The Costs of Being Sustainable

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Abstract

We assess the sustainability footprint of mutual funds through the holdings they have. Rather than relying on ESG metrics, we define the sustainability of a company by its average impact (either positive, or negative) on the 17 UN's Sustainable Development Goals (SDGs). We document that funds aligned with SDGs attract inflows only if they also have a sustainability mandate. For funds without a clear sustainability mandate, the relationship is opposite: those that are more aligned with SDGs, attract fewer flows. When we decompose scores in their *positive* and *negative* component, we find that it is mainly the negative component that drives our results. This suggests that, despite investors' preference for sustainable funds, investors limit their actions to excluding funds that are negatively aligned with SDGs rather than increasing capital inflows towards funds that are positively aligned. Our findings indicate that investors divest from non sustainable funds into "neutral" funds, instead of contributing to advancing SDGs.

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1 Introduction

The prominence of sustainable investing has increased substantially over the last decade. The number of signatories of United Nations Principles for Responsible Investment (PRI) has grown from 734 in 2010 to 3,826 in 2021, with total assets under management (AUM) increasing sixfold from US$21 trillion in 2010 to US$121 trillion in 2021.[1] Despite the fact that PRI signatories attract more capital, they do not systematically hold portfolios with a better environmental, social, and governance (ESG) profile than their non-signatory peers (Brandon et al., 2022; Kim and Yoon, 2022). Similarly, funds marketed as sustainable have been found to attract more investor capital than non-ESG funds, as mutual fund investors respond to the perceived sustainability profile of funds as revealed by their ratings (Hartzmark and Sussman, 2019; El Ghoul and Karoui, 2017). Fund families also appear to respond to investor demand for sustainability by converting funds to ESG labels if funds' ability to attract inflows has been lagging behind (Kaustia and Yu, 2021). This trend raises the concern that the motivation for offering sustainable-labeled funds could lie more with marketing rather than reflect responsible purposes.

It is not clear whether funds that are labeled as sustainable or that have high ESG ratings are ultimately committed to investing in sustainable assets (Brandon et al., 2022; Chen, 2022), and what drives investors' preferences for these funds (Green and Roth, 2021; Heeb et al., 2022). In this paper, we contribute to answering these questions by assessing the sustainability 'footprint' of funds through an *objective* measure that is not reliant on company disclosures of ESG policies, in contrast with *conventional* ESG measures used by investors to infer funds' sustainability.

Investors typically assess the sustainability performance of their holdings using ESG ratings (Rzeźnik et al., 2022). Despite the popularity of these metrics, their interpretation can be difficult for three reasons. First, the methodologies underlying the construction of ESG scores by different rating providers are often proprietary and opaque. The lack of a standardized approach to constructing them is reflected in the divergence across the scores of different providers (Berg et al., 2022), leaving investors with a fair degree of uncertainty over the ESG performance of a security. Second, ESG ratings aggregate many different pieces of information that are difficult to disentangle by looking at the ratings alone. For example, if a company's E, S and G performance is combined in a composite ESG score, the latter could hide a high degree of heterogeneity in firm's performance

[1] See `https://www.unpri.org/about-us/about-the-pri`

across the three dimensions. Third, most ESG metrics are coming from self-reported information, lacking in transparency and objectivity. Marquis et al. (2016) and Diouf and Boiral (2017) document how companies selectively disclose relatively benign impacts, creating an impression of transparency while masking their true performance. Similarly, Chen (2022) finds that all three major environmental rating providers (MSCI, Eikon, and Sustainalytics) assign higher scores to companies with better communication strategies, controlling for the effective environmental commitment. As a result, ESG investors face the risk to not holding a sustainable portfolio and therefore to misallocating their capital.

