Product differentiation in the socially responsible mutual fund industry

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ABSTRACT

In this study, we analyse the effect of product differentiation on prices and clients' attraction in the socially responsible (SR) mutual fund industry. Using three proxies for differentiation, including a text-based indicator, a return-based indicator, and a portfolio-holding indicator, we analyse a sample of US SR equity mutual funds in the period 1999–2019. Our findings show that the text differentiation measure better explains the product differentiation impact on prices and flows than the measures based on funds' characteristics. Our text differentiation results indicate that younger SR funds and funds belonging to smaller families are more differentiated. In addition, differentiation allows SR funds to charge higher fees and attract more money flows. Finally, our results indicate that SR fund investors are sensitive to differentiation regarding other funds implementing the same SR strategies, but not in relation to other funds in the same Morningstar financial style category.

1. Introduction

Socially responsible (SR) mutual funds consider both financial and non-financial issues when deciding how to invest the money of shareholders. These non-financial issues encompass a wide range of matters, such as environmental preservation, the promotion of good corporate governance practices, or the consideration of moral and/or religious values, among others. The first modern SR fund[1] appeared in the 70 s in the US market. When SR funds appeared, they represented a marginal portion of the total mutual fund industry, but they have experienced an impressive growth in recent years. Nowadays, SR funds constitute a mainstream investment collective vehicle in the most developed financial markets (Erragragui and Lagoarde-Segot, 2016). The assets related to sustainable, responsible, and impact investment strategies in the US market reached $8.7 trillion in 2016[2] . Only two years later, at the beginning of 2018, this figure experienced a growth of 38 %, reaching $12 trillion. This represented 25 % of the total assets under professional management. In

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addition, much of this growth was triggered by asset managers, who managed $11.6 trillion assets involved in ESG (environmental, social and governance) issues in 2018, representing an increase of 44 % since 2016.

This impressive growth has attracted the attention of the mutual fund literature. An important number of academic papers have analysed this type of fund in recent years. Most of them have focused on two main topics: (i) the financial performance of SR funds (see, among many others, Bauer et al., 2005; Gil-Bazo et al., 2010; Nofsinger and Varma, 2014; Muñoz et al., 2015; or Chen and Scholtens, 2018); and (ii) the behaviour of SR fund investors (see, among many others, Bollen, 2007; Benson and Humphrey, 2008; Renneboog et al., 2011; Muñoz, 2016; Riedl and Smeets, 2017; or Muñoz, 2019). However, some relevant topics remain underexplored for this type of fund. This is the case for product differentiation and its consequences on prices and clients' attraction. This topic is gaining momentum, given the impressive growth of SR mutual funds and the consequent competition increase in their industry. In the present research, we first analyse product differentiation in a sample of actively managed SR mutual funds mainly investing in equity in the period 1999–2019 and domiciled in the US market. Considering the figures provided by USSIF, the US market is the most competitive worldwide SR mutual fund industry and constitutes the perfect laboratory for analysing the topic of the paper. More concretely, the main objectives of the present paper are to analyse the drivers of product differentiation and the consequences of this differentiation on net expense ratios and relative net money flows as proxies of prices and clients' attraction, respectively.

In order to measure the differentiation degree of SR funds, we first use the text-based indicator of a fund's uniqueness, which is based on the description of the principal investment strategies (PIS) of the funds' prospectuses. This measure has recently been proposed by Kostovetsky and Warner (2019). However, they do not analyse the SR mutual fund industry and they focus on the whole universe of US mutual funds. The special characteristics of SR mutual fund investors, who give more importance to the ethical (or non-financial) component in their investments, make the analysis of the ability of a SR fund to differentiate from the others relevant and justify its study. However, as a robustness test, we also analyse whether SR funds are differentiated from conventional ones. Therefore, we compute the text uniqueness of SR funds against a matched sample of conventional ones.

As Kostovetsky and Warner (2019) point out, differentiation measures based on standard fund characteristics (e.g., holdings, returns, risk-factor weights, etc.) do not fully reflect the relevant degree of a fund's uniqueness, since it is likely that the correlation of these standard characteristics, especially for funds implementing the same investment strategies, is high. These authors explain that when fund sponsors aim to offer unique funds, perceived by investors as "different" or "new", they could use the written description of the fund provided in its prospectus to attract the targeted investors. In this way, a text-based proxy computed from that description could be more effective for reflecting the degree of uniqueness of SR funds than other proxies previously used in the literature, such as the holding portfolio overlap (Wahal and Wang, 2011; or In et al., 2014, among others). The key aspect for the effectiveness of product differentiation is that SR fund clients can perceive it (Bharadwaj et al., 1993; Vorhies et al., 2009). However, portfolio holdings are probably not always analysed/observed/compared by most investors in the fund selection, so investors may find it hard to extract conclusions about the "fund uniqueness" from this type of information. In contrast, it is more likely that investors read funds' prospectuses and perceive funds as "different" or "new", in contrast to their peers, according to the information provided in them. In spite of this, we have also considered it relevant to check uniqueness with fund fundamental indicators, based on returns and fund holdings. This analysis has allowed us to reach the same conclusions as Kostovetsky and Warner (2019).

With regard to text-based differentiation, we compute two different indicators. The first one considers that SR funds compete with other SR funds within the same financial style category (see Appendix 1). The second indicator considers that SR funds compete with other SR funds implementing the same SR strategies (positive screens, negative screens, engagement, impact investing, or environmental sector; see Appendix 2).

In short, our results show that SR fund investors are sensitive to differentiation regarding other SR funds implementing the same SR strategy/ies, but not to other SR funds in the same Morningstar financial style category. That is, for an investor of a SR domestic small cap equity fund that excludes "sin" sectors, it is more relevant to consider the differentiation regarding other SR funds that also exclude this type of stocks than in relation to other SR domestic small cap equity funds. Another finding shows that younger funds and funds belonging to smaller families are more differentiated. In addition, the most differentiated SR funds are able to charge higher fees and attract more money flows. Furthermore, another interesting finding is that the benefits of differentiation are sustained over time, but they are more relevant in the first years of life of an SR fund. In addition, we observe that the effect of lagged returns on money flows is slighter for more differentiated products, and that this effect tends to disappear over time. Overall, our empirical findings suggest that, despite the impressive growth experienced by the SR mutual fund industry in recent years, it continues to show the features of a non-competitive market.

Furthermore, we conduct several robustness tests and extract the following conclusions: the text uniqueness measures better capture the impact of product differentiation on SR funds' investors than other indicators based on fundamentals, the differentiation from conventional funds does not allow for charging higher fees or attracting more money, the intra-family differentiation is not effective for charging higher fees or attracting more money flows, and our previous results for SR funds are conducted by non-institutional investors.

Finally, we want to stress that the analyses performed in this research are of interest from the perspectives of international financial markets and multinational enterprises. SR mutual funds provide funding to multinational enterprises and liquidity to the stocks issued by them. On the other hand, they also impact multinational corporations through multiple shareholder activism strategies to improve the CSR (corporate social responsibility) records of the investee companies (Li et al., 2021). Institutional investors, such as SR mutual funds, may also impact firms' innovation (Chi et al., 2019). Moreover, we focus on the US SR mutual fund industry, the most developed one worldwide. As Fernández-Avilés et al. (2012) point out, the "US stock market historically plays a leading role in the international financial markets, (due, in part, to its high liquidity and the importance of the US economy)" (p. 203). US-listed companies include some of the largest holdings with worldwide activity. In addition, most relevant companies from other countries are listed in the

American stock markets, seeking access to more resources. As Davis and Marquis (2021) explain, "there are now more non-US companies traded on Nasdaq and NYSE than there are German corporations traded on the Deutsche Bourse" (p. 352). The US SR mutual funds in our sample invest mainly in equity, both domestic and global, listed in American and other stock markets. For example, in 2019, some of the stocks more relevant in the portfolios of the SR mutual funds in our sample are issued by huge multinational corporations such as Microsoft, Axa, Amazon, Apple, Alibaba, Amadeus, or Samsung (all of these with an average fund weight higher than 3% in the sample portfolios).

The rest of the paper is structured as follows. The second section includes a literature review and establishes the research hypotheses. The third section presents the data used and explains the construction of the proxies. The fourth section reports the main empirical findings of the research. The fifth section addresses the robustness tests and, finally, the sixth section ends the article with the main conclusions.

2. Literature review and research hypotheses

Product differentiation means that companies can "reduce competition, and can charge higher prices and generate above-normal profits" (Nachum and Wymbs, 2005, p. 417). Moreover, this strategy can help to create customer loyalty (Boehe and Cruz, 2010) and make the attraction of new clients easier (Levitt, 1980; Kracklauer et al., 2004). Product differentiation in the mutual fund industry has mostly been analysed in previous literature in relation to conventional mutual funds.

In this regard, Massa (2000) investigates why there are so many funds in the market. This author points out that the answer depends on market segmentation strategies, performed by mutual fund companies to exploit the heterogeneity of mutual fund investors. Thus, market forces may lead to the existence of an excessive number of mutual funds and categories. In a subsequent study, Massa (2003) finds that to the extent that mutual fund families are able to differentiate their products in terms of non-performance-related characteristics, they do not need to compete in terms of financial performance. In addition, this author observes that product differentiation has a negative impact on financial performance and a positive effect in the number of funds created. Wahal and Wang (2011) use the overlap in the portfolio holdings as a proxy for the mutual funds' differentiation degree. These authors analyse the impact of new funds entering the market on the existing funds and observe that less differentiated existing funds engage in price competition. Khorana and Servaes (2012) analyse the US market in the period 1976–2009 and obtain empirical evidence supporting the idea that both price competition and product differentiation allow mutual fund advisors to increase their market share. In et al. (2014) also use the overlap in the portfolio holdings to determine the degree of competence suffered by existing funds when new funds appear. Specifically, they focus on how the entrance of new funds, both SR and conventional ones, affect the financial performance of existing SR funds. They observe that conventional and SR mutual funds do not compete in the same mutual fund market and that the competition for money flows in the mutual fund industry is segregated. Additionally, these authors conclude that, despite the important growth experienced by the SR mutual fund industry in recent years, it does not exhibit the features of a competitive market, since the entrance of new competitors does not negatively affect financial performance. This is a unique study dealing with competition in the SR mutual fund market, as far as we know. However, we address this analysis from another perspective: we focus on product differentiation through a text prospectus-based analysis.

More recently, Kostovetsky and Warner (2019) develop a text-based product differentiation measure, built from the information provided by funds' advisors in the "Principal Investment Section" of funds' prospectuses. This indicator presents several advantages, as we have explained in the previous section. These authors analyse product differentiation in the US mutual fund market in the period 1975–2016 and demonstrate the superiority of the text-based indicator for better capturing the product differentiation, since it is easier for investors to obtain fund information from fund prospectuses than from fund characteristics. In addition, they show that smaller families offer more differentiated funds because they are not able to compete on economies of scale or brand recognition with larger families and funds in the first years of life are more "unique" because, afterwards, other entrants can copy the more successful existing funds. Other relevant findings are that mutual fund companies offering more "unique" funds are able to not only attract more money flows, but also collect more rent.

The aforementioned empirical evidence leads us to pose the following research hypothesis:

RH1: SR funds that are in their first years of life and belong to smaller families are more differentiated.

On the other hand, SR fund investors, unlike conventional ones, present a multi-attribute utility function depending on financial factors (return and risk) and non-financial ones (ESG issues) (Bollen, 2007). The non-financial concerns of SR investors are diverse. Some of them are mainly interested in capturing their religious principles through managers' decisions (Ferruz et al., 2012). However, others are especially worried about the environmental impact of their investments (Muñoz et al., 2014). In et al. (2014) point out that, given a set of non-financial attributes relevant for a particular investor, he or she will select those SR funds greatly linked to these values or issues. Rield and Smeets (2017) find that both social preference (the degree of investor awareness on non-financial issues, such as environmental or social matters) and social signalling (spurring investors' social image or reputation by investing in ethical funds) are the most relevant factors for explaining their investment decisions. In this way, it is reasonable to expect that a key factor for SR fund investors in the fund selection process would be how well a fund reflects their ethical values. The fund prospectus constitutes the basic source of information about fund values for showing investors whether the non-fiduciary fund factors are in line with their non-financial concerns. Additionally, the skill of providing useful SR information in the prospectus may be a key indicator of the

innovation and product differentiation levels of a SR fund.

Thus, SR mutual funds differentiate themselves from other SR funds mainly through the type and total number of screens implemented when selecting investments (In et al., 2014). Management companies can adopt different strategies to incorporate the non-financial issues in their management decisions covering different ESG themes[3] . The two traditional approaches are negative, or exclusionary screens, and positive, or inclusionary screens. Negative screens consist of excluding certain sectors from the eligible stock universe (e.g., tobacco, alcohol, gambling, weapons, etc.). Conversely, positive screens select stocks from companies with good records on ESG issues (e.g., companies that have reduced their CO_2 emissions or those committed to policies of equality between men and women). Other practices for incorporating non-financial issues are engagement and impact investing. Engagement, also known as shareholder activism, is defined as a relational process between investors and companies (McNulty and Nordberg, 2016), in which investors seek for investee companies to improve their ESG performance. On the other hand, the aim of impact investing is to positively impact society on topics related to ESG issues. Another relevant label in the SR mutual fund industry identifies investments committed to the environment. Although the aforementioned SR strategies could also tackle environmental issues, the specialized segment in green investments is marketed under the labels "green" or "environmental friendly" (Muñoz et al., 2014).

The above reasoning leads us to pose the next research hypothesis:

RH2: SR fund investors are more sensitive to differentiation regarding other SR funds implementing the same SR strategies than regarding other SR funds performing the same financial style.

In the past, when SR mutual funds represented a small niche of the market, investors rarely found alternatives matching their specific non-financial concerns. However, due to the important growth experienced by this type of fund in recent years, SR fund investors with a particular non-financial concern can now choose among more options. In addition, the different strategies followed by SR fund managers to include ESG issues in the investment process are not exclusionary. In fact, many SR funds implement multiple screens (see Appendix 2), both positive and negative, covering a broad range of non-financial matters. They combine the screening process with engagement practices and/or impact investing. As In et al. (2014) point out (p. 162), "With relatively fixed number of screens available and a tendency for SR funds to employ multiple screens, it is likely that an increase in the number of new SR entrants will increase competition among SR funds due to greater overlap in target investors, values and issues, and screened investments". In this context of rising competence, the product differentiation regarding other SR funds covering the same ESG attributes emerges as a very useful tool for management companies to attract money flows and establish higher prices. Thus, we propose the following research hypotheses.

RH3: A higher degree of differentiation allows SR funds to charge higher fees, reflected in higher net expense ratios.

RH4: A higher degree of differentiation allows SR funds to attract greater money flows.

