If anything, institutional flows into low sustainability funds drop more sharply during the market crash, before recovering to pre-COVID levels during the post-stimulus rebound. This pattern is also confirmed with normalized net flows, where the continued flow advantage of high sustainability funds stands out even more clearly.[22]

We further confirm this pattern by estimating the difference-in-differences specification in Equation (1) on the sample of institutional funds, analogous to the analysis of retail fund flows. Results in Panel A of Table 8 are consistent with the patterns in Figure 4. The coefficients on the interaction terms between the high sustainability and COVID dummy variables are not statistically significant from zero, whereas low ESG funds suffer a significant drop in net flows of 0.24 percentage points relative to average funds during the market crash. However, even low ESG fund flows quickly recover during the post-stimulus market rebound, with no statistically significant difference between low and average sustainability funds during this period.

Panels B and C of Table 8 further corroborate these findings. Panel B shows that high ESG funds receive higher institutional flows relative to average funds prior to the COVID-19 crisis. While this sustainable fund flow advantage slightly weakens during the market crash, mildly declining from a point estimate of 0.2 to a marginally insignificant 0.14 percentage points, high ESG funds regain their flow superiority in the post-stimulus

[22]The patterns in Figure 4 are also seen with weekly weight-average institutional flows (see Figure A.3) and week-by-week regression coefficients of flows on sustainability ratings (see Figure A.4).

period. In contrast, low ESG funds suffer significantly lower than average net flows during the crash, attracting flows that are 0.27 percentage points less than the average fund. Panel C shows that, in marked contrast to retail flows, institutional flows do not drop during the crash, consistent with the fact that institutional investors have deeper pockets than retail investors, enabling them to continue investing through market distress. During the market rebound, institutional flows increase strongly relative to the pre-COVID period. Columns 2−6 show that the lowest sustainability funds experience the largest decline in institutional flows during the market crash, while there is no significant change in flows to average and high sustainability funds. During the post-stimulus rebound, funds with low or below average sustainability ratings experience weaker recoveries in flows of 0.27 and 0.23 percentage points, respectively. Average and above average rated funds enjoy greater flows that are 0.39 percentage points higher than before the crisis, which is topped by an increase of 0.52 percentage points among funds with the highest sustainability rating.

Consistent with the differences in operational and financial constraints between institutional and retail investors, these results stand in sharp contrast to our main results based on retail fund flows. To make this comparison formal, we test whether retail flows behave differently from institutional flows by estimating a triple-difference specification augmented from Equation (1) with a $Retail_i$ dummy indicating whether the fund is a retail or institutional fund on the pooled sample of retail and institutional funds.

Table 9 presents the results. The estimated coefficient of the triple-interaction term, $HighESG \times COVID \times Retail$, shows that the differences between institutional and retail flows are statistically significant. The estimates indicate that the drop in high ESG retail flows relative to low ESG retail flows is 0.21 to 0.25 percentage points larger than those of institutional flows. In column 2, we control for virtually all variations at the fund portfolio level by including fund-by-week fixed effects. This specification is identified from variation within funds that offer both institutional and retail share classes, reducing the number of observation from 72,087 to 49,610. Comparing retail flows to institutional flows of the same

fund in a given week, we confirm that the differences between retail and institutional flows are robust even controlling for any observable and unobservable time-varying characteristic of a given fund portfolio.

Taken together, the evidence shows that the drop in sustainable mutual fund flows from retail investors stands in marked contrast with the behavior of institutional investors who continue investing in ESG throughout the COVID-19 crisis. Given that institutional investors are more likely to have deeper pockets and a more persistent mandated focus on sustainability, these findings are consistent with a shift in retail preference or attention away from ESG driven by tightening economic conditions that disproportionately affect retail investors.

4.4 Sample Extensions

International Robustness

Given that our study focuses on US funds, one might be concerned that our results are driven by idiosyncrasies of US fund investors but not applicable more broadly to funds in other parts of the world. We ensure robustness of our results by studying the extent of international variation in our difference-in-differences estimates. To do this, we extend our sample to include non-US open-end retail mutual funds. Specifically, we compare our baseline difference-in-differences results based on the US sample with results using alternative samples consisting of (i) funds sold in European countries (EU),[23] (ii) all non-US funds, and (iii) all open-end funds worldwide. In these regional subsample regressions, we additionally control for country-by-week fixed effects to eliminate the effects of any time-varying country level confounding factors.[24]

Table 10 reports these results. We find that our main finding is robust in all of the

[23]The European sample includes funds sold to investors in Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Liechtenstein, Malta, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and cross-border Europe.

[24]In regressions for non-US funds, we exclude expense ratios from the controls given that this information is missing for most non-US funds because only the US requires mandatory annual reporting of this variable.

international samples. For EU funds, all non-US funds, and all funds worldwide including the US, we find negative and statistically significant coefficients on $HighESG \times COVID$. Moreover, the magnitudes of the coefficients are similar across samples, indicating that mutual funds with the highest sustainability rating receive similarly lower net inflows during the COVID crisis compared to pre-COVID, regardless of where the fund is sold. With the caveat of potential differences in the legal and regulatory settings of funds across different countries, this result helps solidify the idea that ESG fund flow responses to COVID-19 are consistent with an economic constraint driven by a shift in investment preferences.

Effects of Reopening the Economy

Between late April and early May 2020, the majority of US states (i.e., 40 out of 50 states) adopted policies loosening lockdowns and business restrictions to reopen and stimulate their economies.[25] After a significant decline by nearly 15% between February and April, employment also started to stabilize and recover in May.[26] The reversion in economic conditions around May stands in contrast with the continuous upward trend in the US stock market since March, providing an additional opportunity to clarify the channel for our results by disentangling changes in ESG investment preferences from fund flow responses to stock returns. We therefore extend our sample period to June 2020 and include an additional post-COVID dummy denoted COVID (Reopening) indicating weeks between May 2 and June 27, to examine whether the post-COVID decline in high ESG fund flows are reversed during the reopening period, consistent with a preference shift driven by changes in economic conditions.

We report the results in Table 11. Consistent with reopenings alleviating economic constraints, we show that US retail fund flows into high ESG funds no longer decline sharply during the reopening period, returning to their pre-COVID levels as a fraction of total net assets. The coefficients on $HighESG \times COVID(Reopening)$ are still negative, but no longer

[25] See The New York Times.

[26] See monthly total non-farm employment reported by US Bureau of Labor Statistics.

statistically significant nor economically large. Overall, our analyses on extended samples further lend support to our interpretation that retail investors re-prioritize their investments away from ESG investments, which they perceive as luxury goods that they are unwilling or unable to afford under economic strain.

5 Conclusion

In this paper, we exploit a large economic shock imposed by the COVID-19 pandemic to study the response of investor preferences for sustainability to financial and economic distress, revealed by retail mutual fund flows. We find that funds with high sustainability ratings prior to the crisis experience a sharper decline in net fund flows and an increased likelihood of net outflows in response to the COVID-19 shock compared to the average fund and funds with low sustainability ratings, wiping out the relative attraction of retail flows these funds enjoyed before the pandemic-induced downturn.

We rule out explanations for this result based on differences in fund size, style, age, expense ratios, raw or risk-adjusted past performance, past fund flows, or Morningstar star ratings. By analyzing contemporaneous returns during the post-COVID crash and stimulus periods, we further show that increased risk tolerance or investors "buying the dip" cannot fully explain our result. As sustainable fund returns are more resilient early during the crash, we also find it unlikely that our finding is driven by increased risk aversion.

Our results are more consistent with an investor preference channel, where retail investors have a "taste" for sustainability beyond financial motives. Our findings suggest that these non-pecuniary benefits are perceived as costly and unsustainable for retail investors under extreme economic conditions that impose binding financial constraints. The results are also consistent with an attention-based explanation, where retail investors become less alert to sustainability issues in the face of a much more salient shock. Our analysis of institutional flow behavior also corroborates this interpretation where we find that fund flows from so-

phisticated institutional investors, who typically have deep pockets and often carry explicit ESG mandates, do not respond to the COVID-19 shock in the same way as retail investors. While we are unable to completely rule out explanations based on time-varying growth expectations, such factors must be negatively correlated between high and low sustainability assets and also differ significantly across retail and institutional investors to fully explain our findings.

Generalizing our US-based findings, we also extend our sample to include non-US open-end funds, and show that our results are robust across different samples including Europe, all regions outside the US, and the full global sample as well. In addition, we also extend our sample period to include subsequent months after April (i.e., May and June 2020) when the COVID-19 crisis evolved amid state reopenings, and find that high ESG funds regain some of their flow advantages during these later months when employment began to stabilize.

One caveat of our study is that our findings are based on data aggregated at the fund level, such that we cannot distinguish whether they are driven by a changing composition of retail investors during the COVID-19 crisis or a within-investor shift in preference, an important question for future research that requires more disaggregated data. At the minimum, however, our study hints at the economically sensitive nature of sustainable investing.

The results of this paper point to retail investors as a source of fragility for socially responsible investment practices in the mutual fund industry. Given that retail investors comprise a significant fraction of the mutual fund investor base and the client base for institutional investors as well, our study underscores the implications of potential externalities from retail fund flows on the long-run prospects of ESG investing overall.

