Performance and Flow of SRI Mutual Funds and Investors Sophistication

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Abstract

In this paper we provide a comprehensive analysis of the performance of US SRI mutual funds as well as its relation to the flow of new money that those funds experience in the context of investors sophistication. In particular, we compare the performance of SRI retail and institutional shareclasses and we analyse flow-performance and performance-flow relation for those classes. Our paper provides new insights into the role of the investors sophistication for those relations in the presence of sustainability preferences. We find that SRI mutual fund sector earns positive abnormal returns before expenses and retail SRI funds outperform their institutional peers both, before and after fees. Moreover, we find a positive flow-performance relation which is convex for SRI retail funds and linear for the SRI institutional ones. Finally, we cannot confirm the smart money effect for SRI retail funds, instead we find a dumb money effect for SRI institutional funds.

JEL classification: G10, G11, G23
Keywords: SRI investment, retail funds, institutional funds, flow-performance relation, smart money, dumb money

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1 Introduction

Socially responsible investments (SRI) are not new in financial markets, although for a long time they were perceived as a niche by portfolio managers and investment companies. It is, however, just over the recent decade when we have witnessed an increasing awareness of environmental, social and ethical issues among majority of investors, leading to a global trend of adding sustainable investments to their portfolios. According to US Social Investment Forum (USSIF)[1], in 2010 around 12% of all the assets under professional management in US ($3.1 out of $25.2 trillion), were involved in investments that apply various environmental, social and governance (ESG) criteria in the analysis and portfolio selection process. Ten years later, in 2020 this number increased to 33% ($17.1 out of $51.4 trillion). In particular, the assets involved in ESG funds under the management of US registered investment companies[2] rose from around $320 billion in 2010 to $3.1 trillion in 2020 and most of them were managed by mutual funds. This prevailing development of the SRI sector of investment companies was possibly facilitated by the introduction of the principles and ratings by regulatory bodies, such as United Nations Principles for responsible investments or sustainable ratings from Morningstar.[3]

The recent boom of sustainability investment sector also lead to a growth in the literature on the research of SRI/ESG investments. There is a substantial number of studies contributed to evaluate the performance of SRI funds (Hamilton et al. 1993, Statman 2000, Gil-Bazo et al. 2010, Climent and Soriano 2011, Henke 2016, Alda 2020) and the relation between their performance and sustainability ratings (Hartzmark and Sussman 2019, Gantchev et al. 2021, Madhavan et al. 2021). Other strand of the research focuses on the drivers of the sustainable investment demand (Riedl and Smeets 2017, Cerqueti et al. 2021, Döttling and Kim 2021) and the relation between returns and SRI fund flows (Bollen 2007, Benson and Humphrey 2008, Renneboog et al. 2011). Despite the growth of the SRI fund sector and the related academic literature, the analysis of how the investment decisions of SRI mutual fund investors are related to funds performance and the role of investor sophistication in this process has not been conducted in the literature. This paper fills in the gap.

In our paper we provide a comprehensive analysis of the performance of US SRI mutual funds as well as its relation to the flow of new money that those funds experience. Particularly, we consider not only the entire sample of SRI funds but also its retail and institutional shareclasses (hereafter retail and institutional SRI funds). Our focus on a category of SRI mutual funds is motivated by a recent study of Hartzmark and Sussman (2019) who show that while investors value sustainability, in line with psychological literature they tend to respond to extreme indicators of this feature and ignore more detailed sustainability information. We consider then SRI mutual funds as labeled by USSIF where the SRI label serves as a quality label of the mutual fund's sustainability rating. The group of SRI mutual funds gives both retail and institutional investors a convenient possibility to accommodate their sustainability preferences without a need of conducting costly and time-consuming screening process. As a result, we are able to analyse the investment decisions of retail and institutional SRI investors in the light of their sustainability preferences.

The empirical analysis in our paper is three-folded. First, we evaluate the performance o SRI mutual funds and its both retail and institutional shareclasses and we compare it with the performance of conventional funds. We use two different matching procedures for the identification of the conventional funds which allows us to shed a light on the control of managerial skills within the SRI investments. Second, we investigate how SRI funds characteristics and performance impact the amount of money that those funds attract or lose subsequently (flow-performance relation hereafter) and whether the investors sophistication plays a role in the flow-performance relation. Third, we study how investment decisions of the SRI mutual fund investors, which are reflected in the flows of money, are related to the profits they earn subsequently (performance-flow relation hereafter) and whether the investors sophistication matters for the performance-flow relation. While the performance of SRI/ESG funds has been extensively studied in academic literature, the analysis of the flow-performance and performance-flow relation for SRI funds and its retail and institutional shareclasses is what makes a novelty of our paper. Growing recent interest of investors in sustainable investments calls for a thorough analysis of the role of investors sophistication for the flow-performance and performance-flow relation.

The contributions of our paper can be listed as follows. First, we evaluate and compare the performance of both retail and institutional SRI mutual fund classes. While the literature on the performance differences between retail and institutional mutual funds in general is relatively large (James and Karceski 2006, Evans and Fahlenbrach 2012, Salganik-Shoshan 2016, Jiang and Yuksel 2017), no attention has been devoted to analyze the performance of retail and institutional mutual funds in the context of sustainability preferences. In this

[1] USSIF 2020 Report on US Sustainable, Responsible and Impact Investing Trends, USSIF 2010 Report on Socially Responsible Investing Trends in the United States

[2] Such as mutual funds, exchange-traded funds and closed-end funds.

[3] United Nations Principles for responsible investment was launched in 2006 to reflect the increasing relevance of ESG issues to investment practices (Kim and Yoon 2022). Morningstar published sustainability ratings in 2016 for mutual funds to show fund's involvement in ESG issues (Hartzmark and Sussman 2019)

paper we address this issue. Second, when comparing the performance of the SRI mutual funds with their conventional peers, we adopt two matching procedures. First, we match SRI funds with the conventional peers using the same manager and investment objective as the matching criteria, which allows us to control for fund managerial skills. Second, we match SRI funds against conventional funds using fund age, size and investment objective as the set of matching criteria. The comparison of the performance of SRI funds with their matched conventional mutual funds directly allows us to conclude on the role of managerial skills when comparing the performance of SRI and conventional mutual funds. Our findings reveal that managerial skills might be of special importance when considering investments into sustainable funds. Finally, we investigate the role of investors sophistication and its influence on the flow-performance and performance-flow relations within the class of SRI mutual funds. To the best of our knowledge, this topic has not been addressed in the academic literature so far. We apply standard methodologies for our analysis but also, as a novelty, we adopt the monotonicity relation test proposed by Patton and Timmermann (2010). It is a simple, non-parametric test that is implemented via bootstrap method. The advantage of the test is that it does not require any assumptions regarding the functional form of the monotonic relation, which is of special importance in our context since we investigate as well the shape of the flow-performance relation for SRI mutual funds.

Our main empirical findings are as follows. First, considering the performance of SRI mutual fund sector and its shareclasses, our results show that the overall SRI mutual funds make positive abnormal returns before fees, but not statistically significantly different from zero after fees. We also find that retail SRI funds are outperforming institutional SRI funds both before and after fees. Second, after comparing the performance of SRI funds with their conventional peers, we find no differences in performance when we consider SRI and conventional mutual funds run by the same management companies. However, when we compare the performance and SRI and conventional funds with similar fund characteristics, yet not necessarily run by the same management companies, we observe that SRI mutual funds outperform their conventional peers both before and after expenses. Third, our study shows that there is a positive relation between past performance and future investment flow for SRI mutual funds as well as for their both, retail and institutional shareclasses. Thus the SRI funds performing well in the past, subsequently attract more investment. We confirm a positive flow-performance relation with monotonic relation test of Patton and Timmermann (2010). Further investigation reveals that the flow-performance relation is convex for retail SRI funds, whereas linear for institutional SRI funds. Finally, provide an evidence that there is no smart money effect among the sample of all SRI funds as well as retail SRI funds. Interestingly, we find a dumb money effect for institutional SRI funds as funds net attracting new money subsequently underperform funds net losing new money. We show that the dumb money effect is mainly driven by bad performance of funds with large new money inflows and is rather a short-lived phenomenon as it disappears after 3 months. Our results are robust to a series of robustness checks.

In summary, our empirical results shed a new light on the role of investors sophistication in the flow-performance and performance-flow relation. Both, retail and institutional SRI investors seem to behave rationally, after accommodating their sustainability preferences in the sense that they direct more of their money towards best past performers. Yet, institutional SRI investors are more harsh in punishing mutual fund managers for bad performance. On the other hand, the lack of smart money effect for retail SRI funds and the dumb money effect for institutional ones, may indicate that, apart from preference for sustainability and performance, there might be other factors that drive the investment of the SRI investors. With these novel results, we contribute to the empirical literature on the growing importance of sustainability in the investment industry.

The rest of the paper is organised as follows. Section 2 overviews in details the literature related to this study. In section 3 we provide the description of the dataset used and the measurement of the flow of funds. In section 4 we discuss performance measures, examine the performance of SRI mutual funds as well as its retail and institutional shareclasses and compare it with the performance of conventional funds. In section 5 we analyse the relation between past performance and future flow of money for SRI mutual funds while in section 6 we study the opposite: the relation between past flow of money and future performance for SRI mutual funds. Both sections 5 and 6 are self-sufficient in the sense that they contain the description of the relevant methodologies, discussion of the empirical results and necessary robustness checks. Section 7 concludes.

2 Literature Review

2.1 SRI fund performance

Most of earlier studies on SRI or ESG mutual funds focus on the performance comparison and find no significance evidence of different average performance between ESG or SRI claimed funds and their conventional peers (Hamilton et al. 1993, Statman 2000, Benson et al. 2006, Bauer et al. 2007, Renneboog et al. 2008). This might be attributed to the constraints of portfolio as non-financial criteria rather than mean-variance efficiency. Hamilton et al. (1993) find that only the young SRI funds outperform the randomly selected conventional funds

during 1981-1990 whereas the superior performance vanishes for the older funds. Similar evidence has been found by Statman (2000) that the SRI funds on average outperform the conventional funds during 1990-1998 but only at a marginal extent. Benson et al. (2006) instead find that SRI funds underperform the conventional funds during 1994-2003 using an eight-factor model. No significance difference has been found between the performance of SRI funds and conventional alternatives, during 1990-2001 (Bauer et al. 2005) and during 1991-2003 (Renneboog et al. 2008) respectively. Climent and Soriano (2011) also confirm that SRI funds either underperform or achieve not significantly different performance from their conventional peers, during the period of 1987-2009. By comparing SRI funds with conventional funds during 1997-2005 using a different matching approach, Gil-Bazo et al. (2010) find that SRI funds perform better before- and after-fee than conventional funds, exclusively due to the SRI funds managed by SRI specialised management companies.

However, more recent studies have identified that socially responsible investing may have a positive impact on fund performance, especially during economic downturns. According to Henke (2016), SRI bond funds can outperform their conventional peers during the period 2001–2014, and this outperformance is directly related to the mitigation of ESG risks, which is achieved by the exclusion of corporate bond issuers with poor corporate social responsibility activities. Focusing on both European and US green funds during 1996-2015, Silva and Cortez (2016) find that US green funds can outperform other SRI funds in crisis periods although European green funds underperform benchmark. Later studies indicate that ESG score may have positive impact on the fund performance. Alda (2020) finds that ESG screening intensity leads to greater returns and larger flows for UK funds during 2016-2018, and there's a increasing conventional interest from pension fund towards ESG factors. The SRI funds can outperform, and the SRI-fund nature positively influences ESG scores. Using holding-based analysis of equity funds during 2014-2019, Madhavan et al. (2021) also find that funds with high ESG scores have different factor loadings with those of low-scoring ESG funds, and there is a strong positive relationship between fund performance and factor ESG scores. However, some mixed evidence is also found by Bofinger et al. (2021), by relating the ESG rating to active fund investment skill. They find that higher ESG ratings are associated with overpricing and low investment skills, after analysing funds during 2006-2016. Fund managers are confronted with a dilemma that investing according to investor's sustainability preferences lead to active overpricing which might be interpreted as low investment skill. Some recent studies also find mixed evidences on the performance of passively managed ESG or SRI funds (Omura et al. 2021, Pavlova and de Boyrie 2022). Using sustainability (ESG) ratings of funds from 2016-2017, Hartzmark and Sussman (2019) suggest that sustainability is viewed as positively predicting future performance, but they find no evidence that high-sustainability funds outperform low-sustainability funds.

Some recent studies have been conducted on the economic rationale of the inclusion of ESG investment in portfolio management, and the incorporation of ESG factor in asset pricing. In practice, many conventional fund managers have adopted features of responsible investing in the investment process, by taking the companies' ESG information into the valuation and asset pricing process. The ESG fund forces companies to partially internalize negative externalities (Van Duuren et al. 2016, Giese et al. 2019, Landier and Lovo 2020). Other studies suggest the uncertainty underlying the ESG profile; the investors' preferences for green and sustainable investments, or potential reduction for systematic risk could contribute to the growth of this sector. For example, Avramov et al. (2021) mention that uncertainty of the corporate ESG profile affects the risk-return trade-off under context of asset pricing and portfolio implications. All these could contribute to the mixed evidence of the relationship between sustainability and fund performance. Pástor et al. (2021) suggest that green assets outperform when positive shocks hit the ESG factor, which captures shifts in customers' tastes for green products and investors' tastes for green holdings. This is also confirmed by Borgers and Pownall (2014), who conduct a survey analysis on institutional investors such as pension fund participants, and find significant variation in attitudes towards socially and environmentally responsible investment. The pension fund beneficiaries have a positive attitudes towards social responsibility in their pension investment. Cerqueti et al. (2021) also find that by including high ESG ranked funds into portfolio could potential reduce systematic risk.

2.2 SRI fund flow and performance relation

The relation between fund performance and flow of money has been investigated in the academic literature from two main perspectives, which reflect two different angles of research. The first perspective focuses on how mutual fund investors respond to fund performance and subsequently invest their funds. For that purpose the relation between past performance of the mutual funds and their future flow of money is analyzed. Majority of the empirical works show that this relation is positive so that funds with better performance attract subsequently more money. Earlier studies (Chevalier and Ellison 1997, Sirri and Tufano 1998, Del Guercio and Tkac 2002, Huang et al. 2007, Ferreira et al. 2012) unveil that the flow-performance is convex, implying that investors disproportionally reward past winners but reluctantly punish past losers. However, the more recent works (Spiegel and Zhang 2013, Ha and Ko 2019, Schiller et al. 2020) provide evidence that this relation is more linear rather than convex, after controlling for fund flow endogeneity or model misspecifications. The second perspective can

be traced back to the question of Zheng (1999) of why, in spite of bad performance the mutual fund industry attracts so much money and how it is related to managerial skills. For that purpose academics study the relation between funds past flow of money and their future performance. Most of the studies (Gruber 1996, Zheng 1999, Keswani and Stolin 2008, Jiang and Yuksel 2017) show that there this relation is positive so that funds that attract more money subsequently perform better than funds losing the money (smart money effect). There are, however some studied that shed some light on the smart money effect and find opposite empirical results (Frazzini and Lamont 2008, Feng et al. 2014, Akbas et al. 2015, Rakowski and Yamani 2021).

The literature on fund flow and performance relations for SRI/ESG mutual funds is much less developed and focuses on the comparison of the relations for SRI and conventional funds. Bollen (2007) examines the flow-performance relation and finds evidence that the flows of SRI funds are more sensitive to positive past returns but not necessarily less sensitive to negative past returns in comparison to conventional funds over the 1980-2002. Using different sample and methodologies, Benson and Humphrey (2008) show that SRI fund flows are actually less sensitive to past returns than conventional flows, indicating that SRI investors derive non-financial utility from their investments. There is however no difference in the shape of the flow-performance relation of SRI funds in comparison to conventional funds. Finally, Renneboog et al. (2011) investigate how non-financial/sustainable attributes influence the flow-performance relation of SRI mutual funds across various geographical regions in comparison to conventional funds. They confirm the findings of Benson and Humphrey (2008) and show that the flow-return relation depends on the types of screens used and screening intensity. Renneboog et al. (2011) demonstrate as well that there is no smart money effect within the SRI funds as the past flows of SRI funds are not related to their future performance. While the aforementioned studies compare of the flow-performance relation for SRI funds with the conventional ones, the concern of our paper is somehow different. We investigate the flow-performance and performance-flow relations for SRI mutual funds but focus on how these relations differ between two SRI clienteles, the retail and the institutional one, applying as well alternative methodologies.

2.3 Institutional and retail investors

Mutual fund normally provide institutional and retail shareclasses for different investor clientele. Various studies (Del Guercio and Tkac 2002, Goyal and Wahal 2008, James and Karceski 2006, Goyal and Wahal 2008, Keswani and Stolin 2008, Evans and Fahlenbrach 2012) show that investor sophistication may influence the fund performance and play an role in how the investors respond to this performance and other investment attributes. The reason for that is that retail and institutional investors differ significantly from each other in terms of their investment objectives, the level of financial sophistication, the search costs they face or the available information. In an early study James and Karceski (2006) show that in spite of lower management expenses, the performance of institutional mutual funds is comparable to that of the retail funds. They also find that the flows of institutional investors are less sensitive to past returns than the flows of the retail investors and more sensitive to risk-adjusted performance measures in comparison to retail funds. Evans and Fahlenbrach (2012) confirm their conclusions with similar findings and Salganik-Shoshan (2016) demonstrates that institutional clients use more quantitatively advanced performance evaluation criteria such as risk-adjusted returns or tracking error and are less sensitive to fund expense ratio. Mazur et al. (2017) on the other hand investigate the shape of the flow-performance relation for retail and institutional investors. They find convex/concave relationship in the upper/lower performance region, with the convexity characterising retail funds and concavity being more pronounced for institutional funds. On the other hand, the academic research on the performance-flow relationship also provides evidence that the investor sophistication may play a role here. Frazzini and Lamont (2008) concludes that retail mutual fund investors represent dumb money while institutional mutual fund investors can be perceived as smart ones. This is also confirmed by Feng et al. (2014) who shows that institutional investors represent smart money as they move their funds into future good performers. On the contrary Salganik-Shoshan (2013) finds the smart money effect for both retail and institutional mutual funds and Jiang and Yuksel (2017) show that the positive relation between past flow and future performance disappears for retail and institutional funds once they take into account the persistence of the flow. Döttling and Kim (2021) is the only study, to the best of our knowledge, that considers investment decisions of SRI retail and institutional mutual fund. The focus of the paper is however different to ours, as they investigate the fund flows of SRI investors as a reaction to the COVID-19 pandemic shock. They do not study the flow-performance and performance-flow relation for SRI retail and institutional investors, which is what we do in our work.

3 Data

3.1 Mutual fund sample

In line with earlier studies, we consider the monthly performance of SRI equity funds from December 1999 to March 2021[4] . The data for SIF funds come from the survivor-bias free US mutual fund database of the Center for Research in Security Prices (CRSP). This database provides a comprehensive coverage of mutual funds, including monthly return rates, size (total net asset values), expense ratio, turnover, and load. The focus of our study is an examination of the fund performance and flow of SRI equity funds. We obtain our list of SRI funds from the SIF's reports published in the previous years 2010, 2012, 2014, 2016, 2018, 2020. The report contains comprehensive information about SRI in the US. In particular, the reports contain a list of SRI mutual funds compiled by SIF. In order to construct this list, SIF employs a direct survey methodology and gathers information from third parties. A fund is included in the SIF list if it utilises one or more social or environmental criteria as part of a formal investment policy. In order to be included in the list, funds are required to provide written confirmation of social screening when not explicitly incorporated into the fund prospectus. Furthermore, SIF performs checks to exclude any institution that says it takes into account social or corporate governance criteria in its investment decisions but lacks a formal policy for doing so or has a policy but does not observe it.

In order to build our sample of SRI funds, we first label a mutual fund as SRI in a given year if it was included in the corresponding SIF report. Some SRI funds included in some reports, however, do not appear in others, despite being alive. We check funds' prospectuses to identify whether these changes were due to changes in the SRI orientation of the funds and found that temporary exclusions from the reports were not associated with any significant change in reported investment strategy. Thus, we label a fund as SRI for the whole sample period if the fund appears at least once in the SIF reports. We merge the list of SIF funds with the CRSP mutual fund database to get the historical data on fund returns, size and other characteristics.