3. Data and methods

To test the research hypotheses, we study a sample of actively managed SR mutual funds mainly investing in both domestic and global equity assets, which are domiciled in the US market during the period January 1999–October 2019. The sample analysed is free of survivorship bias because we also consider the funds disappearing before October 2019. The source of all information used in this research is the Morningstar database. To define the sample, we start selecting all funds with "YES" under the label Socially Conscious[4], that are domiciled in the US market, non-index and investing in equities. Thus, we obtain 2695 different share classes. For each share class, we collect information on monthly returns, monthly total net assets (TNA), inception date, net expense ratio, turnover ratio, advisor name, Morningstar category (which clusters funds according to their financial investment style; see Appendix 1), SR investment strategy indicators (representing different screens and SR strategies; see Appendix 2) and the "principal investment strategies" (PIS) section of their prospectuses. We focus on product differentiation and use (at a first stage) as proxy a measure based on the PIS section of the funds' prospectus, which is common for all share classes belonging to the same fund. Consequently, we work at the mutual fund level and aggregate all share classes of each fund following the method proposed by Renneboog et al. (2011). After this process, we obtain 559 different SR mutual funds, belonging to 162 different fund families.

To measure the differentiation degree of the SR funds in our sample, we use the approach, recently developed by Kostovetsky and Warner (2019), based on the textual analysis of mutual funds' prospectuses[5] . First, we obtain from Morningstar the PIS section included in the prospectus of each fund. We then format the text by eliminating all characters other than the 26 English letters (including numbers), replacing capital letters with lower case letters and deleting common suffixes such as -s, -ed, -ly and -ing (Kostovetsky and Warner, 2019, p. 8). We remove branding names, repeated words and, to deal with the noise of common nonfinancial words (such as "the", "is", or "and"), we also remove the words known as "stop words", that is, words that do not add information content to the question at hand; in our case, these words are unlikely to be relevant for describing fund strategy[6] . After this process,

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[3] Appendix 3 shows some examples of the different SR strategies in the prospectuses of SR funds included in our sample.

[4] According to Morningstar, this label "is allocated to funds that invest according to non-economic guidelines. Such funds may make investments based on such issues as environmental responsibility, human rights, or religious views. A socially conscious fund may take a pro-active stance by selectively investing in, for example, environmentally-friendly companies, or firms with good employee relations. This group also includes funds that avoid investing in companies involved in promoting alcohol, tobacco, or gambling, or in the defense industry".

[5] As noted before, in a second stage, and as robustness tests, we also apply two other approaches based on returns and holdings to measure uniqueness.

[6] The generic stop word data are taken from the website: https://sraf.nd.edu/textual-analysis/resources/#StopWords

Fig. 1. Word cloud of most frequently used words. This figure is a word cloud that reports the words appearing more than 100 times in the prospectuses of the SR funds in our sample. The word size represents the word frequency.

Fig. 2. Word cloud of most frequently used words related to ESG topics. This figure is a word cloud that reports the "ethical" words appearing multiple times in the prospectuses of the SR funds analysed. The word size represents the word frequency. For example, "social" is the most frequent word, appearing 93 times.

1334 different words remain in the sample analysed. Fig. 1 plots the most frequent words in the prospectuses analysed, and Fig. 2 represents the most frequent words related to ESG issues.

Subsequently, we compute, for each fund-month observation[7], the overlap in words between all funds in the same Morningstar category (in our sample, SR mutual funds belong to 26 different Morningstar categories, see Appendix 1). For instance, if fund 1 presents 30 different words in its PIS after the adjustments, and fund 2, included in the same Morningstar category for the same month, contains 15 of those words in its PIS, the pairwise overlap of the first fund with the second one would be 0.5. In an extreme case, whether all words (none of them) in the PIS of fund 1 appear (do not appear) in the PIS of fund 2, the text overlap would present a value of 1 (0). Following Kostovetsky and Warner (2019), we then average the pairwise overlap measure across all funds in the same Morningstar category-month to compute the *Text average overlap Morningstar style* variable for each fund and month.

As we focus on SR funds, we expect that investors compare SR funds implementing the same screening process or ESG strategies to make investment decisions. That is, if an investor is worried about religious issues, it is likely that his/her SR fund eligible universe would be formed by all SR funds implementing screens consistent with his/her moral values, and the comparison with other SR funds

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[7] Differently to Kostovetsky and Warner (2019), who computed it on a yearly basis.

Table 1

Summary statistics of the *Text average overlap SR strategies* and *Text average overlap Morningstar styles* variables.

	Mean	SD	p10	p50	p90
	Panel A: Text average overlap SR strategies				
Overlap all sample	0.396	0.08	0.295	0.396	0.500
Overlap SR strategies of funds < 3 years	0.390	0.077	0.292	0.386	0.498
Overlap SR strategies of funds > 3 years	0.398	0.08	0.295	0.399	0.502
Overlap SR strategies in Small Families	0.376	0.08	0.275	0.367	0.490
Overlap SR strategies in Large Families	0.415	0.075	0.320	0.412	0.523
	Panel B: Text average overlap Morningstar financial styles				
Overlap all sample	0.421	0.09	0.295	0.421	0.539
Overlap Morningstar styles of funds < 3 years	0.412	0.09	0.295	0.407	0.527
Overlap Morningstar styles of funds > 3 years	0.423	0.09	0.295	0.424	0.541
Overlap Morningstar styles in Small Families	0.392	0.09	0.277	0.389	0.513
Overlap Morningstar styles in Large Families	0.449	0.082	0.345	0.446	0.556

This table reports summary statistics for the *Text average overlap SR strategies* (panel A) and Text average overlap Morningstar financial styles (panel B) indicators. It is reported the mean, the standard deviation, the 10th percentile, the median and the 90th percentile, for the full sample of SR funds and the following subsamples: SR funds younger than three years, SR funds older than three years, SR funds belonging to small families and SR funds belonging to large families.

belonging to a specific Morningstar category would be of little interest. Thus, we repeat this procedure to compute, for each fund-month observation, the word overlap between all funds implementing the same SR strategy (see Appendix 2). However, unlike the financial investment style, SR funds can implement several SR screens or strategies at the same time, appearing in several comparison subsets. Thus, first, we average the pairwise overlap measure across all funds applying the same SR strategy for each fund and month and, subsequently, we compute the average of this measure for all SR strategies implemented by a fund, obtaining the *Text average overlap SR strategies* variable for each fund and month.

Table 1 presents some summary statistics for both the *Text average overlap SR strategies* and the *Text average overlap Morningstar styles* variables for the full sample and some relevant subsamples.

We should clarify that 456 out of 559 funds in our sample implement at least one SR strategy, for which Morningstar provides information.[8] Panel A of Table 1 shows that, on average, a SR fund shares 39.6 % of words with the other funds implementing the same SR strategy/ies. These figures are 29.5 % and 50 % at the 10th and 90th percentiles, respectively. Kostovetsky and Warner (2019) explain that product innovation is more likely for small families and new funds. Thus, we provide information separately for funds belonging to small and large families[9] and funds in their first years of life (younger than three years) and older funds (above three years). According to the summary statistics, younger funds and funds belonging to smaller families show slightly lower text average overlaps than the average sample and the rest of the subsamples. In the case of *Text average overlap Morningstar styles,* we compute the indicator for 547 out of 559 funds in the initial sample.[10] Panel B shows that SR funds share more words in the PIS section with other funds in the same Morningstar category (42.1 %) than with other SR funds applying the same SR strategies (39.6 % in panel A). In general, the results for the different subsamples are similar to those shown for the *Text average overlap SR strategies.*[11]

Once we have computed the text overlap indicators, following the procedure designed by Kostovetsky and Warner (2019), we build the proxies of product differentiation to measure the uniqueness of SR funds. First, we reverse the *Text average overlap Morningstar styles (SR strategies)* by multiplying it by negative one, since overlap measures provide information on similarity between funds. Second, we standardize it to obtain a zero mean and a standard deviation of one. Finally, we regress the outcome on the number of words in the PIS (and on the number of implemented SR strategies in the case of the *Text average overlap SR strategies)* and take the residuals of this regression as the proxy for text uniqueness. Thus, we obtain the variables *Text uniqueness Morningstar styles* (i.e., financial styles) and *Text uniqueness SR strategies*.

The aims of this paper are to study the product differentiation drivers and the impact of differentiation on prices and client attraction. To this purpose, we build the following additional variables: first, we approach fund size with the log of the fund's monthly total net assets (expressed in $ million). The family of the fund is determined according to the advisor's name, and we compute the size of the family as the sum of the monthly total net assets of all SR funds managed by the same advisor (expressed in $ millions). Then, we take the log of the monthly total net assets of each family. The net expense ratio and the turnover ratio are directly collected from Morningstar[12] . The fund age is computed as the log of years since the inception date of the fund's oldest share class. Finally, the relative monthly flows are computed according to this expression:

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[8] The remaining funds have been labelled by Morningstar as Socially Conscious, but they do not implement any SR strategy for which we have information.

[9] Small (large) families are those whose managed total net assets are below (above) the median in the sample analysed.

[10] The remaining funds belong to Morningstar categories formed of only one fund all through the sample period considered.

[11] Tables in appendices 1 and 2 provide summary statistics of the text average overlap indicators for different SR strategies and Morningstar financial style categories.

[12] This information is only available in a yearly basis; however, other variables in our sample are obtained on a monthly basis. We make the assumption that the value of these magnitudes is the same for all months at year t.

Table 2
Summary statistics for the SR mutual fund characteristics.

	Mean	SD	p10	p50	p90
Text Uniqueness SR strategies	0	1	−1.127	−0.094	1.354
Text Uniqueness Morningstar styles	0	1	−1.238	0.0012	1.245
Family Size ($ Million)	22674.26	38197.31	132.35	6932.38	76744.25
Log Family Size	8.297	2.436	4.885	8.844	11.248
Fund Size ($ Million)	1441.999	5091.2	13.64	255.93	3080.83
Log Fund Size	5.409	2.132	2.613	5.545	8.033
Fund Age (years)	11.35	11.6	1.67	8.98	21.51
Log Fund age	1.96	1.16	0.51	2.19	3.07
Expense ratio (%)	1.533	1.226	0.62	1.259	2.541
Log Expense ratio	0.22	0.646	−0.478	0.231	0.934
Turnover ratio (%)	67.02	70.41	14	49	132
Net Monthly Flows (%)	0.908	6.007	−2.591	−0.043	5.206
Monthly Fund Returns (%)	0.649	4.896	−5.401	0.953	6.11

This table reports summary statistics on various mutual fund characteristics for the sample analysed. Specifically, it provides information for the *Text uniqueness SR strategies*, *Text uniqueness Morningstar styles*, family size (expressed in $ million), log of family size, fund size (expressed in $ million), log of fund size, fund age (expressed in years), log of fund age, net expense ratio (expressed in %), log of the net expense ratio, turnover ratio (expressed in %), net money flows (expressed in %), and the net monthly return (expressed in %). For each variable, it is provided the mean, standard deviation, the 10th percentile, the median, and the 90th percentile.

$$Flows_{i,t} = \frac{\left[TNA_{i,t} - TNA_{i,t-1} \times \left(1 + r_{i,t} \right) \right]}{TNA_{i,t-1}} \tag{1}$$

Where $TNA_{i,t}$ is the total net assets of fund i at the end of month t, $TNA_{i,t-1}$ is the total net assets of fund i at the end of month t-1 and $r_{i,t}$ is the net monthly return of fund i at month t. Following Kostovetsky and Warner (2019), we winsorized the relative monthly flows at 1% and 99 % levels.

Table 2 reports some summary statistics of these variables for the full sample analysed. The average family size is $22,674.26 million, while the average fund size reaches the figure of $1442 million. The average age is more than 11 years. The average net expense (turnover) ratio is 1.53 % (67.02 %). Finally, the average monthly flow is 0.91 % and the average monthly net return 0.65 %.

4. Empirical findings

4.1. Determinants of product differentiation

In this section we analyse the determinants of product differentiation in the SR mutual fund industry. We aim to determine the characteristics of the most differentiated SR funds, as well as the SR strategies and the financial styles implemented by them. We regress the text uniqueness indicators on some relevant mutual fund characteristics in a multivariate approach (Eq. 2). We include the size, age, and turnover ratio of the fund, and the family size. In addition, we include dummy variables for the SR strategies implemented or the Morningstar categories, depending on the text uniqueness measure analysed (*Text uniqueness SR strategies* or *Text uniqueness Morningstar styles*) as well as time controls.

$$Text\_Uniqueness\_indicator_{i,t} = \alpha_i + \sum_{i=1}^{4} \beta_i Mutual\ Fund\ Characteristics_{i,t} + \sum SR\ strategy\ or\ Morningstar\ category\ Dummy\ variables$$
$$+ \sum Time\ controls + e_{i,t}$$

$$(2)$$

Table 3 shows the results for the five different models built from Eq. 2, in which the dependent variable is the *Text uniqueness SR strategies*.

Model 1 of Table 3 presents the results considering only the mutual fund characteristics as independent variables. We observe that the family size and the fund age (the fund size and the turnover ratio) significantly negatively (positively) affect the differentiation of SR funds regarding other SR funds implementing the same SR strategies. These results show that larger and more actively managed SR funds are more differentiated. In addition, the family size and fund age results are consistent with the RH1 and the empirical evidence obtained by Kostovetsky and Warner (2019) for conventional funds. These authors, as noted before, find that smaller families offer more "unique" mutual funds because they are not able to compete on economies of scale or brand recognition. They also concluded that funds are more differentiated in the first years of life because, afterwards, other entrants can copy the more successful existing funds.

Model 2 adds five dummy variables representing the different SR strategies. The implementation of positive screens, negative screens, impact investing or environmental issues positively relates with the differentiation of SR funds. Engagement is the only strategy with a significantly negative coefficient, indicating that SR funds involved in shareholder activism or engagement are less differentiated than the other SR funds.