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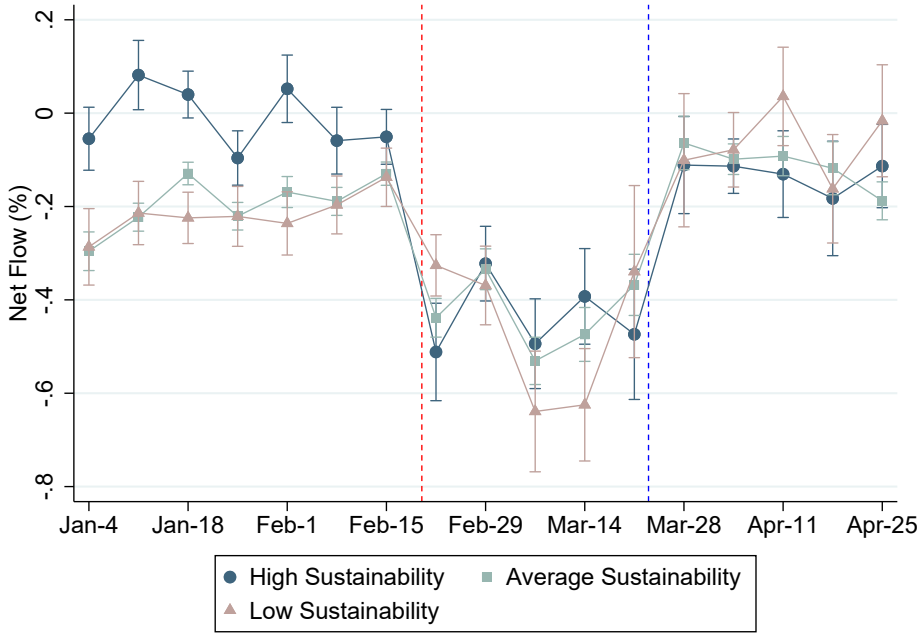
Figure 1. Weekly Average Retail Fund Flows by Sustainability Rating

These figures plot the average weekly retail net flows of high (five globes), average (three globes), and low (one globe) sustainability funds, along with their mean standard error bands, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively. Plots are shown for raw net flows and normalized net flows.

a. Net Flow



b. Normalized Net Flow

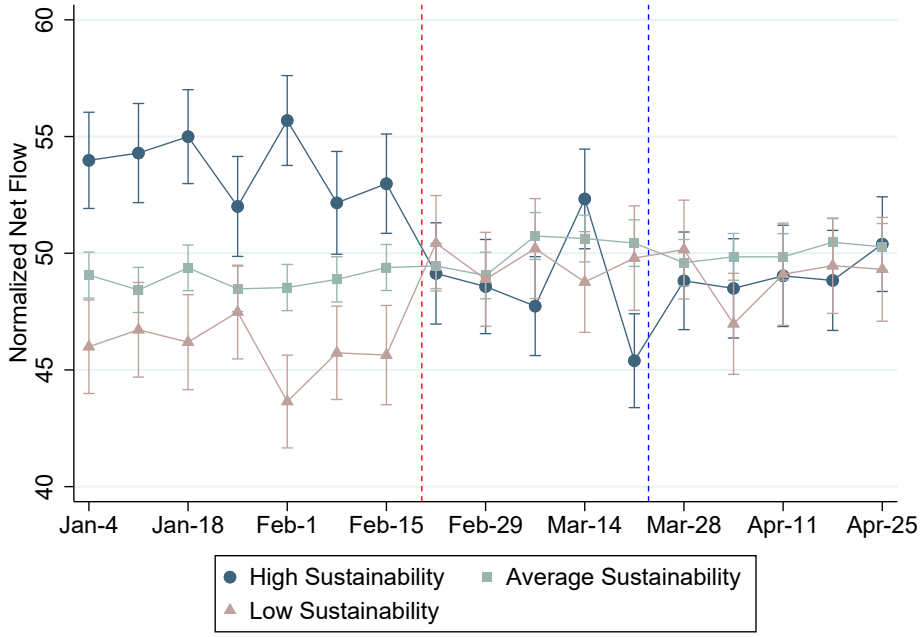
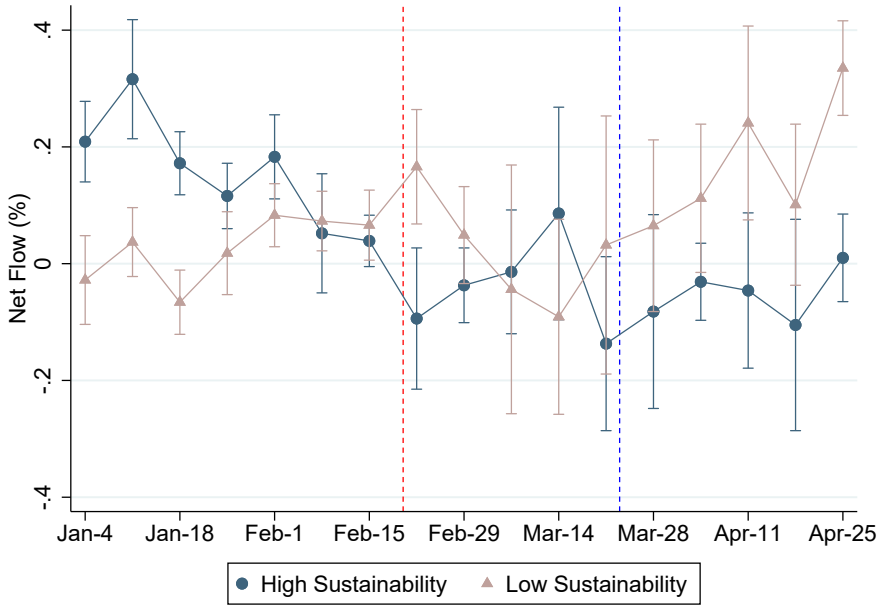


Figure 2. Week-by-Week Regression Slopes by Sustainability Rating

These figures plot coefficients on *High ESG* and *Low ESG* along with their standard error bands from week-by-week fund level regressions of net flows on dummy variables for Morningstar sustainability ratings, controlling for prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively. Plots are shown for raw net flows and normalized net flows.

a. Net Flow



b. Normalized Net Flow

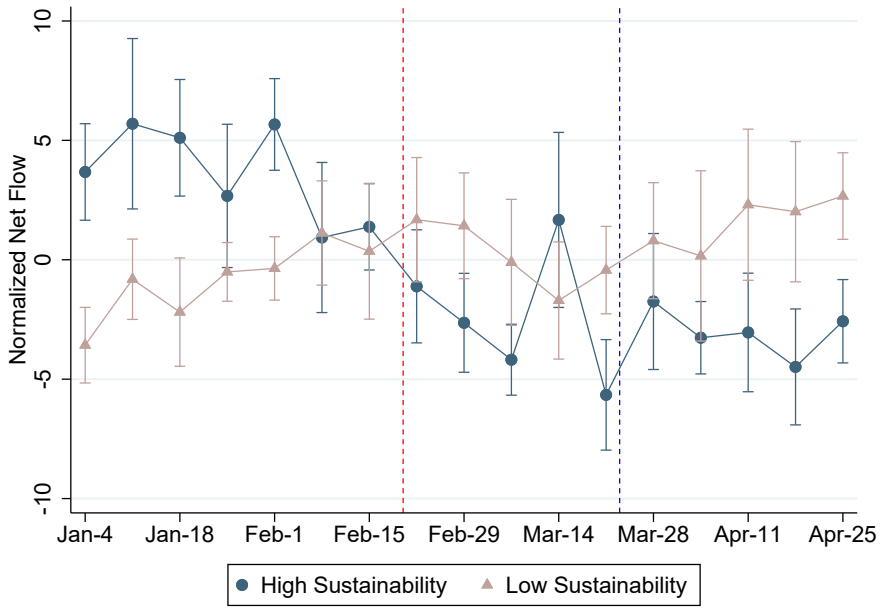
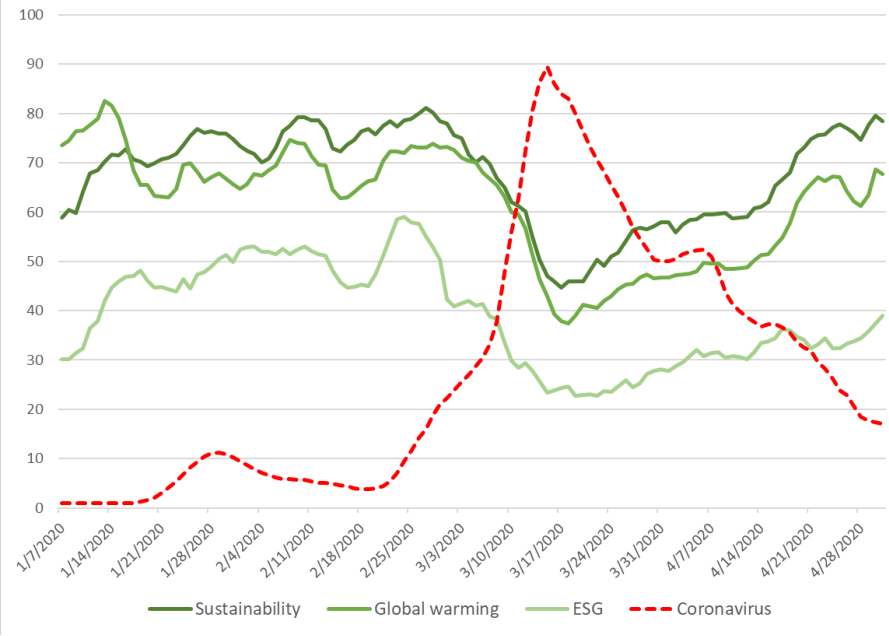


Figure 3. Google Search Trends

These figures plot 7-day moving averages of Google search trends of economic- and sustainability topics, using Google Trends data from Jan 1, 2020 to May 1, 2020 for the United States. Higher numbers indicate that more users search for terms related to a topic.

a. Sustainability Topics



b. Economic Topics

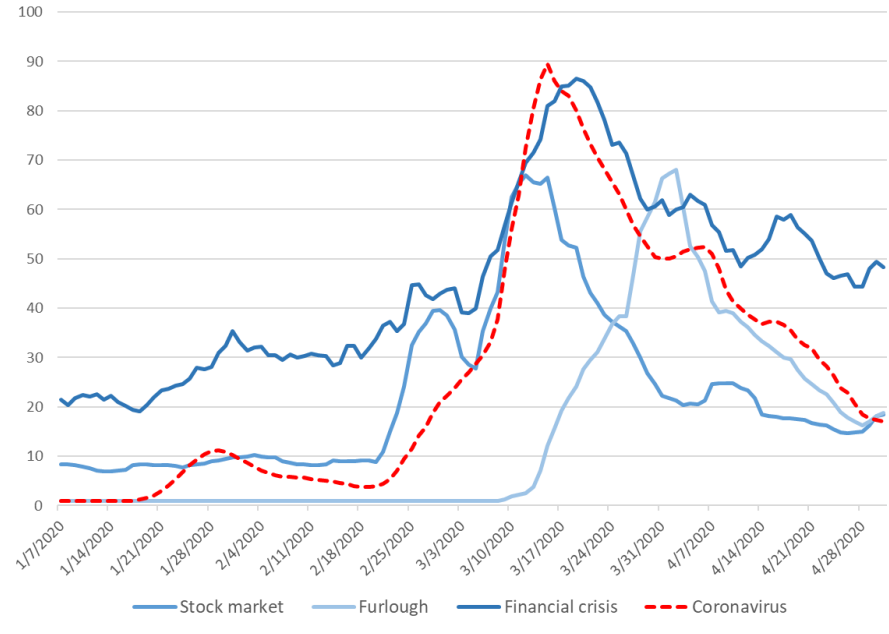
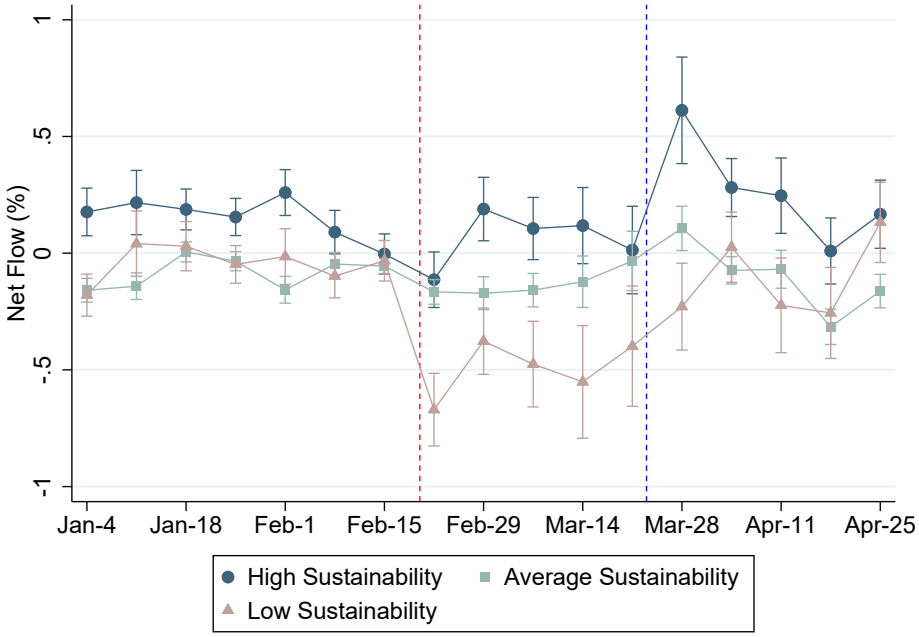