We only focus on the equity funds (both US domestic and foreign), and exclude the bond or fixed-income funds. To address the incubation bias (Evans 2010), we exclude the returns from the period before a fund received a ticker[5] from NASDAQ. As for all funds, we do not impose an additional filter for fund size or return history. Mutual funds tend to offer different shareclasses[6] to investors, even though the returns come from the same portfolio. The data report net return rates for each fund shareclass separately. For each fund and month, we compute the weighted net fund return rate by averaging over the net return rates of a fund's different shareclasses using, as weights, the ratios of shareclass net assets to the fund's total net assets (TNA). The resulting net return rate is what the average investor receives when investing in the fund. Shareclass aggregation prevents newly-created shareclasses of a fund from causing duplication of return data that comes, effectively, from the same portfolio. We compute the gross return for each fund following the same procedure in Fama and French (2010). We also repeat the same procedure to aggregate the institutional (and retail) shareclasses as institutional (and retail) funds as sated in the literature (MacGregor et al. 2022). As a result we have 57 SRI mutual funds in total, 52 retail funds, and 47 institutional funds from December 1999 to March 2021.

We examine the fund performance and performance versus flow relationship of SRI funds with respect to their conventional peers. There are two matching methods used in this study to filter the conventional funds to take account of both fund manager skills and fund characteristics for more robust references. The first method is less restrictive but controls for fund managerial skills, by matching SRI funds with the conventional peers managed by the same managers and under the same investment objectives defined by CRSP.[7] The second approach relies on the characteristics of funds. We adopt similar procedures in Climent and Soriano (2011), and match SRI funds against an equally weighted portfolio of several conventional funds using fund age, end of period fund size, and fund investment objective as the set of matching criteria.

Figure 1 depicts the development of the SRI mutual fund sector. From Panel A of Figure 1 we can see that the number of available SRI funds has been steadily growing since 1999 with a clear jump around 2016 when around 10 new SRI funds appeared at once[8]. Panel B of Figure 1 shows the dynamics of the Total Net Assets of the SRI mutual fund sector. Similarly to the number of funds, the amount of money invested into SRI funds

[4]We truncate the original starting date of January 1991 to December 1999 in our analysis, in order to have at least three funds in the constructed portfolios.

[5]A ticker is an abbreviation used to uniquely identify publicly traded shares of a particular stock on a stock market.

[6]Shareclasses can differ regarding their front- and back-end loads paid to brokers, and the contribution to annual operating expenses of portfolio management.

[7]We use '*crsp_obj_cd*' provided in CRSP mutual fund database as it gives a more comprehensive coverage of fund investment objectives.

[8]It might be related to the fact that in March 2016 the Morningstar introduced the Sustainability Ratings which provide easy and intuitive signals of how well the mutual funds deal with ESG issues. Hartzmark and Sussman (2019) show that after the introduction of these ratings, it became easier and less costly for the investors to assess the sustainability of mutual funds which attracted much attention of the investment industry.

has been increasing since 1999. We can observe as well a clear change of the dynamics in TNA of all and retail SRI funds around the financial crisis of 2007-2008.

[Figure 1 here]

3.2 Money Flows

In measuring the flow of new money into the mutual fund, we follow a usual practice in the literature and use two most often applied measures of the flow of new money.[9]

First, we compute the dollar net flow of new money for fund i in month $t+1$ according to the following formula:

$$dollar\ flow_{i,t\to t+1} = TNA_{i,t+1} - TNA_{i,t}(1 + R_{i,t+1}) \tag{1}$$

where $TNA_{i,t+1}$ and $TNA_{i,t}$ is the Total Net Asset (TNA) of the fund i at the end of month $t+1$ and t respectively, $R_{i,t+1}$ is the fund's i net return over the month $t+1$. The dollar flow reflects the new money (new cash) that inflow to the fun net out of all possible new cash outflows. It is then an approximation of the exact flow of new money and expresses only the net effects of money flows. The reason for that is that the CRSP Mutual Fund Database does not report directly the data on new money inflows and outflows for mutual funds so these must be recovered from funds' TNA and returns. Keswani and Stolin (2008) provide a more detailed discussion on this approximation and the consequences of its usage in empirical work. Moreover, the equation (1) assumes that the flow of new money occurs at the end of month $t+1$, all fund's dividends are reinvested into the fund and that the investors of the merged funds put their money into a surviving fund, which helps to address the survivorship bias problem.[10] Many previous studies show that these assumptions are not crucial from empirical perspective (see e.g. Chevalier and Ellison (1997), Sirri and Tufano (1998), Sapp and Tiwari (2004), Frazzini and Lamont (2008), Ferreira et al. (2012)). The dollar flow is commonly used when studying the relation between past flow of new money and future funds' performance for the formation of flow portfolios (see e.g. Zheng (1999), Sapp and Tiwari (2004), Keswani and Stolin (2008), Frazzini and Lamont (2008), Feng et al. (2014), Jiang and Yuksel (2017)). As pointed by Zheng (1999), the dollar amount of new money is more appropriate for mutual fund industry since it focuses on economically meaningful new money flows from the aggregate perspective.

Second, we compute as well the percentage net flow of new money for fund i in month $t+1$ as the dollar flow given in equation (1) normalized by the fund's previous month's TNA. Specifically:

$$percentage\ flow_{i,t\to t+1} = \frac{TNA_{i,t+1} - TNA_{i,t}(1 + R_{i,t+1})}{TNA_{i,t}} \tag{2}$$

The percentage flow tells us the dollar value of new money relative to the fund's assets. According to Sirri and Tufano (1998) it reflects "the percentage growth of a fund in excess of the growth that would have occurred had no new funds flowed in and had all dividends been reinvested". Such a normalisation is often applied in the literature for example for methodological reasons. Moreover, Chevalier and Ellison (1997) provide empirical evidence that mutual funds have tendency to grow or shrink proportionately to their initial TNA, which justifies the use of normalized flow. On the other hand, the normalisation may inflate the flow when fund experiences disproportionately high net inflows or outflows, which often occurs at the beginning or end of the fund's life. Thus in order to ensure that extreme values of percentage flow do not impact our empirical results, we follow a standard procedure and winsorize the percentage flow by fund at the bottom and top 1% of its distribution. The percentage flow is more appropriate in the examinations of the relation between past performance and future flow since economically small dollar flows (e.g. for small mutual funds) might be relatively high from the perspective of an individual fund and potentially driven by the fund's past performance (Sirri and Tufano 1998, Huang et al. 2007, Ferreira et al. 2012).

In some of the analysis in this study, we consider the flow of new money for SRI mutual funds over periods longer than a month. We define then the dollar net flow of new money for fund i over the p consecutive months $t+1$, $t+2$, ..., $t+p$ as follows:

$$dollar\ flow_{i,t\to t+p} = TNA_{i,t+p} - TNA_{i,t}(1 + R_{i,i,t\to t+12}) \tag{3}$$

where $TNA_{i,t+p}$ and $TNA_{i,t}$ is the Total Net Asset (TNA) of the fund i at the end of month $t+p$ and t respectively, $R_{i,i,t\to t+12}$ is the fund's i net return over the p consecutive months $t+1$, $t+2$, ..., $t+p$. In a similar spirit we define the percentage flow over the p months as the dollar flow normalised by the TNA in month t.

[9] Frazzini and Lamont (2008) provide an excellent explanation of the concept of new money flow for mutual funds.

[10] In our sample we have 4 SRI mutual funds that merge with bigger but non-SRI funds which are here considered as surviving funds. Consequently from the practical perspective the 4 funds leave our sample of SRI funds and we do not have the merger factor (MGTNA) in our formula.

4 Performance of SRI mutual fund sector

4.1 Measuring performance

In measuring performance of the SRI mutual funds we take a standard approach in the academic literature and use alpha which reflects the abnormal return, that is the additional return the fund pays in excess of what it expects to pay according to its risk. It is the most often used risk-adjusted measure in empirical research on mutual fund performance evaluation. The expected return of the fund is determined by a specific benchmark model. In this study we use three different benchmark models for performance evaluation: CAPM, three-factor model of Fama and French (1993) (FF) and four-factor model of Carhart (1997) (Carhart). Alphas from the three models are estimated from the following time series regressions:

$$R_{i,t} - R_{f,t} = \alpha_i^{capm} + \beta_m MKTRF_t + \varepsilon_{i,t} \quad (4)$$

$$R_{i,t} - R_{f,t} = \alpha_i^{ff} + \beta_m MKTRF_t + \beta_{smb} SMB_t + \beta_{hml} HML_t + \varepsilon_{i,t} \quad (5)$$

$$R_{i,t} - R_{f,t} = \alpha_i^{car} + \beta_m MKTRF_t + \beta_{smb} SMB_t + \beta_{hml} HML_t + \beta_{umd} UMD_t + \varepsilon_{i,t} \quad (6)$$

where $R_{i,t}$ and $R_{f,t}$ are respectively fund i return and risk free rate in month t, $MKTRF_t$ is excess return on value-weighted market portfolio in month t, SMB_t, HML_t, UMD_t are the returns on factor-mimicking portfolios related respectively to size, book-to-market and momentum effects in month t.

Elton and Gruber (2020) note that while the academic community has already recognised that performance evaluation of mutual funds needs to be adjusted for risk and various benchmark models have been proposed for that purpose, the investment profession very often relies on simple performance measures such as excess return (in excess of a risk free rate or of a market return) or Sharpe ratio. In order to accommodate the views of both, in this investigation where necessary, we also report the aforementioned simple measures of performance.

The first step of our empirical analysis focuses on assessing the average performance of SRI mutual fund sector with a breakdown to retail and institutional shareclasses (which we refer shortly to as retail/institutional funds) and evaluation of how the SRI funds perform in comparison to their conventional peers.

In order to measure the performance of SRI mutual funds as a sector, each month we form a portfolio constructed out of all SRI funds available at given month and compute its return. We use both net and gross fund returns in order to study the performance respectively after and before deducting the expenses. Commonly before-fees (gross) performance reflects the abnormal return of the fund earned by the fund management while after-fees (net) performance reflects the abnormal returns that flows to the investors. In a similar spirit we form fund portfolios out of retail and institutional funds only which represent respectively the sectors of retail and institutional investors. Additionally, in order to compare the relative performance of the two sectors, we also form a zero cost portfolio which is long/short in a portfolio of retail/institutional funds and we assess its performance. The zero cost portfolios are also constructed for comparing the performance of conventional and SRI fund sectors.

4.2 SRI sector fund performance and comparison with conventional funds

Our basic results on performance of the sectors of all, retail and institutional SRI funds are reported in Table 1. There are few interesting observations which we would like to focus on in what comes. First, we can observe in Panels A-C that SRI funds as a sector over the December 1999 to March 2021 period obtained on average positive and statistically significant abnormal return (alpha) before applying fees. For example, according to Carhart model, a portfolio of all SRI funds was paying abnormal return of 0.143% per month before fees. After deducting the fees, the alpha is still positive, hoverer not significant any more. This indicates that active management of SRI funds indeed seems to add value, however this value is not further passed to final clients. Second, over the Dec1999–Mar2021 period institutional funds were performing on average badly. We can observe that after fees abnormal return was statistically negative and of magnitude from –0.063% (for Carhart model) to –0.091% (for CAPM) per month. The abnormal return after fees was negative as well, however not statistically significant. Thus for institutional funds, in contrast to all SRI funds, active management not only does not bring value, but it negatively impacts final clients. Third, in the last two columns of Table 1 we report performance measures for a zero cost portfolio which is long in a portfolio of SRI retail funds and short in a portfolio of SRI institutional funds. While retail funds, as a separate portfolio, from statistical perspective perform neither well nor badly, in comparison to institutional funds, they perform statistically better both before and after the fees. We can observe that before (after) fees they pay around 0.1% (0.07%) per month more than institutional funds and this number is statistically significant. It is important to underline here, that the conclusions reported above

are insensitive to whether we use CAPM, Fama-French or Carhart benchmark pricing models. Moreover, the magnitude of estimated alphas is similar to the findings of many studies in this literature.[11]

[Table 1 here]

In Table 2 we report the performance of the two sectors: SRI and conventional funds. As mentioned we consider two samples of conventional funds: a sample of manager-matched funds that represents funds matched to the SRI sample based on the same manager and investment objective as a set of matching criteria, and a sample of characteristics-matched funds that represents funds matched to the SRI sample based on age, end of period size, and investment objective as a set of matching criteria. We can observe in Table 2 that the performance of conventional funds crucially depends on the matching method. Manager-matched funds perform neither badly not well from a statistical perspective. In comparison to SRI funds they obtain negative abnormal returns (both before and after fees) but these are not statistically significant either. In other words, roughly the same group of managers obtains slightly better performance when managing SRI funds in comparison to conventional funds but the differences are statistically negligible. On the other hand, when we compare the performance of a sample of characteristics-matched funds, we can observe that they are performing statistically badly after fees: their abnormal return is –0.149% or –0.140% per month, according to respectively Carhart or Fama-French models. Moreover, they earn around 0.2% per month less than the equivalent SRI funds and this number is statistically significant.

[Table 2 here]

Comparing the results of the two samples of conventional funds with SRI funds, it seems that the management skills play an important role in the managing mutual funds that focus on investments into a specific sectors of equities. We can see that the same group of managers obtains similar investment results when managing SRI or conventional funds, while the sample of conventional funds preforms worse than equivalent sample of SRI funds, when the management is different. The empirical results we find here, fit well into a strand of literature which examines the role of specialised manager knowledge for performance of sector funds, such as real estate (MacGregor et al. 2021, 2022). Overall, we can conclude that SRI funds may perform better but definitely do not perform worse that conventional funds.

4.3 Performance dynamics of SRI funds

The performance evaluation of SRI funds as a sector and its comparison with the conventional funds, conducted so far, is an unconditional performance which does not change over time. In order to address a possible time variation in fund performance, we use 60-month rolling window regressions. Specifically each month, we estimate time series regressions for portfolios of all SRI, retail and institutional funds as specified in equations (4)–(6) using the latest 60 month of observations and we record alphas. In this manner we obtain a dynamic measure of abnormal returns that reflects the information about portfolio performance over the last 5 years. The dynamic alphas from different benchmark models and for the three SRI fund portfolios are depicted in Figure 2 (after fees) and Figure 3 (before fees). We can observe that there is not much variation in performance of SRI fund portfolios over time and the alphas from various benchmark models are rather stable over time. In Figure 3 in panels A and B we can see that abnormal returns before fees for portfolios of all SRI and retail funds are mostly positive. On the other hand, the alphas for institutional funds (in panel C) are usually below zero. This is even more pronounced when abnormal returns after fees are considered (panel C of Figure 3). This accounts for a strong confirmation that indeed SRI institutional funds are were not performing well.

[Figure 2 and Figure 3 here]

In order to address the possible dynamic in relative performance of SRI retail vs SRI institutional funds, as well as relative performance of conventional (both manager-matched and characteristics-matched) vs SRI funds, we repeat the 60-month rolling windows regressions for the three zero cost portfolios. The dynamic alphas from different benchmark models for the three zero cost portfolios are depicted in Figure 4 (after fees) and Figure 5 (before fees). Comparing the performance of the SRI retail vs SRI institutional funds, we can see from panel A of both figures that retail funds were performing in general better than institutional funds over the Dec1999–Mar2021 period, again the result being more pronounced for abnormal returns before fees. Equivalent conclusion can be drawn when we compare the relative performance of manager-matched/characteristics-matched conventional funds with SRI funds. We can see from panels B and C of both Figures that the zero-cost portfolios representing the differences between conventional and SRI funds usually have negative abnormal returns. This indicates that the conventional funds are usually performing worse than SRI funds. The results are more pronounced for characteristics-matched conventional funds, which further confirms the findings from the static

[11] see e.g. Keswani and Stolin (2008), Tables IV-VI or (Zheng 1999), Tables III-IV

analysis of the relative performance of the two groups of funds: characteristics-matched conventional funds are performing worse than SRI funds.

[Figure 4 and Figure 5 here]

In summary, the analysis the dynamic performance of SRI funds and the comparison to their conventional peers draws no qualitatively different inferences with that of unconditional performance in subsection 4.2.

5 Relation between past performance and future flow of money

The relation between past performance and future flow of money (flow-performance relation hereafter) is often analyzed in the context of designing the proper incentives structured for mutual funds managers as many studies have shown that there exists a convex relation between past performance and future flow (see e.g. Chevalier and Ellison (1997)). This implies that mutual fund managers are rewarded for doing well in the past with disproportionately large fund inflows while they are not punished to the same extent for under-performing in the past with equally large fund outflows, which can lead to moral hazard problems.

In this section we investigate the relation between past performance and future flow of money separately for all, retail and institutional SRI funds. As it is common in the literature (Sirri and Tufano 1998, Huang et al. 2007, Ferreira et al. 2012), we measure flow of funds using a percentage flow measure given in equation (2). Past performance, on the other hand, although usually measured over the past year, can be measured in different ways. We follow three most frequently used methods based on review of literature.

First, we measure past performance by a 12-month cumulative alpha which reflects fund's average abnormal return over the past year.[12] It is defined as follows:

$$\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1 + R_{i,t} - \hat{R}_{i,t}) - 1 \tag{7}$$

The 12-month cumulative alpha for fund i at month t: $\alpha_{i,t}^{cum}$ is computed as the geometric average of the differences between fund net realised $R_{i,t}$ and estimated $\hat{R}_{i,t}$ over the past 12 months. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using recent 36-month estimation window) and factor realisations over the relevant months. We use three benchmark models to determine the fitted fund returns: CAPM, Fama-French three-factor model and Carhart four-factor model.

Second, we measure past performance as alpha which represents the intercept from a specified asset pricing model given in equations (4)–(6)[13] In order to introduce dynamics into this performance measure, alpha for a given month is estimated over the period of 36 months prior to a given month-end.[14]

Third, following our discussion in subsection 4.1, we use simple performance measures which reflect the fund's performance not fully adjusted for risk. Specifically, measure fund's past performance in a given month as fund's average excess return in excess of a risk free rate and of a market return and as a Sharpe ratio.[15] As already mentioned, all these measures reflect the performance over the 12 months prior to a given month-end.

In the detailed analysis in the rest of this section, in order to keep the main empirical picture clear, we focus on the case when past performance is measured by 12-month cumulative alpha given in (7). The empirical results for the other two groups of performance measures are considered as robustness checks are placed into the Online Appendix.

5.1 Flow-performance relation

In order to obtain an overview the flow-performance relation for each of the three groups of SRI funds we form five equal portfolios[16]We are not able to create 10 or 20 portfolios as is done by Sirri and Tufano (1998) or Huang et al. (2007) because our sets of SRI funds is much smaller in comparison to the set of all equity funds - for example in some months we have no more than 10 institutional SRI funds. Each month SRI funds (all/retail/institutional separately) are ranked into one of five bins based on their past performance (that is a performance in the preceding month) and a percentage flow is computed for each portfolio. The relation between relative past performance and average percentage flow for the three groups of SRI funds is depicted

[12]Such a measure of past performance has been often used in more recent studies e.g. Ferreira et al. (2012), Agarwal et al. (2018), Harvey and Liu (2019).

[13]Such a measure of past performance has been common in earlier studies e.g. Sirri and Tufano (1998), Huang et al. (2007).

[14]We also consider the 24-month period as the robustness check, and find no qualitative differences of empirical results from the 36-month rolling estimation period.

[15]These or similar past performance measures have been used in Ferreira et al. (2012) and Spiegel and Zhang (2013).

[16].

in Figure 6. For brevity, we report here only the average flow for performance portfolios when performance is measured by 12-month cumulative alpha. The equivalent figures for other performance measures show a similar picture and are placed into the Online Appendix.

[Figure 6 here]

We can observe from Figure 6 that there is an positive relation between past performance and future flow of funds no matter whether we consider all, retail or and institutional SRI funds. Mutual funds with a better past performance attract higher percentage of new money subsequently on average in comparison to funds performing worse in the past. The detailed quantitative estimation results for Figure 6 are reported in Table 3. We can see that the worst past performers among all and retail SRI funds actually experience net outflows of new money. For example, if we consider a portfolio of all SRI funds that performs worst according to CAPM benchmark model, we can see that the average net outflow of new money from this portfolio is 0.606% per month of its TNA. On the other hand, the equivalent portfolio of best past performers attracts new money - the average net inflow for this portfolio is 2.548% per month of its TNA. For retail SRI funds we can observe a steeper-sloped relation between past performance and future flow of money. For instance, in case of CAPM model, we can see that not only the worst past performance portfolio but also the second worst portfolio net lose new money as the average net outflow for each of these two portfolios is respectively 0.653% and 0.142% of their $TNAs$. This is however not the case for institutional SRI funds, for which all portfolios (no matter the past performance) on average net attract new money subsequently.

