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Sustainability Preferences Under Stress: Evidence from COVID-19

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Abstract

We document fragile demand for socially responsible investments (SRIs) by retail mutual fund investors. Using COVID-19 as an economic shock, we show funds with higher sustainability ratings experienced sharper declines in retail flows during the pandemic, controlling for fund characteristics. The decline in retail SRI fund flows is sharper than that of institutional flows, more pronounced when economies are hit harder by COVID-19, and unlikely to be driven by fund performance, past flows and size, or shifting investor attention. Corroborated by out-of-sample survey evidence, our findings highlight the high sensitivity of SRI demand by retail investors with respect to income shocks.

I. Introduction

Socially responsible investing has grown rapidly over the recent decade, reaching everyday investors and sparking a debate on the determinants of investor demand for socially responsible investment (SRI). Recent studies highlight protection against downside risk provided by investments with strong environmental, social, and governance (ESG) criteria, as well as pro-social preferences that may drive investor demand for such investments. An important but unanswered question

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related to this literature is how sensitive investor demand for SRI is to changes in real economic conditions. We fill this gap by documenting fragility in SRI demand among retail mutual fund investors in the face of economic distress.

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 Feb. 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 the demand for sustainable investments, as it triggered the first major economic crisis of its magnitude and severity since the substantial growth in sustainable investing in recent years.[1]

Using the COVID-19 shock, we analyze investment responses by retail investors in mutual funds with different ESG ratings. We hypothesize that retail SRI fund flows respond sensitively to the COVID-19 shock based on a number of well-documented facts in the literature. First, retail SRI demand is often driven by pro-social preferences (see Riedl and Smeets (2017)), rather than explicit public commitments to ESG often made by institutional investors.[2] Pursuing such pro-social motives may be perceived as costly, especially in the face of negative economic shocks. Moreover, retail investors have limited capital and tend to actively reallocate investments across different funds (see, e.g., Del Guercio and Tkac (2008), Frazzini and Lamont (2008), Ben-Rephael, Kandel, and Wohl (2012), Wang and Young (2020), and Ceccarelli, Ramelli, and Wagner (2021)). These facts motivate a hypothesis that the negative income shock and ensuing economic distress imposed by the COVID-19 crisis will have shifted investor demand away from sustainable investments, consistent with retail investors facing higher marginal costs of pursuing pro-social preferences during economic downturns.[3]

In a difference-in-differences framework using weekly retail fund flow and sustainability rating data from Morningstar, we find that investor demand for SRI significantly weakens under the economic stress induced by COVID-19. While funds with high Morningstar sustainability ratings (i.e., high ESG funds) receive higher than average flows prior to the COVID-19 crisis, these relatively high flows disappear after the pandemic-induced market crash in mid-February 2020.[4] In fact, high ESG funds are significantly more likely to suffer net outflows than the average fund during the COVID-19 crisis period compared to before. Moreover, the decline in SRI fund flow persists after late March, when the market rebounded following the announcement of the U.S. stimulus package while the real economy continued to deteriorate. This result is illustrated in Figure 1, plotting weekly average retail

[1]For example, see Baker, Bloom, Davis, Kost, Sammon, and Viratyosin (2020a) and Ramelli and Wagner (2020) for recent studies documenting the exogenous and unprecedented nature of the COVID-19 shock.

[2]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). See Figure A.1 in the Supplementary Material.

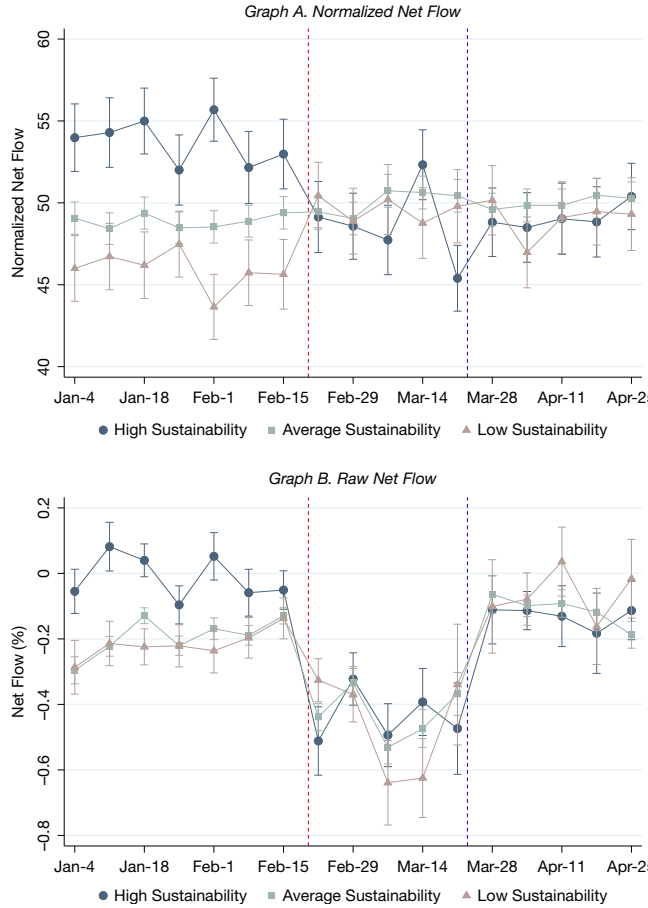
[3]In the Supplementary Material, we derive this hypothesis from a simple model that embeds nonpecuniary utility from holding sustainable investments, drawing from equilibrium models of ESG investing (see Pastor, Stambaugh, and Taylor (2021b)).

[4]The pre-COVID trends are consistent with Hartzmark and Sussman (2019) and Ceccarelli et al. (2021).

FIGURE 1

Weekly Average Retail Fund Flows by Sustainability Rating

The graphs in Figure 1 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 Feb. 20 (beginning of the market crash) and Mar. 23 (stimulus approval date), respectively. Plots are shown for normalized net flows (Graph A) and raw net flows (Graph B).



fund flows over the period from Jan. to Apr., 2020 for funds with different sustainability ratings.

We conduct several additional tests to help draw inferences from the changes in SRI demand by individual investors. First, we contrast them with institutional fund flows. In doing so, our study departs from extant studies documenting resilient returns and demand for sustainable investments (see, e.g., Albuquerque, Koskinen, Yang, and Zhang (2020), Pastor and Vorsatz (2020), and Ding, Levine, Lin, and Xie (2021)), which often abstract from important investor heterogeneity crucial for understanding the nature of SRI demand and the sources of its resilience or fragility (see, e.g., Oehmke and Opp (2020), Pastor et al. (2021b), and Goldstein, Kopytov, Shen, and Xiang (2022)). In particular, differences between retail and institutional

investors have important implications for explaining the responses of retail SRI flows to COVID-19. Unlike retail investors, institutional investors are subject to investment mandates that restrict the universe of stocks they can invest in and the variability of their holdings (see Koijen and Yogo (2019)). Recently, institutions increasingly include explicit commitments to ESG issues in their mandates, often initiating ESG-related shareholder engagement and demanding higher standards on corporate ESG disclosure (see, e.g., Dyck, Lins, Roth, and Wagner (2019), Krueger, Sautner, and Starks (2020), Barko, Cremers, and Renneboog (2021), Ilhan, Krueger, Sautner, and Starks (2023), and Hoepner, Oikonomou, Sautner, Starks, and Zhou (2022)).[5] Compared to retail investors, institutional investors are also less financially constrained and more sophisticated in their investment strategies (see Evans and Fahlenbrach (2012)).[6] As such, institutional investors are less likely to turn away from sustainable investments during market turbulence and economic downturns (see, e.g., Blanchett, Finke, and Reuter (2020), Cao, Titman, Zhan, and Zhang (2023)).

Consistent with these distinctions, we find that institutional flows into high ESG funds do not decline in response to the COVID-19 shock, in contrast to retail flows. We highlight differences between retail and institutional fund flow responses to COVID-19 in pooled triple-difference regressions, which allows us to compare retail and institutional share classes within the same fund by controlling for fund-by-week fixed effects that subsume all portfolio-level characteristics. Given the explicit ESG mandates and deeper pockets of institutional investors, this result taken together with our main finding indicates that the decline in SRI demand by retail investors was driven by the economic distress imposed by COVID-19.

We also exploit geographic heterogeneity in the severity of the economic impact of COVID-19 to corroborate our interpretation. Our results are not only robust on average in an international sample of open-end funds extended beyond our baseline U.S. sample, but also more pronounced for funds sold in countries with stringent restrictions (e.g., lockdowns) or low economic growth during COVID-19. In other words, the ESG fund flow responses are more negative when the real economic effects of COVID-19 are more severe.

In exploring other potential channels, we first exclude explanations based on conventional factors known to explain fund flows by directly controlling for a host of fund characteristics related to size, expenses, performance, style, and star ratings, combined with a rich set of granular fixed effects. We further inoculate our results from the effects of noise and outliers by normalizing flows within fund size deciles. We also show the results are not driven by differences in past performance or contemporaneous return-chasing strategies, nor by differences in past flows across funds with different sustainability ratings. Our results are also robust to controlling for shifts in flows into index funds or healthcare/technology sector funds around the

[5]Many institutions publicize such commitments by joining global networks of proponents for responsible investing, such as the Principles for Responsible Investment (PRI) (see Gibson, Glossner, Krueger, Matos, and Steffen (2022)). Consistent with such investment mandates, Glossner, Matos, Ramelli, and Wagner (2021) find no evidence that institutions tilt toward or away from sustainable investments during the crisis, despite seeking shelter in hard measures of financial resilience.

[6]Institutional share classes of mutual funds, which typically have lower expense ratios, are offered to capital-rich investors with high minimum investment requirements of $200,000 or more.

shock. We also find no evidence of increased fund entry during our sample period, indicating that greater competition for SRI flows is not a likely culprit either.

A plausible alternative explanation is that COVID-19 served as a salient event that shifted the attention of retail investors away from sustainable investments toward other assets. Consistent with this channel, Ozik, Sadka, and Shen (2021) show that retail trading activity increased sharply during COVID-19 lockdowns, especially among stocks with high COVID-19-related media coverage. We explore this channel in three ways. First, we test whether the post-pandemic drop in ESG fund flow is more pronounced for funds with higher pre-pandemic flow-performance sensitivity as a proxy for ex-ante fund level investor attentiveness to salient information about the fund. Second, we extend our sample period to compare pre-pandemic ESG fund flows with post-pandemic flows during subperiods when most U.S. states ended lockdowns and reopened their economies, when vaccine developments materialized, and when retail investors prominently traded speculative assets at the center of social media attention. Finally, we correlate ESG fund flows with measures of aggregate retail stock trading activity. Across these tests, we find no evidence that ESG fund flows around the COVID-19 crisis were negatively associated with indicators of retail investor attention to stocks, suggesting that the markets for SRI and speculative investments may accommodate distinct groups of investors. However, conclusions regarding investor composition in these different markets cannot be definitively made without more granular information regarding retail investor portfolios, and we leave this for future research.

Another possibility is that retail investors lowered their expectations about the future performance of investments around the COVID-19 shock (see Giglio, Maggiori, Stroebel, and Utkus (2021)). This may have contributed to a shift away from ESG funds during the crisis. Because it is difficult to infer changes in beliefs from fund flows alone, we rely on indirect out-of-sample evidence from an online survey experiment designed in the spirit of Chinco, Hartzmark, and Sussman (2022) to elicit revealed preference for ESG investing from a pool of retail investor participants recruited from the online platform Prolific. The survey is comprised of i) a repeated experiment in which participants choose investment allocations based on hypothetical income shocks as well as information about the sustainability ratings and returns of two different mutual funds, and ii) a series of questionnaires regarding beliefs and expectations about sustainable investments. With the caveat of an out-of-sample survey, our experiment highlights that income shocks can significantly and negatively impact SRI demand by individuals, underscoring the real economic effects of COVID-19 as a potentially important channel for its impact on SRI fund flows. Although the survey was conducted after some of the effects of COVID-19 were revealed, the responses also indicate that retail investors do *not* expect sustainable investments to perform worse after COVID-19 than before, which is inconsistent with concerns that changes in return expectations may have driven the fall in SRI demand during the crisis.

Our study is closely related to the literature that examines how different investor objectives drive sustainable investment demand. A large body of research highlights the role of social capital in mitigating firm downside risk (see, e.g., Lins, Servaes, and Tamayo (2017), Albuquerque, Koskinen, and Zhang (2019)).

For example, investors view climate change as an important source of risk (see, e.g., Krueger et al. (2020), Ilhan et al. (2023)). This risk is priced by markets (see, e.g., Bernstein, Gustafson, and Lewis (2019), Baldauf, Garlappi, and Yannelis (2020), and Bolton and Kacperczyk (2021)), and investors seek strategies to hedge against this risk (see, e.g., Engle, Giglio, Kelly, Lee, and Stroebel (2020), Giglio, Kelly, and Stroebel (2021)). In the context of such risks, the impact of income shocks on SRI demand is ambiguous: On one hand, investors may demand liquidity during bad times and sell better-performing sustainable investments, while on the other hand, increased risk aversion may induce them to seek shelter in these assets. Another strand of literature documents nonpecuniary pro-social motives for SRI. For example, sustainable fund flows are less volatile and less sensitive to past negative returns (see, e.g., Bollen (2007), Renneboog, Ter Horst, and Zhang (2011)), and social preferences or signals often outweigh financial motives in SRI decisions (see, e.g., Riedl and Smeets (2017), Bauer, Ruof, and Smeets (2021)). Indeed, it has been shown that salient information on sustainability attracts fund flows (see, e.g., Hartzmark and Sussman (2019), Ceccarelli et al. (2021)). Under such nonpecuniary motives, SRI may be sensitive to income shocks akin to demand for luxury goods (see Bansal, Wu, and Yaron (2022)). In fact, recent studies model the mix of such heterogeneous investors as a crucial ingredient in understanding SRI demand (see, e.g., Oehmke and Opp (2020), Humphrey, Kogan, Sagi, and Starks (2021), Pastor et al. (2021b), Pedersen, Fitzgibbons, and Pomorski (2021), and Goldstein et al. (2022)). We contribute to this literature by highlighting the importance of economic stress in the sustainability of SRI demand by retail investors.