In this paper, we assess the sustainability footprint of mutual funds through the profile of the companies they hold. We depart from the conventional practice of considering ESG scores in order to evaluate the ESG profile of a firm. Rather, we define the sustainability of a firm by the impact of its products and services on the UN's 17 Sustainable Development Goals (SDGs). Impact can be either positive, or negative. The SDG alignment of a firm is a much broader measure of its sustainability than the E, S and G ratings. SDGs address the full spectrum of global macro systemic issues that matter to all stakeholders, all businesses and all countries. They were established in 2015 by 193 countries "to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by the year 2030".[2] We retrieve firms' SDG alignment scores from a novel database of sustainability ratings at the company level supplied by Util, a data provider. The SDG alignment scores are obtained by mapping the products and services provided by firms to a broad range of sustainability concepts that span the SDGs. The scores are also adjusted geographically to reflect variations in the relative importance of SDGs across geographies. Util's methodology assesses both the positive and the negative impact of companies on SDGs. Consequently, we are capable of clearly discerning companies that contribute to the advancement of SDGs from those that have detrimental impacts. On the contrary, standard ESG scores are more difficult to interpret as a low ESG score might mean that a company does not have a good sustainability standing but also that it is not sufficiently transparent in reporting its ESG policies.

The data provider uses natural language processing (NLP) and knowledge graph infrastructure to capture and assess the relationship between each product or service category and the various sustainability concepts. The NLP model uses a vast pool of unstructured data consisting of over 120 million peer-reviewed academic articles to identify the presence of relationships, as well as the magnitude and the direction of impact of firms'

[2] https://www.undp.org/sustainable-development-goals

products and services categories on these fine-grained sustainability concepts. Firms' scores are obtained by aggregating these individual impacts by weighing the product/service categories by the revenues that the firm derives from them. They are further aggregated at the firm level into the 17 distinct SDGs to obtain a set of positive and negative impact scores per firm. The sustainability metrics that we use in our analysis thus provide an objective and evidence-based view of a company's impact. They do not rely on self-reported company disclosures and the degree of transparency of these disclosures. In this way, the bias due to companies choosing what to disclose and analysts judging what is relevant in determining a sustainability score is substantially reduced.

We are not the first to analyse to what extent sustainable mutual funds are effectively taking into account ESG/sustainability aspects. Our study is also not the first to measure sustainability with SDGs alignment. For example, Morningstar provides SDG scores at the fund level (the "Average Revenue Percentage") that are calculated as a weighted average of the holding-level revenue percentage contributing to a particular SDG. However, to the best of our knowledge, we are the first to use a data set that completely ignores self-reported information on company sustainability policies and is based on objective scientific literature. Contrary to the SDG alignment scores we use in our analysis, Morningstar metrics are based on firm-level scores from Sustainalytics that rely heavily on company-reported ESG policies. In addition, their coverage does not span the whole spectrum of SDGs.

In our analysis, we consider the sustainability footprint of equity mutual funds along four dimensions aggregated across SDGs: *economy & infrastructure*, *environment*, *basic needs*, and *social progress*. We document that on average, funds' portfolios are negatively aligned with environmental goals, while having a positive alignment with economic & infrastructure and social goals. In stark contrast to this pattern, Morningstar fund SDG scores reveal that mutual funds perform best along the basic needs dimension, primarily due to high scores of large funds, while social progress scores are the lowest for all funds.

Given an objective measure of the sustainability profile of a mutual fund based on the SDG alignment scores from Util, our paper addresses three main questions as follows. First, we examine whether, in their allocation decisions, fund investors incorporate information about the sustainability impact of the funds they invest in. In particular, we investigate whether fund flows are associated with the sustainability score of the fund portfolio preceding the investment decision. We find that, on average, overall mutual fund flows are negatively associated with the extent to which a fund is aligned with the achievement of sustainability goals: funds that hold companies with a negative impact on SDGs attract more flows. However, for funds with a clear sustainability mandate in their prospectus, a higher portfolio alignment with SDGs is associated with higher subsequent investor flows. Furthermore, we find that these results are mainly driven by the funds whose portfolios have a negative impact on SDGs: funds that are positively aligned with SDGs do not attract flows, while the ones with a predominantly negative alignment experience outflows.