In model 3, we modify model 2 by disaggregating the impact investing dummy into five other dummies representing the following

Table 3
Text uniqueness SR strategy determinants.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family Size	−0.071***	−0.048***	−0.044***	−0.047***	−0.033***
	(−36.14)	(−21.78)	(−20.31)	(−21.11)	(−15.65)
Fund Size	0.088***	0.090***	0.089***	0.090***	0.046***
	(32.33)	(33.3)	(33.61)	(33.35)	(17.57)
Fund Age	−0.039***	−0.048***	−0.044***	−0.048***	−0.001
	(−8.37)	(−10.55)	(−10.05)	(−10.57)	(−0.18)
Turnover ratio	0.095***	0.058***	0.066***	0.056***	0.028***
	(12.1)	(7.99)	(9.41)	(7.78)	(4.04)
D(ummy)_Incorporation_SR_strategy		0.186***	0.132***	0.184***	0.195***
		(11.65)	(7.82)	(11.55)	(8.45)
D_Engagement_SR_strategy		−0.561***	−0.426***	−0.565***	−0.382***
		(−39.04)	(−29.87)	(−39.31)	(−28.71)
D_Impact_Investing_SR_strategy		0.365***		0.381***	0.846***
		(18.26)		(18.91)	(33.88)
D_Environmental_Sector_SR_strategy		0.802***	0.802***		0.701***
		(26.53)	(26.09)		(18.14)
D_Negative_Screens_SR_strategy		0.250***	0.214***	0.256***	
		(19.87)	(15.53)	(20.05)	
D_Gender_diversity_SR_strategy			1.490***		
			(27.61)		
D_Low_carbon_fossil_fuel_free_SR_strategy			0.493***		
			(16.43)		
D_Community_develop_SR_strategy			−0.647***		
			(−9.84)		
D_Impact_environmental_SR_strategy			−0.111***		
			(−4.71)		
D_Impact_other_themes_SR_strategy			−1.436***		
			(−15.62)		
D_Renewable_energy_SR_strategy				0.801***	
				(25.58)	
D_Water_focused_SR_strategy				0.886***	
				(12.36)	
D_General_environmental_sector_SR_strategy				−0.057**	
				(−2.46)	
D_Norms_based_SR_strategy					−0.303***
					(−5.65)
D_Abortion_stem_cells_SR_strategy					−0.233***
					(−10.26)
D_Adult_entertainment_SR_strategy					−0.581***
					(−18.9)
D_Alcohol_SR_strategy					0.599***
					(14.74)
D_Animal_testing_SR_strategy					−2.722***
					(−34.55)
D_Controversial_weapons_SR_strategy					0.305***
					(8.63)
D_Gambling_SR_strategy					−0.648***
					(−13.29)
D_GMOs_SR_strategy					−0.108**
					(−2.06)
D_Military_contacting_SR_strategy					−0.045*
					(−1.82)
D_Nuclear_SR_strategy					−0.204***
					(−5.14)
D_Pesticides_SR_strategy					1.043***
					(16.78)
D_Small_arms_SR_strategy					−0.196***
					(−5.92)
D_Thermal_coal_SR_strategy					−0.223***
					(−6.91)
D_Tobacco_SR_strategy					0.851***
					(30.25)
D_Neg_others_SR_strategy					−0.152***
					(−6.9)
Intercept	0.098***	−0.243***	−0.213***	−0.249***	−0.192***
	(2.64)	(−6.29)	(−5.47)	(−6.4)	(−5.04)
Time Controls	YES	YES	YES	YES	YES
Obs.	50,307	50,307	50,307	50,307	50,307

Table 3 (*continued*)

	Model 1	Model 2	Model 3	Model 4	Model 5
VIF	3.19	2.89	3.23	2.85	4.24
F-test	83.46 (0)	167.34 (0)	181.15 (0)	244.71 (0)	444.49 (0)
R-squared	0.03	0.09	0.12	0.09	0.24

This table reports the pooled OLS regressions (using monthly data) of different models built from Eq. 2. The dependent variable is the *Text uniqueness SR strategies* variable. Model 1 only includes mutual fund characteristics and time controls. Family size is the log of the total net assets (expressed in $ million) managed by the family of fund i at month t; fund size is the log of the total net assets (expressed in $ million) managed by fund i at month t; the fund age is the log of the years since the inception date of the oldest share class fund i at month t; the turnover ratio of the fund is also considered. Model 2 adds dummy variables to model 1 representing SR strategies. Models 3/4/5 disaggregate impact investing/environmental sector/negative screens into different subcategories. For all models, the estimated coefficients, the t-ratios computed with robust standard errors, the number of observations, the variance inflation factor testing potential multicollinearity problems, the F-test and its p-value, testing reliability of independent variables, and the R-squared are reported.
*** Significant at 1%; **significant at 5%; * significant at 10 %.

topics: gender diversity, low-carbon/fossil fuel-free, community development, impact environmental and other impact themes. The results achieved indicate that gender diversity and low carbon/fossil fuel-free themes are the drivers of the differentiator effect of impact investing strategy.

In model 4, we modify model 2 by replacing the more generic "environmental sector" strategy with three sub-strategies: renewable energy, water-focused and the general environment. The results show that SR funds focused on renewable energies or water are more differentiated (the coefficients are positive and significant), so these two strategies are the drivers of the differentiator effect of the environmental sector strategy.

Finally, in model 5 we substitute negative screens with 15 dummies representing specific topics or industries excluded: norms-based, abortion stem cells, adult entertainment, alcohol, animal testing, controversial weapons, gambling, GMOs (genetically modified organisms), military contracting, nuclear, pesticides, small arms, thermal coal, tobacco and others. Our findings led us to conclude that SR funds avoiding investments into alcohol, tobacco, controversial weapons, and pesticides sectors are more differentiated than the others.

Table 4 reports the results for the different models built from Eq. 2, but now the dependent variable is the text uniqueness Morningstar financial styles[13] .

Model 1 of Table 4 presents the results considering mutual fund characteristics as explanatory variables. We conclude that fund size, fund age, and turnover ratio (family size) significantly positively (negatively) affect SR fund differentiation regarding other SR funds in the same Morningstar category; that is, implementing the same financial style. These results are similar to those shown on Table 3, except for fund age, which turns positive and significant, indicating that differentiation regarding other funds in the same financial style category is sustained over time. This finding could indicate that some features of a non-competitive market remain in the SR mutual fund industry despite its huge growth.

Model 2 adds nine dummy variables to model 1, representing all domestic equity financial styles. The results indicate that large cap funds are more differentiated than the others (the estimated dummy coefficients on large cap categories are significantly positive and the other categories display negative and significant coefficients). This finding suggests that SR funds belonging to Morningstar domestic categories with more observations (see Appendix 1) are more differentiated compared to SR funds belonging to categories with lower observations. This empirical evidence could indicate that a higher competence in the category analysed requires more product differentiation strategies, in an attempt to catch a greater benefit.

Model 3 adds seven dummy variables to model 1, representing all financial styles related to international or global equity. The results obtained indicate that SR funds belonging to the US fund foreign large growth, the US fund foreign large value, the US fund world large stock, and the US fund world small/mid stock categories are more differentiated than SR funds in the other international and global categories. Model 4 adds four dummy variables to model 1, representing Morningstar categories focused on specific geographical markets. In general, these SR funds show low differentiation. Only SR funds investing in Europe are positively related to the differentiation proxy. Finally, model 5 adds six dummy variables to model 1, representing financial style categories focused on specific sectors. The only positive and significant coefficient is the dummy for SR funds investing in technology. The remaining estimated coefficients are negative and significant.

Overall, the coefficients on dummies representing investment styles focused on specific markets or sectors are negative and significant, suggesting that SR funds belonging to uncommon categories do not need to differentiate themselves from their peers since it is likely that the level of competence in such markets/sectors is low.

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[13] Although the number of funds with text average overlap Morningstar styles is greater than the number of funds with text average overlap SR (given the available information), the number of observations is lower in the former because the existence of competitors in the comparison subset also determines the number of observations. When a specific fund exists in a Morningstar category in a specific month, but this is the only fund in this category, we cannot compute the text average overlap indicator until another fund appears in this category.

Table 4
Text uniqueness Morningstar style determinants.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family Size	−0.116***	−0.081***	−0.118***	−0.112***	−0.107***
	(−58.17)	(−43.88)	(−59.88)	(−59.96)	(−55.79)
Fund Size	0.079***	0.027***	0.088***	0.074***	0.078***
	(29.42)	(11.13)	(32.64)	(27.89)	(30.48)
Fund Age	0.020***	0.029***	0.010**	0.013***	0.008*
	(4.28)	(6.57)	(2.24)	(2.78)	(1.83)
Turnover ratio	0.037***	0.085***	0.048***	0.030***	0.011
	(4.75)	(12.57)	(6.49)	(3.83)	(1.42)
D(ummy)_US fund large cap blend_Morningstar_style		0.786***			
		(75.16)			
D_US fund large cap growth_Morningstar_style		0.273***			
		(26.31)			
D_US fund large cap value_Morningstar_style		0.415***			
		(29.56)			
D_US fund mid cap blend_Morningstar_style		−0.405***			
		(−18.51)			
D_US fund mid cap growth_Morningstar_style		−0.324***			
		(−14.38)			
D_US fund mid cap value_Morningstar_style		−0.097***			
		(−4.07)			
D_US fund small cap blend_Morningstar_style		−0.160***			
		(−8.41)			
D_US fund small cap growth_Morningstar_style		−1.022***			
		(−53.66)			
D_US fund small cap value_Morningstar_style		−0.493***			
		(−21.92)			
D_US fund foreign large blend_Morningstar_style			−0.376***		
			(−33.63)		
D_US fund foreign large growth_Morningstar_style			0.699***		
			(38.23)		
D_US fund foreign large value_Morningstar_style			0.341***		
			(17.36)		
D_US fund foreign small mid growth_Morningstar_style			−0.662***		
			(−25.7)		
D_US fund foreign small mid value_Morningstar_style			−1.074***		
			(−33.85)		
D_US fund world large stock_Morningstar_style			0.331***		
			(20.56)		
D_US fund world small mid stock_Morningstar_style			0.705***		
			(27.79)		
D_US fund China region_Morningstar_style				−1.170***	
				(−107.62)	
D_US fund diversified emerging markets_Morningstar_style				−0.388***	
				(−30.14)	
D_US fund Europe Stock_Morningstar_style				0.223***	
				(2.67)	
D_US fund pacific Asia ex-Japan stock_Morningstar_style				−0.089*	
				(−1.68)	
D_US fund global real estate_Morningstar_style					−1.642***
					(−23.71)
D_US fund health_Morningstar_style					−0.667***
					(−45.16)
D_US fund infrastructure_Morningstar_style					−0.561***
					(−38.31)
D_US fund natural resources_Morningstar_style					−0.170***
					(−3.21)
D_US fund real estate_Morningstar_style					−2.530***
					(−342.95)
D_US fund technology_Morningstar_style					1.486***
					(49.59)
Intercept	0.549***	0.370***	0.468***	0.583***	0.527***
	(15.05)	(10.22)	(12.64)	(16.07)	(14.47)
Time Controls	YES	YES	YES	YES	YES
Obs.	49,761	49,761	49,761	49,761	49,761
VIF	3.35	2.72	2.81	3.01	2.86
F-test	171.35 (0)	626.09 (0)	343.61 (0)	1237.89 (0)	9768.91 (0)
R-squared	0.07	0.25	0.14	0.09	0.15

This table reports the pooled OLS regressions (using monthly data) of different models built from Eq. 2. The dependent variable is the *Text uniqueness Morningstar styles* variable. Model 1 only includes mutual fund characteristics and time controls. Family size is the log of the total net assets (expressed

in $ million) managed by the family of fund i at month t; fund size is the log of the total net assets (expressed in $ million) managed by fund i at month t; the fund age is the log of the years since the inception date of the oldest share class of the fund i at month t; the turnover ratio of the fund is also considered. Models 2/3/4/5 add to model 1 dummy variables representing Morningstar domestic/global/specific other markets/sectorial financial styles. For all models, the estimated coefficients, the t-ratios computed with robust standard errors, the number of observations, the variance inflation factor testing potential multicollinearity problems, the F-test and its p-value testing reliability of independent variables and the R-squared are reported.

*** Significant at 1%; **significant at 5%; * significant at 10 %.

4.2. Impact of product differentiation on prices

In this section we analyse the effect of SR funds' differentiation on prices. In the case of mutual funds, the price is determined by the fees paid by investors, measured by the net expense ratio of the fund. The net expense ratios of SR mutual funds have received little attention in previous literature. However, the research that has compared the fees of SR and conventional mutual funds did not find significant differences. In this regard, Gil-Bazo et al. (2010) analyse the financial performance of SR and conventional mutual funds considering the effect of fees, and conclude that, in general (with some exceptions), conventional and SR funds charge similar fees.

To test RH3, we regress the net expense ratio on the text uniqueness indicator and other mutual fund characteristics, specifically: the family size, the fund size, the fund age, and the turnover ratio. We specify the following panel regression Eq. (3).

$$Net\ Expense\ Ratio_{i,t} = \alpha_i + \sum_{i=1}^{4} \beta_i Mutual\ Fund\ Characteristics_{i,t} + \beta_5 Text\ Uniqueness_{i,t} + \sum Time\ controls + e_{i,t} \quad (3)$$

Table 5 reports the results obtained from the different models estimated from Eq. 3.

Model 1 (2) shows the results from the fixed effect (random effect) panel data regression, in which the net expense ratio is regressed on mutual fund characteristics and the *Text uniqueness SR strategies* variable, considering the entire sample. The fixed effect F-statistic and the Breusch-Pagan tests indicate that fixed effect and random effect models are better than the pooled regression. The results indicate that the net expense ratio is negatively and significant related to the fund size and age, suggesting that larger and older funds charge lower net expense ratios, consistent with the empirical evidence obtained in the conventional mutual fund literature, which shows the existence of economies of scale and economies of learning in mutual fund administration (see, among others, Latzko, 1999; Khorana et al., 2009; Gil-Bazo and Ruiz-Verdú, 2009; or Navone and Nocera, 2016). Regarding the *Text uniqueness SR strategies* variable, the estimated coefficient is positive and significant, indicating that more differentiated SR funds in a SR strategy can charge higher fees. This result is consistent with our RH3. The above findings are obtained for both fixed effect and random effect estimations, although the Hausman test shows that the fixed effect estimation better fits our data sample.

Models 3 and 4 provide the results for the *Text uniqueness Morningstar styles* variable. The results for the family size, fund size, age, and turnover ratio are consistent with the results of models 1 and 2. However, the estimated coefficients on the *Text uniqueness Morningstar styles* variable are now negative and non-significant. Hence, the differentiation regarding other SR funds implementing the same financial style does not allow SR mutual fund advisors to charge higher fees. This result is consistent with our RH2, indicating that SR fund investors are more sensitive to the SR fund strategy than to the financial one. One might conclude that SR fund investors give more importance to the non-financial or ethical value of their investments, so are willing to pay more for investing in such funds that invest specifically in the sectors/activities that they consider in line with their preferences.

In addition, in our sample period, the US SR mutual fund market presents different degrees of competition (lower in the first years and higher in the last decade because new funds entered the market)[14]. Thus, we split the full sample into two subsamples (1999–2009 and 2010–2019) to check when differentiation strategies are more valued by the market. Model 1 is re-estimated for these subsamples (models 5 and 6). The results indicate that the *Text uniqueness SR strategies* variable is only significant in the second period. Therefore, product differentiation permits establishing higher fees as competition rises. Model 3 is re-estimated for the two subsamples (models 7 and 8) and the results indicate that *Text uniqueness Morningstar styles* remains non-significant in both periods. This reinforces the idea that SR fund investors are sensitive to differentiation only to other funds applying the same SR strategy/ies. In et al. (2014) hypothesize and obtain empirical evidence supporting that SR investors mainly choose to invest in SR funds due to ethical reasons. Our results reinforce such evidence, suggesting that SR investors mainly include in their eligible investment universe those funds applying the SR strategy that fits with their personal values.