Figure 4. Weekly Average Institutional Fund Flows by Sustainability Rating

These figures plot the average weekly institutional net flows of high (five globes), average (three globes), and low (one globe) sustainability funds, along with their mean standard error bands, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively. Plots are shown for raw net flows and normalized net flows.

a. Net Flow



b. Normalized Net Flow

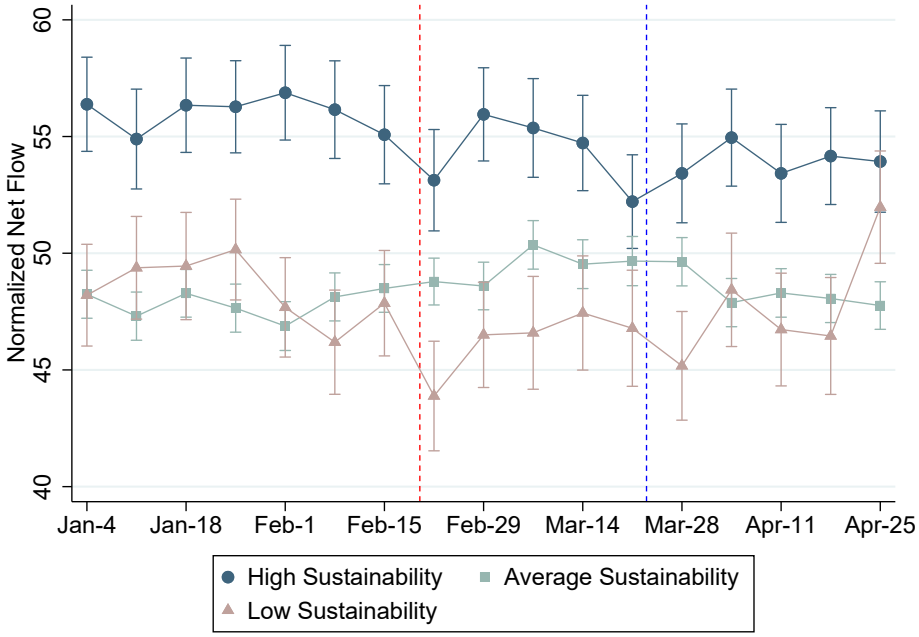


Table 1. Summary Statistics

This table presents summary statistics of key variables over the sample period from Jan 4 to Apr 25, 2020. Panel A shows the mean, standard deviation, 10th, 25th, 50th, 75th, and 90th percentiles of each continuous variable. The fraction of funds whose prospectuses explicitly list ESG mandates, or funds with Morningstar low carbon designations are shown as well. In Panel B, the mean of each continuous variable and ESG prospectus/low carbon fund fractions are reported for each Morningstar sustainability rating. Differences in means between funds with high and low sustainability ratings, as well as their t-statistics, are reported for the full sample period, pre-COVID (Jan 4 to Feb 15), post-COVID crash (Feb 22 to Mar 21), and post-COVID stimulus sub-periods (Mar 28 − Apr 25).

Panel A. Variable Distributions

Variables	Mean	St. Dev.	p10	p25	p50	p75	p90
Net Flow, Weekly (%)	-0.21	1.27	-1.03	-0.49	-0.19	0.05	0.57
Normalized Net Flow, Weekly	50.25	28.85	10	25	50	75	90
Total Net Assets ($ billion)	1.35	7.34	0.02	0.05	0.20	0.71	2.08
Monthly Return (%)	-5.29	7.94	-16.59	-9.71	-4.01	1.62	3.27
Prior 12-Month Return (%)	0.70	1.25	-1.14	0.00	1.00	1.58	2.05
FF 5-Factor Alpha (%)	-0.05	0.57	-0.65	-0.33	-0.06	0.25	0.61
Expense Ratio	1.38	0.59	0.74	1.04	1.32	1.63	2.00
Star Rating	3.11	1.05	2	2	3	4	4
Age	18.41	11.92	5.24	10.06	18.02	23.58	29.75
ESG Risk: Environmental	47.91	27.67	11	24	47	72	87
ESG Risk: Social	50.19	27.18	12	28	50	73	88
ESG Risk: Governance	52.36	27.41	14	29	53	76	90
Fraction (%) of Funds with:							
ESG Prospectuses	6.71						
Low Carbon Designations	26.75						

Table 1. Summary Statistics (continued)

Panel B. Morningstar Sustainability Rating Breakdowns

Sustainability Rating	Net Flow	Norm. Net Flow	Total Net Assets	Monthly Return	Prior 12m Return	FF 5-Factor Alpha	Expense Ratio	Star Rating	Age	ESG Risk: Env.	ESG Risk: Social	ESG Risk: Gov.	Frac. Funds with: ESG Prosp.	Frac. Funds with: Low Carbon
High	-0.17	50.91	0.78	-4.51	0.98	0.10	1.44	3.36	17.44	22.69	33.78	38.10	22.09	63.03
Above Average	-0.20	51.58	0.87	-4.70	0.89	0.03	1.41	3.34	18.26	35.82	47.54	48.77	10.74	41.83
Average	-0.24	49.54	1.39	-5.30	0.69	-0.08	1.31	3.12	18.85	51.18	53.56	55.97	3.53	20.42
Below Average	-0.19	50.66	1.92	-5.85	0.54	-0.13	1.36	2.97	17.85	59.41	52.14	54.19	2.60	14.43
Low	-0.24	47.86	1.44	-6.02	0.43	-0.12	1.56	2.57	19.56	69.91	57.69	59.27	5.47	10.58
Full Sample Period (Jan4 − Apr25)														
High-Low	0.07	3.05	-0.66	1.50	0.54	0.22	-0.12	0.79	-2.12	-47.22	-23.91	-21.16	16.62	52.45
t-stat	2.27	4.24	-4.53	7.42	17.18	14.14	-7.93	26.80	-7.42	-69.24	-28.83	-25.69		
Pre-COVID (Jan4 − Feb15)														
High-Low	0.20	7.81	-0.69	0.45	0.41	0.22	-0.11	0.77	-1.85	-47.61	-23.57	-20.71	16.77	52.47
t-stat	5.81	7.09	-2.86	3.35	18.27	7.97	-4.86	17.13	-4.23	-45.62	-18.44	-16.28		
Post-COVID, Crash (Feb22 − Mar21)														
High-Low	0.02	-0.99	-0.61	1.25	0.50	0.25	-0.11	0.76	-2.26	-47.25	-23.94	-21.55	16.33	52.33
t-stat	0.27	-0.74	-2.48	7.01	12.21	8.29	-4.16	13.81	-4.28	-37.37	-15.56	-14.14		
Post-COVID, Stimulus (Mar28 − Apr25)														
High-Low	-0.07	0.11	-0.64	3.74	0.84	0.21	-0.13	0.86	-2.37	-46.62	-24.38	-21.46	16.77	52.46
t-stat	-0.99	0.08	-2.52	12.55	16.41	9.49	-4.73	15.32	-4.45	-36.24	-15.76	-13.98		

Table 2. The Impact of COVID-19 on ESG Fund Flows

This table presents results from fund-week level diff-in-diff regressions of net flows on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID period starting in the week ending Feb 22. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Results are shown for net flows and normalized net flows as the dependent variable. Control variables include prior month's return, prior 12-month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, star rating level, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Before and After COVID-19

	Dependent Variable:									
	Net Flow					Normalized Net Flow				
	Long Sample Nov2−Apr25	Main Sample Jan4−Apr25				Long Sample Nov2−Apr25	Main Sample Jan4−Apr25			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High ESG × COVID	-0.157***	-0.200***	-0.197***	-0.179***	-0.179***	-4.992***	-5.859***	-5.612***	-3.998***	-4.078***
	(0.056)	(0.058)	(0.058)	(0.054)	(0.054)	(1.273)	(1.395)	(1.394)	(1.247)	(1.212)
Low ESG × COVID	0.119**	0.088	0.084	0.025	0.026	4.731***	3.868***	3.544***	0.753	0.159
	(0.059)	(0.059)	(0.060)	(0.065)	(0.066)	(1.244)	(1.231)	(1.267)	(1.343)	(1.363)
High ESG	0.107***	0.139***	0.137***	0.071*	0.071*	2.360*	2.736*	2.628	-0.229	-0.207
	(0.040)	(0.046)	(0.046)	(0.038)	(0.038)	(1.389)	(1.643)	(1.641)	(1.415)	(1.404)
Low ESG	-0.084**	-0.016	-0.014	0.090**	0.089**	-4.348***	-3.091**	-2.942**	1.389	1.778
	(0.038)	(0.041)	(0.041)	(0.039)	(0.039)	(1.268)	(1.385)	(1.399)	(1.383)	(1.399)
Ret × COVID			-0.009					-0.684**		
			(0.009)					(0.269)		
Ret	0.032***	0.032***	0.039***			1.074***	1.057***	1.597***		
	(0.005)	(0.006)	(0.008)			(0.140)	(0.155)	(0.247)		
Ret12m × COVID				-0.151***	-0.156***				-10.646***	-7.871***
				(0.041)	(0.043)				(1.220)	(1.342)
Ret12m				0.274***	0.278***				13.902***	12.222***
				(0.037)	(0.037)				(1.295)	(1.330)
log(TNA)	0.032***	0.041***	0.041***	0.017**	0.017**	0.624***	0.558**	0.558**	-0.426	-0.429
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.239)	(0.265)	(0.265)	(0.267)	(0.267)
Expense Ratio	-0.014	-0.013	-0.014	0.007	0.007	-2.074***	-1.964***	-1.974***	-1.865**	-1.866**
	(0.023)	(0.026)	(0.026)	(0.024)	(0.024)	(0.635)	(0.723)	(0.723)	(0.726)	(0.728)
Δ^+Star	0.004	-0.018	-0.018			-0.778	-0.687	-0.697		
	(0.029)	(0.033)	(0.033)			(0.697)	(0.846)	(0.845)		
Δ^-Star	-0.013	-0.046	-0.047			-0.563	-1.382	-1.451		
	(0.027)	(0.033)	(0.033)			(0.782)	(0.943)	(0.943)		
Star Rating				0.106***	0.104***				3.755***	5.084***
				(0.015)	(0.014)				(0.426)	(0.433)
Star Rating × COVID					0.004					-2.368***
					(0.019)					(0.455)
Observations	57,528	37,654	37,654	34,746	34,746	57,528	37,654	37,654	34,746	34,746
Category-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj R^2	0.0441	0.0548	0.0548	0.0630	0.0630	0.0682	0.0731	0.0735	0.103	0.104