Our work also complements recent studies investigating the consequences of COVID-19 on sustainable investments, which document resilient returns and flows to high ESG assets during the crisis (see, e.g., Albuquerque et al. (2020), Pastor and Vorsatz (2020), and Ding et al. (2021)). Pooling retail and institutional funds, Pastor and Vorsatz (2020) argue that ESG fund flows remained stable during the crisis based on cumulative flows after the onset of the crisis. While this is an important finding, this interpretation is not based on a comparison of fund flows after the COVID-19 shock relative to before. A key distinction of our study is that we formally compare pre-COVID and post-COVID fund flows in a difference-in-differences framework, and also across different investor groups by cleanly treating retail and institutional share classes as separate funds, allowing us to uncover fragility in retail SRI fund flows. However, their finding is not inconsistent with ours, which shows that when retail and institutional investors are pooled together, high ESG funds do continue to attract more flows than other funds after the COVID-19 shock, but to a lesser extent than before.[7] This interpretation is also consistent with subperiod univariate analysis by Pastor and Vorsatz (2020), which indicates that the gap in flows between high and low ESG funds narrowed by half.

Distinct from these studies, we highlight a source of fragility in SRI demand stemming from investor heterogeneity that is important to understanding determinants of SRI demand, namely that retail investors are more sensitive to real economic shocks than institutional investors. Understanding retail SRI preferences is also important given the increasing market participation by retail investors (see,

[7]See Figure A.2 in the Supplementary Material.

e.g., Barber and Odean (2001), Cen (2019), Kalda, Loos, Previtero, and Hackethal (2021), and Ozik et al. (2021)).[8] In the long term, our finding implies a potentially broader shift in investor preferences under prolonged economic distress, due to potential externalities from retail flows that may weaken institutional ESG commitment more broadly.

II. The COVID-19 Crisis

In early 2020, the coronavirus pandemic, or COVID-19, brought a major shock to the global economy, spreading from a regional health crisis in Wuhan, China, to a global crisis within a few months. The crisis disrupted the real economy and financial markets with unprecedented speed, and triggered a stock market crash in mid-February (see, e.g., Baker et al. (2020a), Ramelli and Wagner (2020)). 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 in mid-March (see, e.g., Alfaro, Chari, Greenland, and Schott (2020), Croce, Farroni, and Wolfskeil (2020), Giglio et al. (2021), Gormsen and Koijen (2020), and Fahlenbrach, Rageth, and Stulz (2021)).

Given the ramifications of the COVID-19 pandemic for labor, healthcare, and social unrest, 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 investors. Many practitioners anticipate even faster growth in sustainable investing in the post-COVID era, based on evidence of resilient performance by SRI during the crisis (see, e.g., Albuquerque et al. (2020), Ferriani and Natoli (2020), Pastor and Vorsatz (2020), and Ding et al. (2021)).[9] Distinct from this outlook, we hypothesize that the unique nature of the COVID-19 crisis has disproportionately adverse implications for SRI demand by retail mutual fund investors, individuals who are vulnerable to economic shocks and comprise a significant fraction of the mutual fund investor base.

A unique aspect 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

[8]Consistent with our results, Glossner et al. (2021) document that retail stock investors at an online discount brokerage platform invested differently from institutional investors during the COVID-19 crash, exhibiting reduced interest in environmental and social stocks.

[9]See comments by industry leaders such as BlackRock (https://www.blackrock.com/institutions/en-gb/our-clients/defined-contribution/esg-amid-covid-and-beyond), JPMorgan (https://www.jpmorgan.com/global/research/covid-19-esg-investing), Morgan Stanley (https://www.morganstanley.com/im/en-us/individual-investor/insights/investment-insights/covid-19-six-implications-for-sustainable-investing-in-an-interconnected-world.html), and UBS (https://www.ubs.com/global/en/wealth-management/chief-investment-office/investment-opportunities/sustainable-investing/2020/sustainable-investing-after-covid19.html). Also see media coverage by CNBC (https://www.cnbc.com/2020/06/07/sustainable-investing-is-set-to-surge-in-the-wake-of-the-coronavirus-pandemic.html), Forbes (https://www.forbes.com/sites/georgkell/2020/05/19/covid-19-is-accelerating-esg-investing-and-corporate-sustainability-practices), the *Wall Street Journal* (https://www.wsj.com/articles/esg-investing-shines-in-market-turmoil-with-help-from-big-tech-11589275801), and Morningstar 2020 Q1 (https://www.morningstar.co.uk/uk/news/202274/investors-back-esg-in-the-crisis.aspx/) Q2 (https://www.morningstar.co.uk/uk/news/204525/sustainable-fund-flows-hit-record-in-q2.aspx) reports.

consumption and business revenues through quarantines and lockdowns (see, e.g., Baker, Farrokhnia, Meyer, Pagel, and Yannelis (2020b), Fahlenbrach et al. (2021), Horvath, Kay, and Wix (2021), and Alekseev, Amer, Gopal, Kuchler, Schneider, Stroebel, and Wernerfelt (2023)). Consequently, it affected labor demand, resulting in pay cuts and job losses (see, e.g., Cajner, Crane, Decker, Grigsby, Hamins-Puertolas, Hurst, Kurz, and Yildirmaz (2020a), Cajner, Crane, Decker, Hamins-Puertolas, and Kurz (2020b), Coibion, Gorodnichenko, and Weber (2020b), and Forsythe, Kahn, Lange, and Wiczer (2020)). In turn, consumers experienced substantial income shocks, which further impacted their consumption behavior as well as expectations about future employment and consumption (see, e.g., Baker, Farrokhnia, Meyer, Pagel, and Yannelis (2020c), Coibion, Gorodnichenko, and Weber (2020a), and Granja, Makridis, Yannelis, and Zwick (2022)). It has been widely documented that consumers curtailed spending most dramatically in nonessential 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, Baker, Barrero, Bloom, Bunn, Chen, Davis, Leather, Meyer, Mihaylov, Mizen, Parker, Renault, Smietanka, and Thwaites (2020)).

A. Hypothesis

An important implication of the nature of the COVID-19 shock is that it heavily affects demand for costly but nonessential goods. It, therefore, provides a laboratory for testing whether sustainable investments by retail investors are sensitive to economic shocks. As we formally show in the Supplementary Material, this prediction arises from a simple model that embeds nonfinancial motives for such investments.[10] The framework draws from equilibrium models of ESG investing in which investors weigh the nonpecuniary utility from holding sustainable investments against earning lower expected returns (see, e.g., Pastor, Stambaugh, and Taylor (2022), Pastor et al. (2021b)). The model predicts that investors prioritize financial returns in the face of an economic shock as their marginal utility of consumption increases. To examine this prediction, we focus on retail mutual fund flows as a proxy for individual investor demand for SRI. In the following section, we describe how we collect our data and construct our sample.

III. Data and Sample Overview

A. Data

We obtain data for all open-end domestic U.S. 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 Jan. 2019 to Apr. 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

[10]See Section A.IV in the Supplementary Material.

and net flows over the week. We also compute prior month's and previous 12 months' returns, as well as Fama and French (2015) 5-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.

To measure 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 historical 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 freely available to investors through the Morningstar website. The introduction of the rating has also been shown to affect both retail and institutional fund flows, where funds with five- (one-) globe ratings receive greater (smaller) than average flows (see Hartzmark and Sussman (2019)). Motivated by this finding, we identify funds with five globes as "high ESG funds" and funds with one globe as "low ESG funds."

To arrive at our main sample, we first retain funds that have at least one nonmissing daily flow value during a given week. Following Kacperczyk, Van Nieuwerburgh, and Veldkamp (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, e.g., 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 and sustainability ratings are those of the largest share class. If the fund offers both retail and institutional share classes, we separately aggregate share-level information as 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 Jan. 4, 2020 to the week ending Apr. 25, 2020. The main focus of our study is on the sample of retail mutual funds. Detailed variable definitions are listed in the Appendix.

[11]Sustainalytics ESG Risk Ratings measure a firm's unmanaged exposure to ESG risks, such that firms with better ESG practices and less controversial businesses obtain better scores. See Sustainalytics website (https://www.sustainalytics.com/esg-ratings/).

[12]See Morningstar Sustainability Rating Methodology (https://www.morningstar.com/content/dam/marketing/shared/research/methodology/744156_Morningstar_Sustainability_Rating_for_Funds_Methodology.pdf).

TABLE 1
Summary Statistics

Table 1 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, 2020), post-COVID crash (Feb. 22 to Mar. 21, 2020), and post-COVID stimulus subperiods (Mar. 28 to Apr. 25, 2020).

Panel A. Variable Distributions

Variables	Mean	Std. 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						

Panel B. Morningstar Sustainability Rating Breakdowns

Sustainability Rating	NET FLOW	NORM NET_FLOW	TOTAL NET_ASSETS	MONTHLY RETURN	PRIOR 12_M_RETURN	FF5_ 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 (Jan. 4–Apr. 25)														
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 (Jan. 4–Feb. 15)														
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 (Feb. 22–Mar. 21)														
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 (Mar. 28–Apr. 25)														
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		

B. 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 a fraction of the fund's total net assets in the previous week. We normalize net flows as the percentile ranking of flows among funds within the same net asset size-sorted decile in a given week, to eliminate the impact of noise and outliers in raw net flows as well as systematic heterogeneities in flows across funds of different sizes (see, e.g., Spiegel and Zhang (2013), Hartzmark and Sussman (2019)). Alternatively, we present results based on raw net flows, which are better suited to interpret the economic significance.

Panel A of Table 1 describes how the data is distributed. Panel B classifies funds into groups according to their Morningstar sustainability ratings: High (five globes), above average (four globes), average (three globes), below average (two globes), and low (one globe). For each sustainability rating, 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 Jan. 4, 2020 to the week ending Apr. 25, 2020, and for three subperiods: 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 Feb. 20; the "post-COVID, crash" period from the week of Feb. 20 to Mar. 21 before the approval of the COVID-19 stimulus package by the U.S. government; and the "post-COVID, stimulus" period after the announcement of the coronavirus rescue package.

Unconditionally, high ESG funds attract higher weekly fund flows compared to low ESG funds, consistent with Hartzmark and Sussman (2019). High ESG funds also have superior past performance, are smaller in size, cheaper in terms of expenses, and younger in age.[13] 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 reflect ESG-related mandates in their prospectuses or fund names and have "low carbon" designations from Morningstar.[14]

After the beginning of the market crash induced by COVID-19, the differences in both normalized and raw net flow between high and low sustainability funds disappear, 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 economically

[13]Note that higher past realized returns may reflect unexpected increases in environmental concerns and are not inconsistent with lower expected returns going forward (see Pastor et al. (2022)).

[14]To determine whether the fund has an ESG-related mandate, we flag funds with mandates on environmental concerns, carbon footprint reduction, renewable energy, gender issues, community development, or ESG shareholder engagement in their prospectuses, or funds with names that include the following strings: "SUSTAIN," "GREEN," "ESG," "CSR," "RESPONSIB," "CLIMATE," "WARMING," "ENVIRONMENT," "SOCIAL," and "GOVERNANCE." Morningstar low carbon designations are based on portfolio-level fossil fuel involvement and carbon risk scores from Sustainalytics (see Ceccarelli et al. (2021)).

and statistically indistinguishable from 0 after the market crash begins. This marked shift in net flow also persists after the stimulus package approval.

This key preliminary result is illustrated in Figure 1, where we plot weekly average normalized net flows (Graph A) and raw net flows (Graph B) of retail funds with high, average, and low sustainability ratings as of Dec. 2019. Parallel trends across sustainability rating groups prior to the shock as well as the differential effects of the shock are both clearly observed, a point we inspect further to validate our difference-in-differences framework.

Overall, the preliminary findings suggest a clear shift in investor demand away from socially responsible funds among retail mutual fund investors. We interpret this as reflecting a high sensitivity of SRI demand by individual investors to income shocks. Next, we investigate this channel and other potential explanations more rigorously in difference-in-differences analyses with a host of controls and fixed effects.

IV. Results

A. Main Results

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

$$\begin{aligned}(1)\quad \text{NORM\_FLOW}_{i,t} = {} & \beta_1 \cdot \text{HIGH\_ESG}_i \times \text{COVID}_t + \beta_2 \cdot \text{LOW\_ESG}_i \times \text{COVID}_t \\ & + \beta_3 \cdot \text{HIGH\_ESG}_i + \beta_4 \cdot \text{LOW\_ESG}_i \\ & + \gamma' \cdot X_{i,t} + \mu_{j,t} + \eta_{y,t} + \theta_g + \varepsilon_{i,t}.\end{aligned}$$

The baseline dependent variable, $\text{NORM\_FLOW}_{i,t}$, is the normalized net flow of fund i in week t. HIGH_ESG_i and LOW_ESG_i are dummy variables that indicate whether a fund has a high (five globes) or low (one globe) sustainability rating as of Dec. 2019, respectively.[15] COVID_t is an indicator variable equal to 1 for weeks ending on Feb. 22, 2020 or after, and 0 otherwise. The vector $X_{i,t}$ collects fund-level controls (i.e., 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, $\eta_{y,t}$, and fund category-by-week fixed effects, $\mu_{j,t}$. We also control for sustainability rating fixed effects, θ_g, or fund fixed effects instead. The key coefficients of interest are β_1 and β_2, which 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.