Additionally, the impact of fund differentiation on the fees charged may vary over SR funds' lives. We then estimate models 1 and 3 in Table 5 for different subsamples of SR funds according to their age. We expect SR funds to be more differentiated in the first years of life and the possibility of charging higher fees for more differentiated products to decline over time, as new funds enter the market and may copy more successful existing SR funds. The results are reported in Table 6.

Models 1, 2, and 3 consider SR funds under three, six and 12 years old, respectively. The results of all models show that the text uniqueness SR strategy coefficients are positive and significant. However, if we focus on the coefficients' magnitude, these are greater for SR funds younger than three years, decreasing as we incorporate older funds into the sample. Thus, the positive effect of product differentiation on prices is sustained over time, although more relevant in the first years of life of SR funds. In other words, the advantages of differentiation for SR fund advisors, although declining over time, are sustained through the SR fund life. This result

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[14] The first (second) subsample contains around 18,000 (31,500) observations.

Table 5

Effect of product differentiation on prices.

	Text Uniqueness SR_strategies		Text Uniqueness Morningstar_styles		Text Uniqueness SR_strategies		Text Uniqueness Morningstar_styles	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: 1999−2009	Model 6 2010−2019	Model 7: 1999−2009	Model 8: 2010−2019
Family Size	−0.111	−0.078	−0.077	−0.052	−0.016	−0.157	0.067	−0.161
	(−1.51)	(−1.3)	(−1.04)	(−0.86)	(−0.14)	(−1.12)	(0.66)	(−1.13)
Fund Size	−0.138***	−0.147***	−0.165***	−0.168***	−0.133	−0.127	−0.216**	−0.128
	(−3.17)	(−3.68)	(−3.8)	(−4.23)	(−1.57)	(−1.63)	(−2.53)	(−1.6)
Fund Age	−0.339***	−0.326***	−0.355***	−0.341***	−0.286***	−0.349***	−0.306***	−0.361***
	(−5.61)	(−5.77)	(−5.84)	(−6.00)	(−2.9)	(−4.17)	(−3.27)	(−4.19)
Turnover ratio	0.064	0.068	0.055	0.058	−0.103	0.017	−0.155	0.017
	(0.91)	(0.98)	(0.73)	(0.78)	(−1.02)	(0.13)	(−1.25)	(0.13)
Text Uniqueness_ SR_strategies	0.562***	0.281**			0.427	0.361*		
	(2.61)	(2.39)			(1.09)	(1.85)		
Text Uniqueness_ Morningstar_styles			−0.083	−0.084			−0.020	0.157
			(−1.3)	(−1.53)			(−0.18)	(1.43)
Intercept	3.349***	2.98***	3.241***	2.877***	2.797***	4.38***	2.682***	4.422***
	(7.09)	(7.94)	(6.84)	(7.71)	(4.38)	(4.11)	(4.48)	(4.15)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	17.16 (0)		15.58 (0)		18.94 (0)	14.08 (0)	17.57 (0)	13.73 (0)
Model Wald χ^2-test		410.07 (0)		373.54 (0)				
Fixed Effects F-test	42.85 (0)		43.48 (0)		48.45 (0)	35.85 (0)	50.99 (0)	36.54 (0)
Breusch-Pagan Test		207.78 (0)		207.78 (0)				
Hausman test	233.22 (0)		107.55 (0)					
R2-Overall	0.08	0.13	0.16	0.16	0.12	0.08	0.16	0.1
Obs.	50,307	50,307	49,761	49,761	18,346	31,961	18,224	31,537

This table reports the fixed effect (models 1 and 3) and random effect (models 2 and 4) results of the net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, *Text uniqueness SR strategies* (models 1 and 2) and *Text uniqueness Morningstar styles* (models 3 and 4) for all SR funds analysed. The table shows for all models: the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test, and its p-value (Wald $\chi2$-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value), which tests whether the fixed effect (random effect) models are preferred to pooled OLS regression, Hausman test and its p-value (which tests what estimation, i.e., fixed effect or random effect better fits our sample), the overall R-squared and the number of observations. Model 5/6 (7/8) reports the results of the model 1 (3) estimated in the period 1999–2009/2010–2019.

*** Significant at 1%; ** significant at 5%; *significant at 10 %.

Table 6

Effect of product differentiation on prices through SR funds' life.

	Text Uniqueness SR_strategies			Text Uniqueness Morningstar_styles		
	Model 1: Funds younger than 3 years	Model 2: Funds younger than 6 years	Model 3: Funds younger than 12 years	Model 4: Funds younger than 3 years	Model 5: Funds younger than 6 years	Model 6: Funds younger than 12 years
Family Size	0.335	0.005	−0.130	0.356	0.023	−0.086
	(1.28)	(0.03)	(−1.18)	(1.44)	(0.13)	(− 0.78)
Fund Size	−0.705***	−0.332**	−0.139**	−0.739***	−0.380***	−0.186***
	(−4.14)	(−2.46)	(−2.01)	(−4.44)	(−2.83)	(−2.69)
Fund Age	0.044	−0.199***	−0.315***	0.016	−0.224***	−0.328***
	(0.69)	(−2.77)	(−4.38)	(0.26)	(−3.11)	(−4.56)
Turnover ratio	−0.698***	−0.327*	0.017	−0.868***	−0.372**	0.008
	(2.25)	(−1.85)	(0.22)	(−2.77)	(−2.08)	(0.1)
Text uniqueness_SR_strategies	2.495**	1.354*	0.738*			
	(2.22)	(1.69)	(1.91)			
Text uniqueness Morningstar_styles				−0.089	−0.218	−0.030
				(−0.27)	(−1.16)	(−0.27)
Intercept	5.823***	3.944***	3.331***	6.071***	3.859***	3.261***
	(2.86)	(3.41)	(5.18)	(3.07)	(3.55)	(5.32)
Time Control	YES	YES	YES	YES	YES	YES
Model F-test	31.55 (0)	25.76 (0)	31.05 (0)	30.87 (0)	25.96 (0)	31.23 (0)
Fixed Effects F-test	8.65 (0)	8.33 (0)	12.06 (0)	8.41 (0)	7.91 (0)	10.68 (0)
R2-Overall	0.01	0.02	0.05	0.05	0.1	0.13
Obs.	8776	17,873	32,177	8931	18,145	32,472

This table reports the fixed effect results of net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, *Text uniqueness SR strategies* (models 1, 2 and 3) and *Text uniqueness Morningstar styles* (models 4, 5 and 6) for SR funds younger than three years (models 1 and 4), younger than six years (models 2 and 5) and younger than 12 years (models 3 and 6). For each model we report the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (testing the reliability of independent variables), the fixed effect F-test and its p-value (testing that the fixed effect model is preferred to pooled OLS regression), the overall R-squared, and the number of observations. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

Table 7

Effect of product differentiation on money flows.

	Text Uniqueness SR strategies		Text Uniqueness Morningstar styles		Text Uniqueness SR strategies		Text Uniqueness Morningstar styles	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: 1999−2009	Model 6: 2010−2019	Model 7: 1999−2009	Model 8: 2010−2019
Lagged Return	0.044***	0.045***	0.042***	0.042***	0.067***	0.024***	0.062***	0.023***
	(7.06)	(7.18)	(7.19)	(7.27)	(7.33)	(3.42)	(7.51)	(3.26)
Family Size	−0.239*	−0.130**	−0.267***	−0.140**	−0.259	−0.277	−0.239	−0.312*
	(−1.95)	(−2.17)	(−2.15)	(−2.3)	(−1.3)	(−1.49)	(−1.15)	(−1.67)
Fund Size	0.483***	0.411***	0.494***	0.417***	0.373**	0.689***	0.382*	0.702***
	(5.43)	(6.12)	(5.39)	(6.08)	(2.08)	(5.9)	(1.93)	(6.03)
Fund Age	−0.831***	−0.828***	−0.784***	−0.792***	−0.828***	−1.009***	−0.785***	−1.002***
	(−7.29)	(−9.08)	(−6.96)	(−8.67)	(−4.6)	(−6.14)	(−4.37)	(−5.95)
Expense ratio	5.291***	5.086***	5.320***	5.082***	5.144***	5.265***	5.086***	5.314***
	(24.42)	(24.97)	(23.9)	(24.38)	(15.14)	(20.51)	(13.94)	(20.36)
Turnover ratio	0.097	0.047	0.110	0.057	0.015	0.099	0.043	0.111
	(0.93)	(0.48)	(1.05)	(0.57)	(0.1)	(0.69)	(0.27)	(0.74)
Text Uniqueness SR_strategies	0.524	0.262**			0.453	0.881**		
	(1.58)	(2.48)			(0.84)	(2.01)		
Text Uniqueness Morningstar_styles			0.077	0.158			0.013	0.243
			(0.42)	(1.35)			(0.04)	(1.21)
Intercept	0.706	1.384***	0.952	0.499	1.545	−0.784	1.441	−0.580
	(0.79)	(2.6)	(1.08)	(0.74)	(1.11)	(−0.58)	(1.06)	(−0.43)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	46.77 (0)		44.82 (0)		34.66 (0)	42.9 (0)	29.36 (0)	41.1 (0)
Model Wald χ^2-test		1208.98 (0)		1158.78 (0)				
Fixed Effects F-test	15.72 (0)		16 (0)		10.39 (0)	12.6 (0)	10.76 (0)	12.61 (0)
Breusch-Pagan Test		24808.01 (0)		24673.34 (0)				
Hausman test	3978.83 (0)		214.13 (0)					
R2-Overall	0.18	0.18	0.18	0.18	0.18	0.17	0.18	0.18
Obs.	50,035	50,035	49,500	49,500	18,113	31,922	18,002	31,498

This table reports the fixed effect (models 1 and 3) and random effect (models 2 and 4) results of relative monthly money flows (expressed in %) on lagged monthly return (expressed in %), the family size, the fund size, the fund age, the turnover ratio, the log expense ratio and the *Text uniqueness SR strategies* (models 1 and 2) and the *Text uniqueness Morningstar styles* (models 3 and 4) for all SR funds analysed in our sample. For each model the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (Wald χ2-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value) testing that the fixed effect (random effect) models are preferred to pooled OLS regression, the Hausman test and its p-value testing what estimation fits better our sample, the overall R-squared, and the number of observations are reported. Model 5/6 (7/8) reports the results of the model 1 (3) estimated for the period 1999–2009/2010–2019. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

Table 8

Effect of product differentiation on money flows through SR funds' life (*Text uniqueness SR strategies*).

	SR fund younger than 3 years		SR funds younger than 6 years		SR funds younger than 12 years		Full sample of SR funds	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Lagged Return	0.063***	0.064***	0.072***	0.073***	0.060***	0.061***	0.044***	0.044***
	(4.17)	(4.21)	(6)	(6.15)	(7.22)	(7.32)	(7.06)	(7.11)
Family Size	−0.678	−0.677	−0.633**	−0.634**	−0.315**	−0.314**	−0.239*	−0.239*
	(−1.58)	(−1.58)	(−2.58)	(−2.59)	(−2.09)	(−2.09)	(−1.95)	(−1.95)
Fund Size	0.712**	0.711**	0.436**	0.437**	0.431***	0.431***	0.483***	0.483***
	(2.13)	(2.12)	(2.02)	(2.02)	(4.67)	(4.67)	(5.43)	(5.43)
Fund Age	−0.803***	−0.803***	−0.689***	−0.691***	−0.627***	−0.628***	−0.831***	−0.832***
	(−3.92)	(−3.92)	(−4.22)	(−4.24)	(−4.88)	(−4.88)	(−7.29)	(−7.29)
Expense ratio	4.828***	4.829***	5.414***	5.412***	5.544***	5.543***	5.291***	5.291***
	(12.97)	(12.98)	(18.4)	(18.39)	(25.03)	(25.02)	(24.42)	(24.42)
Turnover ratio	−0.601	−0.611	−0.042	−0.042	−0.003	−0.002	0.097	0.097
	(−1.36)	(−1.38)	(−0.21)	(−0.21)	(−0.02)	(−0.02)	(0.93)	(0.93)
Text Uniqueness SR_strategies	3.709**	3.706**	1.609*	1.636*	1.081**	1.086**	0.524	0.525
	(2.13)	(2.14)	(1.8)	(1.84)	(2.4)	(2.41)	(1.58)	(1.59)
Text Uniqueness SR_strategies * Lagged Return		−0.023*		−0.022**		−0.012		−0.005
		(−1.8)		(−2.02)		(−1.55)		(−0.96)
Intercept	3.169	3.225	4.594***	4.595***	2.027*	2.024*	0.706	1.578***
	(0.87)	(0.84)	(2.9)	(2.9)	(1.8)	(1.8)	(0.79)	(2.7)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	19.43 (0)	19.08 (0)	27.71 (0)	27.48 (0)	54.46 (0)	53.98 (0)	46.77 (0)	45.22 (0)
Fixed Effects F-test	4.15 (0)	4.15 (0)	6 (0)	5.99 (0)	10.87 (0)	10.86 (0)	15.72 (0)	15.72 (0)
R2-Overall	0.09	0.09	0.16	0.16	0.18	0.18	0.18	0.18
Obs.	8672	8672	17,694	17,694	31,945	31,945	50,035	50,035

This table reports the fixed effect results of relative monthly money flows (expressed in %) on lagged monthly return (expressed in %), the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, the *Text uniqueness SR strategies* and the interaction term between monthly lagged return and the *Text uniqueness SR strategies* (models 2, 4, 6 and 8) for all SR funds (models 7 and 8) and for SR funds younger than three years (models 1 and 2), younger than six years (models 3 and 4) and younger than 12 years (models 5 and 6). For each model the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (testing reliability of independent variables), the fixed effect F-test and its p-value (testing that the fixed effect model is preferred to pooled OLS regression), the overall R-squared, and the number of observations are reported. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

suggests that, despite the huge growth of the SR mutual fund market in recent years, this market continues to show the features of a non-competitive market. Conversely, the effect of differentiation on fees should disappear over time. This finding is also demonstrated in In et al. (2014), who do not find evidence that the entrance of new SR funds affects their financial performance.

Models 4, 5, and 6 show the results for SR funds younger than three, six and 12 years old, respectively. The results obtained indicate that the *Text uniqueness Morningstar styles* indicator does not significantly affect the net expense ratio of SR funds for any of the fund age windows considered. This reinforces the previous empirical evidence, showing that SR fund investors do not recognize the differentiation from other SR funds in the same Morningstar financial style category as a relevant factor in their utility function.

4.3. Impact of product differentiation on clients' attraction

In this section we analyse whether more differentiated SR funds are able to attract more money. In order to measure clients' attraction, we use the relative net money flows computed according to expression (1). We then regress the fund money flows on several mutual fund characteristics and on the text uniqueness variables. Since our data sample shapes a panel, we specify the following panel regression Eq. (4).

$$Money\ Flows_{i,t} = \alpha_i + \sum_{i=1}^{5} \beta_i Mutual\ Fund\ Characteristics_{i,t} + \beta_6 Text\ Uniqueness_{i,t} + \sum Time\ controls + e_{i,t} \tag{4}$$

Table 7 reports the results for the different models from Eq. 4.