Table 2. The Impact of COVID-19 on ESG Fund Flows (continued)

Panel B. Before COVID-19, During the Crash, and During the Stimulus

	Dependent Variable:									
	Net Flow					Normalized Net Flow				
	Long Sample Nov2−Apr25	Main Sample Jan4−Apr25				Long Sample Nov2−Apr25	Main Sample Jan4−Apr25			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High ESG × COVID (Crash)	-0.147**	-0.200***	-0.183***	-0.163***	-0.165***	-4.916***	-6.004***	-5.182***	-3.298**	-3.455**
	(0.061)	(0.066)	(0.065)	(0.063)	(0.062)	(1.511)	(1.675)	(1.658)	(1.533)	(1.476)
High ESG × COVID (Stimulus)	-0.169**	-0.201***	-0.205***	-0.195***	-0.192***	-5.075***	-5.716***	-5.759***	-4.563***	-4.555***
	(0.072)	(0.073)	(0.072)	(0.069)	(0.070)	(1.491)	(1.548)	(1.533)	(1.404)	(1.401)
Low ESG × COVID (Crash)	0.056	0.033	0.020	-0.050	-0.059	4.255***	3.497**	2.861**	-0.551	-1.547
	(0.076)	(0.078)	(0.080)	(0.086)	(0.087)	(1.337)	(1.437)	(1.411)	(1.530)	(1.535)
Low ESG × COVID (Stimulus)	0.185**	0.146*	0.153*	0.102	0.110	5.230***	4.252***	4.362**	2.061	1.751
	(0.076)	(0.078)	(0.080)	(0.088)	(0.088)	(1.724)	(1.635)	(1.750)	(1.878)	(1.882)
High ESG	0.107***	0.139***	0.137***	0.071*	0.071*	2.359*	2.736*	2.620	-0.231	-0.209
	(0.040)	(0.046)	(0.046)	(0.038)	(0.039)	(1.389)	(1.644)	(1.641)	(1.415)	(1.404)
Low ESG	-0.084**	-0.016	-0.014	0.090**	0.089**	-4.347***	-3.090**	-2.954**	1.394	1.774
	(0.038)	(0.041)	(0.041)	(0.039)	(0.039)	(1.268)	(1.385)	(1.399)	(1.383)	(1.399)
Observations	57,528	37,654	37,654	34,746	34,746	57,528	37,654	37,654	34,746	34,746
Category-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ret/COVID Interactions	N	N	Y	Y	Y	N	N	Y	Y	Y
Star/COVID Interactions	N	N	N	N	Y	N	N	N	N	Y
Return Controls	Monthly	Monthly	Monthly	12-month	12-month	Monthly	Monthly	Monthly	12-month	12-month
Star Rating Controls	Changes	Changes	Changes	Level	Level	Changes	Changes	Changes	Level	Level
Adj R^2	0.0441	0.0549	0.0551	0.0632	0.0637	0.0681	0.0730	0.0745	0.104	0.107

Table 3. Fund ESG Ratings and Fund Flows

This table presents results from fund-week level OLS regressions of net flows on *High ESG*, *Above Avg ESG*, *Below Avg ESG*, and *Low ESG* − dummy variables indicating whether a fund had a high, above average, below average, or low Morningstar sustainability rating as of Dec 2019. Results are shown for net flows and normalized net flows as the dependent variable, and for pre-COVID and post-COVID sub-periods. Control variables include prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

	Dependent Variable: Net Flow				Dependent Variable: Normalized Net Flow			
	Pre-COVID		Post-COVID		Pre-COVID		Post-COVID	
	Long Sample Nov2−Feb15	Main Sample Jan4−Feb15	Crash Feb22−Mar21	Stimulus Mar28−Apr25	Long Sample Nov2−Feb15	Main Sample Jan4−Feb15	Crash Feb22−Mar21	Stimulus Mar28−Apr25
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High ESG	0.107**	0.163***	-0.041	-0.049	3.082**	3.876**	-2.526	-3.047*
	(0.041)	(0.047)	(0.074)	(0.077)	(1.452)	(1.737)	(1.684)	(1.686)
Above Avg ESG	0.035	0.079**	-0.048	-0.032	2.225**	2.991**	-0.657	-0.387
	(0.029)	(0.032)	(0.056)	(0.047)	(0.985)	(1.166)	(1.139)	(1.133)
Below Avg ESG	-0.010	0.039	0.054	0.096**	0.348	1.180	1.065	1.162
	(0.026)	(0.029)	(0.051)	(0.048)	(0.934)	(1.061)	(1.093)	(1.106)
Low ESG	-0.089**	0.005	0.021	0.172*	-3.472**	-1.608	-0.083	1.605
	(0.040)	(0.041)	(0.092)	(0.089)	(1.348)	(1.468)	(1.647)	(1.870)
Ret	0.038***	0.038***	0.011	0.040***	1.386***	1.528***	0.002	1.301***
	(0.006)	(0.008)	(0.013)	(0.008)	(0.191)	(0.242)	(0.299)	(0.197)
log(TNA)	0.019***	0.025***	0.062***	0.040***	0.808***	0.870***	0.487	0.202
	(0.007)	(0.008)	(0.013)	(0.013)	(0.256)	(0.316)	(0.314)	(0.350)
Expense Ratio	-0.001	-0.004	-0.006	-0.039	-2.199***	-2.239***	-1.467	-1.825*
	(0.024)	(0.026)	(0.046)	(0.037)	(0.669)	(0.809)	(0.942)	(0.979)
Δ^{+}Star	0.055	0.069**	-0.019	-0.078	-0.282	1.045	0.703	-2.741**
	(0.035)	(0.033)	(0.071)	(0.056)	(0.898)	(1.343)	(1.460)	(1.312)
Δ^{-}Star	0.037	-0.004	-0.083	-0.047	0.326	-0.957	-2.827*	-0.618
	(0.030)	(0.035)	(0.067)	(0.052)	(0.970)	(1.297)	(1.469)	(1.589)
Observations	35,870	15,850	11,011	10,793	35,870	15,850	11,011	10,793
Category-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y	Y	Y	Y	Y
Adj R^2	0.0339	0.0574	0.0431	0.0384	0.0709	0.0885	0.0694	0.0631

Table 4. Fund Flows Around COVID-19

This table presents results from fund-week level OLS regressions of net flows on dummy variables indicating the post-COVID period starting in the week ending Feb 22. Regressions are run for the full sample, as well as separately for subsamples of funds in each Morningstar sustainability rating group. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category and vintage fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Before and After COVID-19

	Dependent Variable: Net Flow					
	All Funds	High	Above Average	Average	Below Average	Low
	(1)	(2)	(3)	(4)	(5)	(6)
COVID	-0.220***	-0.362***	-0.316***	-0.185***	-0.179***	-0.158**
	(0.032)	(0.072)	(0.054)	(0.041)	(0.054)	(0.073)
Ret	-0.010***	-0.011**	-0.012***	-0.010***	-0.012***	-0.007
	(0.002)	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)
log(TNA)	0.042***	0.078**	0.046**	0.034***	0.060***	-0.044
	(0.008)	(0.032)	(0.020)	(0.012)	(0.015)	(0.042)
Expense Ratio	-0.006	0.407***	-0.033	-0.033	-0.075*	-0.243***
	(0.026)	(0.110)	(0.071)	(0.040)	(0.043)	(0.088)
Δ^+Star	0.067**	-0.000	0.084	0.079	-0.094	0.339***
	(0.033)	(0.086)	(0.065)	(0.051)	(0.080)	(0.103)
Δ^-Star	-0.112***	-0.241***	-0.035	-0.111*	-0.161***	0.075
	(0.032)	(0.083)	(0.080)	(0.065)	(0.054)	(0.093)
Observations	38,033	3,337	8,463	14,163	8,962	3,014
Category FE	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y
Adj R^2	0.0321	0.0874	0.0504	0.0249	0.0514	0.0954

Table 4. Fund Flows Around COVID-19 (continued)

Panel B. Before COVID-19, During the Crash, and During the Stimulus

	Dependent Variable: Net Flow					
	All Funds	High	Above Average	Average	Below Average	Low
	(1)	(2)	(3)	(4)	(5)	(6)
COVID (Crash)	-0.214***	-0.344***	-0.303***	-0.170***	-0.171***	-0.166**
	(0.029)	(0.072)	(0.053)	(0.038)	(0.051)	(0.072)
COVID (Stimulus)	0.213***	0.084	0.113*	0.252***	0.236***	0.358***
	(0.041)	(0.130)	(0.066)	(0.064)	(0.064)	(0.102)
Ret	0.009***	0.012	0.009**	0.010***	0.005	0.014***
	(0.002)	(0.007)	(0.004)	(0.004)	(0.004)	(0.005)
log(TNA)	0.040***	0.077**	0.043**	0.033***	0.058***	-0.046
	(0.008)	(0.032)	(0.020)	(0.011)	(0.015)	(0.042)
Expense Ratio	-0.009	0.404***	-0.038	-0.031	-0.077*	-0.249***
	(0.026)	(0.109)	(0.070)	(0.039)	(0.043)	(0.088)
Δ^{+}Star	0.024	-0.059	0.045	0.036	-0.123	0.291***
	(0.033)	(0.089)	(0.065)	(0.051)	(0.079)	(0.096)
Δ^{-}Star	-0.086***	-0.194**	-0.010	-0.088	-0.142***	0.096
	(0.031)	(0.083)	(0.080)	(0.065)	(0.052)	(0.092)
Observations	38,033	3,337	8,463	14,163	8,962	3,014
Category FE	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y
Adj R^2	0.0413	0.0965	0.0589	0.0338	0.0595	0.108