[Table 3 here]

In order to investigate whether there exists a truly positive relation between past performance and average future flow of money for SRI fund portfolios (observed in Figure 6), we run the monotonic relation test (MR test hereafter) proposed by Patton and Timmermann (2010). The null hypothesis in the MR test is that the relation between past performance and future flow of money is flat or weakly declining, while the alternative maintains a monotonically increasing relation. The MR test is a nonparametric test, it is implemented via bootstrap method to cope with nonnormality and it does not require any assumptions regarding the functional form of the monotonic relation between past performance and future flows. The latter point is of special importance in the context of the recent debate whether the relation between past performance and future flows is convex or rather linear. Following Patton and Timmermann (2010) and for comparison purposes, we include two test statistics (referred by Patton and Timmermann (2010) as MR and MR^{all}) to test the monotonic relation as well as the standard Student t-test. The details of the two types of the MR tests, Student t-test and the implementation procedure are explained in Patton and Timmermann (2010) and we refer the reader there if necessary.

The results of the tests are reported in the last three columns of Table 3. We can observe a strong evidence against the null hypothesis for all SRI and retails SRI funds – all the p-values (no matter which asset pricing model was used to adjust performance for the risk) are zero which implies that the relation between past performance and future flow of money for all and retail SRI funds is statistically positive. For the institutional SRI funds the evidence against the null is a bit weaker as the p-values range from 0.001 to 0.085. This seems to confirm what we observe in Panel C of Figure 6 for institutional SRI funds that the increasing relation between past performance and future flow is not as clear and smooth as for all or retail SRI funds.

The above analysis takes into account only one dimension of possible reasons for increasing flow of money: the past performance. In order to account for a multivariate dimension and control for other factors which can potentially influence the flow of new money, we consider multivariate panel regressions with a set of possible determinants of future flow of money. We run then the panel regressions (separately for each group of SRI mutual funds) where we regress flow of funds on past performance and a set of control variables, in the following equation:

$$Flow_{i,t\to t+1} = \theta_0 + \theta_{pp} PastPerf_{i,t} + \sum_j \theta_j Controls_{i,j,t} + \varepsilon_{i,t} \tag{8}$$

where $Flow_{i,t\to t+1}$ is the flow of fund's i over the month $t+1$, $PastPerf_{i,t}$ is its past performance and a set of control variables includes: size of the fund, measured by the log of its TNA ($logTNA_{i,t}$), age of the fund, measured by the log of fund's age ($logAGE_{i,t}$), standard deviation of fund's net return ($std(ret)_{i,t}$), expense ratio ($ExpRatio_{i,t}$), turnover ratio ($TurnRatio_{i,t}$), size of the fund's family, measured by the log of fund's family TNA ($logFamTNA_{i,t}$)and the log of the number of funds under management of the fund's family ($logFamNum_{i,t}$). All the explanatory variables are measured for month t or are computed or estimated based on data before (and including) month t. We run panel regressions with time and fund family company fixed effects and adopt the cross-fund robust standard errors (MacGregor et al. 2021, 2022).

The results of the multivariate panel regressions (using a cumulative alpha as a measure of fund's past perfor-

mance) are reported in Table 4[17]. We can observe from the table that for all three groups of funds, that is for all, retail and institutional SRI funds, past performance is a statistically significant determinant of next month's flow of funds and funds with higher past year's performance attract subsequently relatively larger amounts of new money. This relation holds even, when we take into account other potential factors influencing the future flow of money. Consequently, the obtained results provide a robustness to our previous findings in Figure 6 and confirm a positive relation between past performance and future flow of money for SRI mutual funds in the presence of other factors.

[Table 4 here]

5.2 Shape of the flow-performance relation

In the light of the recent debate whether the flow-performance relation is convex or linear, we find it important to address this question within the outset of SRI mutual funds. Initial inspection of the Figure 6 suggest that there seems to be a convex relation between past performance and future flow of funds for SRI retails funds, while the convexity is the least obvious for SRI institutional funds.

In order to shed more light on the possible shape of the flow-performance relation, we implement a piecewise-linear specification in the spirit of Sirri and Tufano (1998) or Huang et al. (2007) which allows the flow-performance relation to have different sensitivities at different levels of past performance.

The methodological procedure is as follows. For each month the fractional performance ranks (ranging from zero as worst past performance to one as best past performance) are assigned to each fund based on its past year performance (measured by 12-month cumulative alpha). The ranks reflect the percentage relative performance of funds within a given month. Then the fractional ranks are piecewise decomposed into three performance "pieces", each reflecting respectively the bottom quintile (Low), the three middle quintiles (Mid) and the top quintile ($High$) of the fund's fractional performance ranks, according to the following definition:

$$Low_{i,t} = \min(0.2, Rank_{i,t}) \quad (9)$$

$$Mid_{i,t} = \min(0.6, Rank_{i,t} - Low_{i,t}) \quad (10)$$

$$High_{i,t} = Rank_{i,t} - (Low_{i,t} + Mid_{i,t}) \quad (11)$$

So for example if within a particular month, the fund is ranked as the 10th best out of 100 funds according to its past performance, its fractional rank equals 0.90. Out of that value, 0.2 reflects the bottom quintile of the rank (Low), 0.6 reflects the middle three quintiles of the rank (Mid) and 0.1 reflects the top quintile of the rank ($High$). The piecewise linear specification allows the piecewise performance measures, given in equations (9)-(11), to have different slopes in their relation with future flow of money.

We pool the data across funds and months and regress monthly flow of money on piecewise past performance and a set of control variables as follows:

$$Flow_{i,t\to t+1} = \gamma_0 + \gamma_{low} Low_{i,t} + \gamma_{mid} Mid_{i,t} + \gamma_{high} High_{i,t} + \sum_j \gamma_j Controls_{i,j,t} + \varepsilon_{i,t} \quad (12)$$

where $Flow_{i,t\to t+1}$ is the flow of fund's i over the month $t+1$, $Low_{i,t}, Mid_{i,t}, High_{i,t}$ are its past piecewise performance measures and control variables include the same set of variables as in equation (8). The coefficients γ_{low}, γ_{mid}, γ_{high} reflect how sensitive the future flow is with respect to past performance at different levels of past performance. Similar to Ferreira et al. (2012), we do not use Fama-Macbeth approach as there months in our sample in which there exist data for as little as 6 mutual funds only. Instead, we run panel regressions with time fixed effects and adjust standard errors for clustering by fund. The described above methodological procedure is applied separately to each of the three groups of SRI funds: all, retails and institutional ones.

The estimation results for piecewise linear specifications for all, retail and institutional SRI funds are reported in Table 5. For brevity, we focus only on coefficients related to the three piecewise performance measures as they represent the sensitivities of the flow-performance relation at different levels of performance and omit the coefficients on control variables to conserve the space. We can observe from Panels A and B of the table that for all and retails SRI funds, the flow of new money is most sensitive to past performance when the level of past performance is high. This holds no matter which benchmark model is used for measuring past performance. For example when we consider retail SRI funds and adjust past performance using Carhart four-factor model, the change in $High$ performance ranking in a given month by 10% (e.g. from 85th to 95th percentile) induces an increase in the percentage flow of new money of 1.32% (0.1×0.132), while the same change in Low performance ranking increases the percentage flow of new money only by 0.23% (0.1×0.023). In order to determine whether

[17] We report in the table only the estimation results for the full econometric specification as given in equation (8). The nested models with limited number of control variables give qualitatively similar results and are available from authors upon request.

the sensitivity of the flow-performance relation is indeed higher for high levels of performance in comparison to low levels of past performance, we conduct a Wald test and test the null of no difference between the relevant sensitivity coefficients ($H_0 : \gamma_{high} = \gamma_{low}$). The results of the test, reported in Table 5 in the column named "H-L", indicate that for all and retail SRI mutual funds, the flow of new money is statistically more sensitive to past performance when we consider high past performance regions rather than the low ones. This is a direct evidence of the convex relation between past performance and future flow of funds for all and retail SRI funds.

[Table 5 here]

The picture, however, is quite different when w consider institutional SRI mutual funds. Inspecting Panel C of Table 5 one can see that only the institutional SRI funds in the *Mid* past performance ranking are characterized with statistically positive sensitivity of future flow to past performance. The sensitivity coefficients for the funds in the *Low* and *High* past performance ranking are not only statistically indifferent from zero but, more importantly, not different from each other, which is reflected in high p-values of the Wald test in the "H-L" column of Table 5. This implies that the sensitivity of the future flow to past performance is the same for SRI institutional funds within low and high past performance regions. We can conclude that the relation between past performance and future flow of funds for institutional SRI funds, although positive, is not convex.

Finally, we consider also the long-term aspect of the relation between past performance and future flow and investigate whether the shape of flow-performance relation for the three groups of SRI funds is preserved over longer periods. Specifically, we are interested here whether convexity in the flow-performance relation for all and retails SRI funds is a short-lived phenomenon which is present only in the flow of money in the subsequent month or perhaps it persists over longer periods. For that purpose we focus now on the percentage flow of money over periods longer than a subsequent month with respect to past performance. From the technical perspective, we pool the data across funds and months and, using monthly data, regress a flow of money over the consecutive p months on piecewise past performance and a set of control variables as follows:

$$Flow_{i,t\to t+p} = \gamma_0 + \gamma_{low} Low_{i,t} + \gamma_{mid} Mid_{i,t} + \gamma_{high} High_{i,t} + \sum_j \gamma_j Controls_{i,j,t} + \varepsilon_{i,t} \tag{13}$$

where $Flow_{i,t\to t+p}$ is the flow of fund's i between the end of months t and $t+p$, $Low_{i,t}$, $Mid_{i,t}$, $High_{i,t}$ are its past piecewise performance measures in month t and control variables include the same set of variables as in equation (8). We consider future flow of money over horizons up to 12 months, i.e. $p \in \{1, 3, 6, 9, 12\}$. Given the estimated equation for various values of p, we compute the differences between the sensitivities of the flow-performance relation at *High* and *Low* levels of performance and test, using the Wald test, whether these differences are statistically significant.

The estimation results for various horizons are reported in Table 6. We can see from Panels A and B of the table that for all and retail SRI funds, the flow-performance relation continues to be convex even if we consider flow of money over longer periods. Comparing the sensitivity coefficients on *High* and *Low* piecewise past performance, we can observe that the sensitivity of the future flow of money over the next 3 or 6 months to past performance is statistically higher for *High* performance regions, although its economic magnitude decreases as the horizon increases. This holds, no matter which benchmark model is used. We conclude then that the all and retail SRI funds that perform best in the past, continue attracting unproportionately higher percentages of new money not only over the consecutive month but even up to 6-month periods in the future. As previously, this is not the case for the institutional SRI funds. We can observe in Panel C of Table 6 that the reported differences in the sensitivity coefficients of the flow-performance relation at *High* and *Low* levels of performance for various horizons are of low economic magnitude and statistically not different from zero. This result is robust to various benchmark models used to risk-adjust the past performance.

[Table 6 here]

5.3 Robustness checks

In order to assure that our empirical results are not driven by a particular measures of past performance, we conduct our empirical analysis of the relation between past performance and future flow of funds, using alternative past performance measures. As mentioned as the beginning of this section, we measure past performance by alpha which represents the intercept from a specified asset pricing model given in equations (4)–(6), estimated using the 36-month rolling window regressions, but we also use simple performance measures which reflect fund's performance not adjusted for the risk.

The estimation results for these alternative past performance measures are reported in Tables A1–A8 in the Online Appendix. For both past performance measures we can observe that there exists a positive relation

between past performance and future flow of money for all, retail and institutional SRI mutual funds as can be seen in Figure A1 and Figure A2. The Student t-test as well as the MR tests of Patton and Timmermann (2010), reported in Table A1 and Table A2, further confirm this. In Table A3 and Table A4 we show that this positive relation is robust to the inclusion of a set of control variables – we can observe that the coefficients reflecting the influence of the past performance on future flow of money (first columns) are statistically positive for all, retail and institutional SRI funds, no matter which benchmark model was used. The empirical results related to the examination of the shape of the flow-performance relation are reported in Table A5 and Table A6. We can observe in Panels A and B of the two tables that for all and retail SRI funds, the Wald test confirms that the flow-performance relation is steeper in high past performance regions in comparison to the low ones which indicates that the flow of new money is statistically more sensitive to past performance when we consider high levels of past performance. Again, this is not the case for institutional SRI funds, for which the flow of money has the same sensitivity in high and low performance regions. This confirms our previous findings that the flow performance relation is convex for all and retial SRI funds, while it is not for institutional SRI funds. Finally, in Table A7 and Table A8 we report the results related to the long term aspect of the shape of the flow-performance relation. Again, the results confirm that the convexity in the flow-performance relation for all and retail SRI funds is preserved up to three or even six quarter ahead (depending on the past performance measure used), while there we find no convexity for institutional SRI funds.

6 Relation between past flow of money and future performance

The relation between funds past flow of money and their subsequent performance has been studied since Gruber (1996) in the context of the identification of managerial skills. The intuition of Gruber (1996)'s idea is simple: a rational investor that is able to differentiate between good and bad fund managers, should direct her capital to mutual funds managed by good managers that will subsequently perform well. This smart money effect, that is a positive relation between past flow and future performance because of managerial skills, was later confirmed, among others by Zheng (1999) and Keswani and Stolin (2008).

In this section we examine the relation between past flow of new money and future performance separately for three groups of SRI funds: for all, retail, and institutional. From methodological perspective, we use portfolio approach[18] that focuses on flow portfolios and currently is commonly used within the literature on smart money effect. Flow portfolios are dynamically formed out of a set of mutual funds, based on the fund's flow of money. Following the literature, we use a dollar flow measure given in equation (1). The portfolio formation procedure is the following. Each month we group mutual funds into two portfolios based on the sign of their flow in the preceding month: (1) a negative flow portfolio that includes the funds that were losing money in the previous month (in net) and this is reflected in the negative value of the fund's past dollar flow and (2) a positive flow portfolio that includes the funds that were attracting money in the previous month (in net) and this is reflected in a positive value of the fund's past dollar flow. Once the mutual funds are sorted into the portfolios, for each portfolio we obtain monthly returns using two portfolio-weighting schemes. Specifically, we compute (i) flow-weighted (FW) portfolio returns, where the funds' returns are weighted with their previous month flows and (ii) equally-weighted (EW) portfolio returns. Using flow-weighted returns for flow portfolio is a standard practice and has been often applied in the literature since Zheng (1999). Weighting funds according to their flows focuses on funds that experience high money flows in absolute terms so it gives more importance to extreme funds in this respect. On the other hand, equal weighting scheme does not focus on any specific fund and all of them are treated equally. Finally, given portfolio returns we evaluate the portfolio performance using alphas from CAPM, Fama-French three-factor and Carhart four-factor models, as specified in equations (4)–(6) as well as simple performance measures. Effectively, we are interested whether the two portfolios differ in their performance.

6.1 Performance of flow portfolios

We report the performance of positive and negative flow portfolios in Table 7. We can observe from Panel A of the table that for the entire sample of SRI mutual funds, both negative and positive flow portfolios have alphas which are statistically not different from zero. This holds no matter which weighting scheme is applied. However, the difference in performance between positive and negative flow portfolios, although positive, is also statistically indifferent from zero. This reflects the fact that SRI funds that net attract and net lose new money, experience subsequently the same performance. A very similar situation hold for retial SRI fund in Panel B of Table 7. Both positive and negative flow portfolios underperform however this underperformance is significant only for EW positive flow portfolios for which estimated alphas range from -0.110% to -0.125% per month. When comparing the performance of retail SRI funds with positive and negative net money flows we observe

[18] Zheng (1999) refers to this approach as "portfolio regression approach" while Keswani and Stolin (2008) call it "portfolio-level approach"

that their abnormal returns are the same from a statistical perspective. Given no difference in performance of mutual funds that experience money inflows and outflows, we conclude that there is no smart money effect neither for SRI mutual funds nor for retail SRI funds.

[Table 7 here]

Very different patterns can be observed in Panel C of Table 7 where we consider flow portfolios formed out of institutional SRI funds. We can observe that mutual funds net attracting new money in the past, subsequently perform badly. If we consider flow-weighted scheme, their abnormal returns are statistically negative and of relatively high economic magnitude ranging from -0.140% to -0.156% per month. This may not be that surprising given that the institutional SRI funds overall were underperforming as can be seen in Table 1. However, positive flow portfolios perform statistically worse than negative flow portfolios: they underperform the negative flow portfolios by approximately 0.11% per month. This actually reflects a dumb money effect among the institutional SRI funds as the funds which are net attracting new money not only subsequently perform badly but also perform statistically worse than the funds net losing new money. The new money is directed to the mutual funds performing relatively badly in the future so we can see that dumb money effect is mostly driven by institutional SRI funds with net new money inflows. Comparison of the above empirical results with equal-weighting scheme, yields some interesting observations. We can see that in this case positive flow portfolios also perform statistically badly (their alphas range from -0.140% to -0.156% per month) although they do not underperform the negative flow portfolios in statistical sense. We can infer that the dumb money effect is mainly driven by mutual funds with the highest dollar inflows or outflows, which we could summarise as "big money is dumb but the small one not so much".

Given our empirical findings, we now turn to a question of whether the observed dumb money effect for SRI institutional funds preserves over longer periods. A priori, we would expect it to be rather a short-lived phenomenon. For that purpose we now build flow portfolios and keep them over horizons longer than a month. Specifically, at the end of each p-month period we group mutual funds into two portfolios, negative and positive flow portfolios, based on the sign of their dollar flow over the preceding p months $Flow_{i,t-p\to t}$. We then compute flow-weighted returns for each portfolio and consider the portfolio that reflects difference between positive and negative flow portfolio. For this zero-cost portfolio we estimate its performance and test whether this difference is statistically significant. We consider horizons p from 1 to 12 months so $p \in \{1, 2, ..., 12\}$.

The estimation results for a flow-weighted scheme for various horizons are reported in Table 8. If we consider flow portfolios constructed out of all or retail SRI funds (Panels A and B), we can see that both positive and negative flow portfolios have the same performance from a statistical perspective, as the reported differences in their performance are not significant, no matter whether which horizon we consider. The only exception is the 12-month period for all SRI funds (Panel A, p=12) where we observe that positive flow portfolio is underperforming the negative flow portfolio by around 0.183% to 0.194% per month. We believe this might be related to the performance reversion over long term but have no further explanation for that. Interestingly, when we consider flow portfolios composed out of institutional SRI funds (Panel C) we can observe that positive flow portfolio statistically underperform negative flow portfolio over the period up to around 3 months. The differences between alphas for positive vs negative flow portfolio are statistically different from zero for horizons $p = 1, 2, 3$ but not beyond that. Intuitively it means that institutional SRI funds that net attract new money perform on average statistically worse than the institutional SRI funds that net lose new money and such an underperformance continues up to 3 months. Then the differences in performance disappear. We conclude that the dumb money effect among the institutional SRI funds is rather a short-lived phenomenon and lasts for around 3 months.

[Table 8 here]

Our empirical findings are interesting in the sense that they are quite different from what most of the studies conclude on the relation between past flow and future performance. A substantial set of empirical work[19] confirms that there is a positive relation between past flows and future performance which suggests that investor's money is smart as most of it is directed towards the funds that subsequently either perform well or overperform the funds with negative/lowest flow of money. Our study not only does not support the smart money hypothesis but rather suggests that SRI institutional investor's money is dumb as it flows to the funds which are subsequently performing badly and underperform funds with negative money flows.