Table 2 presents the regression results. Columns 1–5 in Panel A report results from using normalized net flows as the dependent variable over our main sample period, varying the configuration of fixed effects and controls. Across all specifications, we find a negative and statistically significant coefficient on HIGH_ESG ×

[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 1 month.

COVID, indicating 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. Column 1 shows that high ESG funds rank 3 percentage points higher in their net flows within their size groups prior to the crisis, consistent with Hartzmark and Sussman (2019). However, their percentile rankings decline by 6 percentage points more after the onset of the crisis. Columns 2–5 show that these results are robust to controlling for sustainability rating or fund fixed effects, past

TABLE 2

The Impact of COVID-19 on ESG Fund Flows

Table 2 presents results from fund-week level difference-in-differences regressions of normalized net flows (NORM_FLOW) 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, 2020. Alternatively, the dependent variable is replaced by raw net flows as a percentage of previous week's total net assets (RAW_FLOW, column 7) or an indicator for whether net flows are negative (NEG_FLOW, column 8). In Panel A, a single COVID indicator is used, whereas in Panel B the COVID period is broken into two subperiods: The market crash period from Feb. 22 to Mar. 21, 2020 (COVID_CRASH) and stimulus period from Mar. 28 to Apr. 25, 2020 (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, vintage-by-week, and sustainability rating or fund fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Before and After COVID-19

	Dependent Variable: NORM_FLOW						Dependent Variable	
	Main Sample: Jan. 4–Apr. 25					Long Sample: Nov. 2–Apr. 25	RAW_FLOW	NEG_FLOW
	1	2	3	4	5	6	7	8
HIGH_ESG × COVID	−5.859***	−5.615***	−4.715***	−4.031***	−4.111***	−4.992***	−0.198***	0.076***
	(1.395)	(1.393)	(1.341)	(1.238)	(1.203)	(1.273)	(0.057)	(0.023)
LOW_ESG × COVID	3.868***	3.550***	2.060*	0.785	0.189	4.731***	0.085	−0.035**
	(1.231)	(1.268)	(1.186)	(1.352)	(1.371)	(1.244)	(0.060)	(0.018)
HIGH_ESG	2.736*					2.360*		
	(1.643)					(1.389)		
LOW_ESG	−3.091**					−4.348***		
	(1.385)					(1.268)		
RET × COVID		−0.680**	−0.440**				−0.009	0.011***
		(0.268)	(0.198)				(0.009)	(0.004)
RET	1.057***	1.597***	0.769***			1.074***	0.040***	−0.024***
	(0.155)	(0.248)	(0.204)			(0.140)	(0.008)	(0.004)
RET12M × COVID				−10.715***	−7.929***			
				(1.219)	(1.339)			
RET12M				14.380***	12.696***			
				(1.309)	(1.343)			
log(TNA)	0.558**	0.558**	−18.666***	−0.472*	−0.476*	0.624***	0.040***	−0.007*
	(0.265)	(0.266)	(3.550)	(0.269)	(0.269)	(0.239)	(0.008)	(0.004)
EXPENSE_RATIO	−1.964***	−2.014***	−15.203***	−1.876***	−1.877***	−2.074***	−0.015	0.029***
	(0.723)	(0.724)	(5.151)	(0.721)	(0.724)	(0.635)	(0.026)	(0.011)
STAR_UP	−0.687	−0.682	0.468			−0.778	−0.018	0.009
	(0.846)	(0.845)	(0.680)			(0.697)	(0.034)	(0.013)
STAR_DOWN	−1.382	−1.460	−1.293*			−0.563	−0.047	0.007
	(0.943)	(0.941)	(0.716)			(0.782)	(0.033)	(0.014)
STAR_RATING				3.792***	5.126***			
				(0.426)	(0.434)			
STAR_RATING × COVID					−2.377***			
					(0.454)			
No. of obs.	37,654	37,654	37,652	34,746	34,746	57,528	37,654	37,654
Category-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sustainability rating FE	No	Yes	No	Yes	No	No	Yes	Yes
Fund FE	No	No	Yes	No	No	No	No	No
Adj. R^2	0.0730	0.0737	0.352	0.104	0.105	0.0682	0.0551	0.0963

(continued on next page)

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

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

	Dependent Variable: NORM_FLOW						Dependent Variable	
	Main Sample: Jan. 4–Apr. 25					Long Sample: Nov. 2–Apr. 25	RAW_FLOW	NEG_FLOW
	1	2	3	4	5	6	7	8
HIGH_ESG × COVID_CRASH	−6.004*** (1.675)	−5.797*** (1.673)	−5.124*** (1.572)	−4.201*** (1.519)	−4.263*** (1.475)	−4.916*** (1.511)	−0.198*** −0.066	0.070*** −0.026
HIGH_ESG × COVID_STIMULUS	−5.716*** (1.548)	−5.435*** (1.546)	−4.276*** (1.521)	−3.865*** (1.420)	−3.965*** (1.397)	−5.075*** (1.491)	−0.199*** −0.072	0.082*** −0.026
LOW_ESG × COVID_CRASH	3.497** (1.437)	3.290** (1.449)	2.580* (1.386)	0.374 (1.545)	−0.310 (1.539)	4.255*** (1.337)	0.03 −0.079	−0.031* −0.019
LOW_ESG × COVID_STIMULUS	4.252*** (1.635)	3.822** (1.681)	1.488 (1.547)	1.215 (1.767)	0.708 (1.795)	5.230*** (1.724)	0.143* −0.079	−0.039 −0.024
HIGH_ESG	2.736* (1.644)					2.359* (1.389)		
LOW_ESG	−3.090** (1.385)					−4.347*** (1.268)		
No. of obs.	37,654	37,654	37,652	34,746	34,746	57,528	37,654	37,654
Category-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sustainability rating FE	No	Yes	No	Yes	Yes	No	Yes	Yes
Fund FE	No	No	Yes	No	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RET/COVID interactions	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STAR/COVID interactions	No	No	No	No	Yes	No	No	No
Return controls	Monthly Changes	Monthly Changes	Monthly Changes	12 Month Level	12 Month Level	Monthly Changes	Monthly Changes	Monthly Changes
Star rating controls								
Adj. R^2	0.073	0.0736	0.352	0.104	0.105	0.0681	0.0551	0.0962

returns (1 or 12 months) or Morningstar star ratings (changes or levels) known as important determinants of retail investment flows (see, e.g., Sirri and Tufano (1998), Del Guercio and Tkac (2008), and Pastor and Vorsatz (2020)), and their interactions with the COVID crisis dummy. Column 6 also shows similar estimates when comparing post-COVID flows to a longer pre-COVID period starting in Nov. 2019. The last two columns further indicate that these results are not merely driven by a relative decline, but rather by an absolute decline in high ESG fund flows.[16] Column 7 shows a 0.2 percentage point greater decrease in weekly net flows as a fraction of total net assets for high ESG funds compared to average funds, but an economically and statistically insignificant differential change in flows for low ESG funds, indicating that the COVID-19 shock disproportionately impacted flows to high ESG funds. Given flows are measured at weekly frequency, this is an economically large effect. Column 8 shows that relative to average funds, the likelihood of experiencing outflows increases by 8 percentage points more for high ESG funds and 4 percentage points less for low ESG funds.[17] These results suggest that high ESG funds lose their luster during the COVID crisis.

[16]This is also seen in Table A.3 in the Supplementary Material where we examine fund flow dynamics around the COVID-19 shock.

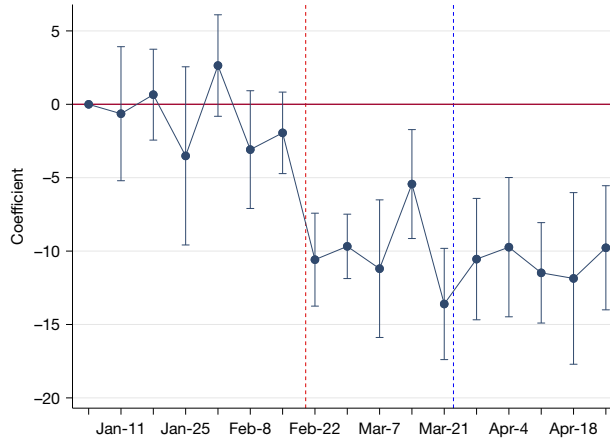
[17]Table A.4 in the Supplementary Material also shows that high ESG funds experience both greater outflows and smaller inflows after the COVID-19 shock, by interacting the explanatory variables with a negative net flow dummy.

FIGURE 2
Parallel Trends

Figure 2 plots coefficients along with their 95% confidence intervals from the following regression:

$$\text{NORM\_FLOW}_{i,t} = \sum_{k=-6}^{+9}\sum_{g=2}^{5}\beta_{g,k}\cdot d[g]_i \times d[T+k]_t + \gamma' \cdot X_{i,t} + \mu_j + \eta_y + \theta_g + \omega_t + \varepsilon_{i,t}.$$

The dependent variable is normalized net flow (NORM_FLOW), and $d[T+k]_t$ denotes dummy variables indicating whether the fund-week observation is k weeks from the week ending Feb. 22. The dummy for the first week of the sample is omitted. $d[g]_i$ denote dummy variables indicating whether the fund is assigned a g globe rating by Morningstar, where g ranges from 2 to 5. The dummy for the group of funds with a 1- globe rating is omitted. The baseline control variables as well as fund category, vintage year, sustainability rating, and week fixed effects are included in the regression. The plotted coefficients are the slopes on the weekly dummies interacted with the $d[g=5]$ indicator variable, describing the dynamics of high ESG fund flows relative to the omitted low ESG fund flows from 6 weeks prior to 9 weeks after the onset of the crisis.



In Panel B of Table 2, we further split the COVID period into two subperiods to disentangle responses during the market crash period from Feb. 22 to Mar. 21, 2020, when the S&P 500 declined in value by more than 30%, from the subsequent market rebound through Apr. 25, 2020 following the passing of the CARES Act on Mar. 23 that provided a $2.2 trillion stimulus to the U.S. economy. During both periods the economy remained weak, with unemployment insurance claims peaking in the beginning of April and remaining elevated through May.[18] 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 demand for sustainability that is not merely driven by the ubiquitous but temporary sell-off during the market crash.

A potential concern for our difference-in-differences methodology is that there may be confounding differences in fund flow trends between high ESG funds and other funds. Therefore, we validate our empirical strategy by inspecting parallel trends in high and low ESG fund flows, as such differences, if any, would be most palpable between these funds. Figure 2 plots coefficients along with their 95% confidence intervals from the following regression:

[18]See U.S. Employment and Training Administration Unemployment Insurance Weekly Claims Report (https://fred.stlouisfed.org/series/ICSA).

$$(2)\quad \text{NORM\_FLOW}_{i,t} = \sum_{k=-6}^{+9}\sum_{g=2}^{5}\beta_{g,k}\cdot d[g]_i \times d[T+k]_t + \gamma'\cdot X_{i,t} + \mu_j + \eta_y + \theta_g + \omega_t + \varepsilon_{i,t}.$$

The dependent variable is normalized net flow, and $d[T+k]_t$ denote dummy variables indicating whether the fund-week observation is k weeks from the week ending Feb. 22, 2020. The dummy for the first week of the sample is omitted. $d[g]_i$ denote dummy variables indicating whether the fund is assigned a g globe rating by Morningstar, where g ranges from two to five. The dummy for the group of funds with the lowest sustainability rating (i.e., one globe) is omitted. The baseline control variables as well as fund category, vintage year, sustainability rating, and week fixed effects are included in the regression. The plotted coefficients are the slopes on the weekly dummies interacted with the indicator variable for the group of funds with the highest sustainability rating, together describing the dynamics of high ESG fund flows relative to the omitted low ESG fund flows from 6 weeks prior to 9 weeks after the onset of the COVID crisis.[19] Figure 2 shows that prior to the crisis, high and low ESG funds maintain their relative fund flows in parallel, as none of the coefficients are statistically different from 0. Around the onset of the crisis, we observe a clear divergence where high ESG fund flows drop significantly relative to low ESG fund flows. The parallel pre-event trend mitigates concerns that confounding differences may be driving the large subsequent divergence in fund flows between high and low ESG funds, complementing the unconditional average net flow trends shown in Figure 1.[20]

B. Corroborating Results

These results are consistent with a decline in demand for sustainable investments in response to economic stress induced by COVID-19, indicating that retail investor demand for SRI is highly sensitive to income shocks. Illustrative evidence from internet search traffic data supports this view. Figure 3 plots weekly moving averages of Google search trends on topics related to sustainability (e.g., sustainability, global warming, ESG) and economic outcomes (e.g., stock market, furlough, financial crisis), against search trends for the coronavirus. It is clear that search traffic for sustainability-related topics dropped around the onset of the COVID-19 crisis, coinciding with a surge in interest on the coronavirus and its economic ramifications. These trends are consistent with a negative shock to demand for sustainability early into the COVID-19 crisis. In this section, we provide several pieces of evidence corroborating this interpretation.