Table 5. Effects of COVID-19 on ESG Fund Outflow Likelihood

This table presents results from fund-week level diff-in-diff regressions of an indicator variable for negative net flows on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID period starting in the week ending Feb 22. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Before and After COVID-19

	Dependent Variable: **I**(Negative Flow)	
	(1)	(2)
High ESG × COVID	0.080***	0.076***
	(0.023)	(0.023)
Low ESG × COVID	-0.040**	-0.035**
	(0.017)	(0.018)
High ESG	-0.047*	-0.045*
	(0.027)	(0.027)
Low ESG	0.039*	0.036*
	(0.020)	(0.020)
Ret × COVID		0.011***
		(0.004)
Ret	-0.015***	-0.024***
	(0.002)	(0.004)
log(TNA)	-0.007*	-0.007*
	(0.004)	(0.004)
Expense Ratio	0.028***	0.029***
	(0.011)	(0.011)
Δ^+Star	0.009	0.009
	(0.013)	(0.013)
Δ^-Star	0.006	0.007
	(0.014)	(0.014)
Observations	37,654	37,654
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Adj R^2	0.0957	0.0962

Table 5. Effects of COVID-19 on ESG Fund Outflow Likelihood (continued)

Panel B. Before COVID-19, During the Crash, and During the Stimulus

	Dependent Variable: **I**(Negative Flow)	
	(1)	(2)
High ESG × COVID (Crash)	0.073***	0.063**
	(0.026)	(0.026)
High ESG × COVID (Stimulus)	0.086***	0.085***
	(0.026)	(0.026)
Low ESG × COVID (Crash)	-0.035*	-0.027
	(0.019)	(0.018)
Low ESG × COVID (Stimulus)	-0.046**	-0.045*
	(0.023)	(0.025)
High ESG	-0.047*	-0.045*
	(0.027)	(0.027)
Low ESG	0.039*	0.036*
	(0.020)	(0.020)
Observations	37,654	37,654
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Controls	Y	Y
Ret/COVID Interactions	N	Y
Adj R^2	0.0957	0.0966

Table 6. Fund Alphas, Past Flows, Sustainability Ratings, and ESG Fund Flows Around COVID-19

This table presents net flow spreads between high and low ESG funds within fund performance quintiles formed on Fama and French (2015) five factor model alphas estimated using returns over the previous 12 months on a rolling-window basis, and within past 12-month flow quintiles. In Panels A and C, funds are classified as high or low ESG based on discrete Morningstar sustainability rating groups as of Dec 2019. In Panels B and D, funds are classified as high or low ESG based on their Morningstar historical sustainability scores as of Dec 2019, by sequentially sorting funds within their alpha or past flow quintile groups. The average net flows of high and low ESG funds within each alpha or past flow quintile, as well as the high-low spread and its t-statistic, are reported for the pre-COVID sample (Jan 4 − Feb 15) and post-COVID samples (Feb 22 − Mar 21 "crash period" and Mar 28 − Apr 25 "stimulus period").

	Pre-COVID				Post-COVID							
					Crash Feb22 − Mar21				Stimulus Mar28 − Apr25			
	Jan4 − Feb15											
Alpha Quintile	High ESG	Low ESG	High-Low	t-stat	High ESG	Low ESG	High-Low	t-stat	High ESG	Low ESG	High-Low	t-stat
Panel A. Alpha and Morningstar Sustainability Rating Double Sorts												
1	-0.32	-0.31	-0.02	-0.18	-0.57	-0.52	-0.05	-0.21	-0.61	-0.19	-0.42	-2.08**
2	-0.17	-0.15	-0.02	-0.34	-0.66	-0.36	-0.30	-1.77*	-0.19	-0.10	-0.10	-0.59
3	-0.05	-0.28	0.23	3.35***	-0.52	-0.36	-0.16	-1.17	-0.23	-0.16	-0.07	-0.61
4	0.16	-0.31	0.48	5.65***	-0.27	-0.46	0.18	1.08	-0.15	-0.15	0.00	0.01
5	0.13	-0.03	0.16	2.01**	-0.39	-0.51	0.12	0.81	0.08	0.24	-0.16	-1.12
Panel B. Alpha and Historical Sustainability Score Sequential Sorts												
1	-0.31	-0.42	0.11	1.79*	-0.62	-0.67	0.06	0.45	-0.29	-0.11	-0.18	-1.62
2	-0.11	-0.29	0.18	3.91***	-0.56	-0.49	-0.07	-0.63	-0.15	0.04	-0.20	-2.19**
3	-0.08	-0.22	0.14	3.35***	-0.29	-0.37	0.08	0.83	-0.13	0.06	-0.19	-2.22**
4	0.08	-0.29	0.36	6.07***	-0.30	-0.43	0.12	1.28	0.07	0.02	0.05	0.54
5	0.08	-0.07	0.16	3.29***	-0.43	-0.54	0.11	1.02	0.01	0.05	-0.04	-0.39
Panel C. Prior 12-Month Flow and Morningstar Sustainability Rating Double Sorts												
1	-0.33	-0.41	0.08	1.47	-0.71	-0.76	0.05	0.38	-0.43	-0.35	-0.08	-0.72
2	-0.31	-0.43	0.11	2.30**	-0.66	-0.60	-0.06	-0.60	-0.25	-0.32	0.07	0.84
3	-0.21	-0.24	0.03	0.36	-0.85	-0.66	-0.19	-0.96	-0.58	-0.41	-0.17	-1.11
4	0.09	-0.14	0.24	2.78***	-0.27	-0.43	0.16	1.06	0.06	-0.11	0.16	1.24
5	0.53	0.20	0.33	3.47***	0.06	0.30	-0.24	-1.21	0.35	1.07	-0.72	-3.50***
Panel D. Prior 12-Month Flow and Historical Sustainability Score Sequential Sorts												
1	-0.30	-0.41	0.11	3.29***	-0.61	-0.69	0.08	1.13	-0.32	-0.22	-0.10	-1.23
2	-0.26	-0.34	0.08	1.92*	-0.68	-0.57	-0.10	-1.31	-0.30	-0.02	-0.28	-3.33***
3	-0.20	-0.40	0.19	3.96***	-0.56	-0.77	0.21	1.85*	-0.23	-0.17	-0.07	-0.87
4	-0.02	-0.23	0.21	3.26***	-0.37	-0.47	0.09	0.78	-0.05	-0.09	0.04	0.42
5	0.42	0.04	0.39	6.29***	0.08	-0.06	0.15	1.20	0.39	0.35	0.04	0.38

Table 7. Buying the Dip? COVID-19 and ESG Fund Returns

This table presents results from fund-week level diff-in-diff regressions of weekly returns on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, prior 12-month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, star rating level, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

	Dependent Variable: Weekly Fund Return			
	(1)	(2)	(3)	(4)
High ESG × COVID (Crash)	0.281**	0.294**	0.089	0.160
	(0.117)	(0.120)	(0.103)	(0.098)
High ESG × COVID (Stimulus)	-0.176*	-0.224**	-0.090	-0.067
	(0.091)	(0.101)	(0.074)	(0.072)
Low ESG × COVID (Crash)	-0.389*	-0.335	-0.253	-0.196
	(0.214)	(0.211)	(0.220)	(0.202)
Low ESG × COVID (Stimulus)	0.406***	0.428***	0.261*	0.237
	(0.133)	(0.125)	(0.154)	(0.166)
High ESG	0.107***	0.033	0.114***	0.019
	(0.037)	(0.044)	(0.037)	(0.031)
Low ESG	-0.172***	-0.086	-0.175***	-0.070
	(0.060)	(0.063)	(0.061)	(0.056)
Observations	37,654	34,746	37,654	34,746
Category-by-Week FE	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Ret/COVID Interactions	N	N	Y	Y
Return Controls	Monthly	12-month	Monthly	12-month
Star Rating Controls	Changes	Level	Changes	Level
Adj R^2	0.963	0.963	0.964	0.964

Table 8. Institutional Fund Flows Around COVID-19

Panel A of this table presents results from fund-week level diff-in-diff regressions of institutional net flows on *High ESG* and *Low ESG* dummy variables indicating the fund's Morningstar sustainability rating as of Dec 2019, and their interactions with a COVID (Crash) dummy indicating the market crash period from Feb 22 to Mar 21 and a COVID (Stimulus) dummy indicating the stimulus period from Mar 28 to Apr 25. Panel B reports results from OLS regressions of institutional net flows on *High ESG*, *Above Avg ESG*, *Below Avg ESG*, and *Low ESG* dummy variables, shown for pre-COVID and post-COVID sub-periods. Panel C presents results from regressions of net flows on the COVID (Crash) and COVID (Stimulus) dummy variables, run for the full sample as well as separately for subsamples of funds in each Morningstar sustainability rating group. Control variables and fixed effect configurations are as in previous tables. In all panels, standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1). Panels D and E present institutional net flow spreads between high and low ESG funds (classified based on discrete Morningstar sustainability rating groups as of Dec 2019) within fund performance quintiles formed on Fama and French (2015) five factor model alphas estimated using returns over the previous 12 months on a rolling-window basis, and within past 12-month flow quintiles. The average net flows of high and low ESG funds within each alpha or past flow quintile, as well as the high-low spread and its t-statistic, are reported for the pre-COVID sample (Jan 4 − Feb 15) and post-COVID samples (Feb 22 − Mar 21 "crash period" and Mar 28 − Apr 25 "stimulus period").