There are, however few studied that shed some light on the smart money effect. For example Frazzini and Lamont (2008) demonstrate that retail mutual fund investors represent dumb money as they lose on average in their mutual fund investments. The reason for that is that they direct their funds towards stocks with high sentiment which are overvalued and subsequently revert to fundamentals thus paying lower returns. The

[19] The non-exhaustive list of studies confirming the smart money hypothesis includes Gruber (1996), Chevalier and Ellison (1997), Zheng (1999), Keswani and Stolin (2008), Yu (2012).

institutional mutual fund investors, on the other hand, reflect smart money as they exploit the inefficiencies introduced by retail investors. In a related study Akbas et al. (2015) provide an empirical evidence that there exists the dumb money effect for mutual fund investors at aggregate level. They show that aggregate flows of mutual funds inflate the cross sectional mispricing which consequently exacerbates standard stock return anomalies. Thus the mutual fund investors make suboptimal asset allocation decisions and in this sense they represent dumb money. Hedge fund investors, on the other hand, represent smart money as they trade upon those anomalies and consequently alleviate the cross sectional mispricing. Also Feng et al. (2014) show that Chinese retail investors exhibit a dumb money effect while the institutional investors' flows can be considered as smart money as they move into future good performers.

In an earlier study Lou (2012) suggest that the smart money effect may be related to a simple price mechanism and a tendency of managers to invest new money into existing stock holdings rather than to managerial stock picking skills. Akbas et al. (2015) raise then concerns about whether the smart money effect exists in mutual fund sector and point that the flow-induced trading mechanism and Lou's price pressure of the flow of new money may actually cause distortions in the relation between past flow and future performance and be responsible for the positive direction of this relation found by many previous studies. Jiang and Yuksel (2017) actually show that the positive relation between past flow and future performance is stronger for retail mutual funds rather than for the institutional, which seems to be inconsistent with the smart money explanation. Once they control for the expected flow of funds, they find that positive and negative unexpected flow portfolios do not differ in performance in statistical terms so there is no smart money effect.

6.2 Performance of unexpected flow portfolios

Given our discussion in the previous sub-section, the importance of the pricing pressure of the flow of new money and its potential influence on the past flow vs future performance relation, we follow Jiang and Yuksel (2017)'s idea and investigate whether this issue has some influence on our empirical findings in this respect. For that purpose for each mutual fund in our sample we break down its flow of new money into the expected component and the unexpected one as follows:

$$Flow_{i,t\to t+1} = \lambda_0 + \sum_{j=1}^{p} \lambda_{flow,j} Flow_{i,t-j\to t+1-j} + \lambda_{i,pp} Perf_{i,t} + \sum_{j} \lambda_{i,j} Controls_{i,j,t} + \varepsilon_{i,t} \tag{14}$$

where $Flow_{i,t\to t+1}$ is the dollar flow of new money for fund i between the end of months t and $t+1$, $Flow_{i,t-j\to t+1-j}$ is its j^{th} lag and p is the optimal number of lags to be included in the equation for past flow and it is selected from a maximum 12 lags based on Bayesian information criterion. $Perf_{i,t}$ is fund's i performance in month t, which, following Keswani and Stolin (2008) and Jiang and Yuksel (2017), is measured as fund's excess return in month t less the sum of the products of risk factor realizations in this month and corresponding factor loadings estimated based on the preceding 36 months. The risk factors reflect specific asset pricing model. We consider here three benchmarks: CAPM, Fama-French three-factor model and Carhart's four-factor model. For brevity we report in the main paper the empirical results only for performance measure based on the Carhart's model.

Out methodological approach is as follows: we estimate the flow equation in (14) separately for each mutual fund in our sample and compute expected flow as the fitted value from that equation. Unexpected flow is the difference between the observed value of the flow and the expected flow. Then, according to the portfolio formation procedure described at the beginning of this section, each month we create positive and negative unexpected flow portfolios based on the sign of the fund's unexpected flow in the preceding month. Finally, we evaluate the performance of the two portfolios and we are interested whether they differ in their performance.

The empirical results for the unexpected flow portfolios are reported in Table 9. We can observe from Panels A and B that for the entire sample of SRI mutual funds and for retail SRI funds the positive and negative unexpected flow portfolios have the same performance. Their alphas are not statistically different from each other, no matter which benchmark model we consider or which weighting scheme we use. This corroborates our empirical findings from Table 7 that there is no smart money effect among SRI and retail SRI mutual funds. However, when we consider institutional SRI funds (Panel C of Table 9), the picture is different. We can observe that institutional SRI funds attracting more new money than expected, that is with positive unexpected flow, perform subsequently badly: their alphas are in the range of -0.231% to -0.241% per month for flow-weighting scheme. Additionally, they perform statistically worse than the equivalent funds attracting less new money than expected. Specifically, the positive unexpected flow portfolio underperforms the negative unexpected flow portfolio by around -0.225% to -0.234% per month, which represents as well a relatively large economic magnitude of the underperformance. Similar pattern can be observed when we consider equal-weighting scheme. The institutional SRI funds with positive unexpected flow earn subsequently statistically negative abnormal

return of magnitude -0.216% to -0.223% per month. They also underperform the negative unexpected flow portfolio of institutional SRI funds by around -0.118% to -0.120% per month, which is roughly half of the underperformance for a flow-weighted scheme. This implies that the magnitude of the dumb money effect is more pronounced for institutional SRI funds with high unexpected new money inflows or outflows. Overall, our empirical results reported in Table 9 confirm our findings from the previous section that there exists dumb money effect for institutional SRI funds, which is mainly driven by institutional SRI funds with large net new money inflows.

6.3 Robustness checks

Since our empirical findings do not confirm the smart money effect, which so far has gained most of the confirmation in the academic literature, we conduct a battery of robustness checks in order to eliminate the element of chance or luck in our analysis and further support our main empirical findings. The results of the robustness check are reported in the Online Appendix.

First, following the literature[20] and in order to account for the fact that there might be a disproportionate number of funds net attracting and losing new money in our sample, we create two equal (in terms of the number of funds) flow portfolios. Specifically, the low flow portfolio includes half of mutual funds with the lowest past dollar flow while the high flow portfolio contains half of mutual funds with the highest past dollar flow. The performance of those portfolios is reported in Table B9. We can see from Panels A and B of the Table that, when we consider portfolios created out of all SRI or retail SRI funds, the performance of high and low flow portfolios is the same from a statistical perspective. This confirms our previous findings that there is no smart money effect between all SRI and retail SRI mutual funds. More importantly, when we consider high and low flow portfolios of institutional SRI funds (Panel C of Table B9) we can recognize the same pattern as in Table 7. For a flow-weighted scheme, half of the institutional SRI funds with the highest flow of new money subsequently perform badly as they achieve statistically negative alphas of magnitude -0.173% to -0.190% per month. Moreover, they also underperform the half of the institutional SRI funds with the lowest flow of new money by roughly 0.13% per month and this underperformance is statistically significant. A very similar situation can be observed for an equal-weighted scheme. These results further corroborate our previous findings that there exists the dumb money effect among the institutional SRI mutual funds.

Second, in examining whether the observed dumb money effect for SRI institutional funds preserves over longer periods we considered flow-weighted portfolios of new money. As a robustness check, we consider in Table B10the long term performance of equally-weighted flow portfolios. We can see in Panel C of the Table that, while the dumb money effect is non-existent for a 1-month horizon, it appears at 2-months horizon only and then disappears. This is a confirmation that the dumb money effect is driven mainly by institutional SRI funds with large new money flows.

Finally, as a robustness check, we consider alternative performance measures for the flow equation given in (14). Specifically, we show that our empirical results are qualitatively invariant to mutual fund performance based on CAPM or Fama-French three-factor model. We report the empirical results for those two performance measures respectively in Table B12 and Table B11. In both tables in Panel C, where we consider institutional SRI funds, we can see that the mutual funds with greater inflows than expected perform subsequently statistically worse than the funds with lower inflows than expected; the difference in alphas between positive vs negative unexpected flow portfolios is negative in statistical terms. We should add here as well that we considered many alternative econometric specifications for expected flow given in equation (14), (e.g. excluding control variables, using simple performance measures such as excess return) however the empirical findings are qualitatively similar to those presented in Tables 9, B12 and B11 and do not alter our main conclusions. The unreported empirical results are available from the authors upon request.

Overall, our robustness tests conform the main empirical finding of this study on the relation between past flow and future performance for SRI mutual funds that the retail SRI investors' money is not smart and the institutional SRI mutual funds represent a dumb money effect. The institutional SRI mutual funds that net attract new money or have highest net money inflows subsequently perform poorly and underperform that equivalent SRI funds that net lose new money or have the lowest net new money inflows. The dumb money effect is mainly driven by mutual funds with largest dollar inflows or outflows, persists over a short period of up to three months and is invariant to performance measures used. Additionally, it is economically magnified if we exclude the possible flow-induced trading and related price pressure mechanism.

[20] e.g. Zheng (1999), Keswani and Stolin (2008), Yu (2012)

7 Conclusions

The growing interest from both retail and institutional investors in sustainable investments calls for a thorough analysis of how SRI funds characteristics and performance are related to the flow that those funds attract. The existing literature shows that the SRI fund performance and flow-performance relation may differ as compared to conventional funds. There is ,however, no sufficient evidence showing conclusive findings and no studies conducted on the impact of investor sophistication on fund flow and performance in the context of sustainable preferences. In this paper we fill in this gap and provide the first comprehensive analysis of the performance of US SRI retail and institutional mutual funds as well as their relation to the flow of new money that those funds experience. Special focus is given to the role that investors sophistication pays for those relations.

Our results show that overall the SRI mutual funds make positive abnormal returns before fees of magnitude 0.12%-0.14%, but not statistically significantly different from zero after fees. We also find that retail SRI funds are overperforming institutional SRI funds both before and after fees by roughly 0.1% and 0.06% per month respectively. These differences in performance between the two shareclasses are mainly due to institutional SRI funds obtaining negative abnormal returns especially after accounting for expenses.

When comparing the performance of SRI funds with their conventional peers, we find no differences in performance when we consider SRI and conventional mutual funds run by the same management companies and with similar investment objectives. However, when we compare the performance and SRI and conventional funds with similar fund characteristics, yet not necessarily run by the same management companies, we observe that SRI mutual funds outperform their conventional peers by almost 0.2% per month (both before and after expenses). There are two sources of these differences: the SRI funds overperforming before fees and conventional funds underperforming after fees. These results allow us to conclude that the managerial skills might play important role in case of investments made into sustainable funds, however this issue requires a more detailed investigation which is beyond the scope of this paper.

Moreover, our study shows that there is a positive relation between past performance and future investment flow for SRI mutual funds as well as for their both, retail and institutional shareclasses. Thus the SRI funds performing well in the past, subsequently attract more investment. We confirm a positive flow-performance relation with monotonic relation test of Patton and Timmermann (2010). When investigating the shape of the flow-performance relation, we find evidence that this relation is convex within a sample of all and retail SRI funds, whereas linear for institutional SRI funds. Our empirical findings are invariant when we control for other factors potentially influencing the flow of new money and are also robust to alternative measures of past performance.

Given the empirical results on the flow-performance relation, we conclude that the fund performance is an important driver for investment decisions made by SRI investors. However, retail and institutional SRI investors incorporate it differently into their decision-making process. In particular, retail SRI investors disinvest their money from worst past performers and this disinvestment is disproportionately lower in comparison to the additional investment they make for equivalent best past performing funds. On the other hand, the linear flow-performance relation for institutional SRI investors indicates that institutional SRI investors disinvest the funds from the worst past performers to the same extent as they invest money into best past performers. They are then more demanding investors in comparison to their retail peers when faced with bad performance.

Additionally, our results reveal that there exists no smart money effect among the sample of all SRI funds as well as retail SRI funds. Interestingly, we find a dumb money effect for institutional SRI funds as funds net attracting new money subsequently underperform funds net losing new money. We show that the dumb money effect is mainly driven by bad performance of institutional SRI funds with large money inflows. We reveal as well that the dumb money effect is rather a short-lived phenomenon and disappears after 3 months. Our results are robust to a series of robustness checks. Specifically, the dumb money effect for institutional SRI funds is invariant to alternative constructions of flow portfolios and it is magnified when we take into account of the consequences of flow-induced trading and related price pressure. Given our findings on the performance-flow relation, we conclude that the decisions of the SRI investors might be driven also by non-financial factors, which confirm the findings in the recent literature.

Our study provides a comprehensive analysis of possible factors affecting SRI retail and institutional investor decision-making process. Our empirical results provide important insights on the flow-performance and performance-flow relations for SRI investors and the role the investors sophistication plays for those relations. SRI mutual funds with best past performance attract more money subsequently from both retail and institutional SRI investors and the funds with worst performance are punished by the SRI investors with disinvestments. However,institutional SRI investors are more demanding and punish worst performances with relatively larger money outflows. On the other hand, the lack of smart money effect for retail SRI investors and the dumb money effect for institutional ones signals that, apart from preference for sustainability and

performance, there might be other non-financial factors that drive the investment of the SRI investors. With these novel results, we contribute to the empirical literature on the growing importance of sustainability and investor sophistication in the investment industry.

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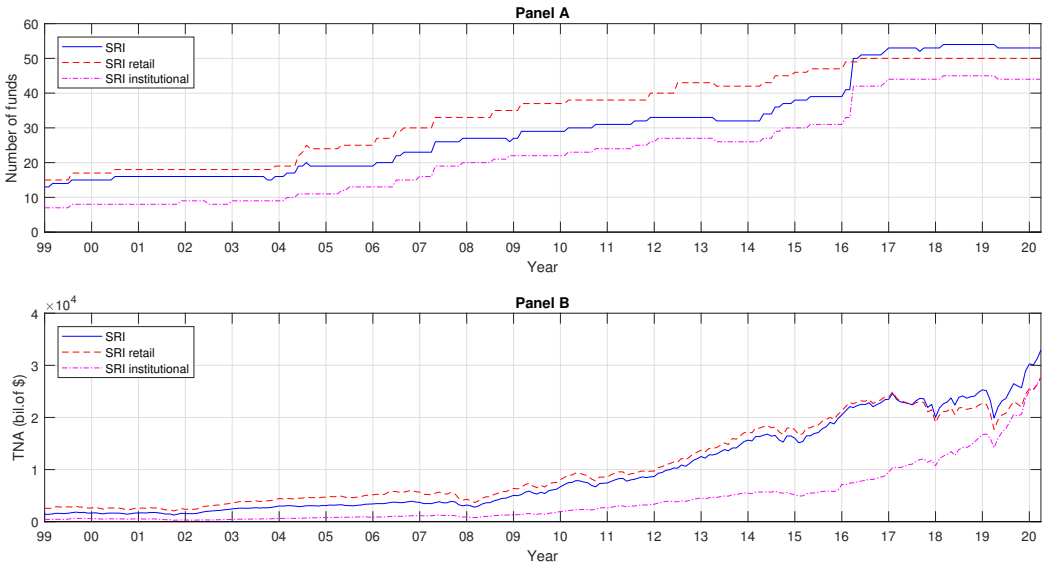
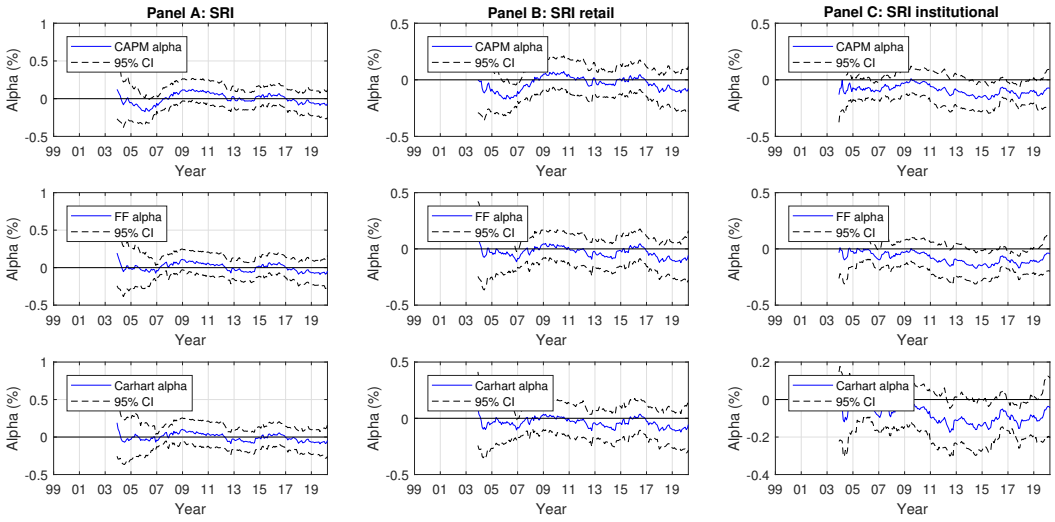
Figures

Figure 1: SRI mutual fund sector development



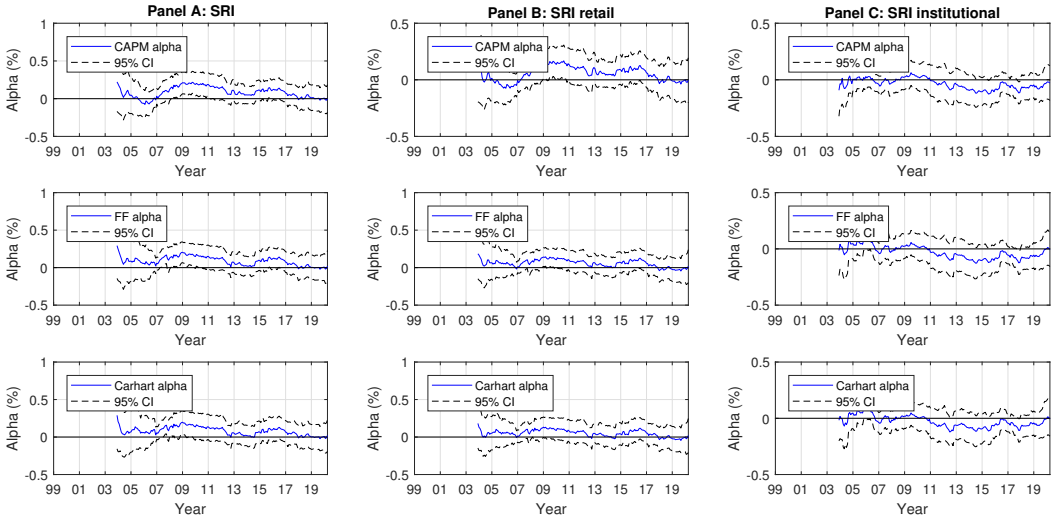
Notes: Figure 1 plots in Panel A the number of all, retail and institutional SRI mutual funds (equity funds, both domestic and international) and in Panel B the amount of money (billions of US $) invested into each group of SRI mutual funds over years 1999–2021.

Figure 2: Performance dynamics of SRI mutual fund sector (value-weighted portfolio of net returns)



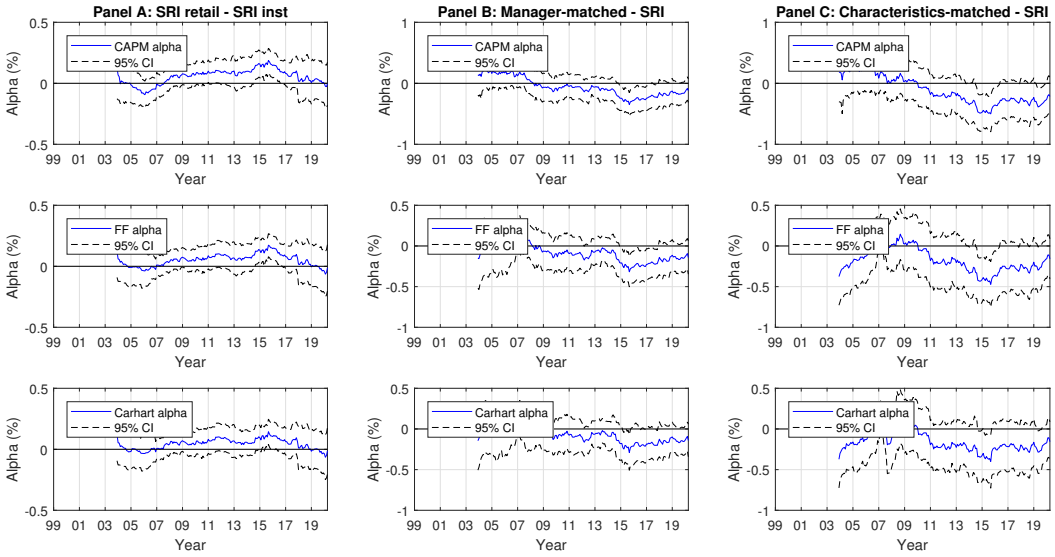
Notes: Figure 2 plots alphas for SRI mutual fund sector which is represented by a value-weighted VW portfolio of net returns. We consider sector portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Alphas are based on 60-month rolling window time series regressions and for the purpose of their estimation we use the following three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We also plot the 95% confidence interval band (based on Newey-West standard errors). The data span the period Dec1999–Mar2021.