Second, we investigate the relationship between the sustainability profile of a fund and its market performance. We find that on average, funds investing in more SDG-aligned companies, experience lower returns than funds investing in less SDG-aligned companies. A 1% increase in the SDG alignment of a fund portfolio, on average, is associated with a 0.01% decrease in fund monthly abnormal returns, obtained from the five factor Fama-French model augmented with momentum (Fama and French, 2015; Carhart, 1997). We find that the different dimensions of sustainability have distinct effects on abnormal returns. Funds with higher positive impact with respect to basic needs SDGs experience lower returns than their peers. On the contrary, funds whose portfolios are more positively aligned with SDGs related to economy & infrastructure have higher abnormal returns. Importantly we find that funds with a sustainability mandate perform worse on average than non-sustainable funds. However, an increase in the alignment of their portfolios with SDGs is associated with an improved performance.

Our findings highlight the fact that on average, funds that are positively aligned with SDGs attract inflows only if they have a sustainability mandate in their prospectus or other regulatory filings. For funds with no sustainability mandate, the relationship is reversed: funds that are more aligned with SDGs attract fewer flows. When we decompose SDG alignmnent scores in their positive and negative components, we find that it is mainly the negative component that drives our results. These findings are consistent with the fact that sustainable investors are primarily guided by an exclusionary approach when it comes to allocating their assets (Dimson, 2020). This suggests that, despite investors' preference for sustainable funds, investors limit their actions to excluding funds that are negatively aligned with SDGs rather than increasing their capital inflows towards funds that are positively aligned. These findings highlight the fact that investors divest from non sustainable funds into "neutral" funds, instead of contributing to the aim of advancing SDGs by investing in positively aligned funds.

Our paper contributes to the strand of literature related to understanding how investors value the non pecuniary aspects of financial assets. Green and Roth (2021), Oehmke and Opp (2023), Pastor et al. (2021), and Pedersen et al. (2021) derive theoretical implications when economic agents have preferences for sustainable investing. Hong and Kacperczyk (2009) find that investors require a premium to hold 'sin' companies, and Bolton and Kacperczyk (2021, 2023) find similar results for high emitting companies. Hartzmark and Sussman (2019) argue that investors value sustainability and that they believe sustainability to be an indicator of positive future returns even though this does not show up in the data. Baker et al. (2022) find that investors, on average, are willing to pay 20 basis points more per year for funds with an ESG mandate. Our paper complements these findings by examining how investors' preferences align with different dimensions of sustainability. We find evidence that institutional investors incorporate information about the sustainability alignment of mutual funds when they make their capital allocation decisions, beyond the information contained in publicly available ESG ratings. Investors differentiate across different aspects of sustainability. The fund flow patterns we unveil are suggestive of institutional investors' preferences for 'remunerative' sustainability.

More generally, our paper contributes to the studies on the portfolio allocation choices of mutual funds. Atta-Darkua et al. (2023) document that institutional investors that join *climate related investor initiatives* decarbonize their equity portfolios. Ceccarelli et al. (2024) show that mutual funds actively reduced their exposure to firms with high carbon risk scores after the release of Morningstar's novel carbon risk metrics in April 2018. Brandon et al. (2022) demonstrate that institutional investors signatories of PRI exhibit portfolio-level ESG scores that are at best similar to those of peer institutional investors non-signatories. Furthermore, US signatories do not improve the ESG scores of portfolio companies after investing in them. Kim and Yoon (2022) find a significant increase in fund flows to PRI signatory funds regardless of their prior fund-level ESG score. While signatories do not subsequently improve their fund-level ESG scores, a substantial proportion of funds rely on their PRI status to attract capital without making notable changes to ESG. They also observe that funds attracting below average flows are more likely to be repurposed as ESG funds. Kaustia and Yu (2021) study the potential greenwashing behavior of mutual fund companies. They find that a self-designated ESG label helps mutual funds attract more flows than their non-ESG peers with otherwise similar characteristics even if the self-designated ESG label is in conflict with Morningstar's ratings. This result highlights potential greenwashing motivations.