1. Retail Versus Institutional Fund Flows

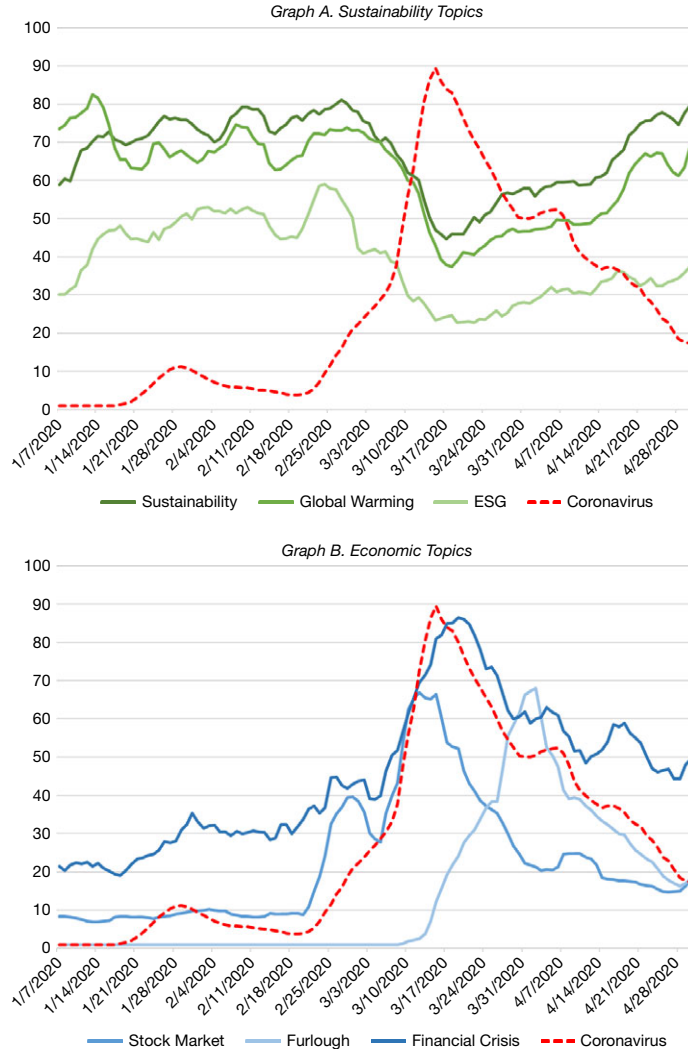
First, we contrast retail fund flows to institutional fund flows. This comparison is useful because retail and institutional investors are distinct in a number of ways

[19]Table A.1 in the Supplementary Material tabulates the regression results.

[20]Tables A.2 and A.3 in the Supplementary Material, which report cross-sectional variation in fund flows across sustainability rating groups within different subperiods and time-series variation in fund flows within each sustainability rating group, respectively, further corroborate the parallel trend inspection.

FIGURE 3
Google Search Trends

Figure 3 plots 7-day moving averages of Google search trends of sustainability (Graph A) and economic (Graph B) 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.

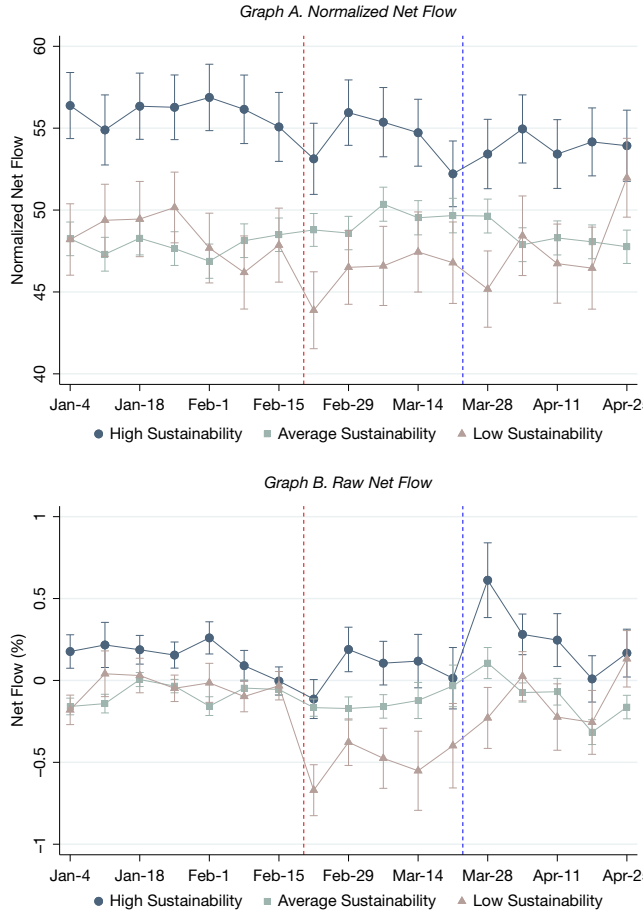


that have important implications for their sustainable investment demand. Most important is the fact that many institutional investors are subject to investment mandates that limit the universe of stocks they are allowed to invest in and the extent their holdings vary over time (see Koijen and Yogo (2019)). Recently, institutions increasingly include commitments to ESG in their mandates and make these commitments public, often initiating shareholder ESG engagement and influencing corporate ESG disclosure policies (see, e.g., Dyck et al. (2019), Krueger et al. (2020), Barko et al. (2021), Ilhan et al. (2023), and Hoepner et al. (2022)). Retail

FIGURE 4

Weekly Average Institutional Fund Flows by Sustainability Rating

Figure 4 plots 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 Feb. 20 (beginning of the market crash) and Mar. 23 (stimulus approval date), respectively. Plots are shown for normalized (Graph A) and raw (Graph B) net flows.



investors typically do not share this distinction, and their ESG investments are more often driven by pro-social preferences (see Riedl and Smeets (2017)). Institutional investors are also less financially constrained and more sophisticated in their investment strategies than retail investors (see Evans and Fahlenbrach (2012)). All of this makes institutions less likely to turn away from sustainable investments during market turbulence and economic downturns, compared to retail investors. Consistent with this conjecture, Glossner et al. (2021) find no evidence that institutions tilt toward or away from sustainable investments during the crisis, despite seeking shelter in hard measures of financial resilience. Therefore, we expect

TABLE 3

Retail Versus Institutional Sustainability Fund Flows

Table 3 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 a dummy variable indicating the post-COVID period starting in the week ending Feb. 22, 2020. The dependent variable is either normalized net flow (NORM_FLOW) or raw net flow (RAW_FLOW). Control variables include prior month's return, interaction between past returns and the COVID period dummy, log of total net assets, expense ratio, dummies for star rating upgrades and downgrades, as well as category-by-week, vintage-by-week, and sustainability rating 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. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable			
	NORM_FLOW		RAW_FLOW	
	1	2	3	4
HIGH_ESG × COVID × RETAIL	−3.648**	−3.895*	−0.253***	−0.209**
	(1.780)	(1.990)	(0.093)	(0.093)
LOW_ESG × COVID × RETAIL	3.859**	1.823	0.214**	0.146
	(1.532)	(2.061)	(0.095)	(0.115)
HIGH_ESG × RETAIL	−0.962	−0.438	0.014	0.013
	(1.670)	(1.815)	(0.065)	(0.067)
LOW_ESG × RETAIL	−1.656	−2.499	−0.013	−0.066
	(1.623)	(2.097)	(0.067)	(0.091)
COVID × RETAIL	−1.300*	−1.315	−0.159***	−0.181***
	(0.737)	(0.811)	(0.048)	(0.051)
RETAIL	−3.940***	−7.807***	−0.044**	−0.120***
	(0.599)	(0.641)	(0.022)	(0.028)
HIGH_ESG × COVID	−2.306*		0.046	
	(1.262)		(0.075)	
LOW_ESG × COVID	−0.254		−0.109	
	(1.422)		(0.090)	
No. of obs.	72,087	49,610	72,087	49,610
Category-by-week FE	Yes	No	Yes	No
Vintage-by-week FE	Yes	No	Yes	No
Sustainability rating FE	Yes	No	Yes	No
Fund-by-week FE	No	Yes	No	Yes
Controls	Yes	Yes	Yes	Yes
RET/COVID/RETAIL interactions	Yes	Yes	Yes	Yes
Adj. R^2	0.0771	0.275	0.0366	0.129

institutional SRI flows to be less affected by the COVID-19 economic shock than retail SRI flows.

Consistent with these notions, Figure 4 shows that in contrast to retail fund flows, institutional flows into 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 post-stimulus periods. This pattern is confirmed clearly with normalized net flows, where the relative flow advantage of high ESG funds is shown to continue. If anything, raw net flows from institutions into low ESG funds drop more sharply during the market crash, before recovering to pre-COVID levels during the post-stimulus rebound.[21] These patterns stand in sharp contrast to those of retail fund flows, consistent with the differences in operational and financial constraints faced by institutional and retail investors.

[21]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 A.5 in the Supplementary Material are consistent with the patterns in Figure 4.

To formally test this comparison, we estimate a triple-difference specification augmented from equation (1) by further interacting a dummy variable, $RETAIL_i$, indicating whether the fund is a retail or institutional fund, for the pooled sample of retail and institutional funds.[22]

Table 3 presents the results. The coefficient on the triple-interaction term, HIGH_ESG × COVID × RETAIL, shows that the difference between institutional and retail flow responses to COVID-19 is economically and statistically significant. The drop in high ESG retail flows is greater than the drop in high ESG institutional flows by 3.6 to 3.9 percentile ranks within fund size groups, or 0.21 to 0.25 percentage points as a fraction of total net assets. In columns 2 and 4, we further include fund-by-week fixed effects. These specifications are identified from variations within funds that offer both institutional and retail share classes, reducing the number of observations 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 are robust even controlling for any observable and unobservable time-varying characteristic of a given fund portfolio.

Taken together, the drop in SRI demand by retail investors following the COVID-19 shock stands in marked contrast with a continued demand by institutional investors, who are subject to stronger investment mandates and have deeper pockets. These differences indicate that the shift in retail demand away from ESG is driven by tightening economic conditions.

2. Severity of Economic Impact

To further corroborate this interpretation, we extend our baseline sample to include non-U.S. open-end retail mutual funds, covering 13,155 funds sold in 39 countries, and exploit cross-country variation in the severity of the economic shock imposed by COVID-19.

First, we begin by documenting the robustness of our baseline results across alternative regional subsamples consisting of i) funds sold in European countries,[23] ii) all non-U.S. funds, and iii) all open-end funds worldwide. In these regressions, we additionally control for country-fixed effects to eliminate the effects of any country-level confounding factors during our sample period.[24] As reported in Panel A of Table 4, we find that our main finding is robust in all of the international samples. For all geographical subsamples, we find negative and statistically significant coefficients on HIGH_ESG × COVID. Moreover, the magnitudes of the coefficients are large in all samples, albeit smaller in Europe, indicating that mutual

[22]Similar to Figure 2, we plot weekly coefficients from an augmented triple-difference version of equation (2) further interacted with $RETAIL_i$, in Figure A.3 in the Supplementary Material (also tabulated in Table A.1 in the Supplementary Material). This figure shows that retail and institutional flows into high ESG funds move roughly in parallel prior to the onset of the COVID-19 crisis, but diverge afterward as retail investors invest significantly less in high ESG funds in response to the COVID-19 shock. An inspection of these trends validates the triple-difference framework.

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

TABLE 4

Effects of COVID-19 on ESG Fund Flows Around the World

Table 4 presents results from an extended international sample of open-end mutual funds. Panel A presents results from fund-week level difference-in-differences regressions of normalized net flows (NORM_FLOW) 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, 2020. The regressions are run on three geographical subsamples: European funds, all non-U.S. funds, and all global funds including U.S. funds. Control variables include prior month's return, interactions between past returns and the COVID period dummy, log of total net assets, dummies for star rating upgrades and downgrades, as well as category-by-week, vintage-by-week, country, and sustainability rating or fund fixed effects. In Panel B, the difference-in-differences regressions are run on subsamples consisting of funds sold in countries with stringent versus lax restriction policies (subsamples within all countries, or within a subset of countries that had either low or high economic support), or low versus high GDP growth during the COVID-19 crisis. Countries are classified as stringent versus lax or low versus high support according to the Oxford COVID-19 Government Response Tracker (OxCGRT) restriction stringency and economic support indices. Alternatively, the subsamples are pooled together and the regressions are augmented by further interacting country-level dummies indicating restriction stringency (STRINGENT) or low economic growth rates (LOW_GROWTH) during the post-COVID period. All controls, fixed effects (except fund fixed effects, reported in Table A.8 in the Supplementary Material), and relevant interaction terms are included in the regressions in Panel B. Standard errors are adjusted for clustering at fund and category-by-week levels. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. International Robustness