Models 1 and 2 show the results for the fixed effect and random effect panel data regressions, respectively, with the *Text uniqueness SR strategies* as an explanatory variable. The fixed effect F-statistic and the Breusch-Pagan tests indicate that the fixed effect and random effect models are better than the pooled regression. The results are very similar in both models; specifically, SR fund investors are return chasers (the lagged monthly return coefficient is positive and significant). This means that SR funds with a positive return in the last month receive more money flows. Regarding the remaining fund characteristics, the results indicate that family size and fund age (fund size and net expense ratio) exert a negative (positive) influence on money flows. The result of the expense ratio is contrary to those found for conventional funds; that is, funds charging more expenses receive more money flows. This striking finding could indicate that SR fund investors do not consider the price as a relevant feature in the fund selection process, likely because they are more concerned about the non-financial attributes of the fund. As a result, SR investors might be willing to pay more in exchange for investing in a fund covering their particular non-pecuniary goals. This reinforces the empirical evidence provided by In et al. (2014),

supporting the argument that SR investors mainly choose to invest in SR funds due to ethical reasons. In addition, this result indicates that, despite the increase in the number of funds offered in the SR mutual fund industry in recent years, this market does not yet show the key features of a competitive market (In et al., 2014). With regard to the text uniqueness SR strategies coefficient, the results show a positive coefficient, but only a significant coefficient in model 2 (the random effect model). However, the Hausman test indicates that the fixed effect model fits better our sample; hence, we conclude that more differentiated SR funds are not able to attract more money flows.

Models 3 and 4 present the same results than models 1 and 2 but with the *Text uniqueness Morningstar styles* as the explanatory variable. With regard to the mutual fund characteristics, the estimated coefficients led us to maintain the conclusions extracted from models 1 and 2. With regard to the *Text uniqueness Morningstar styles* coefficient, we also obtain non-significant results. Therefore, differentiation regarding other funds implementing the same financial strategies is not effective for attracting more money flows.

On the other hand, our intuition says that product differentiation strategies might be more relevant in more competitive scenarios. Accordingly, we split our full sample 1999–2019 into two subsamples (1999–2009/2010–2019) and repeat the analyses. We focus only on the fixed effect model because it is more appropriated in our sample according to the Hausman test. Models 5 and 6 report the results of model 1 for 1999–2009 and 2010–2019 periods, respectively. Focusing on the text uniqueness SR strategies estimated co-efficient, this is insignificant in the first subsample and positive and significant in the second one. Hence, whether we focus on the last decade, product differentiation regarding other SR funds implementing the same SR strategies allows fund advisors to attract more money flows. This last finding is consistent with our fourth research hypothesis. Models 7 and 8 report the same results as model 3 but for the 1999–2009 and 2010–2019 periods, respectively. With regard to the *Text uniqueness Morningstar styles* indicator, the estimated coefficients remain non-significant in both subsamples. This indicates that differentiation regarding other SR funds following the same financial style is not able to attract more money flows. These results are consistent with the second research hypothesis.

Similarly, the impact of differentiation on prices may vary over the SR fund life. We then re-estimate models 1 and 3 of Table 7 for several subsamples according to fund age. In addition, we incorporate an interaction term between text uniqueness and lagged monthly return to analyse whether the differentiation degree has an effect on the relationship between fund flows and previous financial performance. Tables 8 and 9 report the results with the *Text uniqueness SR strategies* and the *Text uniqueness Morningstar styles* variables as explanatory variables, respectively.

Focusing on Table 8, models 1, 3, 5 and 7 report the same results as model 1 of Table 7 but for SR funds younger than three, six and 12 years and the full sample, respectively. Models 2, 4, 6, and 8 add to the others the interaction term between *Text uniqueness SR strategies* and the lagged monthly return. The results indicate that more differentiated SR funds are able to attract more money flows (significantly positive coefficients in all the subsamples, except for the full sample). Considering the coefficient magnitude, this decreases with the incorporation of older funds into the sample. This means that SR fund differentiation is more effective for capturing more money flows at the first life years and this attraction power diminishes over time. With regard to the interaction term, the co-efficient is negative and significant for funds younger than three and six years (models 2 and 4) and turns non-significant in models 6 and 8; that is, differentiation moderates the attraction effect of past financial performance on money flows, although this effect tends to disappear over time.

The analyses for the *Text uniqueness Morningstar styles* variable (Table 9) show that the only significant result is the interaction term between past financial performance and text uniqueness in the sample formed by the SR funds younger than three years (model 1). However, in general, we obtain non-significant coefficients on both the *Text uniqueness Morningstar styles* variable and the interaction terms. These findings reinforce the previous empirical evidence, indicating that the product differentiation regarding other SR funds in the same financial style group does not matter for SR fund investors.

5. Robustness tests

5.1. Variable construction for robustness analyses

In this subsection, we explain how we build the additional variables required to develop robustness analyses[15] to enlarge our previous empirical evidence. First, we develop two extra standardized uniqueness measures; the first measure is based on fund returns, and the second one is based on fund holdings (Kostovetsky and Warner, 2019). These two measures allow us to compare textual uniqueness with uniqueness in fund fundamentals (Wahal and Wang, 2011; Hoberg et al., 2018; Kostovetsky and Warner, 2019). The similarity measure of uniqueness based on fund returns is obtained following Kostovetsky and Warner (2019). We calculate, for each fund-year observation, the correlation of daily returns with each of the other funds in the same SR category annually. We then obtain the annual average of this fund-pairwise measure across all other funds in the same SR category to calculate the following measure: *Returns: Average correlation.* We also repeat this process by Morningstar category and obtain the returns-based similarity measure in Morningstar categories. Afterwards, following the process explained in Section 3 and Kostovetsky and Warner (2019), we build the product differentiation proxies by reversing *Returns: Average correlation* (by multiplying it by negative one) and standardizing it to obtain a zero mean and a standard deviation of one. To calculate the second measure, we obtain the annual portfolio holding weights of the funds analysed from Morningstar database[16]. Following Kostovetsky and Warner (2019), we calculate the cosine similarity between the holdings of two funds (i.e., the cosine similarity between two vectors is the dot product of the two vectors scaled by the

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[15] We thank the anonymous referee for suggesting these robustness tests.
[16] We want to clarify that all share classes of a fund present the same portfolio holdings.

Table 9

Effect of product differentiation on money flows through SR funds' life (*Text uniqueness Morningstar styles*).

	SR fund younger than 3 years		SR funds younger than 6 years		SR funds younger than 12 years		Full sample of SR funds	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Lagged return	0.068***	0.063***	0.068***	0.067***	0.057***	0.056***	0.042***	0.041***
	(4.49)	(4.09)	(6.24)	(5.97)	(7.38)	(7.07)	(7.19)	(6.99)
Family Size	−0.697*	−0.696*	−0.740***	−0.739***	−0.322**	−0.322**	−0.267**	−0.267**
	(−1.71)	(−1.7)	(−3.16)	(−3.16)	(−2.13)	(−2.13)	(−2.15)	(−2.15)
Fund Size	0.758**	0.757**	0.594***	0.593***	0.458***	0.457***	0.494***	0.494***
	(2.32)	(2.31)	(2.92)	(2.91)	(4.78)	(4.77)	(5.39)	(5.39)
Fund Age	−0.792***	−0.791***	−0.700***	−0.701***	−0.616***	−0.616***	−0.784***	−0.784***
	(−3.83)	(−3.83)	(−4.19)	(−4.19)	(−4.7)	(−4.7)	(−6.96)	(−6.96)
Expense ratio	4.788***	4.781***	5.481***	5.478***	5.552***	5.549***	5.320***	5.319***
	(13.25)	(13.26)	(18.88)	(18.87)	(24.88)	(24.86)	(23.9)	(23.89)
Turnover ratio	−0.670	−0.675	−0.114	−0.114	0.015	0.015	0.110	0.110
	(−1.61)	(−1.64)	(−0.59)	(−0.59)	(0.13)	(0.13)	(1.05)	(1.05)
Text Uniqueness Morningstar_styles	0.421	0.295	−0.175	−0.196	0.127	0.113	0.077	0.072
	(0.47)	(0.3)	(−0.41)	(−0.44)	(0.43)	(0.38)	(0.42)	(0.39)
Text Uniqueness Morningstar_styles * Lagged return		−0.033***		−0.013		−0.010		−0.006
		(−2.65)		(−1.25)		(−1.43)		(−1.11)
Intercept	3.943	4.064	4.665***	4.667***	2.096*	2.135*	0.978	0.978
	(1.11)	(1.14)	(3.06)	(3.06)	(1.92)	(1.95)	(1.11)	(1.11)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	18.3 (0)	18.52 (0)	30.32 (0)	30.44 (0)	51.35 (0)	52.92 (0)	44.82 (0)	45.62 (0)
Fixed Effects F-test	4.2 (0)	4.2 (0)	6.29 (0)	6.28 (0)	11.15 (0)	11.14 (0)	16 (0)	16 (0)
R2-Overall	0.16	0.16	0.16	0.16	0.18	0.18	0.18	0.18
Obs	8826	8826	17,967	17,967	32,247	32,247	49,500	49,500

This table reports the fixed effect results of relative monthly money flows (expressed in %) on lagged monthly return (expressed in %), the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, the *Text uniqueness Morningstar styles* and the interaction term between monthly lagged return and the *Text uniqueness Morningstar styles* (models 2, 4, 6 and 8) for all SR funds (models 7 and 8) and for SR funds younger than three years (models 1 and 2), younger than six years (models 3 and 4) and younger than 12 years (models 5 and 6). For each model the estimated co-efficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (testing reliability of independent variables), the fixed effect F-test and its p-value (testing that the fixed effect model is preferred to pooled OLS regression), the overall R-squared, and the number of observations are reported. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

product of the magnitudes of the two vectors). Therefore, we obtain the cosine similarity of the holding weights of each fund-year observation with the holding weights of each of the other funds in the same SR category. We then average this pairwise measure across all other funds in a SR category annually to obtain the measure *SR Holdings: average cosine similarity*. Additionally, we repeat this calculation process for each Morningstar category, obtaining the measure *Morningstar Holdings: average cosine similarity*. Once we compute the overlap indicators, again following the process explained in Section 3 and Kostovetsky and Warner (2019), we build the uniqueness proxies. We reverse the *SR/Morningstar Holdings: average cosine similarity* and standardize them to obtain a zero mean and a standard deviation of one. Finally, we regress the outcome on the number of holdings in the fund (and on the number of SR strategies implemented in the *SR Holdings: average cosine similarity*) and take the residuals of this regression as uniqueness proxies. Thus, we obtain the variables *Holdings Uniqueness SR strategies* and *Holdings Uniqueness Morningstar styles*.

Second, we study whether SR funds are able to differentiate with regard to conventional funds in their prospectuses. Thus, we examine the text uniqueness of SR funds against conventional funds. To undertake this analysis, we obtain data for actively managed conventional mutual funds domiciled in the US market and investing in domestic and global equity assets from January 1999 to October 2019, from the Morningstar database. The sample analysed is free of survivorship bias because we consider funds disappeared before October 2019. We obtain 32,198 different share classes and, for each share class, we collect information on monthly returns, monthly total net assets (TNA), inception date, net expense ratio, turnover ratio, Morningstar category, and the "principal investment strategies" (PIS) section of their prospectuses. The PIS section is common for all share classes belonging to one fund. Since we work at the mutual fund level, we aggregate all share classes belonging to a fund, following Renneboog et al. (2011), and as we applied in the share-class aggregation of SR funds. After this process, we obtain 9354 different conventional mutual funds.

To avoid bias from inadequate comparison between the SR fund and conventional fund samples due to size differences, we apply the r:1 nearest-neighbour matching method (Rubin, 1973). This method selects matched conventional funds and provides balance between subsamples (Ammann et al., 2019; Bilbao-Terol et al., 2017; Joliet and Titova, 2018). The method matches the control group (conventional funds) to the treated group (SR) with the smallest distance between them on several characteristics (Morningstar fund category, size, and fund age), discarding non-matched control individuals. The propensity score is used as the similarity measure between funds, estimated with logistic regression on the aforementioned fund characteristics. We apply a 3:1 nearest neighbour matching to provide more balanced samples; thus, this matching allows the same control fund to be matched several times (Ammann et al., 2019; Bilbao-Terol et al., 2017). Our matching provides 1400 matched conventional funds.

From the PIS prospectus section of the 1400 matched conventional funds, we format the text as in the study of Kostovetsky and Warner (2019); that is, we repeat the method applied in the SR fund prospectuses described in Section 3. Next, we compute the

Table 10

Summary statistics of robustness average overlap and uniqueness variables.

	Mean	SD	p10	p50	p90
Panel A: Average overlap measures					
Overlap SR strategies based on returns	0.710	0.206	0.397	0.787	0.907
Overlap Morningstar styles based on returns	0.792	0.233	0.445	0.898	0.969
Overlap SR strategies based on holdings	0.069	0.053	0.013	0.053	0.148
Overlap Morningstar styles based on holdings	0.202	0.133	0.043	0.180	0.390
Text average overlap at family level	0.553	0.146	0.376	0.540	0.750
Text average overlap SR-conventional	0.399	0.087	0.286	0.399	0.510
Panel B: Uniqueness measures					
Returns Uniqueness SR strategies	0	1	−0.957	−0.377	1.521
Returns Uniqueness Morningstar styles	0	1	−0.762	−0.456	1.492
Holdings Uniqueness SR strategies	0	1	−1.474	0.257	1.114
Holdings Uniqueness Morningstar styles	0	1	−1.369	0.130	1.176
Uniqueness family	0	1	−1.316	0.073	1.025
Uniqueness conventional	0	1	−1.278	0.005	1.222

This table reports summary statistics of average overlap measures (panel A) and Uniqueness measures (panel B). The mean, the standard deviation, the 10th percentile, the median and the 90th percentile for the full sample of SR funds are reported.

pairwise overlap in words between each SR fund with all conventional funds in the same Morningstar category for each fund-month observation. Finally, following the process explained in Section 3, we average the pairwise overlap measure across all SR funds in the same Morningstar category monthly to compute the *Text average overlap Morningstar SR strategies versus conventional* variable for each SR fund and month. Lastly, to calculate the uniqueness measure, we reverse *Text average overlap Morningstar SR strategies versus conventional* and standardize it to obtain a zero mean and a standard deviation of one. Next, we regress the outcome on the number of words in the PIS. Finally, we take the residuals of this regression as the proxy for text uniqueness, obtaining the *Uniqueness conventional* indicator. In addition, our initial results show that SR funds involved in shareholding activism and engagement are less differentiated; consequently, these funds may present similarities with conventional funds due to their nature. We then use the text uniqueness obtained comparing SR and conventional funds to analyse its influence on engagement funds and determine the uniqueness importance for engagement fund investors.