Figure 3: Performance dynamics of SRI mutual fund sector (value-weighted portfolio of gross returns)



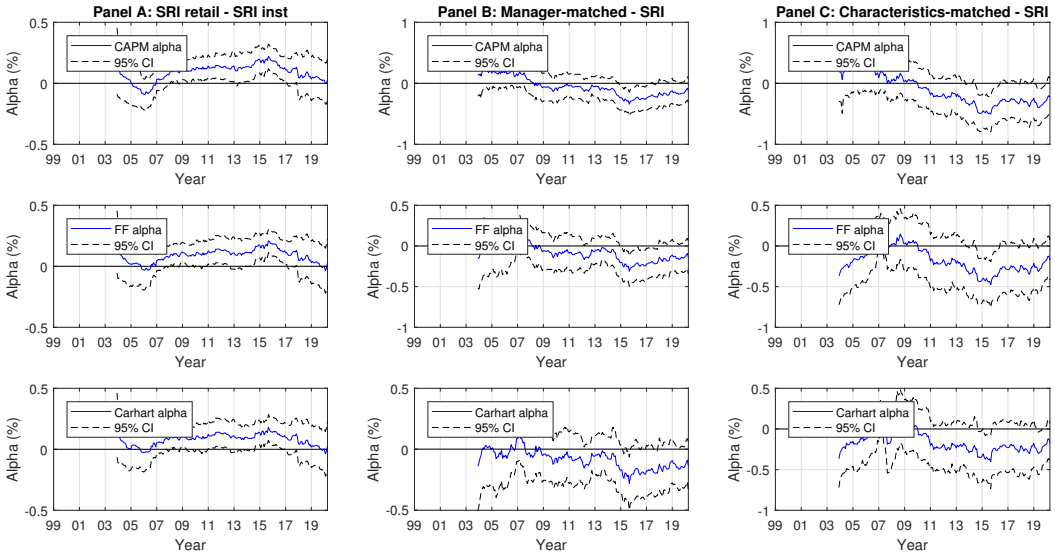
Notes: Figure 3 plots alphas for SRI mutual fund sector which is represented by a value-weighted VW portfolio of gross returns. We consider sector portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Alphas are based on 60-month rolling window time series regressions and for the purpose of their estimation we use the following three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We also plot the 95% confidence interval band (based on Newey-West standard errors). The data span the period Dec1999–Mar2021.

Figure 4: Performance dynamics of zero-cost portfolios (value-weighted net return)



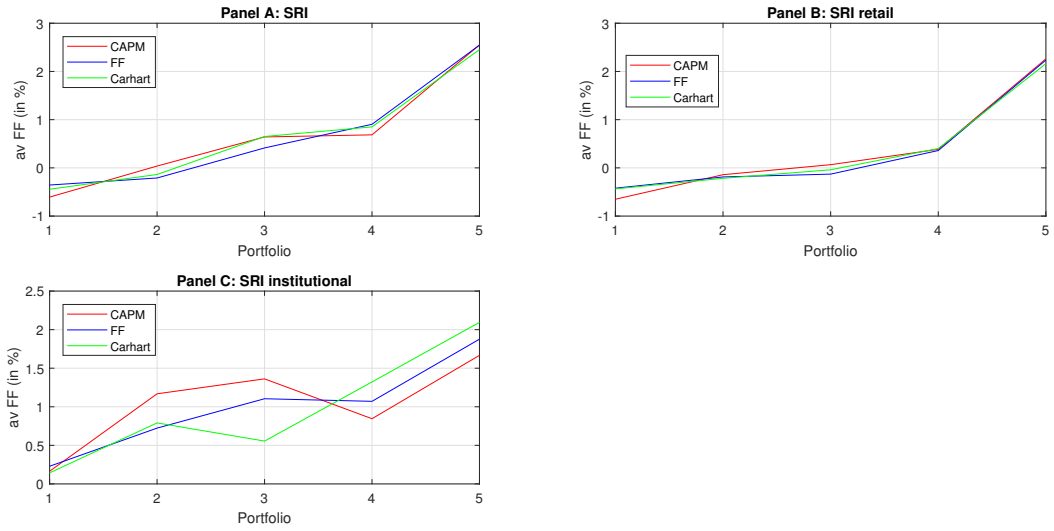
Notes: Figure 4 plots alphas for zero-cost portfolios which are constructed by: subtracting the value-weighted net returns (VWnet) of SRI retail fund portfolio from the equivalent returns of the SRI institutional fund portfolio (Panel A), subtracting the VWnet returns of "Manager-matched" fund portfolio from the equivalent returns of the SRI fund portfolio (Panel B), subtracting the VWnet returns of "Characteristics-matched" fund portfolio from the equivalent returns of the SRI fund portfolio (Panel C). Alphas are based on 60-month rolling window time series regressions and for the purpose of their estimation we use the following three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We also plot the 95% confidence interval band (based on Newey-West standard errors). The data span the period Dec1999–Mar2021.

Figure 5: Performance dynamics of zero-cost portfolios (value-weighted gross return)



Notes: Figure 5 plots alphas for zero-cost portfolios which are constructed by: subtracting the value-weighted gross returns (VWgross) of SRI retail fund portfolio from the equivalent returns of the SRI institutional fund portfolio (Panel A), subtracting the VWgross returns of "Manager-matched" fund portfolio from the equivalent returns of the SRI fund portfolio (Panel B), subtracting the VWgross returns of "Characteristics-matched" fund portfolio from the equivalent returns of the SRI fund portfolio (Panel C). Alphas are based on 60-month rolling window time series regressions and for the purpose of their estimation we use the following three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We also plot the 95% confidence interval band (based on Newey-West standard errors). The data span the period Dec1999–Mar2021.

Figure 6: Average flow of funds for 5 SRI portfolios formed monthly on past performance (cumulative alpha)



Notes: Figure 6 plots the average flow of funds (in % per month) for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance by 12-month cumulative alpha, defined as $\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1 + R_{i,t} - \hat{R}_{i,t}) - 1$ that reflects the monthly alphas, computed as the difference between realized $R_{i,t}$ and model-fitted $\hat{R}_{i,t}$ portfolio net returns. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using 36-month estimation window) and factor realizations for given month. We use three benchmark models to determine the fitted portfolio returns: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. The data span the period Dec99–Mar21.

Tables

Table 1: Performance of SRI mutual fund sector

	SRI		**SRI retail**		**SRI institutional**		**SRI_retail-SRI_institutional**	
	VWnet	**VWgross**	**VWnet**	**VWgross**	**VWnet**	**VWgross**	**VWnet**	**VWgross**
Panel A: CAPM model								
alpha (in %)	0.037	**0.121**	-0.023	0.065	**-0.091**	-0.036	**0.068**	**0.101**
t-stat(NW)	0.658	2.164	-0.523	1.465	-2.153	-0.797	1.786	2.454
pv(NW)	0.511	0.031	0.602	0.144	0.032	0.426	0.075	0.015
pv(boot)	0.508	0.040	0.590	0.141	0.026	0.440	0.086	0.015
R2a	0.961	0.961	0.965	0.965	0.967	0.967	0.030	0.001
Panel B: Fama-French model								
alpha (in %)	0.040	**0.125**	-0.014	0.074	**-0.083**	-0.031	**0.069**	**0.105**
t-stat(NW)	0.711	2.196	-0.314	1.607	-2.145	-0.746	1.897	2.557
pv(NW)	0.477	0.029	0.754	0.109	0.033	0.456	0.059	0.011
pv(boot)	0.489	0.029	0.751	0.126	0.040	0.499	0.058	0.010
R2a	0.961	0.961	0.967	0.967	0.975	0.973	0.146	0.066
Panel C: Carhart model								
alpha (in %)	0.058	**0.143**	0.005	**0.094**	**-0.063**	-0.015	**0.068**	**0.109**
t-stat(NW)	1.014	2.468	0.111	1.986	-1.637	-0.365	1.901	2.675
pv(NW)	0.311	0.014	0.912	0.048	0.083	0.716	0.058	0.008
pv(boot)	0.314	0.015	0.920	0.048	0.080	0.703	0.076	0.007
R2a	0.963	0.963	0.969	0.969	0.977	0.974	0.143	0.066
Panel D: Simple performance measures								
av(R-Rf) in %	0.581	0.666	0.526	0.614	0.473	0.508	0.053	0.107
av(R-Rm) in %	-0.011	0.073	-0.067	0.022	-0.120	-0.085	-0.540	-0.486
Sharpe	0.136	0.156	0.123	0.143	0.108	0.120	0.083	0.161
St dev in %	4.260	4.259	4.284	4.283	4.397	4.232	0.635	0.662

Notes: Table 1 presents various performance measures (in panels) for a portfolio of SRI mutual funds. For constructing the portfolio we use returns before (gross) and after (net) deduction of expenses and we compute value-weighted (VW) returns. We consider portfolios formed within a sample of all, retail and institutional SRI funds. The last two columns show the results for the zero-cost portfolios, which are constructed by subtracting the VWnet/VWgross returns of SRI retail fund portfolio from the relevant returns of the SRI institutional fund portfolio. Panels A–C report alphas from three benchmark models (CAPM, Fama-French three-factor and Carhart four-factor) along with basic statistics such as *t-stat* for testing the null of no significance in performance, the related p-values (parametric $pv(NW)$ and bootstrapped $pv(boot)$ following Kosowski et al. (2006)) and adjusted R^2 (R2a). For parametric estimations we use Newey-West (NW) standard errors. In Panel D we report simple performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) and the Sharpe ratio. Finally, we report as well the standard deviation of portfolio returns. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 2: Comparison of performance between SRI and conventional mutual fund sector

	SRI		**Manager_matched**		**Manager_matched-SRI**		**Characteristics_matched**		**Characteristics_matched-SRI**	
	VWnet	**VWgross**	**VWnet**	**VWgross**	**VWnet**	**VWgross**	**VWnet**	**VWgross**	**VWnet**	**VWgross**
Panel A: CAPM model										
alpha (in %)	0.037	**0.121**	-0.010	0.079	-0.047	-0.042	-0.105	-0.024	-0.141	**-0.146**
t-stat(NW)	0.658	2.164	-0.187	1.396	-0.818	-0.736	-1.205	-0.277	-1.620	-1.666
pv(NW)	0.511	0.031	0.852	0.164	0.414	0.463	0.229	0.782	0.106	0.097
pv(boot)	0.508	0.040	0.856	0.184	0.426	0.471	0.232	0.776	0.103	0.102
R2a	0.961	0.961	0.970	0.969	0.070	0.070	0.924	0.924	0.102	0.102
Panel B: Fama-French model										
alpha (in %)	0.040	**0.125**	-0.028	0.061	-0.068	-0.064	**-0.149**	-0.069	**-0.189**	**-0.193**
t-stat(NW)	0.711	2.196	-0.552	1.176	-1.222	-1.139	-1.982	-0.906	-2.350	-2.403
pv(NW)	0.477	0.029	0.581	0.241	0.223	0.256	0.049	0.366	0.020	0.017
pv(boot)	0.489	0.029	0.606	0.266	0.248	0.274	0.051	0.386	0.016	0.021
R2a	0.961	0.961	0.974	0.974	0.192	0.192	0.948	0.947	0.369	0.369
Panel C: Carhart model										
alpha (in %)	0.058	**0.143**	-0.035	0.055	-0.093	-0.088	**-0.140**	-0.060	**-0.198**	**-0.203**
t-stat(NW)	1.014	2.468	-0.684	1.073	-1.621	-1.538	-1.857	-0.791	-2.348	-2.401
pv(NW)	0.311	0.014	0.495	0.284	0.106	0.125	0.064	0.430	0.020	0.017
pv(boot)	0.314	0.015	0.490	0.283	0.116	0.130	0.057	0.433	0.022	0.020
R2a	0.963	0.963	0.974	0.974	0.243	0.243	0.948	0.947	0.371	0.370
Panel D: Simple performance measures										
av(R-Rf) in %	0.581	0.666	0.573	0.662	-0.008	-0.003	0.508	0.588	-0.073	-0.078
av(R-Rm) in %	-0.011	0.073	-0.019	0.070	-0.601	-0.596	-0.085	-0.005	-0.666	-0.671
Sharpe	0.136	0.156	0.126	0.146	-0.007	-0.003	0.104	0.120	-0.046	-0.049
St dev in %	4.260	4.259	4.548	4.547	1.105	1.105	4.891	4.890	1.606	1.607

Notes: Table 2 presents various performance measures (in different panels) for a portfolio of SRI mutual funds in comparison to portfolios of equivalent conventional funds. We consider two groups of equivalent conventional funds: manager-matched funds (conventional funds matched against SRI funds using the same manager and investment objectives as the set of matching criteria) and characteristics-matched funds (conventional funds matched against SRI funds using age, end of period size, and investment objective as the set of matching criteria). For constructing the portfolio we use returns before (gross) and after (net) deduction of expenses and we compute value-weighted (VW) returns. We provide as well the estimation results the zero-cost portfolios, which are constructed by subtracting the VWnet/VWgross returns of conventional fund portfolio from the equivalent returns of SRI fund portfolio (respectively "Manager_matched-SRI" and "Characteristics_matched-SRI"). Panels A–C report alphas from three benchmark models (CAPM, Fama-French three-factor and Carhart four-factor) along with basic statistics such as *t-stat* for testing the null of no significance in performance, the related p-values (parametric $pv(NW)$ and bootstrapped $pv(boot)$ following Kosowski et al. (2006)) and adjusted R^2 (R2a). For parametric estimations we use Newey-West (NW) standard errors. In Panel D we report simple performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) and the Sharpe ratio. Finally, we report as well the standard deviation of portfolio returns. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 3: Flow of funds for 5 SRI portfolios formed monthly on past performance (cumulative alpha)

		Past Performance (PP) Portfolios						Monotonicity relation tests			
		worst PP	**2nd worst**	**mid PP**	**2nd best**	**best PP**	**best-worst**		**t-test**	**MR test**	**MR_all test**
Panel A: SRI											
CAPM	mean FF (in %)	-0.606	0.038	0.641	0.685	2.548	3.155	test stat	**6.752**	**0.044**	**0.044**
	st dev of FF (in%)	2.550	3.959	2.448	2.288	3.824	4.244	p-value	0.000	0.000	0.000
FF	mean FF (in %)	-0.356	-0.210	0.413	0.904	2.546	2.902	test stat	**6.129**	**0.146**	**0.146**
	st dev of FF (in%)	2.674	2.987	2.350	3.544	3.895	4.272	p-value	0.000	0.000	0.000
Carhart	mean FF (in %)	-0.443	-0.137	0.651	0.850	2.453	2.897	test stat	**6.347**	**0.200**	**0.200**
	st dev of FF (in%)	2.524	2.776	2.592	3.339	3.724	4.105	p-value	0.000	0.000	0.000
Panel B: SRI retail											
CAPM	mean FF (in %)	-0.651	-0.142	0.066	0.384	2.261	2.912	test stat	**8.936**	**0.208**	**0.208**
	st dev of FF (in%)	1.722	1.914	1.182	1.443	3.640	3.754	p-value	0.000	0.000	0.000
FF	mean FF (in %)	-0.421	-0.188	-0.130	0.360	2.236	2.657	test stat	**8.066**	**0.058**	**0.058**
	st dev of FF (in%)	1.625	1.856	1.280	1.594	3.690	3.689	p-value	0.000	0.000	0.000
Carhart	mean FF (in %)	-0.436	-0.217	-0.040	0.401	2.162	2.598	test stat	**8.141**	**0.177**	**0.177**
	st dev of FF (in%)	1.588	1.824	1.351	1.394	3.575	3.610	p-value	0.000	0.000	0.000
Panel C: SRI institutional											
CAPM	mean FF (in %)	0.165	1.168	1.362	0.845	1.667	1.502	test stat	**1.977**	**-0.517**	**-0.517**
	st dev of FF (in%)	3.951	7.121	5.175	3.451	4.690	6.069	p-value	0.049	0.085	0.040
FF	mean FF (in %)	0.229	0.723	1.104	1.071	1.876	1.647	test stat	**2.083**	**-0.034**	**-0.034**
	st dev of FF (in%)	4.093	7.293	5.349	4.098	4.725	6.075	p-value	0.038	0.001	0.001
Carhart	mean FF (in %)	0.143	0.791	0.555	1.322	2.094	1.951	test stat	**2.306**	**-0.236**	**-0.236**
	st dev of FF (in%)	4.147	7.127	7.778	4.072	3.512	5.147	p-value	0.022	0.003	0.002

Notes: Table 3 presents average flow of funds (in % per month) and its standard deviation for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance by 12-month cumulative alpha, defined as $\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1 + R_{i,t} - \hat{R}_{i,t}) - 1$ that reflects the monthly alphas, computed as the difference between realized $R_{i,t}$ and model-fitted $\hat{R}_{i,t}$ portfolio net returns. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using 36-month estimation window) and factor realizations for given month. We use three benchmark models to determine the fitted portfolio returns: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We report as well in this table monotonicity relation tests (test statistics *test stat* and respective p-values) associated with monotonicity of average flow of funds across portfolios. The null hypothesis of no monotonic relation in average flow of funds across portfolio is tested against the alternative of a positive relation. We report here the results of three tests. *t-test* is a standard parametric test for testing the significance in the spread between average flow of funds of the top and bottom ranked portfolios (with Newey-West standard errors). MR and MR_all are Monotonic Relation tests proposed by Patton and Timmermann (2010) and applied to the 5 quintile portfolios. They are based respectively either on the minimal set of portfolio comparisons (MR) or on all possible comparisons (MR_all). Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 4: Multivariate panel regressions of monthly flow of funds on past performance (cumulative alpha)

		PastPerf	logTNA	logAGE	std(ret)	ExpRatio	TurnRatio	logFamTNA	logFamNum	R2a	N
Panel A: SRI											
CAPM	coef	**0.213**	**-0.016**	**-0.012**	0.010	**-3.710**	0.001	**0.019**	**-0.014**	7.735	5170
	p-value	0.000	0.000	0.017	0.881	0.001	0.867	0.000	0.018		
FF	coef	**0.249**	**-0.016**	**-0.012**	0.010	**-3.132**	0.001	**0.020**	**-0.014**	7.764	5170
	p-value	0.000	0.000	0.016	0.867	0.002	0.768	0.000	0.029		
Carhart	coef	**0.226**	**-0.016**	**-0.012**	0.061	**-3.188**	0.000	**0.020**	**-0.014**	7.069	5170
	p-value	0.000	0.000	0.013	0.405	0.002	0.931	0.000	0.025		
Panel B: SRI retail											
CAPM	coef	**0.195**	**-0.011**	0.000	0.011	**-1.467**	-0.003	0.001	**-0.014**	8.124	4345
	p-value	0.000	0.001	0.922	0.828	0.085	0.468	0.393	0.028		
FF	coef	**0.227**	**-0.011**	0.000	0.028	-1.056	-0.003	0.002	**-0.013**	8.242	4345
	p-value	0.000	0.001	0.971	0.550	0.218	0.492	0.232	0.044		
Carhart	coef	**0.203**	**-0.011**	0.000	0.081	-1.020	-0.004	0.002	**-0.014**	7.079	4345
	p-value	0.000	0.001	0.913	0.171	0.250	0.435	0.321	0.021		
Panel C: SRI institutional											
CAPM	coef	**0.167**	**-0.006**	-0.008	-0.102	**-5.247**	0.009	**0.010**	-0.012	1.673	3044
	p-value	0.000	0.001	0.162	0.448	0.012	0.572	0.019	0.408		
FF	coef	**0.178**	**-0.006**	-0.010	-0.137	**-4.451**	0.009	**0.010**	-0.009	1.458	3044
	p-value	0.005	0.003	0.111	0.348	0.028	0.576	0.022	0.514		
Carhart	coef	**0.180**	**-0.006**	-0.010	-0.114	**-4.490**	0.010	**0.010**	-0.010	1.524	3044
	p-value	0.002	0.003	0.092	0.423	0.028	0.552	0.023	0.505		