	Dependent Variable: NORM_FLOW					
	EU		All Non-US		All Global	
	1	2	3	4	5	6
HIGH_ESG × COVID	−3.732***	−2.966***	−4.299***	−3.710***	−4.439***	−3.844***
	(0.751)	(0.760)	(0.698)	(0.643)	(0.657)	(0.577)
LOW_ESG × COVID	1.586	0.559	1.869**	0.955	2.208***	1.230**
	(1.047)	(0.880)	(0.770)	(0.679)	(0.665)	(0.594)
RET × COVID	−1.162***	−0.721***	−0.700***	−0.306***	−0.688***	−0.338***
	(0.186)	(0.146)	(0.131)	(0.109)	(0.118)	(0.099)
RET	1.748***	0.945***	1.207***	0.683***	1.244***	0.712***
	(0.181)	(0.141)	(0.123)	(0.099)	(0.110)	(0.092)
log(TNA)	0.710***	−17.916***	0.694***	−22.792***	0.848***	−21.974***
	(0.168)	(2.221)	(0.129)	(1.996)	(0.114)	(1.827)
STAR_UP	−1.305**	−0.042	−1.642***	−0.011	−1.451***	0.078
	(0.569)	(0.534)	(0.454)	(0.415)	(0.406)	(0.364)
STAR_DOWN	−0.283	−0.212	−0.287	0.349	−0.571	−0.012
	(0.520)	(0.467)	(0.396)	(0.361)	(0.373)	(0.320)
No. of obs.	84,265	84,256	150,914	150,896	188,872	188,852
Category-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	Yes	No	Yes	No
Sustainability rating FE	Yes	No	Yes	No	Yes	No
Fund FE	No	Yes	No	Yes	No	Yes
Adj. R^2	0.0864	0.282	0.0913	0.289	0.0844	0.301

(continued on next page)

TABLE 4 (continued)

Effects of COVID-19 on ESG Fund Flows Around the World

Panel B. Heterogeneity in Policy and Economic Responses

	Dependent Variable: NORM_FLOW											
	Stringency of Lockdowns and Business Restrictions									GDP Growth		
	All Countries			Low Stimulus Countries			High Stimulus Countries					
	Stringent	Lax	Pooled	Stringent	Lax	Pooled	Stringent	Lax	Pooled	Low	High	Pooled
	1	2	3	4	5	6	7	8	9	10	11	12
HIGH_ESG × COVID	−6.063***	−1.169	−1.169	−6.832***	0.452	0.452	−5.137***	−2.143	−2.143	−6.371***	−3.481***	−3.481***
	(0.844)	(1.345)	(1.341)	(1.227)	(1.923)	(1.899)	(1.136)	(1.923)	(1.920)	(1.119)	(1.051)	(1.052)
LOW_ESG × COVID	4.005***	−0.139	−0.139	3.754***	−2.306	−2.306	5.194***	0.334	0.334	3.681***	2.202**	2.202**
	(0.792)	(1.330)	(1.326)	(1.119)	(1.885)	(1.862)	(1.395)	(1.690)	(1.687)	(1.100)	(0.993)	(0.994)
HIGH_ESG × COVID × STRINGENT			−4.894***			−7.284***			−2.994			
			(1.591)			(2.163)			(2.237)			
LOW_ESG × COVID × STRINGENT			4.143***			6.060***			4.860**			
			(1.530)			(2.109)			(2.170)			
HIGH_ESG × COVID × LOW_GROWTH												−2.890*
												(1.543)
LOW_ESG × COVID × LOW_GROWTH												1.479
												(1.446)
HIGH_ESG × COVID:	0.00			0.00			0.09			0.03		
Stringent < Lax (Low < High)?												
No. of obs.	90,447	34,578	125,025	54,179	13,099	67,278	36,094	21,402	57,496	48,772	65,874	114,646
Category-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sustainability rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions and other terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.0762	0.0302	0.0630	0.111	0.0699	0.104	0.111	0.0837	0.101	0.0885	0.0299	0.0677

funds with the highest sustainability rating receive similarly lower net inflows during the COVID crisis compared to the pre-COVID period regardless of where they are sold.

To strengthen our interpretation, we then examine cross-country variation in the severity of the COVID-19 economic shock. To do so, we employ data from the Oxford COVID-19 Government Response Tracker (OxCGRT) compiled by the University of Oxford, which collects publicly available information on 18 indicators related to governmental responses to COVID-19 for 180 countries such as restriction stringency (e.g., lockdowns, school closures, travel, and movement restrictions), economic support (e.g., income support and debt relief), and health system policies, which are aggregated into common indices reported in scores ranging from 1 to 100. Among these indices, we use the stringency and economic support indices, and sort countries into high or low buckets with respect to the median country.[25] We then conduct subsample tests based on the hypothesis that countries with more stringent restrictions are economically impacted more severely by COVID-19, especially when such restrictions are not backed by enough economic support. Alternatively, we also compare countries with lower versus higher GDP growth rates during the first two quarters of 2020. If SRI demand by retail investors is highly sensitive to income shocks, it would be in countries that are economically hit the hardest where declines in ESG fund flows are most severe.

The results are reported in Panel B of Table 4. In the first two columns, we run our baseline difference-in-differences regression on subsamples consisting of funds sold in countries with stringent or lax restrictions. Alternatively, we pool the subsamples together and further interact a country-level STRINGENT dummy variable in a triple difference regression. As in Panel A, we additionally control for country-fixed effects.[26] The results indicate that the decline in ESG fund flows is more pronounced in countries where the economic impact of COVID-19 was stronger due to more stringent restrictions. The coefficient on the interaction term, HIGH_ESG $\times$ COVID, is negative and economically large in severely impacted economies (i.e., -6.1), and several times larger than that in less affected economies (i.e., -1.2). The difference between these coefficients is also statistically significant, as shown in p-values comparing coefficients across the subsamples as well as pooled triple interactions.

In columns 4–9, we further explore whether the contrast in post-COVID ESG fund flows between countries with stringent and lax restrictions is more pronounced among countries that provided little economic support. This additionally helps distinguish between the real economic impact of COVID-19 from the effects of "stay-at-home" policies on investor attention. Consistent with economic shocks as an important channel, we find that the effects of restrictions on post-COVID ESG fund flows are more pronounced in countries that lacked economic support

[25]We average a country's index value over the post-COVID period. The matched Morningstar-OxCGRT sample covers 8,914 funds in 36 countries, excluding funds that are sold cross-border. See Table A.7 in the Supplementary Material for an overview of this sample. The results are robust to dropping countries with less than 10 funds.

[26]To conserve space, we relegate results from the most stringent specifications with fund-fixed effects to Table A.8 in the Supplementary Material, which remain largely robust.

(columns 4–6), but less pronounced in countries that provided high levels of economic support (columns 7–9). In columns 10–12, we also examine low versus high GDP growth subsamples, and similarly find that the impact of COVID-19 on ESG fund flows is more severe in countries with lower post-COVID economic growth.

With the caveat that there may be differences in the legal and regulatory settings of funds across different countries, the results support the idea that ESG fund flow responses to COVID-19 indicate a shift in investment demand driven by economic constraints.

C. Other Potential Channels

In this section, we investigate alternative explanations for our results. In the analysis above, we carefully control for fund characteristics, past returns, their interactions with the COVID-19 shock, as well as a host of granular fixed effects. The normalization of fund flows also helps us account for the effects of fund size.[27] This sets a high bar for ex-ante fund characteristics to account for our findings. Nonetheless, potential channels related to fund performance, past flows and fund size, or changes in investor risk preference, strategy, and attention have important implications for fund flows and call for in-depth analysis.

1. Fund Performance, Past Fund Flows, and Fund Size

First, we ensure that our key results are not driven by past or contemporaneous differences in performance or differences in past flows between high and low ESG funds. We find that our results cannot be explained by ex-ante risk-adjusted fund performance or market risk exposure, nor by investors following a "buying the dip" strategy according to contemporaneous returns. We also document that our main findings are not driven by the fact that high ESG funds experienced greater past flows. To conserve space, we report and discuss the related robustness tests in the Supplementary Material.[28]

2. Changes in Allocation and Attention

Another potential explanation is that retail investors may have disproportionately shifted their allocation or attention across different types of investments in response to "salient news" regarding COVID-19 or other correlated events. For example, retail investors in ESG mutual funds may have increasingly migrated to directly investing in stocks amid rising interest in retail stock trading (see Ozik et al. (2021)). This shift may also be correlated with the magnitude of the impact of COVID-19, partially explaining our findings.[29]

[27]The results are also robust to dropping funds with high exposures (greater than 50%) to basic materials, energy, and utilities industries. We also examine fund entry and exit around the crisis, and find no evidence of increased competition for ESG flows (see Figure A.4 in the Supplementary Material).

[28]These results are reported in Tables A.9 and A.10 in the Supplementary Material and described in Section A.II in the Supplementary Material.

[29]We also test whether investors have changed their appetite for active rather than passive investing, or turned their attention to sectors affected by COVID-19 (e.g., healthcare or technology). These results are reported in Table A.11 in the Supplementary Material.

In Table 5, we explore this attention-related channel. In Panel A, we use the magnitude of the fund's flow-performance sensitivity during the year prior to the pandemic as a proxy for fund-level investor attention to salient information about the fund, to examine whether high ESG funds with more attentive investors experienced a greater decline in flows after COVID-19. We do this by including the triple interaction term between the high ESG fund dummy variable, the post-COVID period dummy variable, and the fund's flow-performance sensitivity in our baseline fund flow regression. In the last two columns, we replace the sensitivity measure with a dummy variable indicating whether the fund is in the top sensitivity quintile. In all specifications, the coefficient on the triple interaction term is negative and statistically insignificant, while the coefficient on the interaction term, HIGH_ESG × COVID, remains statistically significant and similar in magnitude to our

TABLE 5

Attention Channels

In Table 5, Panel A presents results from fund-week level triple-differences regressions of normalized net flows (NORM_ FLOW) 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, 2020, further interacted with fund-level flow-performance sensitivities (in magnitudes) estimated over the year prior to the pandemic, either normalized by subtracting the cross-sectional mean and dividing by the standard deviation (SENSITIVITY), or alternatively used to create an indicator variable classifying whether a fund is in the top sensitivity quintile (HIGH_SENSITIVITY). Panel B reports results from extending the sample period through Mar. 2021, and assigning indicator variables for key additional subperiods: REOPENING period (i.e., weeks ending May 2, 2020, to Nov. 7, 2020); VACCINE development period (i.e., weeks ending Nov. 14, 2020, to Jan. 16, 2021); MEME_STOCK period (i.e., weeks ending Jan. 23, 2021, to Mar. 20, 2021). These time dummy variables are interacted with HIGH_ESG and LOW_ESG, and added to the baseline difference-in-differences regressions. The post-COVID crash and stimulus periods are included as in the original specifications, and the pre-COVID period is the omitted time category. Panel C presents results from regressions of normalized net flow on the interaction terms between time-series aggregate retail trading activity and the HIGH_ESG or LOW_ESG fund dummy variables. Daily retail trading activity (i.e., retail share volume (RETAIL_SHARE_VOL), number of retail trades (RETAIL_TRADES), and retail dollar volume (RETAIL_DOLLAR_VOL)) from Boehmer et al. (2021) is collected from the Trade and Quote (TAQ) database, aggregated to weekly frequency, and normalized across the time-series by subtracting the mean and dividing by the standard deviation. The regressions are run either on the baseline sample period or the extended sample period that includes the meme stock period. In all panels, control variables include prior month's return, interaction between past returns and the COVID period dummy (interaction terms involving flow-performance sensitivity are also included in Panel A), log of total net assets, dummies for star rating upgrades and downgrades, as well as category-by-week, vintage-by-week, and sustainability rating or fund fixed effects. Standard errors are adjusted for clustering at fund and category-by-week levels. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Flow-Return Sensitivity

	Dependent Variable: NORM_FLOW			
	1	2	3	4
HIGH_ESG × COVID	−4.807***	−4.385***	−5.839***	−5.074***
	(1.745)	(1.534)	(1.441)	(1.325)
HIGH_ESG × SENSITIVITY × COVID	−0.226	−0.142		
	(0.207)	(0.204)		
HIGH_ESG × HIGH_SENSITIVITY × COVID			−1.625	−0.795
			(4.414)	(4.585)
LOW_ESG × COVID	4.681***	2.832*	5.133***	3.336**
	(1.628)	(1.555)	(1.358)	(1.333)
LOW_ESG × SENSITIVITY × COVID	−0.119	−0.070		
	(0.198)	(0.193)		
LOW_ESG × HIGH_SENSITIVITY × COVID			−4.444	−3.498
			(2.776)	(2.766)
No. of obs.	37,109	37,108	37,113	37,112
Category-by-week FE	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes
Sustainability rating FE	Yes	No	Yes	No
Fund FE	No	Yes	No	Yes
Controls/Interactions	Yes	Yes	Yes	Yes
Adj. R^2	0.0747	0.350	0.0750	0.350

(continued on next page)

TABLE 5 (continued)
Attention Channels

Panel B. COVID Relief and Attention to Meme Stocks

	Dependent Variable: NORM_FLOW	
	1	2
HIGH_ESG × COVID_CRASH	−5.477***	−4.612***
	(1.486)	(1.261)
LOW_ESG × COVID_CRASH	1.431	0.319
	(1.310)	(1.272)
HIGH_ESG × COVID_STIMULUS	−4.736***	−3.643***
	(1.557)	(1.241)
LOW_ESG × COVID_STIMULUS	1.587	−0.698
	(1.334)	(1.271)
HIGH_ESG × REOPENING	−0.324	0.277
	(1.102)	(0.841)
LOW_ESG × REOPENING	0.137	−0.574
	(1.100)	(0.897)
HIGH_ESG × VACCINE	2.678**	2.745***
	(1.114)	(1.033)
LOW_ESG × VACCINE	0.434	0.506
	(1.080)	(1.033)
HIGH_ESG × MEME_STOCK	4.068***	3.176**
	(1.404)	(1.336)
LOW_ESG × MEME_STOCK	2.446**	1.814*
	(1.102)	(1.095)
No. of obs.	182,830	182,828
Category-by-week FE	Yes	Yes
Vintage-by-week FE	Yes	Yes
Sustainability rating FE	Yes	No
Fund FE	No	Yes
Controls	Yes	Yes
Adj. R^2	0.0926	0.304

Panel C. Retail Trading and ESG Fund Flows

	Dependent Variable: NORM_FLOW								
	Base Period	Extended Period		Base Period	Extended Period		Base Period	Extended Period	
	1	2	3	4	5	6	7	8	9
HIGH_ESG × RETAIL_SHARE_VOL	−0.708	1.330***	1.315***						
	(0.912)	(0.370)	(0.352)						
LOW_ESG × RETAIL_SHARE_VOL	0.588	0.349	0.521						
	(0.827)	(0.355)	(0.348)						
HIGH_ESG × RETAIL_TRADES				−0.248	1.351***	1.375***			
				(0.919)	(0.386)	(0.373)			
LOW_ESG × RETAIL_TRADES				0.797	0.474	0.655*			
				(0.849)	(0.367)	(0.361)			
HIGH_ESG × RETAIL_DOLLAR_VOL							0.125	0.911***	0.915***
							(0.747)	(0.309)	(0.293)
LOW_ESG × RETAIL_DOLLAR_VOL							−0.061	0.177	0.104
							(0.686)	(0.331)	(0.320)
No. of obs.	50,530	182,830	182,828	50,530	182,830	182,828	50,530	182,830	182,828
Category-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vintage-by-week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sustainability rating FE	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Fund FE	No	No	Yes	No	No	Yes	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.0799	0.0918	0.303	0.0799	0.0918	0.303	0.0799	0.0917	0.303

main results in Table 2. The results speak against a shift in attention by previously attentive investors.