The third robustness analysis is based on a fund uniqueness analysis inside fund families to examine the existence of competition at fund family level, which might result in uniqueness benefits for a fund with regard to its family. To develop the measure *Text average overlap at family level*, we divide the SR fund sample into fund families and calculate the text-word overlap between each SR fund and all other funds in a fund family. We then average the pairwise overlap measure across all funds in the same family-month to compute the *Text average overlap at family level* variable for each fund and month. To calculate the family uniqueness, we reverse the *Text average overlap* and standardize it to obtain a zero mean and a standard deviation of one. Finally, we regress the outcome on the number of words in the PIS and on the number of implemented SR strategies, and take the residuals of this regression as the text uniqueness proxy, obtaining the variable *Uniqueness family*.

Table 10 presents some summary statistics of the average overlap and uniqueness measures for the robustness tests of the full sample.

Panel A of Table 1 shows that, on average, the return correlation is 71 % and 79 % among SR funds implementing the same SR strategy/ies and belonging to the same Morningstar category, respectively. The holding overlap measure shows that the holding similarity reduces to 6.9 % between SR funds with the same SR category/ies. However, fund holdings display a higher similarity (20.2 %) between SR funds with the same Morningstar category. The text overlap at family level indicates that an SR fund shares 55.3 % of words with the other funds in the same family. Additionally, the text average overlap of SR funds with their conventional peers shows that both types of funds share 39.9 % of words in the PIS section.

Additionally, we develop a robustness test to determine whether institutional and non-institutional investors value the differentiation in fund prospectus. Thus, we estimate Eqs. 3 and 4 but for different subsamples of SR funds, that is, institutional and non-institutional SR funds. As we work at the mutual fund level and some mutual funds have both institutional and non-institutional share classes, the identification of institutional SR funds in our sample presents some difficulties. We adopt two alternative criteria. The first one, the stricter one, only considers as institutional funds those with 100 % of their total net assets in share classes targeted to institutional investors. In the second one, we label a SR fund as institutional when at least 50 % of their total net assets belong to share classes targeted to institutional investors.

5.2. Empirical findings from robustness analyses

In this subsection, we present the results obtained from robustness analyses. The first robustness analysis considers alternative measures of product differentiation. Table 11 shows the impact of SR funds' differentiation on prices with the uniqueness approached through measures based on returns and holdings instead of text (Table 5 provides the results for text uniqueness measures). Thus, we again estimate Eq. 3, but substitute the uniqueness measures based on the text with the measures based on returns and holdings.

As can be seen in Table 11, diagnosis tests confirm the convenience of fixed effect models over random effect ones. The results for the return uniqueness measures show that when it is computed against other SR funds performing the same SR strategies (models 1 and

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Table 11
Effect of Returns/Holdings differentiation on prices.

	Returns Uniqueness SR strategies		Returns Uniqueness Morningstar styles		Holdings Uniqueness SR strategies		Holdings Uniqueness Morningstar styles	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: Fixed-Effects	Model 6: Random-Effects	Model 7: Fixed-Effects	Model 8: Random-Effects
Family Size	−0.140**	−0.098*	−0.119*	−0.083	−0.136*	−0.094	−0.121	−0.081
	(−2.07)	(−1.85)	(−1.69)	(−1.49)	(−1.83)	(−1.6)	(−1.58)	(−1.34)
Fund Size	−0.118***	−0.127***	−0.142***	−0.149***	−0.136***	−0.144***	−0.145***	−0.151***
	(−2.9)	(−3.5)	(−3.24)	(−3.8)	(−3.09)	(−3.62)	(−3.23)	(−3.76)
Fund Age	−0.350***	−0.325***	−0.363***	−0.338***	−0.350***	−0.326***	−0.337***	−0.315***
	(−5.78)	(−5.87)	(−5.74)	(−5.83)	(−5.44)	(−5.54)	(−5.19)	(−5.31)
Turnover ratio	0.087	0.091	0.069	0.072	0.071	0.073	0.070	0.074
	(1.24)	(1.32)	(0.96)	(1.01)	(0.96)	(1.00)	(0.87)	(0.94)
Returns Uniqueness SR strategies	0.055	0.060						
	(1.14)	(1.25)						
Returns Uniqueness Morningstar styles			0.016	0.016				
			(0.32)	(0.32)				
Holdings Uniqueness SR_strategies					0.030	0.048		
					(0.29)	(0.53)		
Honldings Uniqueness Morningstar_styles							0.093*	0.096**
							(1.8)	(2)
Intercept	3.359***	2.92***	3.369***	2.941***	3.629***	3.170***	3.521***	3.072***
	(7.75)	(8.49)	(7.89)	(8.67)	(6.51)	(8.41)	(7.08)	(7.91)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	18.57 (0)		15.35 (0)		17.02 (0)		17.35 (0)	
Model Wald χ^2-test		443.01 (0)		364.59 (0)		406.24 (0)		415.08 (0)
Fixed Effects F-test	39.38 (0)		41.24 (0)		38.71 (0)		39.01 (0)	
Breusch-Pagan Test		130,000 (0)		140,000 (0)		110,000 (0)		120,000 (0)
Hausman test	142.6 (0)		96.93 (0)		205.34 (0)		83.07 (0)	
R2-Overall	0.1355	0.1517	0.1377	0.1511	0.1398	0.1573	0.1435	0.1585
Obs.	53,971	53,971	51,643	51,643	49,551	49,551	48,713	48,713

This table reports the fixed effect (models 1, 3, 5 and 7) and random effect (models 2, 4, 6 and 8) results of net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, returns uniqueness SR (models 1 and 2), returns uniqueness Morningstar styles (models 3 and 4), holdings uniqueness SR strategies (models 5 and 6) and holdings uniqueness Morningstar styles (models 7 and 8) for all SR funds analysed. The table shows for all models: the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test, and its p-value (Wald χ2-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value), which tests that the fixed effect (random effect) models are preferred to pooled OLS regression, Hausman test and its p-value (which tests what estimation, i.e., fixed effect or random effect fits better our sample), the overall R-squared and the number of observations. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

Table 12
Effect of Returns/Holdings differentiation on money flows.

	Returns Uniqueness SR strategies		Returns Uniqueness Morningstar styles		Holdings Uniqueness SR strategies		Holdings Uniqueness Morningstar styles	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: Fixed-Effects	Model 6: Random-Effects	Model 7: Fixed-Effects	Model 8: Random-Effects
Lagged Return	0.043***	0.044***	0.043***	0.044***	0.041***	0.041***	0.042***	0.043***
	(7.13)	(7.24)	(7.23)	(7.32)	(6.69)	(6.83)	(7.05)	(7.12)
Family Size	−0.280**	−0.160***	−0.322***	−0.179***	−0.253**	−0.169***	−0.248**	−0.174***
	(−2.35)	(−2.65)	(−2.64)	(−2.88)	(−2.06)	(−2.63)	(−2.02)	(−2.66)
Fund Size	0.484***	0.419***	0.496***	0.423***	0.527***	0.454***	0.515***	0.445***
	(5.91)	(6.74)	(5.73)	(6.46)	(5.91)	(6.55)	(5.67)	(6.31)
Fund Age	−0.838***	−0.832***	−0.790***	−0.795***	−0.789***	−0.805***	−0.729***	−0.746***
	(−7.64)	(−9.32)	(−7.04)	(−8.65)	(−6.92)	(−8.52)	(−6.42)	(−7.9)
Expense ratio	5.227***	5.041***	5.210***	5.013***	5.426***	5.239***	5.455***	5.269***
	(25.33)	(25.71)	(23.77)	(24.22)	(23.8)	(24.13)	(23.41)	(23.75)
Turnover ratio	0.118	0.081	0.091	0.062	0.136	0.109	0.112	0.081
	(1.21)	(0.87)	(0.91)	(0.64)	(1.35)	(1.13)	(1.08)	(0.82)
Returns Uniqueness SR strategies	0.195***	0.127*						
	(2.35)	(1.66)						
Returns Uniqueness Morningstar styles			0.197**	0.155*				
			(2.1)	(1.68)				
Holdings Uniqueness SR strategies					−0.086	−0.241**		
					(−0.66)	(−2.39)		
Holdings Uniqueness Morningstar styles							0.154	0.004
							(1.55)	(0.05)
Intercept	0.713	0.310	1.231	0.682	0.415	0.322	0.419	0.398
	(0.82)	(0.47)	(1.4)	(0.98)	(0.43)	(0.44)	(0.43)	(0.52)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	49.64 (0)		45.89 (0)		41.24 (0)		42.43 (0)	
Model Wald χ^2-test		1,287.48 (0)		1,196.13 (0)		1,080.08 (0)		1,120.9 (0)
Fixed Effects F-test	16.32 (0)		16.62 (0)		16.98 (0)		17.58 (0)	
Breusch-Pagan Test		25,724.23 (0)		25,837.76 (0)		23,696.37 (0)		26,493.87 (0)
Hausman test	202.97 (0)		448.7 (0)		307.92 (0)		135.5 (0)	
R2-Overall	0.1831	0.1857	0.1794	0.1831	0.1876	0.1912	0.1855	0.1894
Obs.	53,825	53,825	51,389	51,389	49,343	49,343	48,526	48,526

This table reports the fixed effect (models 1, 3, 5 and 7) and random effect (models 2, 4, 6 and 8) results of relative monthly money flows (expressed in %) on lagged monthly return (expressed in %), the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, the returns uniqueness SR strategies (models 1 and 2), the returns uniqueness Morningstar styles (models 3 and 4), the holdings uniqueness SR (models 5 and 6) and the holdings uniqueness Morningstar (models 7 and 8), for all SR funds analysed in our sample. For each model the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (Wald χ2-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value) testing that the fixed effect (random effect) models are preferred to pooled OLS regression, the Hausman test and its p-value testing what estimation fits better our sample, the overall R-squared, and the number of observations are reported. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

2) and when it is computed considering other SR funds in the same Morningstar financial style (models 3 and 4), the estimated coefficients on uniqueness variables are positive but non-significant. This means that SR funds differentiated through returns are not able to charge higher fees. The results for the holding uniqueness measures (models 5–8) differ according to the criterion considered. Thus, the estimated coefficients on *holdings uniqueness SR* (models 5 and 6) are positive but non-significant, whereas the estimated co-efficients on *holdings uniqueness Morningstar* (models 7 and 8) reach positive and significant values. This result could be reflecting that the portfolio differentiation with regard to other SR funds in the same financial category is relevant for SR funds' investors and allows mutual fund companies to charge higher fees. However, this interpretation seems implausible since portfolio-holding information is difficult for most investors to know and interpret. An alternative, more plausible, explanation for this empirical evidence could be that those SR funds holding a differentiated portfolio with regard to other SR funds in the same Morningstar financial style category are featured by higher fees due to the cost of making a more active strategy. SR mutual fund managers could face more constraints and difficulties to differentiate their portfolios from other funds in the same Morningstar financial style since they have to invest in the

Table 13
Effect of SR funds' differentiation from conventional funds and other SR funds in the same family on prices.

	Uniqueness Conv		Uniqueness conventional Engagement SR funds		Uniqueness Family	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: Fixed-Effects	Model 6: Random-Effects
Family Size	−0.094	−0.063	−0.425	−0.254	−0.030	−0.018
	(−1.23)	(−1.02)	(−1.53)	(−1.41)	(−0.42)	(−0.31)
Fund Size	−0.155***	−0.160***	−0.161	−0.175	−0.165***	−0.165***
	(−3.38)	(−3.84)	(−1.16)	(−1.55)	(−3.91)	(−4.22)
Fund Age	−0.337***	−0.322***	−0.300**	−0.253**	−0.305***	−0.296***
	(−5.4)	(−5.55)	(−2.39)	(−2.34)	(−4.92)	(−5.13)
Turnover ratio	0.071	0.076	−0.416*	−0.348	0.091	0.093
	(0.95)	(1.02)	(−1.68)	(−1.52)	(1.25)	(1.28)
Uniqueness Conventional	0.097	0.045	0.406	0.163		
	(0.55)	(0.38)	(1.11)	(0.79)		
Uniqueness Family					0.096	0.080
					(1.15)	(1.24)
Intercept	3.251***	2.882***	6.350***	4.866***	2.823***	2.611***
	(6.73)	(7.55)	(3.15)	(3.48)	(5.98)	(7.21)
Time Control	YES	YES	YES	YES	YES	YES
Model F-test	16.19 (0)		11.2 (0)		14.76 (0)	
Model Wald χ^2-test		387.29 (0)		288.07 (0)		353.82 (0)
Fixed Effects F-test	41.31 (0)		7.36 (0)		39.28 (0)	
Breusch-Pagan Test		120,000 (0)		992.80 (0)		110,000 (0)
Hausman test	71.89 (0)		148.32 (0)		148.32 (0)	
R2-Overall	0.1384	0.1549	0.0592	0.1170	0.1661	0.1702
Obs.	47,530	47,530	6909	6909	44,652	44,652

This table reports the fixed effect (models 1, 3 and 5) and random effect (models 2, 4 and 6) results of the net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, uniqueness conventional (models 1, 2, 3 and 4) and uniqueness family (models 5 and 6), for all SR funds analysed (models 1, 2, 5 and 6) and for SR funds performing engagement SR strategies (models 3 and 4). The table shows for all models: the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test, and its p-value (Wald χ2-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value), which tests that the fixed effect (random effect) models are preferred to pooled OLS regression, Hausman test and its p-value (which tests what estimation, i.e., fixed effect or random effect fits better our sample), the overall R-squared and the number of observations. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

same type of stocks than their competitors. The holding portfolio differentiation from other SR funds performing the same SR strategy could be easier since, first, the same SR fund could implement several and different SR strategies at the same time and, second, they could belong to different Morningstar financial styles categories and, consequently, invest in a different class of assets. Thus, mutual fund companies will have to use more resources and efforts to achieve a differentiated portfolio from other SR funds in the same Morningstar financial style, and, consequently, this could be reflected in the prices charged to investors. Verbeek and Wang (2013) explain that copycat funds (those funds that replicate portfolios of competitors) "do not spend anything on research" and "can operate with relatively low levels of expenses" (p. 3457). The estimated coefficients for the rest of variables are, in general, consistent with those obtained in Table 5.

Table 12 shows the impact of SR funds' differentiation on money flows with the uniqueness measures based on returns and holdings, instead of text (Table 7 provides the results for text uniqueness measures). Thus, we again estimate Eq. 4 but substituting the uniqueness measures based on text with the measures based on returns and holdings.