Notes: Table 4 presents the estimation results (coefficient estimates along with p-values) of panel regressions for the flow of funds. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the flow of funds between month $t+1$ and $t+2$. Explanatory variables include: past performance ($PastPerf$), log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$)and the log of the number of funds under management for the fund's family ($logFamNum$) . The explanatory variables are all measured for month t and are computed or estimated based on data before (and including) month t. We measure past performance by 12-month cumulative alpha, defined as $\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1 + R_{i,t} - \hat{R}_{i,t}) - 1$ that reflects the monthly alphas, computed as the difference between realized $R_{i,t}$ and model-fitted $\hat{R}_{i,t}$ portfolio net returns. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using 36-month estimation window) and factor realizations for given month. We use three benchmark models to determine the fitted portfolio returns: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 5: Shape of the flow-performance relation (piecewise performance ranks based on cumulative alphas)

		Low	Mid	High	H-L	R2a	N
Panel A: SRI							
CAPM	coef	0.026	**0.010**	**0.133**	**0.108**	10.356	5168
	pv(NW)	0.229	0.080	0.000	0.009		
FF	coef	0.027	**0.012**	**0.128**	**0.100**	10.365	5168
	pv(NW)	0.164	0.029	0.000	0.014		
Carhat	coef	0.035	**0.010**	**0.117**	**0.081**	10.051	5168
	pv(NW)	0.077	0.091	0.001	0.049		
Panel B: SRI retail							
CAPM	coef	0.006	**0.010**	**0.134**	**0.128**	10.703	4345
	pv(NW)	0.671	0.019	0.000	0.001		
FF	coef	0.020	**0.007**	**0.140**	**0.121**	10.767	4345
	pv(NW)	0.209	0.091	0.000	0.002		
Carhart	coef	0.023	0.005	**0.132**	**0.109**	10.274	4345
	pv(NW)	0.124	0.253	0.000	0.003		
Panel C: SRI institutional							
CAPM	coef	0.054	**0.015**	0.029	-0.025	3.078	3042
	pv(NW)	0.010	0.080	0.260	0.418		
FF	coef	0.036	**0.020**	0.049	0.013	3.418	3042
	pv(NW)	0.252	0.003	0.250	0.842		
Carhart	coef	0.017	**0.024**	0.044	0.026	3.436	3042
	pv(NW)	0.577	0.001	0.275	0.685		

Notes: Table 5 presents the estimation results of panel regressions investigating the shape of the flow-performance relation. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the percentage flow of money over the month $t+1$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on past performance measured as the 12-month cumulative alpha, which is defined as $\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1+R_{i,t}-\hat{R}_{i,t})-1$. It reflects the monthly alphas, computed as the difference between realized $R_{i,t}$ and model-fitted $\hat{R}_{i,t}$ portfolio net returns. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using 36-month estimation window) and factor realizations for given month. We use three benchmark models to determine the fitted portfolio returns: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. For brevity, we report in this table only the coefficients (along with its p-values) for the three piecewise performance ranks Low, Mid, $High$ as well as the difference between the coefficients for $High$ and Low piecewise performance ranks (column "H-L"). We test the null of equality between the $High$ and Low coefficients using Wald test and report the related p-values underneath the difference. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 6: Shape of the flow-performance relation over longer horizons (piecewise performance ranks based on cumulative alphas)

	p:	1	3	6	9	12	18	24
Panel A: SRI								
CAPM	H-L	**0.108**	**0.098**	**0.069**	**0.075**	0.014	0.041	0.034
	p-value	0.009	0.014	0.040	0.060	0.725	0.357	0.457
FF	H-L	**0.100**	**0.098**	**0.069**	0.041	0.016	0.013	0.013
	p-value	0.014	0.003	0.004	0.196	0.562	0.754	0.697
Carhart	H-L	**0.081**	**0.091**	**0.063**	0.051	0.022	0.012	-0.002
	p-value	0.049	0.008	0.017	0.195	0.491	0.758	0.954
Panel B: SRI retail								
CAPM	H-L	**0.128**	**0.106**	**0.086**	**0.064**	**0.054**	0.016	0.037
	p-value	0.001	0.001	0.007	0.036	0.064	0.573	0.343
FF	H-L	**0.121**	**0.104**	**0.047**	0.049	0.010	-0.018	0.001
	p-value	0.002	0.001	0.090	0.137	0.708	0.597	0.966
Carhart	H-L	**0.109**	**0.119**	**0.068**	0.061	0.040	0.021	0.007
	p-value	0.003	0.000	0.024	0.114	0.198	0.580	0.802
Panel C: SRI institutional								
CAPM	H-L	-0.025	-0.030	-0.004	0.003	0.015	0.040	-0.107
	p-value	0.418	0.316	0.910	0.929	0.677	0.543	0.250
FF	H-L	0.013	0.020	0.046	0.024	0.062	-0.001	-0.062
	p-value	0.842	0.739	0.485	0.685	0.385	0.985	0.483
Carhart	H-L	0.026	0.022	0.046	0.038	0.060	0.030	-0.039
	p-value	0.685	0.688	0.428	0.599	0.378	0.516	0.672

Notes: Table 6 presents the differences between the coefficients on $High$ and Low piecewise performance ranks ("H-L") and the p-values associated with testing, using Wald test, the null of the equality between the two coefficients. The coefficients are estimated from panel regressions. In panel regressions, separately run for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C), we regress a percentage flow of money over the consecutive p months on piecewise past performance and a set of control variables as given in equation (13). We consider future flow of money over horizons up to 12 months, i.e. $p \in \{1, 3, 6, 9, 12\}$ and each column in the table represents the results for a different horizon p. The dependent variable is the percentage flow of money between the end of months t and $t+p$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on past performance measured as the 12-month cumulative alpha, which is defined as $\alpha_{i,t}^{cum} = \prod_{t-11}^{t}(1 + R_{i,t} - \hat{R}_{i,t}) - 1$. It reflects the monthly alphas, computed as the difference between realized $R_{i,t}$ and model-fitted $\hat{R}_{i,t}$ portfolio net returns. Model-fitted returns are calculated as the sum of a risk free rate and product of factor loadings (estimated using 36-month estimation window) and factor realizations for given month. We use three benchmark models to determine the fitted portfolio returns: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 7: Performance of Negative and Positive flow portfolios formed on past month dollar flow

Negative/Positive flow portfolios						
Panel A: SRI						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.063	0.004	0.067	-0.037	-0.075	-0.038
pv CAPM	0.530	0.947	0.559	0.618	0.212	0.448
alpha FF (%)	-0.070	0.000	0.069	-0.046	**-0.088**	-0.043
pv FF	0.484	0.998	0.541	0.508	0.094	0.402
alpha Car (%)	-0.048	0.017	0.065	-0.025	-0.074	-0.049
pv Car	0.641	0.778	0.576	0.719	0.171	0.341
av(R-Rf)	0.532	0.527	-0.005	0.517	0.469	-0.048
av(R-Rm)	-0.054	-0.059	-0.186	-0.069	-0.116	-0.244
Sharpe	0.111	0.127	-0.003	0.117	0.109	-0.058
Panel B: SRI retail						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.026	-0.103	-0.077	-0.063	**-0.120**	-0.057
pv CAPM	0.766	0.184	0.479	0.405	0.038	0.280
alpha FF (%)	-0.035	-0.106	-0.070	-0.073	**-0.125**	-0.052
pv FF	0.676	0.177	0.506	0.282	0.026	0.297
alpha Car (%)	-0.018	-0.090	-0.072	-0.056	**-0.110**	-0.053
pv Car	0.835	0.265	0.499	0.407	0.058	0.272
av(R-Rf)	0.554	0.424	-0.130	0.498	0.433	-0.066
av(R-Rm)	-0.031	-0.161	-0.289	-0.087	-0.153	-0.280
Sharpe	0.119	0.100	-0.085	0.112	0.099	-0.087
Panel C: SRI institutional						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.048	**-0.154**	**-0.106**	-0.033	**-0.108**	-0.075
pv CAPM	0.423	0.010	0.066	0.591	0.048	0.175
alpha FF (%)	-0.046	**-0.157**	**-0.111**	-0.031	**-0.118**	-0.087
pv FF	0.405	0.008	0.050	0.586	0.022	0.102
alpha Car (%)	-0.026	**-0.140**	**-0.114**	-0.013	**-0.102**	**-0.089**
pv Car	0.636	0.016	0.049	0.827	0.045	0.092
av(R-Rf)	0.507	0.403	-0.103	0.519	0.446	-0.072
av(R-Rm)	-0.079	-0.182	-0.310	-0.067	-0.139	-0.266
Sharpe	0.114	0.091	-0.097	0.118	0.102	-0.080

Notes: Table 7 presents the performance measures (alphas) along with their p-values for portfolios formed on past dollar flow of funds. Each month funds are grouped into 2 portfolios: Negative and Positive flow portfolios (respectively "Neg" and "Pos"), based on the sign of their dollar flow in previous month. Then the portfolio Flow-weighted and Equally-weighted net returns are computed. We provide as well the estimation results the zero-cost portfolios, which are constructed by subtracting the returns of Negative flow portfolio from the returns of Positive flow portfolio ("Pos-Neg"). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 8: Difference in performance of Positive vs Negative flow portfolios formed on past dollar flow over different horizons (flow-weighted portfolios)

Panel A: SRI

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	0.067	-0.005	-0.028	-0.040	-0.050	-0.008	0.057	-0.016	-0.013	0.022	-0.054	-0.144
pv CAPM	0.559	0.964	0.791	0.733	0.662	0.939	0.610	0.884	0.904	0.841	0.588	0.153
alpha FF (%)	0.069	0.000	-0.020	-0.022	-0.034	0.008	0.072	-0.001	0.006	0.032	-0.050	-0.139
pv FF	0.541	1.000	0.848	0.846	0.747	0.938	0.514	0.991	0.948	0.771	0.615	0.148
alpha Car (%)	0.065	-0.006	-0.020	-0.023	-0.029	0.011	0.067	-0.010	0.004	0.024	-0.064	-0.149
pv Car	0.576	0.957	0.851	0.839	0.793	0.914	0.573	0.926	0.970	0.834	0.537	0.136
av(R-Rf)	-0.005	-0.057	-0.084	-0.104	-0.105	-0.052	0.012	-0.060	-0.042	0.000	-0.073	-0.148
av(R-Rm)	-0.186	-0.183	-0.195	-0.214	-0.211	-0.193	-0.211	-0.197	-0.203	-0.198	-0.237	-0.255
Sharpe	-0.003	-0.039	-0.056	-0.066	-0.072	-0.035	0.008	-0.040	-0.028	0.000	-0.054	-0.101

Panel B: SRI retail

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	-0.077	-0.117	-0.166	-0.099	-0.092	-0.075	-0.022	-0.067	-0.119	-0.092	-0.128	**-0.194**
pv CAPM	0.479	0.258	0.087	0.334	0.410	0.459	0.827	0.501	0.192	0.313	0.145	0.016
alpha FF (%)	-0.070	-0.112	-0.157	-0.088	-0.081	-0.056	-0.006	-0.050	-0.098	-0.079	-0.122	**-0.187**
pv FF	0.506	0.269	0.104	0.390	0.447	0.559	0.953	0.604	0.219	0.363	0.147	0.013
alpha Car (%)	-0.072	-0.132	-0.160	-0.089	-0.068	-0.043	0.005	-0.047	-0.090	-0.073	-0.117	**-0.183**
pv Car	0.499	0.196	0.104	0.400	0.535	0.669	0.961	0.637	0.288	0.421	0.176	0.021
av(R-Rf)	-0.130	-0.164	-0.206	-0.148	-0.129	-0.099	-0.044	-0.087	-0.131	-0.102	-0.139	-0.192
av(R-Rm)	-0.289	-0.270	-0.295	-0.289	-0.257	-0.216	-0.231	-0.217	-0.226	-0.253	-0.291	-0.287
Sharpe	-0.085	-0.110	-0.155	-0.104	-0.092	-0.070	-0.030	-0.063	-0.093	-0.075	-0.106	-0.145

Panel C: SRI institutional

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	**-0.106**	**-0.137**	**-0.142**	-0.114	-0.061	0.010	-0.093	-0.033	0.018	0.002	0.034	0.048
pv CAPM	0.066	0.044	0.044	0.144	0.408	0.904	0.316	0.704	0.827	0.986	0.697	0.532
alpha FF (%)	**-0.111**	**-0.132**	**-0.142**	-0.115	-0.068	0.004	-0.087	-0.035	0.011	-0.011	0.021	0.034
pv FF	0.050	0.035	0.037	0.117	0.324	0.954	0.289	0.656	0.887	0.909	0.815	0.658
alpha Car (%)	**-0.114**	**-0.133**	**-0.145**	-0.104	-0.054	0.012	-0.070	-0.028	0.022	0.001	0.033	0.038
pv Car	0.049	0.036	0.032	0.155	0.433	0.881	0.392	0.714	0.779	0.993	0.695	0.594
av(R-Rf)	-0.103	-0.136	-0.144	-0.112	-0.074	-0.005	-0.088	-0.043	0.006	-0.006	0.020	0.038
av(R-Rm)	-0.310	-0.289	-0.329	-0.328	-0.308	-0.256	-0.299	-0.256	-0.243	-0.238	-0.255	-0.251
Sharpe	-0.097	-0.133	-0.138	-0.106	-0.071	-0.005	-0.078	-0.040	0.005	-0.005	0.018	0.036

Notes: Table 8 presents the differences in performance measures (alphas) along with their p-values for Negative vs Positive flow portfolio for various horizons p up to 12 months. At the end of each p-month period mutual funds are grouped into 2 portfolios: Negative and Positive flow portfolios, based on the sign of their dollar flow over the preceding p months. Then the portfolio flow-weighted net returns are computed for both portfolios and we subtract the returns of Negative flow portfolio from the returns of Positive flow portfolio. We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table 9: Performance of Negative and Positive unexpected flow portfolios – past performance based on Carhart's model

Negative/Positive flow portfolios						
Panel A: SRI						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.093	-0.059	0.034	**-0.127**	**-0.168**	-0.041
pv CAPM	0.160	0.244	0.646	0.019	0.000	0.397
alpha FF (%)	-0.094	-0.052	0.042	**-0.121**	**-0.165**	-0.043
pv FF	0.173	0.316	0.601	0.028	0.000	0.381
alpha Car (%)	-0.087	-0.048	0.039	**-0.118**	**-0.158**	-0.040
pv Car	0.223	0.364	0.628	0.036	0.000	0.418
av(R-Rf)	0.779	0.739	-0.040	0.741	0.667	-0.075
av(R-Rm)	-0.113	-0.152	-1.031	-0.150	-0.225	-1.065
Sharpe	0.181	0.189	-0.034	0.175	0.164	-0.105
Panel B: SRI retail						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.049	-0.090	-0.041	**-0.113**	**-0.180**	-0.068
pv CAPM	0.496	0.238	0.628	0.059	0.000	0.245
alpha FF (%)	-0.032	-0.073	-0.041	**-0.105**	**-0.185**	-0.081
pv FF	0.623	0.345	0.638	0.079	0.000	0.163
alpha Car (%)	-0.025	-0.057	-0.032	**-0.100**	**-0.178**	-0.077
pv Car	0.715	0.452	0.704	0.098	0.000	0.179
av(R-Rf)	0.812	0.740	-0.072	0.758	0.663	-0.095
av(R-Rm)	-0.079	-0.151	-1.063	-0.133	-0.229	-1.086
Sharpe	0.191	0.179	-0.056	0.178	0.161	-0.112
Panel C: SRI institutional						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.006	**-0.231**	**-0.225**	**-0.110**	**-0.223**	**-0.112**
pv CAPM	0.936	0.000	0.006	0.051	0.000	0.058
alpha FF (%)	-0.006	**-0.241**	**-0.234**	**-0.101**	**-0.219**	**-0.118**
pv FF	0.934	0.000	0.004	0.076	0.000	0.041
alpha Car (%)	-0.004	**-0.235**	**-0.231**	**-0.097**	**-0.216**	**-0.120**
pv Car	0.963	0.000	0.003	0.092	0.000	0.039
av(R-Rf)	0.853	0.612	-0.241	0.762	0.640	-0.122
av(R-Rm)	-0.039	-0.280	-1.232	-0.129	-0.251	-1.113
Sharpe	0.201	0.148	-0.225	0.179	0.152	-0.150

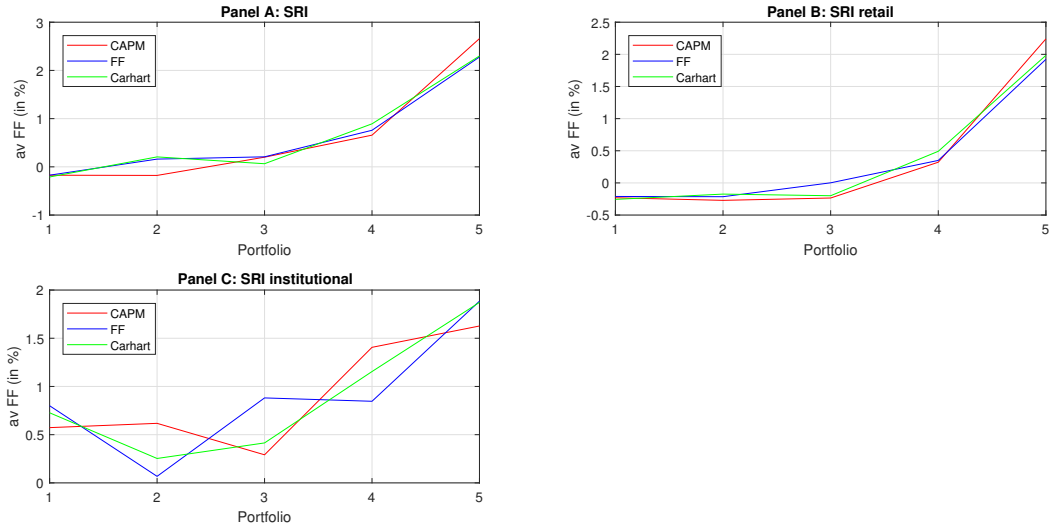
Notes: Table 9 presents the performance measures (alphas) along with their p-values for portfolios formed on past unexpected dollar flow of funds. The unexpected dollar flow for each fund-month is the difference between the observed and fitted values of the fund's flow given in equation (14) where the performance measure used is based on Carhart's four factor model. Each month funds are grouped into 2 portfolios: Negative and Positive unexpected flow portfolios (respectively "Neg" and "Pos"), based on the sign of their unexpected dollar flow in previous month. Then the portfolio Flow-weighted and Equally-weighted net returns are computed. We provide as well the estimation results the zero-cost portfolios, which are constructed by subtracting the returns of Negative flow portfolio from the returns of Positive flow portfolio ("Pos-Neg"). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Online Appendix

In this Online Appendix we include the empirical results which account for robustness checks. The appendix has two parts. In Appendix A we report additional figures and tables related to the study of the relation between past performance and future flow of money for SRI mutual funds (section 5 in the main paper). In Appendix B we collect additional tables that further support the main findings on the relation between past flow of money and future performance for SRI funds (section 6 in the main paper).