In Panel B of Table 5, we examine whether retail investors moved out of ESG funds and gravitated toward attention-grabbing stocks. Because we do not have data on whether investors actually bought individual stocks at the expense of their

ownership in funds, we provide indirect evidence by showing whether high ESG fund flows declined when retail stock trading spiked. To do this, we extend our sample period until Mar. 2021, and assign indicator variables for key additional subperiods: REOPENING period when U.S. states loosened lockdowns and business restrictions to stimulate their economies (i.e., weeks ending May 2, 2020 to Nov. 7, 2020); VACCINE development period beginning with announcements of effective vaccines and applications for FDA approval (i.e., weeks ending Nov. 14, 2020, to Jan. 16, 2021); MEME_STOCK period during which retail investors prominently traded stocks and other speculative assets at the center of social media attention such as GameStop or Dogecoin (i.e., weeks ending Jan. 23, 2021, to Mar. 20, 2021).[30] These time dummy variables are interacted with HIGH_ESG and LOW_ESG, and added to our baseline fund flow regressions. The post-COVID crash and stimulus periods are included as in our original specifications, and the pre-COVID period is the omitted time category.

First, we find that flows into high ESG funds no longer decline during the reopening period, returning to their pre-COVID levels. Given how employment recovered during this period after a significant decline in previous months (in contrast with the monotonic upward trend in the U.S. stock market since March), this further supports the idea that our baseline results are driven by economic distress rather than return-chasing.[31] Next, as economic conditions continued to improve, we find that high ESG funds attracted even more flows than before the crisis during the vaccine development period. Most importantly, the renewed increase in high ESG fund flows continued even during the meme stock period when retail investor interest in individual stocks reached its peak. This stands in contrast with an attention-shifting explanation, where one would expect high ESG fund flows to drop when retail investor attention shifted to "meme stocks."

To corroborate this result, we further exploit time-series data on aggregate retail trading activity from the Trade and Quote (TAQ) database as a measure of retail investor attention to the stock market. This measure is based on the algorithm of Boehmer, Jones, Zhang, and Zhang (2021) who identify retail trades based on whether they receive fractional penny price improvements, and is available at daily frequency as retail share volume, number of retail trades, and retail dollar volume. We aggregate each retail trading variable to weekly frequency and normalize them across the time-series by subtracting the mean and dividing by the standard deviation. We then interact each normalized variable with the HIGH_ESG and LOW_ESG fund dummy variables, and run regressions of normalized net flow on the interaction terms. The regressions are run either on our baseline sample period or the extended sample period that includes the meme stock period during which retail trading activity was particularly high.

Panel C of Table 5 presents the results. In the base period, the coefficient on the interaction term between HIGH_ESG and retail trading activity is not statistically different from 0. In the extended period, we find a *positive* and significant association between retail trading and high ESG fund flows. These results are robust

[30]See The *New York Times* for U.S. state reopenings (https://www.nytimes.com/interactive/2020/us/states-reopen-map-coronavirus.html).

[31]See monthly total nonfarm employment reported by U.S. Bureau of Labor Statistics (https://fred.stlouisfed.org/series/PAYEMS).

across all three measures of retail trading. At the least, this indicates that changes in high ESG fund flows are *not* negatively associated with retail trading, going against the notion that greater attention to individual stock trading may have led to the decline in retail SRI fund flows around COVID-19.

Overall, these analyses lend further support to our interpretation that retail investors reduced SRI demand in response to the economic strain induced by COVID-19, but show little support for the idea that this is merely driven by investors shifting attention to different segments of the market. The fact that retail trading and SRI fund flows do not substitute for each other also suggests that these markets may accommodate distinct groups of investors.

D. External Validity: Survey Evidence

However, it is difficult to *directly* preclude the effects of changes in investor beliefs and expectations about firm fundamentals based solely on analysis of mutual fund flows. We acknowledge this as a fundamental limitation of our study. Notwithstanding, we provide out-of-sample survey evidence to help delineate the different channels driving SRI demand.

1. Main Survey Experiment

In Nov. 2021, we recruited 1,000 participants through Prolific, an online survey recruitment platform that provides access to a large and high-quality pool of participants. After excluding participants without prior investment experience and participants who failed an initial comprehension check or a mid-survey attention check, the final sample consists of 808 survey responses. Panel A of Table 6 provides summary statistics of the participants. 63% of our participants are male, their average age is 39 years, 95% have English as their native language, 6% are unemployed, and their average annual income is $77,416.[32] Only 3% of the participants answered that they previously held professional occupations that required them to trade financial instruments, indicating that the sample well represents U.S. retail investors.

We design a survey experiment to elicit revealed preference for ESG investing from our participants, following the approach of Chinco et al. (2022). To each participant, we present six different hypothetical scenarios with information about the sustainability ratings, returns, and volatility of two different mutual funds, and ask participants how they would allocate their financial investments between the two funds given a hypothetical shock to their income. One fund has a high (i.e., five-globe) sustainability rating and the other fund has an average (i.e., three-globe) sustainability rating, presented in the same way as displayed to investors by Morningstar. The income shock takes on values of 0% (i.e., no income change), −25%, or −50%, as a percentage of current income. Participants are also presented with the average annual returns and volatility of the funds over the past 10 years, and are instructed to assume that those figures are informative about the funds' future performance. The high ESG fund's return randomly varies between 4% and 8%, whereas the average ESG fund's return is fixed at 8%. The volatility of both funds is

[32] We ask participants for their income brackets, and take the bracket's midpoint as their income. The median participant's income bracket is $50,000 to $75,000.

TABLE 6

External Validity: Experimental Survey Evidence

Table 6 presents summary statistics (Panel A) and regression results (Panel B) of responses from an online survey experiment of 808 participants with prior investment experience who reside in the U.S. and have passed a basic comprehension check prior to the survey. Panel A reports demographics (i.e., gender, age, U.S. nationality, income, and employment status), investment background (i.e., investment experience, related occupation, consideration for sustainability issues), impact by COVID-19 (i.e., worsening of economic status and losing job), changes in beliefs due to COVID-19 (i.e., believes sustainability will be less financially or socially important), and various viewpoints toward SRI by participants. Panel B reports results from analyzing responses from an experiment wherein participants decide how to allocate their hypothetical investments between a high ESG fund and an average ESG fund under different scenarios with varying income shocks (i.e., 0% (participant's current income), 25%, or 50% income drop) and expected returns on the high ESG fund (i.e., varies between 4% and 8%). Columns 1–8 present results from regressing the participant's high ESG fund allocation (HIGH_ESG_INV) on the income shock (INCOME_SHOCK) and high ESG fund's return (HIGH_ESG_RET). Columns 3 and 4 break down the independent variables into dummies indicating each level of the income shock and high ESG fund's return, omitting the 0% income shock and 4% return categories. Columns 5–8 present results from the subsample of participants who answered that they consider sustainability in their own investment decisions. Columns 9–12 present results from regressing the annual return a participant is willing to give up to invest in a high ESG fund rather than an average ESG fund (RETURN_WILLINGNESS), collected from an additional questionnaire, on the income shock. Even numbered columns additionally control for participant-fixed effects. Standard errors are adjusted for clustering at the participant level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Summary Statistics of Survey Participants

	Mean	Std. Dev.	Count
Demographics			
Male	0.63	0.48	808
Age	38.79	12.89	800
Native US	0.95	0.22	808
Income	77,416.36	55,343.09	807
Unemployed	0.06	0.23	644
Investment background			
Investment experience	1.00	0.00	808
Investment professional	0.03	0.17	808
Considers sustainability	0.47	0.50	808
COVID impact			
Economically worsened	0.27	0.45	808
Lost job	0.19	0.39	808
Post-COVID Belief			
ESG financially less important	0.11	0.32	808
ESG socially less important	0.10	0.30	808
Views SRI Primarily As…			
Good cause	0.66	0.48	808
Financially superior	0.21	0.41	808
Constraint on investment	0.18	0.39	808
Unimportant	0.16	0.36	808
Unaware	0.06	0.24	808

(continued on next page)

TABLE 6 (continued)

External Validity: Experimental Survey Evidence

Panel B. Determinants of Willingness to Invest in SRI Funds

	Dependent Variable											
	HIGH_ESG_INV (%)								RETURN_WILLINGNESS (%)			
	All Participants				Considers Sustainability When Investing							
	1	2	3	4	5	6	7	8	9	10	11	12
INCOME_SHOCK	−0.122***	−0.122***			−0.126***	−0.126***			−0.031***	−0.033***		
	(0.016)	(0.016)			(0.023)	(0.023)			(0.003)	(0.002)		
HIGH_ESG_RET	14.078***	14.090***			13.885***	13.839***						
	(0.305)	(0.311)			(0.429)	(0.440)						
25%_INCOME_SHOCK			−3.946***	−3.909***			−4.172***	−4.147***			−0.913***	−1.005***
			(0.652)	(0.650)			(0.932)	(0.929)			(0.183)	(0.084)
50%_INCOME_SHOCK			−6.300***	−6.292***			−6.588***	−6.570***			−1.526***	−1.644***
			(0.753)	(0.751)			(1.115)	(1.113)			(0.174)	(0.095)
5%_HIGH_ESG_RET			2.791**	4.254***			3.697**	4.720***				
			(1.206)	(1.027)			(1.850)	(1.579)				
6%_HIGH_ESG_RET			8.284***	9.901***			11.890***	12.531***				
			(1.294)	(1.062)			(1.981)	(1.669)				
7%_HIGH_ESG_RET			19.695***	21.648***			24.203***	25.687***				
			(1.235)	(1.099)			(1.785)	(1.627)				
8%_HIGH_ESG_RET			58.573***	58.684***			56.560***	56.224***				
			(1.330)	(1.331)			(1.852)	(1.903)				
CONSTANT	−43.018***	−43.091***	23.769***	22.738***	−32.925***	−32.637***	31.186***	30.637***	3.032***	3.102***	2.982***	3.041***
	(2.031)	(1.955)	(0.999)	(0.794)	(2.950)	(2.715)	(1.478)	(1.153)	(0.136)	(0.073)	(0.122)	(0.063)
No. of obs.	4,848	4,848	4,848	4,848	2,280	2,280	2,280	2,280	2,367	2,367	2,367	2,367
Participant FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Adj. R^2	0.332	0.592	0.420	0.667	0.356	0.594	0.412	0.641	0.0314	0.769	0.0314	0.768

fixed at 10%. This setting ensures that the high ESG fund does not dominate the average ESG fund on both sustainability and performance dimensions so that participants face a nontrivial choice between the two funds. More details about the survey can be found in the Supplementary Material.[33]

Observing responses on how participants would allocate investments between the two funds under different scenarios allows us to examine the effects of income shocks on SRI investments, controlling for return differences. We estimate the following regression on the sample of survey responses at the participant-scenario level:

$$\text{HIGH\_ESG\_INV}_{i,k} = \alpha + \beta_1 \cdot \text{INCOME\_SHOCK}_{i,k} + \beta_2 \cdot \text{HIGH\_ESG\_RET}_{i,k} + \eta_i + \varepsilon_{i,k}, \tag{3}$$

where $\text{HIGH\_ESG\_INV}_{i,k}$ is the fraction of investment allocated to the high ESG fund by participant i in the kth scenario, $\text{INCOME\_SHOCK}_{i,k}$ is the income shock, $\text{HIGH\_ESG\_RET}_{i,k}$ is the expected return on the high ESG fund, and η_i denotes participant fixed effects.

The results are presented in Panel B of Table 6. In the first two specifications, we include as independent variables the level of the income shock and the high ESG fund's return. In the next two columns, the independent variables are broken down to dummy variables indicating each of their possible values, omitting the 0% income shock and 4% high ESG fund return. Across the four specifications, income shocks negatively impact allocations to the high ESG fund, controlling for its randomly varying returns as well as participant fixed effects. Relative to average high ESG fund allocations of 23.8% in the absence of income shocks, hypothetical reductions in participants' income by 25% and 50% are associated with 3.9 and 6.3 percentage point lower allocations to the high ESG fund, respectively.