Models 1–4 show the results considering the impact of the return uniqueness measures. In the four models, the estimated co-efficients on uniqueness variables are positive and significant, both when they are computed against other SR funds performing the same SR strategies (models 1 and 2) and when they are computed considering other SR funds in the same Morningstar financial style category (models 3 and 4). Although this result is held in the four models, diagnosis tests show the convenience of fixed effect models. This finding could show that SR fund investors are sensitive to returns when selecting investee funds, consistent with the estimated coefficient on lagged return. Bollen (2007) explains that SR fund investors' utility function depends on both ESG attributes and financial outcomes. Similarly, Muñoz (2019) finds that SR mutual fund investors are, in general terms, sensitive to past returns when making investment decisions. Models 5–8 show the results considering the impact of the holding uniqueness measures. The estimated coefficients are negative in models 5 and 6 (being significant only in model 6), and non-significantly positive in models 7 and 8. This means that the differentiation of SR funds' portfolios through holdings does not attract investors' interest. This finding supports our argument provided in the previous section that portfolio holdings are probably not always analysed/observed/compared by most investors in fund selection, as it is difficult for investors to extract conclusions about the "fund uniqueness" from this type of infor-mation. In addition, it reinforces the interpretation about the impact of holding differentiation on prices, based on the results shown in Table 11. Additionally, these results align with those obtained by Kostovetsky and Warner (2020), who find that the measure based on text better explains the product differentiation impact on prices and flows than other measures based on mutual funds' characteristics.

The second robustness analysis is based on the differentiation of SR funds regarding conventional funds. In the case of SR and

Table 14
Effect of SR funds' differentiation from conventional funds and other SR funds in the same family on money flows.

	Uniqueness Conv		Uniqueness conventional Engagement SR funds		Uniqueness Family	
	Model 1: Fixed-Effects	Model 2: Random-Effects	Model 3: Fixed-Effects	Model 4: Random-Effects	Model 5: Fixed-Effects	Model 6: Random-Effects
Lagged Return	0.038***	0.039***	0.029**	0.029***	0.036***	0.036***
	(6.46)	(6.56)	(2.66)	(2.7)	(5.73)	(5.90)
Family Size	−0.267**	−0.137**	−0.490**	−0.175**	−0.163	−0.082
	(−2.07)	(−2.18)	(−2.54)	(−2.38)	(−1.29)	(−1.4)
Fund Size	0.480***	0.403***	0.342**	0.157	0.493***	0.420***
	(5.11)	(5.8)	(2.13)	(1.59)	(5.11)	(5.81)
Fund Age	−0.793***	−0.802***	−0.442**	−0.299**	−0.780***	−0.771***
	(−6.9)	(−8.69)	(−2.43)	(−2.4)	(−6.46)	(−8.15)
Expense ratio	5.275***	5.067***	6.405***	6.219***	5.282***	5.026***
	(22.97)	(23.41)	(16.76)	(17.01)	(22.31)	(23.00)
Turnover ratio	0.105	0.054	−0.574*	−0.628**	0.174	0.103
	(1.00)	(0.54)	(−1.94)	(−2.4)	(1.56)	(1.01)
Uniqueness Conventional	0.054	0.264**	−0.488	0.052		
	(0.2)	(2.44)	(−0.96)	(0.36)		
Uniqueness Family					0.129	0.096
					(0.76)	(1.12)
Intercept	1.243	0.685	0.544	−0.623	0.027	−0.071
	(1.35)	(0.98)	(0.37)	(−0.76)	(0.03)	(−0.1)
Time Control	YES	YES	YES	YES	YES	YES
Model F-test	42.66 (0)		75.72 (0)		46.9 (0)	
Model Wald χ^2-test		1122.08 (0)		1,682.91 (0)		1,193.82 (0)
Fixed Effects F-test	15.70 (0)		7.36 (0)		14.20 (0)	
Breusch-Pagan Test		25,204.24 (0)		99,280 (0)		1,608,818 (0)
Hausman test	3,731.41 (0)		47.16 (0.0067)		311.45 (0)	
R2-Overall	0.1814	0.1849	0.2726	0.2946	0.1854	0.1877
Obs.	47,287	47,287	6882	6882	44,447	44,447

This table reports the fixed effect (models 1, 3 and 5) and random effect (models 2, 4 and 6) results of relative monthly money flows (expressed in %) on lagged monthly return (expressed in %), the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, the uniqueness conventional (models 1, 2, 3 and 4) and the uniqueness family (models 5 and 6), for all SR funds analysed in our sample (models 1, 2, 5 and 6) and for SR funds performing engagement SR strategies (models 3 and 4). For each model the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value (Wald χ^2-test and its p-value) for fixed effect (random effect) models testing the reliability of independent variables, the fixed effect F-test and its p-value (Breusch-Pagan test and its p-value) testing that the fixed effect (random effect) models are preferred to pooled OLS regression, the Hausman test and its p-value testing what estimation fits better our sample, the overall R-squared, and the number of observations are reported. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

conventional funds competing in the same market, it could be of interest to study whether most differentiated SR funds from conventional ones can charge higher prices and attract more clients. Thus, we again estimate Eqs. 3 and 4, but substitute the text uniqueness measures computed against other SR funds with text uniqueness measures computed against conventional funds. The empirical findings are shown in models 1–4 of Tables 13 and 14.

Models 1 and 2 in Tables 13 and 14 show, in general, non-significant coefficients on the uniqueness conventional variable (the only significant coefficient is obtained in model 2 from Table 14, but a diagnosis test shows that the fixed effect model, model 1, is more convenient than the random effect one, model 2). These findings point out that the differentiation from conventional funds does not allow for charging higher fees or to attract more money to SR funds. Models 3 and 4 in Tables 13 and 14 provide the same empirical evidence but for a subset of SR funds, specifically for those funds performing engagement strategies. Due to their nature, the relevant comparison group for this subset of SR funds could be conventional funds instead of other SR funds. However, the estimated co-efficients on the uniqueness conventional measure are also non-significant for this subset of the SR fund industry. These results together indicate that the product differentiation regarding conventional funds does not work and suggests that the SR fund industry constitutes a separate market from the conventional mutual fund market; consequently, differentiation strategies should be implemented with regard to other SR funds. Our findings align with previous literature. In et al. (2014) observe that the entrance of new conventional funds to the market does not make SR funds to reduce their fees but, on the contrary, it allows them to raise them. These authors consider that this finding could indicate that "SR and conventional funds do not compete in the same mutual fund market" (p. 167).

The third robustness analysis is focused on mutual fund families. The growth of the SR mutual fund industry has led to a rise in competition. In addition, SR mutual funds present different profiles and different SR strategies exist to integrate ESG issues into funds' portfolios. In this framework, mutual fund firms could perform differentiation strategies among their SR funds to cover a wider range of SR investors. Hence, diversified mutual fund companies versus focused ones could benefit from the attraction of greater money flows (Siggelkow, 2003). Models 5 and 6 in Tables 13 and 14 show the results of the estimation of Eqs. 3 and 4 respectively, but substituting the uniqueness measures used in the main analyses with a text uniqueness measure computed considering the SR funds belonging to

Table 15
Effect of product differentiation on prices for institutional and non-institutional funds.

	Institutional funds (expense ratio)		Non-Institutional funds (expense ratio)		Institutional funds (flows)		Non-institutional funds (flows)	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Family Size	0.202	0.193	−0.139*	−0.104	−0.315	−0.180	−0.248**	−0.278**
	(0.66)	(0.68)	(−1.86)	(−1.38)	(−0.44)	(−0.25)	(−1.98)	(−2.2)
Fund Size	−0.478	−0.473	−0.132***	−0.159***	0.434	0.374	0.491***	0.505***
	(−1.49)	(−1.51)	(−3.0)	(−3.62)	(0.98)	(0.8)	(5.39)	(5.38)
Fund Age	0.432*	0.425*	−0.369***	−0.384***	−1.072*	−0.997*	−0.819***	−0.766***
	(1.85)	(1.88)	(−5.87)	(−6.06)	(−1.95)	(−1.74)	(−7.12)	(−6.74)
Turnover ratio	0.107	0.106	0.058	0.050	0.083	0.147	0.100	0.116
	(1.14)	(1.15)	(0.82)	(0.64)	(0.38)	(0.65)	(0.95)	(1.08)
Expense ratio					2.487***	2.504***	5.483***	5.525***
					(5.25)	(5.27)	(24.34)	(23.83)
Lagged returns					−0.024	−0.025	0.050***	0.047***
					(−1.33)	(−1.39)	(7.62)	(7.90)
Text Uniqueness SR strategies	0.083		0.610***		−1.350		0.646*	
	(0.26)		(2.71)		(−1.48)		(1.95)	
Text Uniqueness Morningstar styles		0.031		−0.095		−0.182		0.104
		(0.22)		(−1.42)		(−0.45)		(0.53)
Intercept	0.901	0.955	3.591***	3.477***	6.197	5.263	0.395	0.625
	(0.75)	(0.89)	(7.4)	(7.13)	(1.5)	(1.3)	(0.43)	(0.69)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	10.79 (0)	11.64 (0)	15.92 (0)	14.48 (0)	78.52 (0)	58.16 (0)	48.55 (0)	46.41 (0)
Fixed Effects F-test	34.83 (0)	35.46 (0)	39.62 (0)	40.09 (0)	9.19 (0)	8.80 (0)	14.10 (0)	14.40 (0)
Hausman test	131.16	135.60	228.12 (0)	115.60 (0)	45.66	46.52	291.25 (0)	333.14 (0)
	(0)	(0)			(0.0003)	(0.0007)		
R2-Overall	0.1447	0.1386	0.0735	0.1441	0.0908	0.1409	0.1935	0.1961
Obs.	4332	4356	45,975	45,405	4309	4333	45,726	45,167

This table reports the fixed effect of the net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, *Text uniqueness SR strategies* (models 1 and 3) and *Text uniqueness Morningstar styles* (models 2 and 4) (Eq. 3) and fixed effect of relative monthly money flows (expressed in %) on the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, lagged monthly return (expressed in %), and the *Text uniqueness SR strategies* (models 5 and 7) and the *Text uniqueness Morningstar styles* (models 6 and 8) (Eq. 4) for all institutional SR funds (models 1, 2, 5 and 6) and for non-institutional SR funds (models 3, 4, 7 and 8) analysed. We consider a fund to be institutional when 100 % of its total net assets are devoted to institutional investors. The table shows for all models: the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value testing the reliability of independent variables, the fixed effect F-test and its p-value which tests that the fixed effect model is preferred to pooled OLS regression, Hausman test and its p-value (which tests what estimation, i.e., fixed effect or random effect fits better our sample), the overall R-squared and the number of observations. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

the same family (uniqueness family) as the relevant group of comparison. We observe that the estimated coefficients on the uniqueness family variable across the different models are positive but not significant. This means that the differentiation regarding other SR funds in the same family is not effective for charging higher fees or attracting more money flows. This finding could indicate that, although the SR mutual fund industry has experienced important growth in the last decades and a rise in competition, this industry does not show yet some key features of a competitive market. This conclusion aligns with that obtained previously by In et al. (2014).

Our last robustness analysis controls for the level of investors' sophistication. The reaction to SR funds' text differentiation strategies could be different according to the type of investor targeted. Specifically, we expect that institutional investors would be less sensitive to text differentiation indicators than non-institutional investors since the former have more resources, can process more information, and perform more sophisticated techniques when making investment decisions (Keswani and Stolin, 2008; Muñoz, 2016). Thus, we split our full sample into institutional and non-institutional funds. Table 15 shows the results for Eqs. 3 and 4, but considers those SR funds with 100 % of the total net assets in share classes targeted to institutional investors as institutional funds. We focus on fixed effect models for the sake of brevity (the Hausman test reveals that fixed effect models are more appropriate than the random effect ones). As can be seen in Table 15, the estimated coefficients on text uniqueness SR strategies are only significant in the case of non-institutional investors. In Table 16, we present the same analyses considering as institutional funds those SR funds with at least 50 % of their total net assets in share classes targeted at institutional investors. The results are similar to those obtained in Table 15, although the estimated coefficient on text uniqueness SR strategies in model 7 remains positive but becomes non-significant. All these results together suggest that our previous empirical evidence is conducted by non-institutional investors. This means that text differentiation allows mutual fund companies to charge higher fees and to attract money flows, but only in the case of those SR funds targeted at non-institutional investors.

6. Conclusions

In this paper we analyse the product differentiation strategies in the SR mutual fund industry. Specifically, we study the mutual fund characteristics and both the SR and the financial strategies pursued by most differentiated SR funds. Afterwards, we examine the

Table 16

Effect of product differentiation on prices and flows for institutional (TNA > 50 %) and non-institutional funds.

	Institutional funds (expense ratio)		Non-Institutional funds (expense ratio)		Institutional funds (flows)		Non-institutional funds (flows)	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Family Size	−0.075	−0.071	−0.107	−0.062	−0.211	−0.179	−0.403***	−0.372**
	(−0.38)	(−0.36)	(−1.05)	(−0.61)	(−0.87)	(−0.72)	(−2.33)	(−2.17)
Fund Size	−0.069	−0.078	−0.184***	−0.211***	0.576***	0.536***	0.644***	0.640***
	(−0.64)	(−0.7)	(−3.41)	(−3.83)	(4.7)	(4.35)	(6.85)	(6.93)
Fund Age	−0.269**	−0.289**	−0.261***	−0.277***	−0.913***	−0.912***	−0.552***	−0.511***
	(−2.34)	(−2.46)	(−3.6)	(−3.87)	(−4.32)	(−4.32)	(−4.02)	(−3.7)
Turnover ratio	−0.010	−0.014	0.044	0.046	0.102	0.086	0.178	0.154
	(−0.07)	(−0.1)	(0.54)	(0.52)	(0.39)	(0.32)	(1.49)	(1.19)
Expense ratio					5.258***	5.159***	5.471***	5.628***
					(19.25)	(19.02)	(17.32)	(17.48)
Lagged returns					0.005	0.002	0.058***	0.058***
					(0.5)	(0.24)	(7.25)	(7.57)
Text Uniqueness SR strategies	0.358		0.381**		−0.707		0.429	
	(0.85)		(2.43)		(−0.69)		(1.22)	
Text Uniqueness Morningstar styles		−0.015		−0.012		−0.307		0.274
		(−0.17)		(−0.12)		(−1.54)		(0.96)
Intercept	2.564*	2.649*	3.731***	3.533***	−0.104	0.361	0.501	0.193
	(1.78)	(1.84)	(5.4)	(5.13)	(−0.05)	(0.18)	(0.38)	(0.14)
Time Control	YES	YES	YES	YES	YES	YES	YES	YES
Model F-test	8.94 (0)	8.77 (0)	13.91 (0)	13.62 (0)	24.12 (0)	25.6 (0)	32.59 (0)	29.76 (0)
Fixed Effects F-test	26.06 (0)	28.39 (0)	36.26 (0)	35.36 (0)	8.91 (0)	8.97 (0)	11.34 (0)	10.92 (0)
Hausman test	97.10 (0)	145.71 (0)	116.22 (0)	76.80 (0)	83.73 (0)	112.65 (0)	136.85 (0)	87.50 (0)
R2-Overall	0.0992	0.1338	0.1272	0.1842	0.1975	0.1967	0.2016	0.2171
Obs.	16,720	16,611	25,196	24,889	16,651	16,543	25,068	24,771

This table reports the fixed effect of net expense ratio (expressed in %) on family size, fund size, fund age, turnover ratio, *Text uniqueness SR strategies* (models 1 and 3) and *Text uniqueness Morningstar styles* (models 2 and 4) (Eq. 3) and fixed effect of relative monthly money flows (expressed in %) on the family size, the fund size, the fund age, the turnover ratio, the log expense ratio, lagged monthly return (expressed in %), and the *Text uniqueness SR strategies* (models 5 and 7) and the *Text uniqueness Morningstar styles* (models 6 and 8) (Eq. 4) for all institutional SR funds (models 1, 2, 5 and 6) and for non-institutional SR funds (models 3, 4, 7 and 8) analysed. We consider a fund to be institutional when at least 50 % of its total net assets are devoted to institutional investors. The table shows for all models: the estimated coefficients, the t-ratios computed with standard errors corrected for autocorrelation and heteroscedasticity clustered at fund level, the model F-test and its p-value testing the reliability of independent variables, the fixed effect F-test and its p-value which tests that the fixed effect model is preferred to pooled OLS regression, Hausman test and its p-value (which tests what estimation, i.e., fixed effect or random effect fits better our sample), the overall R-squared and the number of observations. *** Significant at 1%; ** significant at 5%; *significant at 10 %.

effect of product differentiation on prices and clients' attraction. Despite the important number of studies focused on SR funds, product differentiation issues remain underexplored. However, the huge growth experienced by the SR mutual fund industry in the last decade, with the consequent rise of competition, makes relevant this research. We analyse US SR mutual funds in the period 1999–2019. The main product differentiation measure used, recently proposed by Kostovetsky and Warner (2019), is based on the text analysis of the principal investment strategy section embedded on the fund prospectuses. Additionally, we perform additional differentiation measures based on fund fundamentals (return and holdings) to compare the results with the text uniqueness differentiation.