Panel A. The Impact of COVID-19 on ESG Fund Flows

	Dependent Variable: Net Flow	
	(1)	(2)
High ESG × COVID (Crash)	0.015	0.024
	(0.101)	(0.102)
High ESG × COVID (Stimulus)	0.068	0.044
	(0.085)	(0.085)
Low ESG × COVID (Crash)	-0.235**	-0.239**
	(0.107)	(0.109)
Low ESG × COVID (Stimulus)	0.055	0.086
	(0.130)	(0.134)
High ESG	0.138*	0.143**
	(0.070)	(0.070)
Low ESG	-0.010	-0.015
	(0.067)	(0.068)
Observations	34,170	34,170
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Controls	Y	Y
Ret/COVID Interactions	N	Y
Adj R^2	0.0340	0.0343

Table 8. Institutional Fund Flows Around COVID-19 (continued)

Panel B. Fund ESG Ratings and Fund Flows

	Dependent Variable: Net Flow		
	Pre-COVID	Post-COVID	
	Jan4 − Feb15	Crash Feb22 − Mar21	Stimulus Mar28 − Apr25
	(1)	(2)	(3)
High ESG	0.200***	0.144	0.242**
	(0.072)	(0.108)	(0.106)
Above Avg ESG	0.175***	-0.027	0.098
	(0.052)	(0.090)	(0.088)
Below Avg ESG	0.022	-0.065	0.112
	(0.039)	(0.082)	(0.077)
Low ESG	0.033	-0.266**	0.124
	(0.069)	(0.116)	(0.150)
Observations	14,344	9,996	9,830
Category-by-Week FE	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y
Controls	Y	Y	Y
Adj R^2	0.0192	0.0362	0.0407

Panel C. Fund Flows Around COVID-19

	Dependent Variable: Net Flow					
	All Funds	High	Above Average	Average	Below Average	Low
	(1)	(2)	(3)	(4)	(5)	(6)
COVID (Crash)	0.012	0.076	-0.076	0.109*	-0.071	-0.337***
	(0.045)	(0.105)	(0.070)	(0.059)	(0.076)	(0.118)
COVID (Stimulus)	0.423***	0.519***	0.388***	0.388***	0.228*	0.268
	(0.065)	(0.152)	(0.107)	(0.092)	(0.137)	(0.193)
Observations	34,521	3,275	7,790	12,689	7,905	2,723
Category FE	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Adj R^2	0.0228	0.0680	0.0392	0.0254	0.0256	0.0728

Table 9. Retail vs. Institutional Sustainability Fund Flows

This table presents results from pooling retail and institutional funds and running fund-week level regressions of net flows on *Retail* − an indicator for whether the fund is a retail fund − and its interactions with *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID period starting in the week ending Feb 22. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects. We further report results from specifications with fund-by-week fixed effects instead, dropping fund-level control variables that are shared by retail and institutional classes of the same fund. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

	Dependent Variable: Net Flow	
	(1)	(2)
High ESG × COVID × Retail	-0.253***	-0.209**
	(0.093)	(0.093)
Low ESG × COVID × Retail	0.214**	0.146
	(0.095)	(0.115)
High ESG × Retail	0.014	0.013
	(0.065)	(0.067)
Low ESG × Retail	-0.013	-0.066
	(0.067)	(0.091)
COVID × Retail	-0.158***	-0.181***
	(0.048)	(0.051)
Retail	-0.044**	-0.120***
	(0.022)	(0.028)
High ESG × COVID	0.046	
	(0.075)	
Low ESG × COVID	-0.108	
	(0.090)	
High ESG	0.133*	
	(0.069)	
Low ESG	-0.010	
	(0.065)	
Observations	72,087	49,610
Category-by-Week FE	Y	N
Vintage-by-Week FE	Y	N
Fund-by-Week FE	N	Y
Controls	Y	Y
Ret/COVID/Retail Interactions	Y	Y
Adj R^2	0.0365	0.129

Table 9. Retail vs. Institutional Sustainability Fund Flows (continued)

	Dependent Variable: Net Flow	
	(1)	(2)
High ESG × COVID (Crash) × Retail	-0.246**	-0.157
	(0.107)	(0.106)
High ESG × COVID (Stimulus) × Retail	-0.265**	-0.269**
	(0.119)	(0.120)
Low ESG × COVID (Crash) × Retail	0.297**	0.343**
	(0.127)	(0.150)
Low ESG × COVID (Stimulus) × Retail	0.126	-0.062
	(0.117)	(0.139)
High ESG × Retail	0.014	0.013
	(0.065)	(0.067)
Low ESG × Retail	-0.013	-0.066
	(0.067)	(0.091)
COVID (Crash) × Retail	-0.074	-0.080
	(0.055)	(0.051)
COVID (Stimulus) × Retail	-0.235***	-0.285***
	(0.080)	(0.091)
Retail	-0.044**	-0.121***
	(0.022)	(0.028)
High ESG × COVID (Crash)	0.041	
	(0.097)	
High ESG × COVID (Stimulus)	0.059	
	(0.085)	
Low ESG × COVID (Crash)	-0.261**	
	(0.107)	
Low ESG × COVID (Stimulus)	0.056	
	(0.130)	
High ESG	0.133*	
	(0.069)	
Low ESG	-0.010	
	(0.065)	
Observations	72,087	49,610
Category-by-Week FE	Y	N
Vintage-by-Week FE	Y	N
Fund-by-Week FE	N	Y
Controls	Y	Y
Ret/COVID/Retail Interactions	Y	Y
Adj R^2	0.0370	0.130

Table 10. International Robustness

This table presents results from fund-week level diff-in-diff regressions of net flows on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with a dummy variable indicating the post-COVID period starting in the week ending Feb 22. The regressions are run on three geographical subsamples: European funds, all non-US funds, and all global funds including US funds. Control variables include prior month's return, interactions between past returns and COVID period dummies, log of total net assets, dummies for star rating upgrades and downgrades, as well as category-by-week, vintage-by-week, and country-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

	Dependent Variable: Net Flow					
	Europe		All Non-US		All Global	
	(1)	(2)	(3)	(4)	(5)	(6)
High ESG × COVID	-0.188**	-0.174**	-0.217***	-0.193***	-0.207***	-0.187***
	(0.079)	(0.081)	(0.066)	(0.066)	(0.055)	(0.055)
Low ESG × COVID	0.090	0.086	0.120**	0.108*	0.114**	0.100**
	(0.066)	(0.066)	(0.058)	(0.057)	(0.049)	(0.049)
High ESG	0.257***	0.248***	0.262***	0.248***	0.238***	0.227***
	(0.061)	(0.063)	(0.055)	(0.056)	(0.047)	(0.047)
Low ESG	-0.197***	-0.198***	-0.220***	-0.217***	-0.187***	-0.182***
	(0.060)	(0.060)	(0.049)	(0.048)	(0.041)	(0.041)
Category-by-Week FE	Y	Y	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y	Y	Y
Country-by-Week FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Ret/COVID Interactions	N	Y	N	Y	N	Y
Observations	80,890	80,890	141,564	141,564	179,193	179,193
Adj R^2	0.0512	0.0514	0.0609	0.0617	0.0578	0.0584

Table 11. Effects of Reopening the Economy

This table presents results from fund-week level diff-in-diff regressions of net flows on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID period, broken into three sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)), stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)), and a reopening period from May 2 to June 27 (COVID (Reopening)). Control variables include prior month's return, interactions between past returns and COVID period dummies, log of total net assets, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

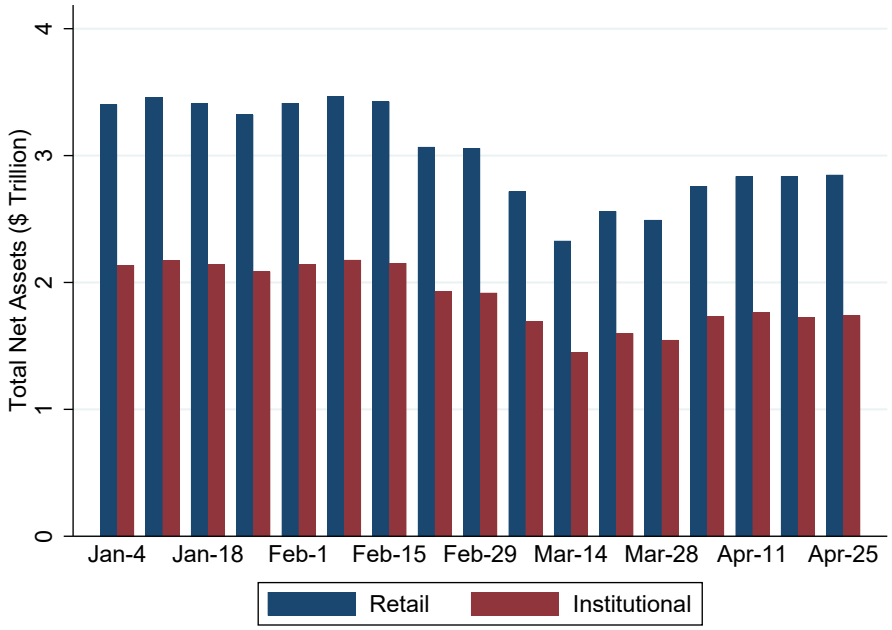
	Dependent Variable: Net Flow	
	(1)	(2)
High ESG × COVID (Crash)	-0.159**	-0.143**
	(0.068)	(0.066)
High ESG × COVID (Stimulus)	-0.219***	-0.227***
	(0.078)	(0.077)
High ESG × COVID (Reopening)	-0.034	-0.030
	(0.079)	(0.079)
Low ESG × COVID (Crash)	0.021	0.007
	(0.089)	(0.091)
Low ESG × COVID (Stimulus)	0.159**	0.173**
	(0.079)	(0.082)
Low ESG × COVID (Reopening)	0.016	0.018
	(0.075)	(0.075)
High ESG	0.140***	0.137**
	(0.054)	(0.054)
Low ESG	-0.053	-0.050
	(0.045)	(0.046)
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Controls	Y	Y
Ret/COVID Interactions	N	Y
Observations	56,558	56,558
Adj R^2	0.0354	0.0355

6 Appendix

Figure A.1. Retail and Institutional Fund Flows and Net Assets

These figures plot weekly aggregate total net assets and dollar net flows of retail and institutional funds over the sample period from Jan 4 to Apr 25, 2020.

a. Total Net Assets



b. Dollar Net Flow

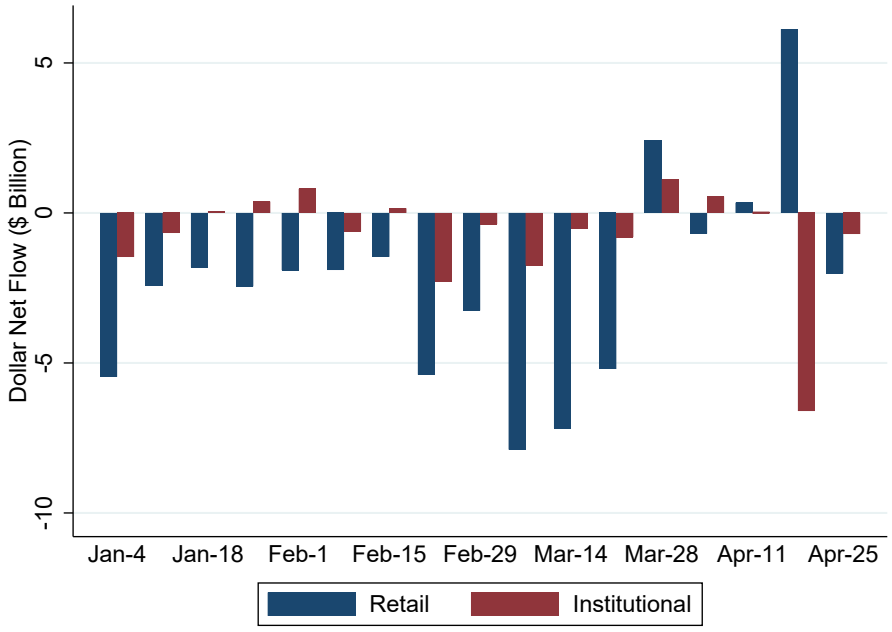


Figure A.2. Weekly Weighted-Average Retail Fund Flows

This figure plots asset-weighted average weekly retail net flows of high (five globes), average (three globes), and low (one globe) sustainability funds, along with their weighted-mean standard error bands, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively.