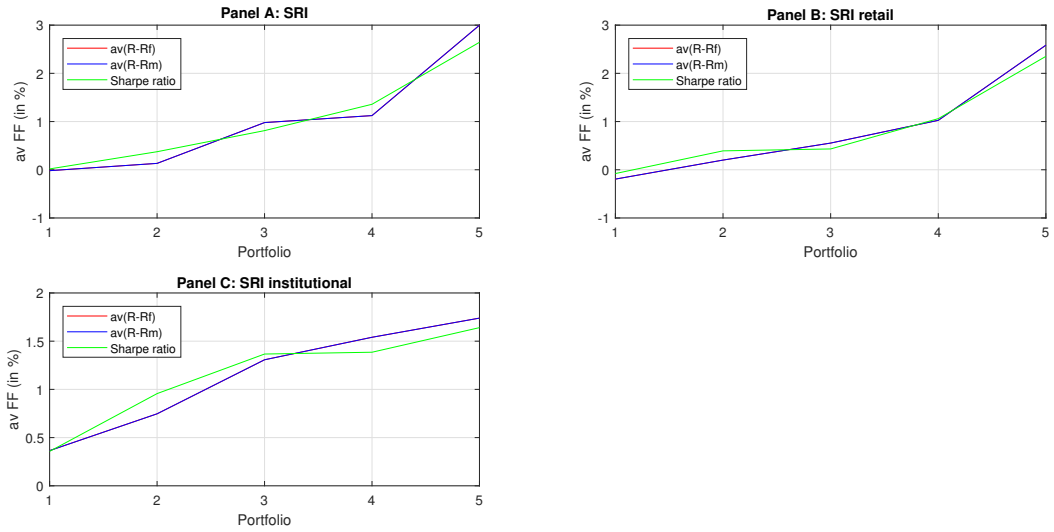
Appendix A Tables and figures for flow-performance relation

Figure A1: Average flow of funds for 5 SRI portfolios formed monthly on past performance (alpha)



Notes: Figure A1 plots the average flow of funds (in % per month) for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance as alpha which represents the intercept from a specified benchmark model estimated over the 36 months prior to a given month-end. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. The data span the period Dec99–Mar21.

Figure A2: Average flow of funds for 5 SRI portfolios formed monthly on past performance (simple performance measures)



Notes: Figure A2 plots the average flow of funds (in % per month) for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance with simple performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio, all computed over the 12 months prior to a given month-end. The data span the period Dec99–Mar21.

Table A1: Flow of funds for 5 SRI portfolios formed monthly on past performance (alpha)

		Past Performance (PP) Portfolios						Monotonicity relation tests			
		worst PP	**2nd worst**	**mid PP**	**2nd best**	**best PP**	**best-worst**		**t-test**	**MR test**	**MR_all test**
Panel A: SRI											
CAPM	mean FF (in %)	-0.174	-0.178	0.200	0.657	2.660	2.834	test stat	**6.091**	**-0.004**	**-0.004**
	st dev of FF (in%)	3.428	2.335	3.239	2.060	3.961	5.005	p-value	0.000	0.000	0.000
FF	mean FF (in %)	-0.173	0.160	0.208	0.758	2.279	2.451	test stat	**5.225**	**0.047**	**0.047**
	st dev of FF (in%)	3.448	2.058	3.500	2.177	3.914	4.972	p-value	0.000	0.000	0.000
Carhart	mean FF (in %)	-0.210	0.206	0.065	0.892	2.300	2.510	test stat	**5.460**	**-0.142**	**-0.142**
	st dev of FF (in%)	2.889	2.881	3.220	2.834	3.381	4.257	p-value	0.000	0.001	0.001
Panel B: SRI retail											
CAPM	mean FF (in %)	-0.231	-0.271	-0.235	0.322	2.241	2.471	test stat	**7.589**	**-0.040**	**-0.040**
	st dev of FF (in%)	1.741	1.858	1.559	1.384	3.536	3.606	p-value	0.000	0.000	0.000
FF	mean FF (in %)	-0.211	-0.215	0.002	0.350	1.922	2.133	test stat	**6.386**	**-0.004**	**-0.004**
	st dev of FF (in%)	1.686	1.889	1.745	1.932	3.371	3.492	p-value	0.000	0.000	0.000
Carhart	mean FF (in %)	-0.256	-0.174	-0.200	0.492	1.984	2.241	test stat	**6.652**	**-0.025**	**-0.025**
	st dev of FF (in%)	1.720	1.347	2.127	1.834	3.507	3.613	p-value	0.000	0.000	0.000
Panel C: SRI institutional											
CAPM	mean FF (in %)	0.573	0.618	0.291	1.406	1.627	1.054	test stat	1.620	**-0.326**	**-0.326**
	st dev of FF (in%)	5.990	5.016	3.429	3.341	3.028	6.606	p-value	0.107	0.013	0.007
FF	mean FF (in %)	0.800	0.068	0.881	0.846	1.885	1.085	test stat	**1.662**	-0.732	**-0.732**
	st dev of FF (in%)	5.301	5.554	2.908	3.443	3.797	6.451	p-value	0.098	0.100	0.032
Carhart	mean FF (in %)	0.727	0.253	0.414	1.155	1.872	1.145	test stat	**1.748**	**-0.474**	**-0.474**
	st dev of FF (in%)	5.974	5.084	3.191	3.045	3.657	7.041	p-value	0.082	0.036	0.009

Notes: Table A1 presents average flow of funds (in % per month) and its standard deviation for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance as alpha which represents the intercept from a specified benchmark model estimated over the 36 months prior to a given month-end. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We report as well in this table monotonicity relation tests (test statistics *test stat* and respective p-values) associated with monotonicity of average flow of funds across portfolios. The null hypothesis of no monotonic relation in average flow of funds across portfolio is tested against the alternative of a positive relation. We report here the results of three tests. *t-test* is a standard parametric test for testing the significance in the spread between average flow of funds of the top and bottom ranked portfolios (with Newey-West standard errors). MR and MR_all are Monotonic Relation tests proposed by Patton and Timmermann (2010) and applied to the 5 quintile portfolios. They are based respectively either on the minimal set of portfolio comparisons (MR) or on all possible comparisons (MR_all). Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A2: Flow of funds for 5 SRI portfolios formed monthly on past performance (simple performance measures)

		Past Performance (PP) Portfolios						Monotonicity relation tests			
		worst PP	**2nd worst**	**mid PP**	**2nd best**	**best PP**	**best-worst**		**t-test**	**MR test**	**MR_all test**
Panel A: SRI											
av(R-Rf)	mean FF (in %)	-0.019	0.132	0.979	1.124	2.998	3.017	test stat	**7.089**	**0.145**	**0.145**
	st dev of FF (in%)	2.398	3.194	3.016	2.614	3.508	4.042	p-value	0.000	0.000	0.000
av(R-Rm)	mean FF (in %)	-0.019	0.132	0.979	1.124	2.998	3.017	test stat	**7.089**	**0.145**	**0.145**
	st dev of FF (in%)	2.398	3.194	3.016	2.614	3.508	4.042	p-value	0.000	0.000	0.000
Sharpe	mean FF (in %)	0.018	0.374	0.812	1.358	2.644	2.627	test stat	**6.161**	**0.357**	**0.357**
	st dev of FF (in%)	2.478	3.021	3.023	2.536	3.675	4.285	p-value	0.000	0.000	0.000
Panel B: SRI retail											
av(R-Rf)	mean FF (in %)	-0.194	0.201	0.554	1.025	2.584	2.778	test stat	**8.490**	**0.353**	**0.353**
	st dev of FF (in%)	2.038	1.810	1.755	2.253	3.246	3.647	p-value	0.000	0.000	0.000
av(R-Rm)	mean FF (in %)	-0.194	0.201	0.554	1.025	2.584	2.778	test stat	**8.490**	**0.353**	**0.353**
	st dev of FF (in%)	2.038	1.810	1.755	2.253	3.246	3.647	p-value	0.000	0.000	0.000
Sharpe	mean FF (in %)	-0.079	0.392	0.432	1.060	2.353	2.431	test stat	**7.352**	**0.040**	**0.040**
	st dev of FF (in%)	2.154	1.992	1.988	1.774	3.313	3.820	p-value	0.000	0.000	0.000
Panel C: SRI institutional											
av(R-Rf)	mean FF (in %)	0.365	0.747	1.307	1.540	1.739	1.374	test stat	**2.281**	**0.199**	**0.199**
	st dev of FF (in%)	3.890	3.831	4.594	4.836	3.781	5.052	p-value	0.023	0.000	0.000
av(R-Rm)	mean FF (in %)	0.365	0.747	1.307	1.540	1.739	1.374	test stat	**2.281**	**0.199**	**0.199**
	st dev of FF (in%)	3.890	3.831	4.594	4.836	3.781	5.052	p-value	0.023	0.000	0.000
Sharpe	mean FF (in %)	0.357	0.956	1.367	1.385	1.640	1.283	test stat	**2.098**	**0.019**	**0.019**
	st dev of FF (in%)	3.873	3.628	4.634	5.028	4.044	5.095	p-value	0.037	0.000	0.000

Notes: Table A2 presents average flow of funds (in % per month) and its standard deviation for 5 quintile portfolios formed on past performance (PP). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Each month funds are grouped into 5 portfolios based on their performance in previous month (past performance) and average flow of funds is computed for each portfolio. We measure past performance with simple performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio, all computed over the 12 months prior to a given month-end. We report as well in this table monotonicity relation tests (test statistics *test stat* and respective p-values) associated with monotonicity of average flow of funds across portfolios. The null hypothesis of no monotonic relation in average flow of funds across portfolio is tested against the alternative of a positive relation. We report here the results of three tests. *t-test* is a standard parametric test for testing the significance in the spread between average flow of funds of the top and bottom ranked portfolios (with Newey-West standard errors). MR and MR_all are Monotonic Relation tests proposed by Patton and Timmermann (2010) and applied to the 5 quintile portfolios. They are based respectively either on the minimal set of portfolio comparisons (MR) or on all possible comparisons (MR_all). Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A3: Multivariate panel regressions of monthly flow of funds on past performance (alpha)

		PastPerf	logTNA	logAGE	std(ret)	ExpRatio	TurnRatio	logFamTNA	logFamNum	R2a	N
Panel A: SRI											
CAPM	coef	**2.919**	**-0.018**	**-0.011**	-0.041	**-3.524**	0.000	**0.020**	**-0.012**	5.697	5170
	p-value	0.000	0.000	0.019	0.584	0.001	0.911	0.000	0.047		
FF	coef	**3.243**	**-0.018**	**-0.011**	-0.036	**-3.101**	0.001	**0.021**	**-0.013**	5.627	5170
	p-value	0.002	0.000	0.021	0.616	0.003	0.727	0.000	0.056		
Carhart	coef	**3.421**	**-0.018**	**-0.011**	-0.006	**-3.054**	0.001	**0.022**	**-0.013**	5.750	5170
	p-value	0.001	0.000	0.015	0.938	0.003	0.765	0.000	0.055		
Panel B: SRI retail											
CAPM	coef	**2.489**	**-0.013**	0.002	-0.036	**-1.431**	-0.003	0.001	**-0.013**	4.940	4345
	p-value	0.000	0.001	0.736	0.502	0.085	0.489	0.360	0.034		
FF	coef	**2.699**	**-0.013**	0.002	-0.021	-1.147	-0.003	0.002	**-0.014**	4.815	4345
	p-value	0.002	0.001	0.725	0.680	0.180	0.595	0.336	0.051		
Carhart	coef	**2.847**	**-0.013**	0.002	0.009	-0.992	-0.003	0.002	**-0.014**	4.962	4345
	p-value	0.001	0.001	0.747	0.862	0.244	0.578	0.327	0.049		
Panel C: SRI institutional											
CAPM	coef	**3.152**	**-0.008**	-0.005	-0.170	**-5.321**	0.007	**0.010**	-0.012	1.465	3044
	p-value	0.000	0.000	0.443	0.248	0.010	0.677	0.017	0.394		
FF	coef	**3.662**	**-0.008**	-0.007	-0.198	**-4.586**	0.007	**0.010**	-0.007	1.446	3044
	p-value	0.002	0.000	0.293	0.206	0.023	0.658	0.018	0.638		
Carhart	coef	**3.687**	**-0.008**	-0.008	-0.167	**-4.746**	0.008	**0.010**	-0.007	1.409	3044
	p-value	0.002	0.000	0.226	0.274	0.022	0.622	0.019	0.627		

Notes: Table A3 presents the estimation results (coefficient estimates along with p-values) of panel regressions for the flow of funds. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the flow of funds between month $t+1$ and $t+2$. Explanatory variables include: past performance ($PastPerf$), log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$)and the log of the number of funds under management for the fund's family ($logFamNum$) . The explanatory variables are all measured for month t and are computed or estimated based on data before (and including) month t. We measure past performance as alpha which represents the intercept from a specified benchmark model estimated over the 36 months prior to a given month-end. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A4: Multivariate panel regressions of monthly flow of funds on past performance (simple performance measures)

		PastPerf	logTNA	logAGE	std(ret)	ExpRatio	TurnRatio	logFamTNA	logFamNum	R2a	N
Panel A: SRI											
av(R-Rf)	coef	**0.003**	**-0.012**	**-0.014**	0.110	**-3.594**	-0.003	**0.014**	**-0.013**	4.429	6436
	p-value	0.003	0.000	0.000	0.226	0.000	0.501	0.001	0.023		
av(R-Rm)	coef	**0.018**	**-0.012**	**-0.010**	-0.022	**-3.166**	-0.002	**0.015**	**-0.013**	6.243	6436
	p-value	0.000	0.000	0.001	0.778	0.000	0.580	0.000	0.015		
Sharpe	coef	**0.015**	**-0.012**	**-0.014**	0.169	**-3.538**	-0.003	**0.014**	**-0.013**	4.565	6436
	p-value	0.007	0.000	0.000	0.123	0.000	0.548	0.001	0.015		
Panel B: SRI retail											
av(R-Rf)	coef	**0.004**	**-0.014**	**-0.008**	0.050	**-2.407**	-0.007	**0.004**	-0.010	5.988	5226
	p-value	0.000	0.000	0.038	0.615	0.009	0.122	0.006	0.151		
av(R-Rm)	coef	**0.017**	**-0.013**	**-0.005**	-0.098	**-2.003**	-0.006	**0.005**	-0.008	7.689	5226
	p-value	0.000	0.000	0.228	0.298	0.032	0.176	0.001	0.268		
Sharpe	coef	**0.019**	**-0.014**	**-0.008**	0.132	**-2.363**	-0.007	**0.004**	-0.011	6.408	5226
	p-value	0.000	0.000	0.034	0.222	0.009	0.121	0.008	0.118		
Panel C: SRI institutional											
av(R-Rf)	coef	**0.003**	**-0.004**	**-0.007**	-0.069	**-3.743**	0.000	**0.007**	-0.013	0.352	3959
	p-value	0.026	0.034	0.076	0.633	0.082	0.990	0.065	0.284		
av(R-Rm)	coef	**0.016**	**-0.004**	-0.004	-0.161	**-3.555**	-0.001	**0.008**	-0.014	1.115	3959
	p-value	0.000	0.042	0.373	0.212	0.069	0.937	0.039	0.249		
Sharpe	coef	**0.011**	**-0.004**	-0.007	-0.050	**-3.746**	0.000	**0.008**	-0.015	0.280	3959
	p-value	0.069	0.027	0.114	0.730	0.080	0.963	0.061	0.242		

Notes: Table A4 presents the estimation results (coefficient estimates along with p-values) of panel regressions for the flow of funds. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the flow of funds between month $t+1$ and $t+2$. Explanatory variables include: past performance ($PastPerf$), log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$)and the log of the number of funds under management for the fund's family ($logFamNum$) . The explanatory variables are all measured for month t and are computed or estimated based on data before (and including) month t. We measure past performance with simple performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio, all computed over the 12 months prior to a given month-end. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A5: Shape of the flow-performance relation (piecewise performance ranks based on alphas)

		Low	Mid	High	H-L	R2a	N
Panel A: SRI							
CAPM	coef	-0.009	**0.022**	**0.106**	**0.115**	9.713	5168
	pv(NW)	0.779	0.000	0.000	0.003		
FF	coef	0.027	**0.012**	**0.108**	**0.081**	9.485	5168
	pv(NW)	0.348	0.060	0.000	0.019		
Carhart	coef	0.008	**0.012**	**0.112**	**0.104**	9.491	5168
	pv(NW)	0.718	0.077	0.001	0.005		
Panel B: SRI retail							
CAPM	coef	-0.013	**0.018**	**0.103**	**0.116**	9.488	4345
	pv(NW)	0.614	0.000	0.000	0.000		
FF	coef	0.007	**0.012**	**0.094**	**0.087**	8.941	4345
	pv(NW)	0.812	0.023	0.000	0.017		
Carhart	coef	0.005	**0.010**	**0.095**	**0.091**	8.965	4345
	pv(NW)	0.850	0.022	0.003	0.014		
Panel C: SRI institutional							
CAPM	coef	0.036	**0.025**	0.029	-0.006	3.199	3042
	pv(NW)	0.554	0.024	0.271	0.925		
FF	coef	0.021	**0.023**	**0.062**	0.042	3.344	3042
	pv(NW)	0.709	0.019	0.071	0.587		
Carhart	coef	0.014	**0.019**	**0.075**	0.061	3.313	3042
	pv(NW)	0.789	0.048	0.030	0.367		

Notes: Table A5 presents the estimation results of panel regressions investigating the shape of the flow-performance relation. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the percentage flow of money over the month $t+1$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on past performance measured as alpha which represents the intercept from a specified benchmark model estimated over the 36 months prior to a given month-end. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. For brevity, we report in this table only the coefficients (along with its p-values) for the three piecewise performance ranks Low, Mid, $High$ as well as the difference between the coefficients for $High$ and Low piecewise performance ranks (column "H-L"). We test the null of equality between the $High$ and Low coefficients using Wald test and report the related p-values underneath the difference. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A6: Shape of the flow-performance relation (piecewise performance ranks based on simple performance measures)

		Low	Mid	High	H-L	R2a	N
Panel A: SRI							
CAPM	coef	0.023	**0.010**	**0.139**	**0.116**	10.506	6433
	pv(NW)	0.343	0.066	0.000	0.007		
FF	coef	0.023	**0.010**	**0.139**	**0.116**	10.506	6433
	pv(NW)	0.343	0.066	0.000	0.007		
Carhart	coef	0.024	**0.015**	**0.085**	0.061	9.772	6433
	pv(NW)	0.322	0.009	0.009	0.125		
Panel B: SRI retail							
CAPM	coef	0.009	**0.010**	**0.122**	**0.113**	12.262	5224
	pv(NW)	0.519	0.069	0.000	0.001		
FF	coef	0.009	**0.010**	**0.122**	**0.113**	12.262	5224
	pv(NW)	0.519	0.069	0.000	0.001		
Carhart	coef	0.019	0.011	**0.081**	**0.062**	11.506	5224
	pv(NW)	0.288	0.109	0.019	0.096		
Panel C: SRI institutional							
CAPM	coef	**0.062**	0.009	0.038	-0.024	2.967	3957
	pv(NW)	0.009	0.197	0.225	0.499		
FF	coef	**0.062**	0.009	0.038	-0.024	2.967	3957
	pv(NW)	0.009	0.197	0.225	0.499		
Carhart	coef	**0.062**	0.008	0.041	-0.021	2.910	3957
	pv(NW)	0.025	0.224	0.111	0.563		

Notes: Table A6 presents the estimation results of panel regressions investigating the shape of the flow-performance relation. Panel regressions are conducted separately for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). The dependent variable is the percentage flow of money over the month $t+1$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on simple past performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio, all computed over the 12 months prior to a given month-end. For brevity, we report in this table only the coefficients (along with its p-values) for the three piecewise performance ranks Low, Mid, $High$ as well as the difference between the coefficients for $High$ and Low piecewise performance ranks (column "H-L"). We test the null of equality between the $High$ and Low coefficients using Wald test and report the related p-values underneath the difference. We report as well the adjusted R square ($R2a$) and the total number of observations (N). In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A7: Shape of the flow-performance relation over longer horizons (piecewise performance ranks based on alphas)

	p:	1	3	6	9	12	18	24
Panel A: SRI								
CAPM	H-L	**0.115**	**0.079**	0.053	0.023	0.017	-0.034	0.046
	p-value	0.003	0.035	0.211	0.635	0.678	0.617	0.261
FF	H-L	**0.081**	**0.058**	0.045	0.023	0.038	-0.046	0.039
	p-value	0.019	0.079	0.128	0.534	0.233	0.314	0.237
Carhart	H-L	**0.104**	**0.066**	**0.063**	0.014	0.039	-0.025	0.019
	p-value	0.005	0.026	0.010	0.660	0.138	0.501	0.538
Panel B: SRI retail								
CAPM	H-L	**0.116**	**0.082**	**0.054**	0.009	0.023	-0.065	0.021
	p-value	0.000	0.005	0.063	0.803	0.430	0.146	0.536
FF	H-L	**0.087**	**0.052**	0.014	0.017	0.004	-0.094	-0.024
	p-value	0.017	0.012	0.670	0.620	0.903	0.291	0.467
Carhart	H-L	**0.091**	**0.066**	0.032	0.010	0.016	-0.059	-0.042
	p-value	0.014	0.049	0.296	0.757	0.610	0.066	0.225
Panel C: SRI institutional								
CAPM	H-L	-0.006	-0.001	-0.040	0.013	-0.043	-0.114	-0.035
	p-value	0.925	0.985	0.650	0.888	0.686	0.433	0.740
FF	H-L	0.042	0.045	0.025	0.044	0.043	0.061	0.061
	p-value	0.587	0.611	0.801	0.660	0.715	0.556	0.501
Carhart	H-L	0.061	0.026	0.030	0.053	0.017	0.017	0.043
	p-value	0.367	0.731	0.753	0.551	0.875	0.860	0.609