With regard to the text differentiation measure, this proxy presents important advantages, discussed at the beginning of this research and by Kostovetsky and Warner (2019). We compute two versions of the proxy to capture the double SR mutual differentiation. The first one measures the differentiation of SR funds with regard to other SR funds pursuing the same financial style (belonging to the same Morningstar category), which we call the text uniqueness Morningstar styles. The second measure informs in regard to the SR fund differentiation regarding other SR funds following the same SR strategies (positive screens, negative screens, engagement, impact investing and environmental sector).

The text uniqueness results indicate that younger SR funds which belong to smaller families are more differentiated. Regarding SR strategies, SR funds involved in shareholder activism or engagement are less differentiated than other SR funds. The sub-strategy analysis shows that SR funds engaged in impact investing through gender diversity and low-carbon/fossil fuel-free issues, renewable energies and water, and excluding alcohol, tobacco, controversial weapons and pesticides are more differentiated. If we focus on differentiation regarding other SR funds pursuing the same financial style, we find that SR funds in domestic styles with more competitors are more differentiated. In addition, the results for those styles focused on specific markets or sectors suggest that SR funds belonging to "uncommon" categories do not need to be different because the competence level is probably lower.

The analysis of the differentiation effect on prices shows that more differentiated SR funds are able to charge higher fees to clients. In addition, this effect is sustained over time, although more relevant during the first years of SR funds' lives. The effect of product differentiation on clients' attraction shows that the most differentiated SR funds are able to capture more money flows, especially in the period 2010–2019 and also during their first years of life. However, this effect diminishes as older funds are incorporated into the sample. Another finding shows that SR funds investors show return-chasing behaviour; however, the product differentiation moderates

the attraction effect of lagged returns on money flows during the first years of SR funds' lives.

Previous results only hold with the *Text uniqueness SR strategies* variable (not with the *Text uniqueness Morningstar styles*). Consequently, SR fund investors only care about differentiation with regard to other funds pursuing the same SR strategies but differentiation among funds within the same financial category is not relevant. This finding is consistent with the argument that SR fund investors mainly select SR funds for non-financial reasons (In et al., 2014; or Riedl and Smeets, 2017). The empirical evidence obtained in this research indicates that mutual fund companies should concentrate their efforts on differentiating their SR funds from others engaged in the same SR strategies to take advantage of product differentiation. Accordingly, our results stress the importance of mutual fund companies providing valuable information in the fund prospectus, a basic document used by investors in the fund selection process. Despite the benefits of product differentiation strategies and the important growth of the SR mutual funds offered in the last decade, some results suggest that the SR mutual fund market still shows features of a non-competitive market. Thus, although product differentiation strategies allow to establish higher prices and attract more money flows, this effect falls over time, although it does not disappear during the SR fund life. In addition, higher prices do not frighten SR mutual fund investors, whenever they satisfy their specific non-pecuniary concerns.

Finally, some robustness analyses allow us to enlarge the empirical evidence provided. More concretely, these additional analyses reveal the following: i) the text uniqueness measures capture better the impact of product differentiation on SR funds' investors than other indicators based on fundamentals, ii) SR mutual funds and the conventional ones compete in different markets because differentiation from conventional funds does not impact on SR funds' investors, iii) SR mutual funds' companies performing differentiation strategies at a family-level do not benefit from these strategies, and iv) the product differentiation based on text is (is not) effective for non-institutional (institutional) investors.

Declaration of Competing Interest

None.

Appendix 1 Text average overlap Morningstar style by Morningstar financial style category

	Number of funds	Obs.	Mean	SD	p10	p50	p90
All SR funds in the sample	547	49,761	0.421	0.09	0.295	0.421	0.539
US fund large blend	94	8652	0.372	0.088	0.255	0.373	0.508
US fund large growth	65	7189	0.423	0.082	0.310	0.427	0.545
US fund large value	37	3651	0.393	0.070	0.289	0.413	0.459
US fund mid cap blend	21	1504	0.443	0.078	0.358	0.448	0.559
US fund mid cap growth	26	2315	0.467	0.088	0.353	0.467	0.566
US fund mid cap value	16	1293	0.437	0.108	0.259	0.458	0.560
US fund small blend	23	2626	0.418	0.093	0.280	0.392	0.550
US fund small growth	21	2238	0.497	0.076	0.388	0.506	0.591
US fund small value	11	1079	0.462	0.073	0.389	0.438	0.596
US fund foreign large blend	34	3444	0.429	0.065	0.340	0.432	0.518
US fund foreign large growth	18	2270	0.388	0.070	0.300	0.363	0.478
US fund foreign large value	11	1182	0.419	0.093	0.267	0.440	0.510
US fund foreign small mid growth	7	876	0.463	0.089	0.298	0.494	0.579
US fund foreign small mid value	4	391	0.557	0.033	0.518	0.571	0.615
US fund world large stock	60	4179	0.399	0.088	0.266	0.404	0.504
US fund world small mid stock	12	768	0.377	0.067	0.284	0.383	0.483
US fund China region	3	342	0.494	0.021	0.472	0.515	0.515
US fund diversified emerging markets	47	3263	0.447	0.071	0.362	0.442	0.536
US fund Europe stock	4	102	0.389	0.079	0.278	0.417	0.52
US fund Pacific-Asia ex-Japan stocks	3	116	0.419	0.059	0.337	0.429	0.481
US fund global real estate	9	532	0.549	0.082	0.481	0.524	0.676

(continued on next page)

(*continued*)

	Number of funds	Obs.	Mean	SD	p10	p50	p90
US fund health	5	857	0.458	0.042	0.397	0.471	0.49
US fund infrastructure	2	10	0.538	0	0.538	0.538	0.538
US fund natural resources	9	383	0.413	0.05	0.366	0.4	0.486
US fund real estate	2	204	0.614	0.02	0.594	0.614	0.633
US fund technology	3	295	0.354	0.04	0.303	0.345	0.414

This table provides information about the number of SR funds in our sample belonging to the different Morningstar categories, defined according to the financial style of the fund. In addition, some summary statistics of the *Text average overlap Morningstar styles* for each Morningstar financial style category are provided.

Appendix 2 Text average overlap SR strategy by SR strategy performed

	Number of funds	Obs.	Mean	SD	p10	p50	p90
All SR funds in the sample	456	50,307	0.396	0.08	0.295	0.396	0.500
Incorporation	398	43,755	0.401	0.080	0.297	0.400	0.510
Engagement	72	7217	0.419	0.093	0.306	0.409	0.552
Impact overall	59	5003	0.343	0.087	0.247	0.335	0.458
Gender diversity	14	1966	0.362	0.095	0.256	0.339	0.520
Low carbon fossil fuel free	34	3247	0.346	0.087	0.248	0.335	0.459
Community develop	17	1814	0.400	0.088	0.292	0.397	0.459
Impact environmental	30	2619	0.361	0.088	0.248	0.349	0.462
Impact other themes	13	1542	0.389	0.086	0.287	0.352	0.525
Environmental sector overall	12	645	0.338	0.070	0.257	0.321	0.449
Renewable energy	7	554	0.349	0.067	0.276	0.323	0.460
Water focused	6	96	0.326	0.017	0.308	0.323	0.358
General environmental sector	7	187	0.300	0.044	0.239	0.322	0.354
Negative screens	146	13,801	0.361	0.073	0.257	0.359	0.455
Negative norms based	13	677	0.415	0.076	0.299	0.402	0.538
Negative abortion & stem cells	36	3469	0.404	0.064	0.298	0.404	0.487
Negative adult entertainment	56	5335	0.389	0.061	0.302	0.389	0.468
Negative alcohol	84	8970	0.359	0.072	0.266	0.358	0.453
Negative animal testing	8	1066	0.422	0.082	0.307	0.449	0.526
Negative controversial weapons	77	6853	0.359	0.076	0.258	0.352	0.453
Negative gambling	85	9239	0.358	0.071	0.266	0.356	0.453
Negative GMOs	14	1736	0.413	0.069	0.312	0.426	0.524
Negative military contacting	15	968	0.374	0.082	0.273	0.367	0.533
Negative nuclear	32	2892	0.352	0.066	0.265	0.363	0.447
Negative pesticides	4	288	0.308	0.062	0.275	0.281	0.413
Negative small arms	66	6034	0.352	0.076	0.255	0.349	0.452
Negative thermal coal	42	3359	0.327	0.054	0.249	0.340	0.392
Negative tobacco	126	12,394	0.355	0.070	0.257	0.353	0.449
Negative others	51	5440	0.354	0.065	0.273	0.357	0.440

This table provides information about the number of SR funds in our sample involved in specific SR strategies for which Morningstar provides information. In addition, some summary statistics of the text average overlap SR strategy for each SR strategy are provided.

Morningstar provides information about the SR strategy type or screens applied by SR funds. Morningstar provides several indicator variables representing different ways to include ESG issues into the investment process. In this appendix, we reproduce the Morningstar definitions for these labels:

1 °ESG Incorporation: "These funds indicate the use of any sort of environmental, social, or governance factors in their investment process. These strategies often use positive screens to make their investment choices, tacitly removing companies that do not meet their standards in relevant environmental, social, and/or governance areas. ESG incorporation typically includes best-in-class strategies where managers select investments based on stronger ESG performance relative to peers". This category would represent SR funds performing positive screens.

2 °Engagement: "These funds use shareholder engagement, including raising resolutions, active proxy voting, and direct company engagement to pursue ESG goals with invested companies".

3° Impact Investment: "These funds seek to make a measurable impact in investments on specific issue areas alongside financial return". For this category, Morningstar provides more detailed information according to the specific issue dealt with in the impact investment. More concretely: *Gender and Diversity, low-carbon/fossil fuel-free, community development, environmental and other themes.*

4 °Environmental sector overall: "These non-diversified funds invest in environmentally-oriented industries, such as Renewable Energy and Water". For this category, Morningstar distinguishes the next sub-labels: "Renewable energy, water-focused and general environmental sector".

5 °Negative screens: "These funds intend to avoid a certain industries or groups of industries not aligning with the fund's values". For this category, information for negative screens of specific issues is also available: *Norms-based, abortion/stem cells, adult*

entertainment, alcohol, animal testing, controversial weapons, gambling, GMOs, military contracting, nuclear, pesticides, small arms and thermal coal, tobacco and other.

More information for these labels is available in the Sustainability Leveraging Brochure of Morningstar: https://advisor.morningstar.com/AWSOE/Training/MRCloud/LeveragingSustainability.pdf

In our sample, 456 out of 559 SR funds implement at least one SR strategy, for which Morningstar provides information. SR funds can apply several SR strategies or screens at the same time. The following table reports the number of SR funds applying different number of SR strategies or screens:

Number of funds	6	2	5	14	13	19	9	16	19	16	17	46	274
Number of SR strategies	14	12	11	10	9	8	7	6	5	4	3	2	1

Appendix 3

In this appendix, we provide some examples of how SR mutual funds provide information about different SR strategies in their prospectuses.

The *Negative Screens: ARK Social Issues Capital Growth* fund indicates in its prospectus that: "The fund normally invests in the equity securities of well-known established companies and small or medium capitalization companies that meet the advisors' social issues criteria screen. Companies involved in the following businesses may be excluded from the funds' portfolio: tobacco and alcohol, gambling, nuclear power, weapons, abortion and contraceptives".

The *Positive Screens: Fidelity Advisor® Women's Leadership* fund points out that: "the fund normally invests at least the 80 % of assets in equity securities of companies that prioritize and advance women leadership and development. Such companies include those that at the time of initial purchase (i) include a woman as a member of the senior management team (ii) are governed by a board for which women represent at least one third of all directors or (iii) in the adviser's opinion have adopted policies designed to attract retain and promote women".

The *Engagement:13D Activist fund* indicates in its prospectus that: "The fund invests primarily in common stocks of US companies of any market capitalization that are the target of shareholder activism. The adviser defines an activist situation as one where an investor holds more than 5% of a company shares and either (a) has a history of activist investing and/or (b) has a publicly disclosed catalyst for change such as seeking board seats improving operations and/or corporate governance practices".

Impact investing: the Karner Blue Animal Impact Butterfly Fund indicates in its prospectus that: "Under normal market conditions at the time of each quarterly reallocation or rebalance the adviser seeks to invest at least 75 % of the fund assets in companies from industries that the adviser believes significantly impact the welfare of animals ("primary industries") and up to 25 % of its assets in companies from other industries ("secondary industries") where the adviser believes a company has made significant contributions to animal welfare outside of its normal business operations".

Environmental Sector: the prospectus of the *GMO Climate Change Fund* points out that: "Under normal market conditions, the fund invests at least 80 % of its assets in companies in "climate change-related industries". The advisor considers "climate change-related industries" to include clean energy, batteries and storage, electric grid, energy efficiency, recycling and pollution control, agriculture, water, and businesses that service such industries".

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