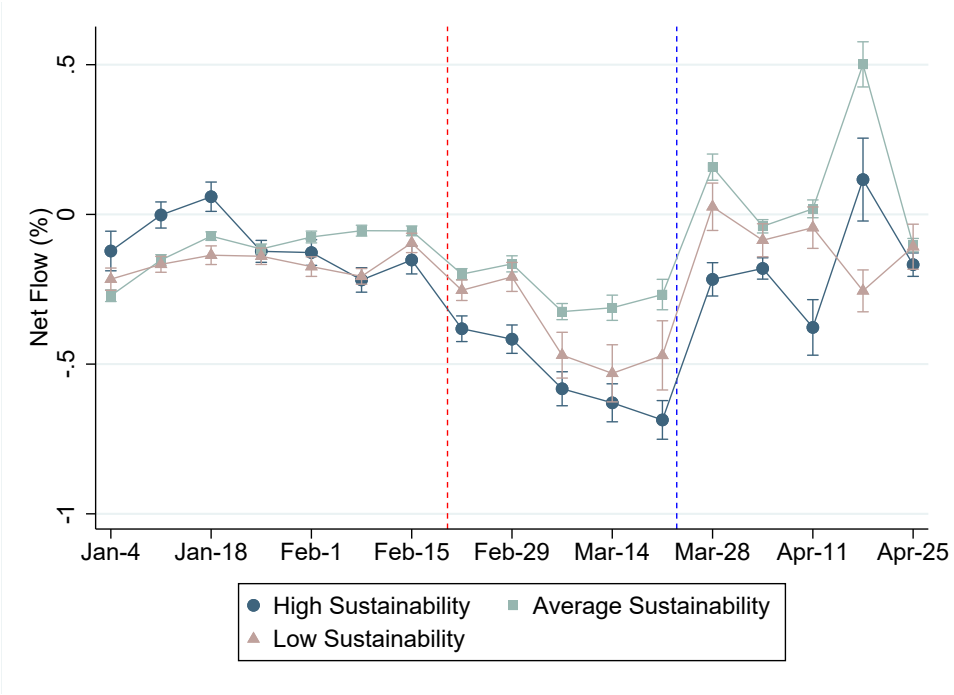


Figure A.3. Weekly Weighted-Average Institutional Fund Flows

This figure plots asset-weighted average weekly institutional net flows of high (five globes), average (three globes), and low (one globe) sustainability funds, along with their weighted-mean standard error bands, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively.

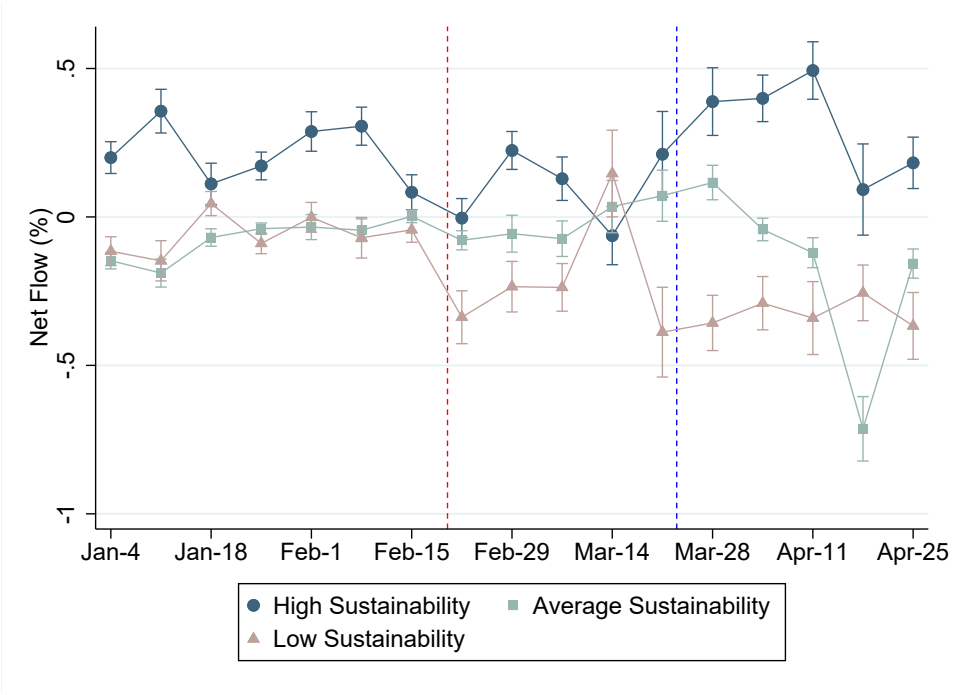
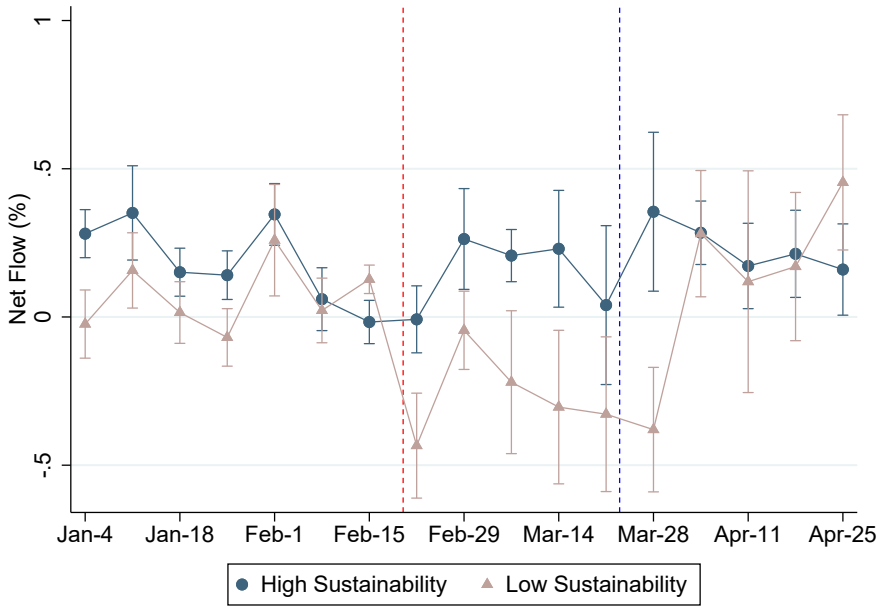


Figure A.4. Week-by-Week Regression Slopes (Institutional)

These figures plot coefficients on *High ESG* and *Low ESG* along with their standard error bands from week-by-week fund level regressions of institutional net flows on dummy variables for Morningstar sustainability ratings, controlling for prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects, over the sample period from Jan 4 to Apr 25, 2020. Morningstar sustainability ratings as of Dec 2019 are used to sort funds. The red and blue vertical dotted lines denote the dates February 20 (beginning of the market crash) and March 23 (stimulus approval date), respectively. Plots are shown for raw net flows and normalized net flows.

a. Net Flow



b. Normalized Net Flow

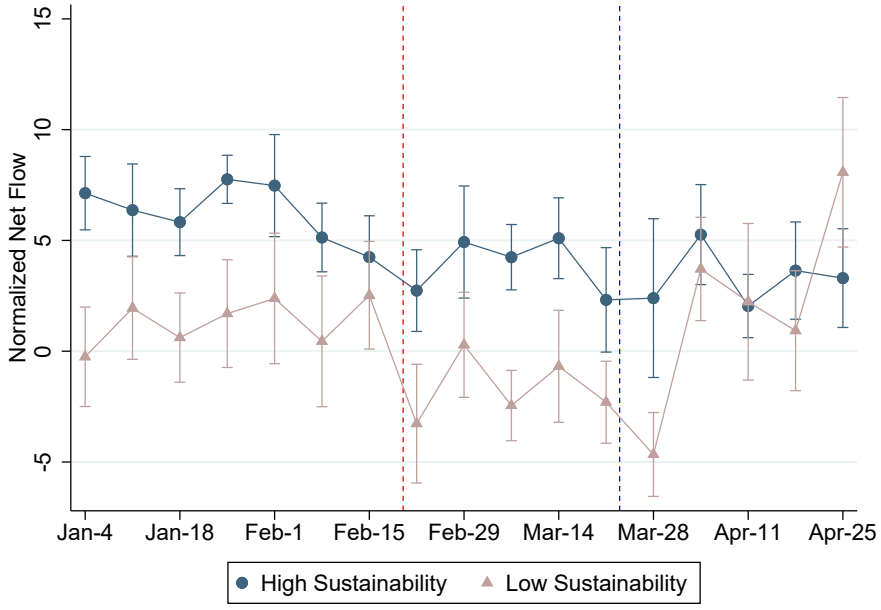


Table A.1. Week-by-Week Regressions Around COVID-19

This table presents results from week-by-week OLS regressions of retail net flows on *High ESG*, *Above Avg ESG*, *Below Avg ESG*, and *Low ESG* dummy variables indicating the fund's Morningstar sustainability rating as of Dec 2019. Control variables include prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category and vintage fixed effects. Standard errors are adjusted for clustering at fund and category levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Net Flow

	Dependent Variable: Net flow																
	Jan-4	Jan-11	Jan-18	Jan-25	Feb-1	Feb-8	Feb-15	Feb-22	Feb-29	Mar-7	Mar-14	Mar-21	Mar-28	Apr-4	Apr-11	Apr-18	Apr-25
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
High ESG	0.209***	0.316***	0.172***	0.116**	0.183**	0.052	0.039	-0.094	-0.037	-0.014	0.086	-0.137	-0.082	-0.031	-0.046	-0.105	0.010
	(0.069)	(0.102)	(0.054)	(0.056)	(0.072)	(0.102)	(0.044)	(0.121)	(0.064)	(0.106)	(0.182)	(0.149)	(0.166)	(0.066)	(0.133)	(0.181)	(0.075)
Above Avg ESG	0.031	0.068	0.042	0.134**	0.064	0.096*	0.063	0.064	0.017	-0.067	-0.195**	-0.063	-0.064	0.033	-0.030	-0.090	-0.020
	(0.077)	(0.045)	(0.037)	(0.055)	(0.050)	(0.054)	(0.040)	(0.068)	(0.078)	(0.088)	(0.085)	(0.142)	(0.064)	(0.059)	(0.078)	(0.112)	(0.064)
Below Avg ESG	0.038	0.089**	0.020	0.103	0.032	0.017	0.029	-0.025	0.110*	-0.027	0.112	0.100	0.095	0.091*	0.103	0.033	0.158***
	(0.082)	(0.036)	(0.048)	(0.066)	(0.063)	(0.076)	(0.029)	(0.074)	(0.054)	(0.066)	(0.105)	(0.106)	(0.091)	(0.049)	(0.063)	(0.129)	(0.050)
Low ESG	-0.028	0.037	-0.066	0.018	0.083	0.073	0.066	0.166	0.049	-0.044	-0.091	0.032	0.065	0.112	0.241	0.101	0.335***
	(0.076)	(0.059)	(0.055)	(0.071)	(0.054)	(0.051)	(0.060)	(0.098)	(0.083)	(0.213)	(0.167)	(0.221)	(0.147)	(0.127)	(0.166)	(0.138)	(0.081)
Observations	2,274	2,277	2,275	2,266	2,252	2,253	2,253	2,237	2,238	2,197	2,170	2,169	2,184	2,141	2,154	2,157	2,157
Category FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj R^2	0.0281	0.0451	0.0555	0.0656	0.0786	0.0819	0.0687	0.0500	0.0733	0.0516	0.0240	0.0260	0.0271	0.0547	0.0620	0.0304	0.0370