Unsurprisingly, higher expected returns positively affect allocations to the high ESG fund. When its return is increased from 4% to 5%, participants increase allocations to the high ESG fund by 2.8 to 4.3 percentage points. As the high ESG fund's return is increased to 6%, 7%, or 8%, participants exponentially increase their allocations to the fund, consistent with the narrowing return gap between the two funds making the high ESG fund increasingly dominant over the average ESG fund among participants who have nonpecuniary preferences for sustainability. In columns 5–8, we rerun the same regressions on a subsample of participants who answered that they consider sustainability in their own investment decisions (i.e., roughly half of the sample), and find similar results.

To further substantiate this result, we also ask participants in a subsequent and separate question, how much annual return they would be willing to forgo to invest $1,000 in a mutual fund with the highest (five-globe) sustainability rating rather than a fund with an average sustainability rating, given hypothetical scenarios with 0%, 25% or 50% income reductions. Results from regressing the return a participant is willing to give up (RETURN_WILLINGNESS) on the income shock are reported in columns 9–12 in Panel B of Table 6. Absent any income shock, participants are willing to give up an average of 3 percentage points in annual returns. RETURN_WILLINGNESS drops by 0.91 to 1.01 percentage

[33]See Section A.III in the Supplementary Material.

points under a 25% income shock, and decreases by more than half by 1.53 to 1.64 percentage points under a 50% income shock.[34]

2. Surveying Changes in Future Expectations

While this out-of-sample survey evidence helps substantiate our hypothesis that negative economic shocks were a key channel explaining lower SRI demand during the COVID-19 crisis, an important alternative explanation is that retail investors may have lowered their beliefs about expected returns on high ESG funds due to COVID-19. To help shed light on this channel, we included additional questions in the survey. We first present participants with two funds: One fund that passively tracks the MSCI USA Standard Index (with a three-globe sustainability rating), and another fund that passively tracks the MSCI USA SRI Index fund (with a five-globe sustainability rating). We provide them with information on the average returns and volatility for these funds from 2010 to 2019, and their current sustainability ratings. We then ask participants to estimate the annual returns on these funds over the future period from 2022 to 2032. Afterward, we subsequently ask them if they would change their estimates if the COVID-19 crisis had not happened. Those who answer "yes" are again prompted to enter their estimates for a counterfactual scenario in which the COVID-19 crisis did not happen. This allows us to elicit whether participants believe that the returns on high ESG funds will change differently from average ESG funds, and whether beliefs about these changes are driven by the COVID-19 crisis.

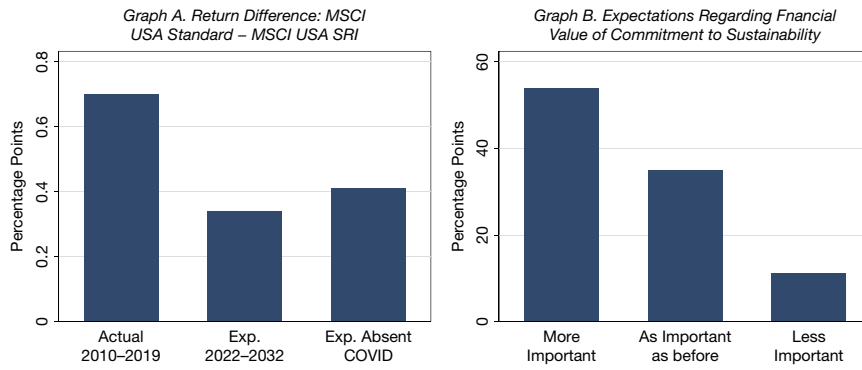
Graph A of Figure 5 reports the mean difference between the estimated future annual returns on the MSCI USA Standard index fund and the MSCI USA SRI index fund. The past average return gap between the two funds from 2010 to 2019 was 0.7 percentage points, meaning that the SRI index fund underperformed relative to the standard index fund. According to participants' responses, the average estimated return gap for the future period from 2022 to 2032 is only 0.34 percentage points (i.e., half of the past return gap), or 0.41 percentage points assuming COVID-19 had not happened, indicating that participants expect the high ESG fund's performance relative to the average ESG fund to *improve* in the future. This is inconsistent with the concern that lower expected returns on SRI funds following COVID-19 might explain the decline in retail SRI demand, as participants heightened their expectations on high ESG fund returns rather than lowering them. Corroborating this response, we also separately ask participants "compared to before the COVID-19 pandemic, do you think commitment to sustainability issues will be a more or less important source of financial value for corporations?" The responses are summarized in Graph B of Figure 5. Consistent with the future return estimates, the majority of participants (i.e., 53.63%) respond that sustainability will be a more important source of financial value for corporations. 34.78% respond "as important as before," and only 11.59% respond "less important."

[34]To account for outliers resulting from participants' misunderstanding of the question, we drop responses if participants answered that they are willing to give up more than 20 percentage points in annual returns. The results are very similar if we alternatively choose thresholds of 10, 50, or 100 percentage points instead.

FIGURE 5

Survey Evidence: Future Expectations of SRI Performance

Figure 5 presents responses from an online survey of 808 participants with prior investment experience who reside in the U.S. and have passed a basic comprehension check prior to the survey. Graph A presents a summary of participants' responses regarding their expectations of the average annual returns of a fund tracking the MSCI USA Standard Index and a fund tracking the MSCI USA SRI Index. Participants were first shown information on past performance of the two indexes from 2010 to 2019 (first bar). Participants were then asked to provide estimates of the two funds' returns over the period from 2022 to 2032 (second bar), and whether their estimates would be different if the COVID-19 crisis had not happened (third bar). Graph B shows how participants responded to a multiple-choice question asking "*Compared to before the COVID-19 pandemic, do you think commitment to sustainability issues will be a more or less important source of financial value for corporations?*"



Altogether, the survey results indicate that income shocks can significantly and negatively impact SRI investment demand by individuals. This finding underscores the real economic effects of COVID-19 as a potentially important channel for its impact on SRI fund flows. The survey results also indicate that retail demand for sustainable investments increases when such investments deliver higher expected returns. At the same time, retail investors do *not* expect sustainable investments to perform worse after COVID-19 than before, which is inconsistent with the concern that changes in return expectations drive the fall in SRI demand during the crisis. With the caveat that we were only able to elicit investor expectations of the post-COVID world after its partial revelation, these findings highlight the possibility that the negative real economic impact of COVID-19 outweighed its positive impact on return expectations for high ESG funds, resulting in a net decline in SRI demand.

V. Conclusion

In this article, we exploit a large economic shock imposed by the COVID-19 pandemic to study retail investor demand for sustainable investments. We find that mutual funds with higher sustainability ratings prior to the crisis experience a sharper decline in fund flows in response to the COVID-19 shock, losing the relative attraction of retail flows these funds enjoyed before the pandemic-induced downturn. Based on a battery of tests of retail fund flows as well as an out-of-sample survey experiment, our results are most consistent with retail SRI demand that is highly sensitive to income shocks.

To the extent that retail SRI demand is driven by pro-social motives, our results suggest that such nonpecuniary benefits are perceived as costly and unsustainable for retail investors under extreme economic conditions. We leave the exploration of

potential changes in the composition of retail investors during the COVID-19 crisis as an important question for future research that requires more disaggregated data. At a minimum, our results point to retail investors as a source of fragility for SRI in mutual funds. Given that retail investors comprise a significant fraction of the mutual fund investor base and the client base for institutions as well, our findings may have implications for potential externalities of retail fund flows on the long-run prospects of ESG investing overall.

Appendix. Variable Descriptions

RAW_FLOW: Weekly percentage of dollar net flows as fraction of fund's total net assets in the previous week.

NORM_FLOW: Percentage ranking of net flows of fund within its fund size sorted decile in a given week.

NEG_FLOW: Indicator for whether the fund's weekly net flow is negative.

HIGH_ESG: Indicator for whether fund has 5-globe Morningstar sustainability rating as of Dec. 2019.

ABOVE_AVG_ESG: Indicator for whether fund has 4-globe Morningstar sustainability rating as of Dec. 2019.

BELOW_AVG_ESG: Indicator for whether fund has 2-globe Morningstar sustainability rating as of Dec. 2019.

LOW_ESG: Indicator for whether fund has 1-globe Morningstar sustainability rating as of Dec. 2019.

$d[g]$: Dummy variables indicating whether the fund is assigned a g globe rating by Morningstar, where g ranges from 2 to 5.

COVID: Indicator for weeks ending Feb. 22 or after.

COVID_CRASH: Indicator for weeks between Feb. 22 and Mar. 21.

COVID_STIMULUS: Indicator for weeks between Mar. 23 and Apr. 25.

$d[T+k]$: Dummy variables indicating whether the observation is k weeks from the week ending Feb. 22, 2020.

RETAIL: Indicator for whether fund is sold to retail investors, based on retail and institutional share classes.

RET: Previous month's return of fund.

RET12M: Previous 12 months' return of fund.

TNA: Total net assets as of previous week's end.

EXPENSE_RATIO: Expense ratio in previous year.

STAR_RATING: Morningstar rating of fund's risk-adjusted performance within same Morningstar category.

STAR_UP: Indicator for whether fund's Morningstar rating was upgraded.

STAR_DOWN: Indicator for whether fund's Morningstar rating was downgraded.

AGE: Fund age calculated based on years since inception date.

FF5_ALPHA: Fund's Fama and French (2015) 5-factor adjusted alpha using 12-month rolling windows.

ESG_RISK_ENVIRONMENTAL: Sustainalytics ESG (environmental) Risk percentage ranking of fund within its global category.

ESG_RISK_SOCIAL: Sustainalytics ESG (social) Risk percentage ranking of fund within its global category.

ESG_RISK_GOVERNANCE: Sustainalytics ESG (governance) Risk percentage ranking of fund within its global category.

ESG_PROSPECTUS: Indicator for whether fund has explicit ESG mandate in its prospectus as indicated by Morningstar (e.g., environmental concerns, carbon footprint reduction, renewable energy, gender issues, community development, and ESG shareholder engagement), or in its fund name (e.g., include strings: SUSTAIN, GREEN, ESG, CSR, RESPONSIB, CLIMATE, WARMING, ENVIRONMENT, SOCIAL, and GOVERNANCE).

LOW_CARBON: Morningstar flag for low carbon funds based on portfolio level fossil fuel involvement and carbon risk scores from Sustainalytics.

STRINGENT: Indicator for whether a country is above the median country in its average post-COVID restriction stringency (e.g., lockdowns, school closures, travel, and movement restrictions) index according to the Oxford COVID-19 Government Response Tracker (OxCGRT).

LOW_GROWTH: Indicator for whether a country is below the median country in its average post-COVID GDP growth.

SENSITIVITY: Magnitude of fund's flow-performance sensitivity estimated over the year prior to the pandemic, normalized by subtracting the cross-sectional mean and dividing by the standard deviation.

HIGH_SENSITIVITY: Magnitude of fund's flow-performance sensitivity estimated over the year prior to the pandemic, used to create an indicator variable classifying whether a fund is in the top sensitivity quintile.

REOPENING: Indicator variable for "Reopening" period (i.e., weeks ending May 2, 2020, to Nov. 7, 2020).

VACCINE: Indicator variable for "Vaccine Development" period (i.e., weeks ending Nov. 14, 2020, to Jan. 16, 2021).

MEME_STOCK: Indicator variable for "Meme Stock" period (i.e., weeks ending Jan. 23, 2021, to Mar. 20, 2021).

RETAIL_SHARE_VOL: Daily retail trading share volume from Boehmer et al. (2021), collected from the Trade and Quote (TAQ) database, aggregated to weekly frequency, and normalized across the time-series by subtracting the mean and dividing by the standard deviation.

RETAIL_TRADES: Daily number of retail trades from Boehmer et al. (2021), collected from the Trade and Quote (TAQ) database, aggregated to weekly frequency, and normalized across the time-series by subtracting the mean and dividing by the standard deviation.

RETAIL_DOLLAR_VOL: Daily retail trading dollar volume from Boehmer et al. (2021), collected from the Trade and Quote (TAQ) database, aggregated to weekly frequency, and normalized across the time-series by subtracting the mean and dividing by the standard deviation.

HIGH_ESG_INV (%): Fraction of hypothetical investment (%) allocated by survey participant to high ESG fund.

RETURN_WILLINGNESS: Annual return (%) survey participant is willing to give up to invest $1,000 in a mutual fund with the highest sustainability rating (5 globes) rather than average sustainability rating (3 globes).

INCOME_SHOCK: Level of the hypothetical income shock (i.e., 0%, −25%, or −50%).

25%_INCOME_SHOCK: Dummy variable indicating 25% hypothetical income shock.

50%_INCOME_SHOCK: Dummy variable indicating 50% hypothetical income shock.

HIGH_ESG_RET: Level of the expected return on the hypothetical high ESG fund (i.e., 4%, 5%, 6%, 7%, or 8%).

5%_HIGH_ESG_RET: Dummy variable indicating 5% expected return on the hypothetical high ESG fund.

6%_HIGH_ESG_RET: Dummy variable indicating 6% expected return on the hypothetical high ESG fund.

7%_HIGH_ESG_RET: Dummy variable indicating 7% expected return on the hypothetical high ESG fund.

8%_HIGH_ESG_RET: Dummy variable indicating 8% expected return on the hypothetical high ESG fund.

Variables Used in the Supplementary Material

ABS_FLOW: Absolute value of net flows.

WEEKLY_RETURN: Weekly return of fund.

COVID_RET: Fund's cumulative return during weeks ending Feb. 22 or after.

BETA: Fund's monthly rolling window market beta.