Notes: Table A7 presents the differences between the coefficients on $High$ and Low piecewise performance ranks ("H-L") and the p-values associated with testing, using Wald test, the null of the equality between the two coefficients. The coefficients are estimated from panel regressions. In panel regressions, separately run for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C), we regress a percentage flow of money over the consecutive p months on piecewise past performance and a set of control variables as given in equation (13). We consider future flow of money over horizons up to 12 months, i.e. $p \in \{1, 3, 6, 9, 12\}$ and each column in the table represents the results for a different horizon p. The dependent variable is the percentage flow of money between the end of months t and $t+p$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on past performance measured as alpha which represents the intercept from a specified benchmark model estimated over the 36 months prior to a given month-end. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table A8: Shape of the flow-performance relation over longer horizons (piecewise performance ranks based on simple performance measures)

	p:	1	3	6	9	12	18	24
Panel A: SRI								
CAPM	H-L	**0.116**	**0.091**	**0.065**	0.052	0.014	0.030	-0.027
	p-value	0.007	0.028	0.078	0.124	0.664	0.410	0.530
FF	H-L	**0.116**	**0.091**	**0.065**	0.052	0.014	0.030	-0.027
	p-value	0.007	0.028	0.078	0.124	0.664	0.410	0.530
Carhart	H-L	0.061	0.038	0.015	0.032	-0.019	0.026	0.000
	p-value	0.125	0.314	0.657	0.295	0.613	0.491	0.996
Panel B: SRI retail								
CAPM	H-L	**0.113**	**0.092**	**0.083**	0.045	0.047	0.030	0.012
	p-value	0.001	0.009	0.018	0.206	0.145	0.303	0.748
FF	H-L	**0.113**	**0.092**	**0.083**	0.045	0.047	0.030	0.012
	p-value	0.001	0.009	0.018	0.206	0.145	0.303	0.748
Carhart	H-L	**0.062**	0.047	0.025	0.020	0.015	0.009	0.003
	p-value	0.096	0.179	0.455	0.567	0.636	0.772	0.938
Panel C: SRI institutional								
CAPM	H-L	-0.024	-0.004	-0.009	0.018	-0.059	-0.002	-0.093
	p-value	0.499	0.920	0.810	0.545	0.132	0.967	0.208
FF	H-L	-0.024	-0.004	-0.009	0.018	-0.059	-0.002	-0.093
	p-value	0.499	0.920	0.810	0.545	0.132	0.967	0.208
Carhart	H-L	-0.021	-0.037	-0.041	-0.016	**-0.074**	-0.008	-0.080
	p-value	0.563	0.375	0.315	0.640	0.078	0.899	0.438

Notes: Table A8 presents the differences between the coefficients on $High$ and Low piecewise performance ranks ("H-L") and the p-values associated with testing, using Wald test, the null of the equality between the two coefficients. The coefficients are estimated from panel regressions. In panel regressions, separately run for a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C), we regress a percentage flow of money over the consecutive p months on piecewise past performance and a set of control variables as given in equation (13). We consider future flow of money over horizons up to 12 months, i.e. $p \in \{1, 3, 6, 9, 12\}$ and each column in the table represents the results for a different horizon p. The dependent variable is the percentage flow of money between the end of months t and $t+p$. Explanatory variables include piecewise performance ranks Low, Mid, $High$ and a set of control variables: log TNA ($logTNA$), log of fund's age ($logAGE$), standard deviation of fund return ($std(ret)$), expense ratio ($ExpRatio$), turnover ratio ($TurnRatio$), lof of fund's family TNA ($logFamTNA$) and the log of the number of funds under management for the fund's family ($logFamNum$). The explanatory variables are all measured for month t or are computed based on data before (and including) month t. Piecewise performance ranks are assigned to mutual funds based on simple past performance measures such as average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio, all computed over the 12 months prior to a given month-end. In all regressions we include time fixed effects and we used robust, clustered standard errors. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Appendix B Tables and figures for performance-flow relation

Table B9: Performance of High and Low flow portfolios formed on past month percentage flow

Low/High flow portfolios						
Panel A: SRI						
	Flow-weighted			**Equally-weighted**		
	Low 50%	**High 50%**	**High-Low**	**Low 50%**	**High 50%**	**High-Low**
alpha CAPM (%)	0.012	-0.070	-0.082	-0.035	-0.082	-0.047
pv CAPM	0.899	0.314	0.297	0.608	0.148	0.267
alpha FF (%)	-0.006	-0.082	-0.076	-0.044	-0.096	-0.052
pv FF	0.945	0.224	0.310	0.471	0.063	0.216
alpha Car (%)	0.019	-0.066	-0.084	-0.025	-0.079	-0.054
pv Car	0.818	0.365	0.280	0.690	0.133	0.237
av(R-Rf)	0.573	0.486	-0.087	0.513	0.465	-0.048
av(R-Rm)	-0.013	-0.100	-0.800	-0.072	-0.120	-0.761
Sharpe	0.127	0.109	-0.075	0.118	0.108	-0.068
Panel B: SRI retail						
	Flow-weighted			**Equally-weighted**		
	Low 50%	**High 50%**	**High-Low**	**Low 50%**	**High 50%**	**High-Low**
alpha CAPM (%)	-0.035	**-0.122**	-0.087	-0.081	**-0.143**	-0.063
pv CAPM	0.662	0.083	0.166	0.261	0.007	0.248
alpha FF (%)	-0.048	**-0.127**	-0.079	-0.088	**-0.150**	-0.061
pv FF	0.520	0.071	0.166	0.178	0.004	0.218
alpha Car (%)	-0.024	**-0.105**	-0.080	-0.071	**-0.133**	-0.062
pv Car	0.752	0.161	0.169	0.289	0.012	0.221
av(R-Rf)	0.537	0.441	-0.097	0.478	0.413	-0.065
av(R-Rm)	-0.048	-0.145	-0.809	-0.107	-0.173	-0.778
Sharpe	0.117	0.098	-0.088	0.108	0.094	-0.090
Panel C: SRI institutional						
	Flow-weighted			**Equally-weighted**		
	Low 50%	**High 50%**	**High-Low**	**Low 50%**	**High 50%**	**High-Low**
alpha CAPM (%)	-0.056	**-0.182**	**-0.126**	-0.026	**-0.142**	**-0.115**
pv CAPM	0.507	0.022	0.026	0.670	0.010	0.033
alpha FF (%)	-0.065	**-0.190**	**-0.125**	-0.032	**-0.147**	**-0.115**
pv FF	0.418	0.017	0.035	0.547	0.008	0.020
alpha Car (%)	-0.042	**-0.173**	**-0.131**	-0.013	**-0.133**	**-0.120**
pv Car	0.607	0.032	0.020	0.804	0.015	0.016
av(R-Rf)	0.504	0.391	-0.113	0.523	0.420	-0.103
av(R-Rm)	-0.081	-0.195	-0.826	-0.062	-0.166	-0.816
Sharpe	0.112	0.085	-0.097	0.120	0.095	-0.132

Notes: Table B9 presents the performance measures (alphas) along with their p-values for portfolios formed on past percentage flow of funds. Each month funds are grouped into 2 portfolios: Low flow portfolios ("Low 50%") that include half of funds with the lowest dollar flow over the previous month and High flow portfolios ("High 50%") that include half of funds with the highest dollar flow over the previous month. Then the portfolio Flow-weighted and Equally-weighted net returns are computed. We provide as well the estimation results for the zero-cost portfolios, which are constructed by subtracting the returns of Low flow portfolio from the returns of High flow portfolio ("High-Low"). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table B10: Difference in performance of Positive vs Negative flow portfolios formed on past dollar flow over different horizons (equally-weighted portfolios)

Panel A: SRI

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	-0.038	-0.038	-0.088	-0.062	-0.019	-0.051	-0.055	-0.058	-0.039	-0.027	-0.019	-0.073
pv CAPM	0.448	0.418	0.112	0.370	0.739	0.241	0.387	0.261	0.462	0.638	0.759	0.148
alpha FF (%)	-0.043	-0.034	-0.085	-0.048	-0.007	-0.047	-0.046	-0.049	-0.034	-0.021	-0.013	-0.065
pv FF	0.402	0.461	0.117	0.459	0.891	0.289	0.463	0.346	0.508	0.722	0.835	0.199
alpha Car (%)	-0.049	-0.039	-0.088	-0.047	0.002	-0.047	-0.041	-0.048	-0.030	-0.019	-0.012	-0.056
pv Car	0.341	0.384	0.106	0.442	0.964	0.267	0.526	0.363	0.551	0.758	0.848	0.260
av(R-Rf)	-0.048	-0.041	-0.095	-0.076	-0.032	-0.058	-0.061	-0.063	-0.051	-0.031	-0.032	-0.064
av(R-Rm)	-0.244	-0.220	-0.246	-0.247	-0.245	-0.253	-0.251	-0.245	-0.249	-0.249	-0.259	-0.275
Sharpe	-0.058	-0.053	-0.124	-0.087	-0.042	-0.077	-0.079	-0.084	-0.074	-0.041	-0.044	-0.085

Panel B: SRI retail

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	-0.057	-0.048	-0.089	-0.060	-0.037	-0.014	-0.036	-0.052	-0.082	-0.062	-0.027	-0.089
pv CAPM	0.280	0.370	0.110	0.283	0.567	0.783	0.567	0.302	0.155	0.231	0.620	0.156
alpha FF (%)	-0.052	-0.041	-0.082	-0.050	-0.026	-0.007	-0.030	-0.045	-0.074	-0.055	-0.019	-0.081
pv FF	0.297	0.428	0.114	0.340	0.663	0.889	0.631	0.364	0.190	0.279	0.722	0.165
alpha Car (%)	-0.053	-0.043	-0.076	-0.037	-0.008	0.007	-0.017	-0.040	-0.063	-0.041	-0.010	-0.063
pv Car	0.272	0.398	0.132	0.453	0.887	0.890	0.780	0.416	0.233	0.420	0.853	0.246
av(R-Rf)	-0.066	-0.049	-0.087	-0.065	-0.036	-0.004	-0.031	-0.045	-0.073	-0.050	-0.024	-0.063
av(R-Rm)	-0.280	-0.273	-0.292	-0.290	-0.279	-0.263	-0.276	-0.268	-0.286	-0.286	-0.293	-0.297
Sharpe	-0.087	-0.058	-0.109	-0.077	-0.043	-0.006	-0.037	-0.062	-0.091	-0.067	-0.034	-0.069

Panel C: SRI institutional

	Positive-Negative flow portfolio											
p:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
alpha CAPM (%)	-0.075	**-0.124**	-0.077	-0.037	-0.039	-0.026	-0.075	-0.053	-0.026	-0.034	0.008	-0.033
pv CAPM	0.175	0.022	0.182	0.473	0.509	0.655	0.276	0.415	0.669	0.636	0.910	0.617
alpha FF (%)	-0.087	**-0.127**	-0.076	-0.031	-0.032	-0.028	-0.070	-0.053	-0.026	-0.040	-0.001	-0.043
pv FF	0.102	0.018	0.167	0.534	0.555	0.620	0.283	0.381	0.658	0.559	0.992	0.522
alpha Car (%)	**-0.089**	**-0.126**	-0.077	-0.025	-0.012	-0.022	-0.052	-0.037	-0.010	-0.020	0.025	-0.031
pv Car	0.092	0.022	0.169	0.617	0.825	0.708	0.431	0.531	0.863	0.761	0.705	0.620
av(R-Rf)	-0.072	-0.118	-0.078	-0.036	-0.033	-0.028	-0.069	-0.045	-0.027	-0.027	0.010	-0.031
av(R-Rm)	-0.266	-0.262	-0.262	-0.256	-0.262	-0.241	-0.264	-0.249	-0.226	-0.242	-0.257	-0.270
Sharpe	-0.080	-0.144	-0.091	-0.044	-0.036	-0.039	-0.077	-0.054	-0.032	-0.030	0.012	-0.035

Notes: Table B10 presents the differences in performance measures (alphas) along with their p-values for Negative vs Positive flow portfolio for various horizons p up to 12 months. At the end of each p-month period mutual funds are grouped into 2 portfolios: Negative and Positive flow portfolios, based on the sign of their dollar flow over the preceding p months. Then the portfolio equally-weighted net returns are computed for both portfolios and we subtract the returns of Negative flow portfolio from the returns of Positive flow portfolio. We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table B11: Performance of Negative and Positive unexpected flow portfolios – past performance based on Fama-French three-factor model

Negative/Positive flow portfolios						
Panel A: SRI						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.097	-0.066	0.031	**-0.135**	**-0.164**	-0.029
pv CAPM	0.146	0.199	0.689	0.016	0.000	0.584
alpha FF (%)	-0.098	-0.059	0.038	**-0.132**	**-0.161**	-0.029
pv FF	0.159	0.251	0.646	0.024	0.000	0.592
alpha Car (%)	-0.091	-0.057	0.035	**-0.128**	**-0.157**	-0.030
pv Car	0.201	0.281	0.683	0.031	0.000	0.587
av(R-Rf)	0.774	0.731	-0.044	0.730	0.670	-0.060
av(R-Rm)	-0.117	-0.161	-1.035	-0.161	-0.222	-1.051
Sharpe	0.181	0.187	-0.037	0.173	0.165	-0.084
Panel B: SRI retail						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.081	-0.084	-0.004	**-0.139**	**-0.169**	-0.030
pv CAPM	0.347	0.275	0.970	0.030	0.001	0.630
alpha FF (%)	-0.058	-0.067	-0.009	**-0.126**	**-0.174**	-0.048
pv FF	0.414	0.386	0.919	0.036	0.000	0.410
alpha Car (%)	-0.052	-0.052	0.000	**-0.122**	**-0.164**	-0.042
pv Car	0.475	0.498	0.998	0.045	0.001	0.460
av(R-Rf)	0.790	0.744	-0.045	0.737	0.678	-0.060
av(R-Rm)	-0.102	-0.147	-1.036	-0.154	-0.214	-1.050
Sharpe	0.183	0.180	-0.034	0.172	0.164	-0.066
Panel C: SRI institutional						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.001	**-0.244**	**-0.243**	**-0.112**	**-0.215**	**-0.102**
pv CAPM	0.993	0.000	0.003	0.045	0.000	0.081
alpha FF (%)	-0.002	**-0.253**	**-0.251**	**-0.102**	**-0.212**	**-0.110**
pv FF	0.980	0.000	0.002	0.072	0.000	0.054
alpha Car (%)	0.001	**-0.247**	**-0.248**	**-0.098**	**-0.208**	**-0.110**
pv Car	0.991	0.000	0.002	0.084	0.000	0.052
av(R-Rf)	0.858	0.600	-0.258	0.758	0.653	-0.105
av(R-Rm)	-0.033	-0.291	-1.249	-0.134	-0.239	-1.096
Sharpe	0.203	0.145	-0.239	0.179	0.155	-0.130

Notes: Table B11 presents the performance measures (alphas) along with their p-values for portfolios formed on past unexpected dollar flow of funds. The unexpected dollar flow for each fund-month is the difference between the observed and fitted values of the fund's flow given in equation (14) where the performance measure used is based on Fama-French three factor model. Each month funds are grouped into 2 portfolios: Negative and Positive flow portfolios (respectively "Neg" and "Pos"), based on the sign of their unexpected dollar flow in previous month. Then the portfolio Flow-weighted and Equally-weighted net returns are computed. We provide as well the estimation results the zero-cost portfolios, which are constructed by subtracting the returns of Negative flow portfolio from the returns of Positive flow portfolio ("Pos-Neg"). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.

Table B12: Performance of Negative and Positive unexpected flow portfolios – past performance based on CAPM

Negative/Positive flow portfolios						
Panel A: SRI						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.100	-0.059	0.040	**-0.129**	**-0.165**	-0.036
pv CAPM	0.125	0.278	0.599	0.019	0.000	0.477
alpha FF (%)	-0.100	-0.051	0.049	**-0.127**	**-0.160**	-0.033
pv FF	0.139	0.356	0.545	0.026	0.000	0.519
alpha Car (%)	-0.094	-0.046	0.047	**-0.123**	**-0.156**	-0.033
pv Car	0.181	0.402	0.567	0.034	0.000	0.532
av(R-Rf)	0.767	0.743	-0.024	0.733	0.671	-0.063
av(R-Rm)	-0.124	-0.149	-1.015	-0.158	-0.221	-1.053
Sharpe	0.180	0.188	-0.021	0.175	0.165	-0.091
Panel B: SRI retail						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	0.007	-0.073	-0.080	**-0.107**	**-0.165**	-0.058
pv CAPM	0.917	0.353	0.368	0.076	0.004	0.399
alpha FF (%)	0.004	-0.057	-0.061	**-0.109**	**-0.165**	-0.055
pv FF	0.946	0.470	0.484	0.069	0.003	0.399
alpha Car (%)	0.012	-0.042	-0.054	**-0.105**	**-0.151**	-0.046
pv Car	0.849	0.590	0.532	0.085	0.005	0.467
av(R-Rf)	0.845	0.756	-0.089	0.753	0.688	-0.065
av(R-Rm)	-0.046	-0.136	-1.080	-0.138	-0.203	-1.056
Sharpe	0.204	0.183	-0.070	0.179	0.164	-0.070
Panel C: SRI institutional						
	Flow-weighted			**Equally-weighted**		
	Neg	**Pos**	**Pos-Neg**	**Neg**	**Pos**	**Pos-Neg**
alpha CAPM (%)	-0.029	**-0.241**	**-0.212**	**-0.141**	**-0.196**	-0.054
pv CAPM	0.700	0.000	0.008	0.018	0.000	0.372
alpha FF (%)	-0.031	**-0.251**	**-0.220**	**-0.127**	**-0.198**	-0.071
pv FF	0.688	0.000	0.006	0.030	0.000	0.223
alpha Car (%)	-0.027	**-0.246**	**-0.218**	**-0.123**	**-0.194**	-0.071
pv Car	0.724	0.000	0.006	0.036	0.000	0.220
av(R-Rf)	0.833	0.606	-0.227	0.735	0.665	-0.071
av(R-Rm)	-0.059	-0.286	-1.218	-0.156	-0.227	-1.062
Sharpe	0.196	0.146	-0.210	0.172	0.159	-0.086

Notes: Table B12 presents the performance measures (alphas) along with their p-values for portfolios formed on past unexpected dollar flow of funds. The unexpected dollar flow for each fund-month is the difference between the observed and fitted values of the fund's flow given in equation (14) where the performance measure used is based on CAPM. Each month funds are grouped into 2 portfolios: Negative and Positive flow portfolios (respectively "Neg" and "Pos"), based on the sign of their unexpected dollar flow in previous month. Then the portfolio Flow-weighted and Equally-weighted net returns are computed. We provide as well the estimation results the zero-cost portfolios, which are constructed by subtracting the returns of Negative flow portfolio from the returns of Positive flow portfolio ("Pos-Neg"). We consider portfolios formed within a sample of all SRI funds (Panel A), SRI retail funds (Panel B) and SRI institutional funds (Panel C). Portfolio performance is evaluated based on portfolio alpha, which is the intercept from the specified benchmark model. We use three benchmark models: CAPM, Fama-French three-factor model (FF) and Carhart four-factor model. Finally, we report as well the simple performance measures for the aforementioned portfolios: average returns in excess of risk free rate av(R-Rf) and in excess of market return av(R-Rm) as well as the Sharpe ratio. Statistically significant parameters (at least at 10% significance level) are in bold. The data span the period Dec99–Mar21.