Panel B. Normalized Net Flow

	Dependent Variable: Normalized Net flow																
	Jan-4	Jan-11	Jan-18	Jan-25	Feb-1	Feb-8	Feb-15	Feb-22	Feb-29	Mar-7	Mar-14	Mar-21	Mar-28	Apr-4	Apr-11	Apr-18	Apr-25
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
High ESG	3.677*	5.696	5.108**	2.675	5.667***	0.932	1.379	-1.114	-2.640	-4.186***	1.669	-5.658**	-1.748	-3.265**	-3.044	-4.488*	-2.575
	(2.021)	(3.568)	(2.441)	(3.000)	(1.919)	(3.144)	(1.807)	(2.367)	(2.071)	(1.485)	(3.665)	(2.314)	(2.847)	(1.515)	(2.483)	(2.428)	(1.745)
Above Avg ESG	1.517	2.999*	2.042*	4.886**	2.193*	3.356**	1.820	2.318	0.517	-1.796*	-3.048*	-1.191	-0.156	1.514	-0.325	-1.465	-1.552
	(2.081)	(1.583)	(1.156)	(1.825)	(1.206)	(1.618)	(1.349)	(1.501)	(1.112)	(0.962)	(1.772)	(1.453)	(1.039)	(1.433)	(1.723)	(1.426)	(1.400)
Below Avg ESG	1.412	1.943	-0.115	1.399	3.229*	1.590	0.758	0.310	3.781***	-0.243	0.177	1.222	2.360	0.929	2.251	-0.355	0.403
	(2.118)	(1.263)	(1.889)	(1.481)	(1.854)	(1.610)	(1.095)	(1.534)	(1.346)	(1.561)	(1.549)	(1.737)	(1.431)	(1.424)	(1.345)	(1.894)	(1.153)
Low ESG	-3.577**	-0.816	-2.193	-0.508	-0.363	1.121	0.357	1.679	1.423	-0.108	-1.707	-0.434	0.799	0.161	2.305	2.013	2.668
	(1.583)	(1.682)	(2.267)	(1.230)	(1.326)	(2.183)	(2.844)	(2.602)	(2.214)	(2.638)	(2.452)	(1.831)	(2.429)	(3.565)	(3.164)	(2.937)	(1.813)
Observations	2,274	2,277	2,275	2,266	2,252	2,253	2,253	2,237	2,238	2,197	2,170	2,169	2,184	2,141	2,154	2,157	2,157
Category FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj R^2	0.0595	0.0662	0.0703	0.0872	0.115	0.120	0.117	0.0932	0.0996	0.0802	0.0422	0.0405	0.0361	0.0771	0.0673	0.0697	0.0669

Table A.2. Normalized Fund Flows Around COVID-19

This table presents results from fund-week level OLS regressions of normalized net flows on dummy variables indicating the post-COVID period. Regressions are run for the full sample, as well as separately for subsamples of funds in each Morningstar sustainability rating group. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category and vintage fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Before and After COVID-19

	Dependent Variable: Normalized Net Flow				
	High	Above Average	Average	Below Average	Low
	(1)	(2)	(3)	(4)	(5)
COVID	-3.014*	-1.310	2.337***	2.490**	5.396***
	(1.556)	(1.008)	(0.901)	(1.055)	(1.475)
Observations	3,337	8,463	14,163	8,962	3,014
Category FE	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Adj R^2	0.142	0.0785	0.0733	0.0902	0.156

Panel B. Before COVID-19, During the Crash, and During the Stimulus

	Dependent Variable: Normalized Net Flow				
	High	Above Average	Average	Below Average	Low
	(1)	(2)	(3)	(4)	(5)
COVID (Crash)	-2.861*	-1.233	2.410***	2.531**	5.358***
	(1.575)	(1.024)	(0.909)	(1.058)	(1.488)
COVID (Stimulus)	0.753	1.134	4.371***	4.431***	7.673***
	(2.713)	(1.569)	(1.454)	(1.693)	(2.364)
Observations	3,337	8,463	14,163	8,962	3,014
Category FE	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Adj R^2	0.143	0.0789	0.0736	0.0904	0.157

Table A.3. Asymmetric Effects of COVID-19 on Fund Inflows and Outflows

This table presents results from fund-week level regressions of absolute net flows on *NegFlow* − an indicator for whether the fund's weekly net flow is negative − and its interactions with *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with dummy variables indicating the post-COVID period starting in the week ending Feb 22. In Panel A a single COVID indicator is used, whereas in Panel B the COVID period is broken into two sub-periods: A market crash period from Feb 22 to Mar 21 (COVID (Crash)) and stimulus period from Mar 28 to Apr 25 (COVID (Stimulus)). Control variables include prior month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

Panel A. Before and After COVID-19

	Dependent Variable: Absolute Net Flow	
	(1)	(2)
High ESG × COVID × NegFlow	0.226**	0.215**
	(0.095)	(0.095)
High ESG × COVID	-0.151*	-0.135
	(0.086)	(0.086)
Low ESG × COVID × NegFlow	-0.173	-0.175
	(0.115)	(0.116)
Low ESG × COVID	0.183	0.178
	(0.114)	(0.115)
High ESG × NegFlow	-0.205***	-0.199***
	(0.074)	(0.074)
High ESG	0.176**	0.169**
	(0.070)	(0.070)
Low ESG × NegFlow	0.006	0.011
	(0.086)	(0.083)
Low ESG	-0.014	-0.015
	(0.084)	(0.081)
COVID × NegFlow	-0.067*	-0.075
	(0.037)	(0.058)
NegFlow	-0.062***	-0.035
	(0.024)	(0.026)
Observations	37,654	37,654
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Controls	Y	Y
Ret/COVID/NegFlow Interactions	N	Y
Adj R^2	0.0948	0.0952

Table A.3. Asymmetric Effects of COVID-19 on ESG Inflows and Outflows (continued)

Panel B. Before COVID-19, During the Crash, and During the Stimulus

	Dependent Variable: Absolute Net Flow	
	(1)	(2)
High ESG × COVID (Crash) × NegFlow	0.235*	0.207*
	(0.122)	(0.120)
High ESG × COVID (Stimulus) × NegFlow	0.221*	0.244**
	(0.117)	(0.117)
High ESG × COVID (Crash)	-0.162	-0.131
	(0.112)	(0.110)
High ESG × COVID (Stimulus)	-0.142	-0.153
	(0.106)	(0.106)
Low ESG × COVID (Crash) × NegFlow	-0.050	-0.051
	(0.162)	(0.161)
Low ESG × COVID (Stimulus) × NegFlow	-0.263*	-0.299**
	(0.140)	(0.139)
Low ESG × COVID (Crash)	0.078	0.075
	(0.144)	(0.144)
Low ESG × COVID (Stimulus)	0.251*	0.265*
	(0.144)	(0.143)
High ESG × NegFlow	-0.205***	-0.199***
	(0.074)	(0.074)
High ESG	0.176**	0.168**
	(0.070)	(0.070)
Low ESG × NegFlow	0.006	0.011
	(0.086)	(0.083)
Low ESG	-0.014	-0.015
	(0.084)	(0.081)
COVID (Crash) × NegFlow	-0.005	0.079
	(0.054)	(0.061)
COVID (Stimulus) × NegFlow	-0.114***	-0.380***
	(0.043)	(0.099)
NegFlow	-0.062***	-0.035
	(0.024)	(0.026)
Observations	37,654	37,654
Category-by-Week FE	Y	Y
Vintage-by-Week FE	Y	Y
Controls	Y	Y
Ret/COVID/Negflow Interactions	N	Y
Adj R^2	0.0951	0.0962

Table A.4. Buying the Dip? COVID-19 and ESG Fund Returns

This table presents results from fund-week level diff-in-diff regressions of weekly returns on *High ESG* and *Low ESG* − dummy variables indicating whether a fund had a high or low Morningstar sustainability rating as of Dec 2019 − and their interactions with a dummy variable indicating the post-COVID period starting in the week ending Feb 22. Control variables include prior month's return, prior 12-month's return, interactions between past returns and COVID period dummies, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, star rating level, as well as category-by-week and vintage-by-week fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels (*** p<0.01, ** p<0.05, * p<0.1).

	Dependent Variable: Weekly Fund Return			
	(1)	(2)	(3)	(4)
High ESG × COVID	0.057	0.037	0.048	0.064
	(0.072)	(0.078)	(0.069)	(0.064)
Low ESG × COVID	-0.001	0.039	0.011	0.008
	(0.132)	(0.126)	(0.139)	(0.136)
High ESG	0.107***	0.035	0.111***	0.018
	(0.037)	(0.044)	(0.037)	(0.031)
Low ESG	-0.173***	-0.088	-0.178***	-0.069
	(0.060)	(0.063)	(0.060)	(0.056)
Ret × COVID			0.024	
			(0.055)	
Ret	0.027		0.007	
	(0.041)		(0.024)	
Ret12m × COVID				-0.123
				(0.230)
Ret12m		0.355*		0.446***
		(0.190)		(0.078)
log(TNA)	0.017***	0.002	0.017***	0.002
	(0.006)	(0.005)	(0.006)	(0.006)
Expense Ratio	0.042*	0.029	0.043*	0.029
	(0.024)	(0.022)	(0.024)	(0.022)
Δ^+Star	-0.077		-0.077	
	(0.059)		(0.058)	
Δ^-Star	0.084**		0.086**	
	(0.041)		(0.043)	
Star Rating		0.028		0.027
		(0.033)		(0.032)
Observations	37,654	34,746	37,654	34,746
Category-by-Week FE	Y	Y	Y	Y
Vintage-by-Week FE	Y	Y	Y	Y
Adj R^2	0.963	0.963	0.963	0.963