PAST_FLOW: Fund's past 12-month flows on a rolling-window basis, normalized by subtracting the cross-sectional mean and dividing by the standard deviation.

HIGH_PAST_FLOW: Fund's past 12-month flows on a rolling-window basis, used to create an indicator variable classifying whether a fund is in the top past flow quintile.

INDEX_FUND: Indicator for whether fund is indexed.

HEALTHCARE_SECTOR: Indicator for whether fund is specialized in healthcare sector as indicated by Morningstar.

TECH_SECTOR: Indicator for whether fund is specialized in technology sector as indicated by Morningstar.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109022001296.

References

Albuquerque, R.; Y. Koskinen; S. Yang; and C. Zhang. "Resiliency of Environmental and Social Stocks: An Analysis of the Exogenous COVID-19 Market Crash." *Review of Corporate Finance Studies*, 9 (2020), 593–621.

Albuquerque, R.; Y. Koskinen; and C. Zhang. "Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence." *Management Science*, 65 (2019), 4451–4469.

Alekseev, G.; S. Amer; M. Gopal; T. Kuchler; J. Schneider; J. Stroebel; and N. Wernerfelt. "The Effects of COVID-19 on U.S. Small Businesses: Evidence from Owners, Managers, and Employees." *Management Science*, forthcoming (2023).

Alfaro, L.; A. Chari; A. N. Greenland; and P. K. Schott. "Aggregate and Firm-Level Stock Returns During Pandemics, in Real Time." NBER Working Paper No. 26950 (2020).

Altig, D.; S. R. Baker; J. M. Barrero; N. Bloom; P. Bunn; S. Chen; S. J. Davis; J. Leather; B. H. Meyer; E. Mihaylov; P. Mizen; N. B. Parker; T. Renault; P. Smietanka; and G. Thwaites. "Economic Uncertainty Before and During the COVID-19 Pandemic." *Journal of Public Economics*, 191 (2020), 1–13.

Baker, S. R.; N. Bloom; S. J. Davis; K. J. Kost; M. C. Sammon; and T. Viratyosin. "The Unprecedented Stock Market Reaction to COVID-19." *Review of Asset Pricing Studies*, 10 (2020a), 742–758.

Baker, S. R.; R. A. Farrokhnia; S. Meyer; M. Pagel; and C. Yannelis. "How Does Household Spending Respond to an Epidemic? Consumption During the 2020 COVID-19 Pandemic." *Review of Asset Pricing Studies*, 10 (2020b), 834–862.

Baker, S. R.; R. A. Farrokhnia; S. Meyer; M. Pagel; and C. Yannelis. "Income, Liquidity, and the Consumption Response to the 2020 Economic Stimulus Payments." NBER Working Paper No. 27097 (2020c).

Baldauf, M.; L. Garlappi; and C. Yannelis. "Does Climate Change Affect Real Estate Prices? Only if You Believe in It." *Review of Financial Studies*, 33 (2020), 1256–1295.

Bansal, R.; D. Wu; and A. Yaron. "Socially Responsible Investing in Good and Bad Times." *Review of Financial Studies*, 35 (2022), 2067–2099.

Barber, B. M., and T. Odean. "The Internet and the Investor." *Journal of Economic Perspectives*, 15 (2001), 41–54.

Barko, T.; M. Cremers; and L. Renneboog. "Shareholder Engagement on Environmental, Social, and Governance Performance." *Journal of Business Ethics*, 180 (2021), 777–812.

Bauer, R.; T. Ruof; and P. Smeets. "Get Real! Individuals Prefer More Sustainable Investments." *Review of Financial Studies*, 34 (2021), 3976–4043.

Ben-Rephael, A.; S. Kandel; and A. Wohl. "Measuring Investor Sentiment with Mutual Fund Flows." *Journal of Financial Economics*, 104 (2012), 363–382.

Bernstein, A.; M. T. Gustafson; and R. Lewis. "Disaster on the Horizon: The Price Effect of Sea Level Rise." *Journal of Financial Economics*, 134 (2019), 253–272.

Blanchett, D.; M. Finke; and J. Reuter. "Portfolio Delegation and 401(k) Plan Participant Responses to COVID-19." NBER Working Paper No. 27438 (2020).

Boehmer, E.; C. M. Jones; X. Zhang; and X. Zhang. "Tracking Retail Investor Activity." *Journal of Finance*, 76 (2021), 2249–2305.

Bollen, N. P. B. "Mutual Fund Attributes and Investor Behavior." *Journal of Financial and Quantitative Analysis*, 42 (2007), 683–708.

Bolton, P., and M. Kacperczyk. "Do Investors Care About Carbon Risk?" *Journal of Financial Economics*, 142 (2021), 517–549.

Cajner, T.; L. D. Crane; R. A. Decker; J. Grigsby; A. Hamins-Puertolas; E. Hurst; C. Kurz; and A. Yildirmaz. "The U.S. Labor Market During the Beginning of the Pandemic Recession." *Brookings Papers on Economic Activity*, Summer (2020a), 3–33.

Cajner, T.; L. D. Crane; R. A. Decker; A. Hamins-Puertolas; and C. Kurz. "Tracking Labor Market Developments During the COVID-19 Pandemic: A Preliminary Assessment." NBER Working Paper (2020b).

Cao, J.; S. Titman; X. Zhan; and W. Zhang. "ESG Preference, Institutional Trading, and Stock Return Patterns." *Journal of Financial and Quantitative Analysis*, forthcoming (2023).

Ceccarelli, M.; S. Ramelli; and A. F. Wagner. "Low-Carbon Mutual Funds." ECGI Working Paper (2021).
Cen, X. "Going Mobile, Investor Behavior, and Financial Fragility." Working Paper (2019).
Chinco, A. M.; S. M. Hartzmark; and A. B. Sussman. "A New Test of Risk Factor Relevance." *Journal of Finance*, 77 (2022), 2183–2238.
Coibion, O.; Y. Gorodnichenko; and M. Weber. "The Cost of the COVID-19 Crisis: Lockdowns, Macroeconomic Expectations, and Consumer Spending." NBER Working Paper No. 27141 (2020a).
Coibion, O.; Y. Gorodnichenko; and M. Weber. "Labor Markets During the COVID-19 Crisis: A Preliminary View." BFI Working Paper (2020b).
Croce, M. M.; P. Farroni; and I. Wolfskeil. "When the Markets Get CO.V.I.D: Contagion, Viruses, and Information Diffusion." CEPR Discussion Paper No. DP14674 (2020).
Del Guercio, D., and P. A. Tkac. "The Effect of Morningstar Ratings on Mutual Fund Flow." *Journal of Financial and Quantitative Analysis*, 43 (2008), 907–936.
Ding, W.; R. Levine; C. Lin; and W. Xie. "Corporate Immunity to the COVID-19 Pandemic." *Journal of Financial Economics*, 141 (2021), 802–830.
Dyck, A.; K. V. Lins; L. Roth; and H. F. Wagner. "Do Institutional Investors Drive Corporate Social Responsibility? International Evidence." *Journal of Financial Economics*, 131 (2019), 693–714.
Engle, R. F.; S. Giglio; B. T. Kelly; H. Lee; and J. Stroebel. "Hedging Climate Change News." *Review of Financial Studies*, 33 (2020), 1184–1216.
Evans, R. B., and R. Fahlenbrach. "Institutional Investors and Mutual Fund Governance: Evidence from Retail-Institutional Fund Twins." *Review of Financial Studies*, 25 (2012), 3530–3571.
Fahlenbrach, R.; K. Rageth; and R. M. Stulz. "How Valuable is Financial Flexibility when Revenue Stops? Evidence from the COVID-19 Crisis." *Review of Financial Studies*, 34 (2021), 5474–5521.
Fama, E. F., and K. R. French. "A Five-Factor Asset Pricing Model." *Journal of Financial Economics*, 116 (2015), 1–22.
Ferriani, F., and F. Natoli. "ESG Risks in Times of COVID-19." *Applied Economics Letters*, 28 (2020), 1537–1541.
Forsythe, E.; L. B. Kahn; F. Lange; and D. G. Wiczer. "Labor Demand in the Time of COVID-19: Evidence from Vacancy Postings and UI Claims." *Journal of Public Economics*, 189 (2020), 1–7.
Franzoni, F., and M. C. Schmalz. "Fund Flows and Market States." *Review of Financial Studies*, 30 (2017), 2621–2673.
Frazzini, A., and O. A. Lamont. "Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns." *Journal of Financial Economics*, 88 (2008), 299–322.
Gibson, R.; S. Glossner; P. Krueger; P. Matos; and T. Steffen. "Do Responsible Investors Invest Responsibly?" *Review of Finance*, 26 (2022), 1389–1432.
Giglio, S.; B. T. Kelly; and J. Stroebel. "Climate Finance." *Annual Review of Financial Economics*, 13 (2021), 15–36.
Giglio, S.; M. Maggiori; J. Stroebel; and S. Utkus. "The Joint Dynamics of Investor Beliefs and Trading During the COVID-19 Crash." *Proceedings of the National Academy of Sciences*, 118 (2021), 1–9.
Glossner, S.; P. Matos; S. Ramelli; and A. F. Wagner. "Do Institutional Investors Stabilize Equity Markets in Crisis Periods? Evidence from COVID-19." ECGI Working Paper (2021).
Goldstein, I.; A. Kopytov; L. Shen; and H. Xiang. "On ESG Investing: Heterogeneous Preferences, Information, and Asset Prices." Working Paper (2022).
Gormsen, N. J., and R. S. J. Koijen. "Coronavirus: Impact on Stock Prices and Growth Expectations." *Review of Asset Pricing Studies*, 10 (2020), 574–597.
Granja, J.; C. Makridis; C. Yannelis; and E. Zwick. "Did the Paycheck Protection Program Hit the Target?" *Journal of Financial Economics*, 145 (2022), 725–761.
Hartzmark, S. M., and A. B. Sussman. "Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows." *Journal of Finance*, 74 (2019), 2789–2837.
Hoepner, A. G. F.; I. Oikonomou; Z. Sautner; L. T. Starks; and X. Y. Zhou. "ESG Shareholder Engagement and Downside Risk." Working Paper (2022).
Horvath, A.; B. Kay; and C. Wix. "The COVID-19 Shock and Consumer Credit: Evidence from Credit Card Data." Working Paper (2021).
Humphrey, J.; S. Kogan; J. Sagi; and L. T. Starks. "The Asymmetry in Responsible Investing Preferences." Working Paper (2021).
Ilhan, E.; P. Krueger; Z. Sautner; and L. T. Starks. "Climate Risk Disclosure and Institutional Investors." *Review of Financial Studies*, forthcoming (2023).
Kacperczyk, M.; S. Van Nieuwerburgh; and L. Veldkamp. "Time-varying Fund Manager Skill." *Journal of Finance* 69 (2014), 1455–1484.
Kalda, A.; B. Loos; A. Previtero; and A. Hackethal. "Smart(phone) Investing? A Within Investor-Time Analysis of New Technologies and Trading Behavior." Working Paper (2021).

Koijen, R. S. J., and M. Yogo. "A Demand System Approach to Asset Pricing." *Journal of Political Economy*, 127 (2019), 1475–1515.
Krueger, P.; Z. Sautner; and L. T. Starks. "The Importance of Climate Risks for Institutional Investors." *Review of Financial Studies*, 33 (2020), 1067–1111.
Lins, K. V.; H. Servaes; and A. Tamayo. "Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility During the Financial Crisis." *Journal of Finance*, 72 (2017), 1785–1824.
Oehmke, M., and M. Opp. "A Theory of Socially Responsible Investment." Working Paper (2020).
Ozik, G.; R. Sadka; and S. Shen. "Flattening the Illiquidity Curve: Retail Trading During the COVID-19 Lockdown." *Journal of Financial and Quantitative Analysis*, 56 (2021), 2356–2388.
Pastor, L.; R. F. Stambaugh; and L. A. Taylor. "Dissecting Green Returns." *Journal of Financial Economics*, 146 (2022), 403–424.
Pastor, L.; R. F. Stambaugh; and L. A. Taylor. "Sustainable Investing in Equilibrium." *Journal of Financial Economics*, 142 (2021b), 550–571.
Pastor, L., and B. Vorsatz. "Mutual Fund Performance and Flows During the COVID-19 Crisis." *Review of Asset Pricing Studies*, 10 (2020), 791–833.
Pedersen, L. H.; S. Fitzgibbons; and L. Pomorski. "Responsible Investing: The ESG-Efficient Frontier." *Journal of Financial Economics*, 142 (2021), 572–597.
Ramelli, S., and A. F. Wagner. "Feverish Stock Price Reactions to COVID-19." *Review of Corporate Finance Studies*, 9 (2020), 622–655.
Renneboog, L.; J. Ter Horst; and C. Zhang. "Is Ethical Money Financially Smart? Nonfinancial Attributes and Money Flows of Socially Responsible Investment Funds." *Journal of Financial Intermediation*, 20 (2011), 562–588.
Riedl, A., and P. Smeets. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, 72 (2017), 2505–2550.
Sirri, E. R., and P. Tufano. "Costly Search and Mutual Fund Flows." *Journal of Finance*, 53 (1998), 1589–1622.
Spiegel, M., and H. Zhang. "Mutual Fund Risk and Market Share-Adjusted Fund Flows." *Journal of Financial Economics*, 108 (2013), 506–528.
Wang, A. Y., and M. Young. "Terrorist Attacks and Investor Risk Preference: Evidence from Mutual Fund Flows." *Journal of Financial Economics*, 137 (2020), 491–514.