Parise and Rubin (2023) and Huang et al. (2024) show that ESG mutual funds manipulate their ESG ratings by increasing their holdings in high ESG companies immediately before mandatory portfolio disclosure. As a result, disclosed portfolios receive substantially higher ratings than actual portfolios would. They document that ESG manipulators earn higher risk-adjusted returns and attract more investor flows. Ammann et al. (2019) study the effect of the introduction of Morningstar's Sustainability Rating in March 2016 on mutual fund flows. Their findings suggest that retail investors shift money away from low-rated and into high-rated funds. On the other hand, institutional investors react much more weakly to the publication of the ratings. Couvert (2022) analyzes the impact of mutual funds' announced policies regarding how they generally vote on the different ballot items at the shareholder meetings of their portfolio firms. The author shows that given the discrepancy between announced and revealed preferences, portfolio firms do not adopt the announced environmental and social preferences of their mutual fund shareholders. The results shed light on a growing concern among mutual funds' investors and policymakers, namely that mutual funds' public statements and policy positions reflect marketing rather than stewardship intentions.

A different approach to study how ESG is effectively integrated in investing decision by funds managers is to analyze how different incentives influence the asset allocation of ESG funds. Chen and Dai (2023) examine how equity mutual fund managers make decisions on investing in ESG stocks. The authors find that mutual funds whose flows are highly sensitive to performance, are less inclined to hold stocks with high ESG score in their portfolio. Moreover, fund managers whose compensations are explicitly linked to fund performance invest less in ESG stocks. Similarly Orlov et al. (2023) explore how fund managers' investing decisions vary with the personal investments of managers in the funds they manage. Co-investing managers exhibit significantly lower ESG performance in the funds they manage than their peers. Lowry et al. (2023) find that ESG funds with higher incentives to engage with portfolio firms adopt longer-term investment strategies and implement less negative screening. Strikingly, only investments by committed ESG funds contribute to real ESG-improvements.

Pastor et al. (2023) quantify the actual amount of assets under management (AUM) that are effectively invested according to the ESG paradigm. Strikingly, they find that the total amount of ESG investing is substantially lower than the aggregate AUM of funds that claim to be aligned with ESG principles in their investment decisions. Our approach in identifying the sustainability alignment of mutual funds is similar in that it measures the degree of SDG alignment of a fund through the sustainability profile of the assets it holds, and not through the self-proclaimed ESG mandate of the fund.

Much less work has been done on the understanding the extent to which ESG ratings reflect the same information that is contained in SDGs. To measure the SDG footprint of a firm, Bekaert et al. (2023) use a comprehensive set of unstructured data, including news articles, self-reported company data, NGO reports and social media to create daily SDG scores at the company level. They find that following an ESG investment paradigm yields an SDG-aligned portfolio. Our approach differs in that our SDG metrics are not derived from self-reported information, making our data bias-free. In addition, following standard ESG ratings does not reveal the fund flow—sustainability pattern that we find for SDG alignment.

The remainder of this paper is organized as follows. Section 2 presents the data and discusses our approach. Section 3 discuses our results. Section 4 concludes.

2 Data and Methodology

We retrieve mutual funds data from the CRSP mutual funds database and Morningstar direct. We merge the two data sets through a common ticker symbol and fund names. We discard all fund-quarter observations for which we do not observe at least 95% of the holdings of the fund. To assess the sustainability of a fund, we use firm-level scores provided by the data provider Util. To the best of our knowledge, we are the first academic study to use these data. There are two main reasons of why the features of this data set are innovative. First, the ratings are related to the UN 17 SDGs, giving a bigger granularity to the definition of sustainability than the three dimensions of ESG. Second, the methodology used by Util completely excludes self-reported information on the sustainability practices of individual companies or the ESG mandate of the fund. In this way the ratings are not influenced by the information that companies decide to report.

Util's methodology of assigning sustainability alignment scores to firms starts by mapping companies to their products and services using the revenues they derive from them. Then, through natural language processing (NLP) models, 120 million peer-reviewed articles are analyzed to find evidence of products' impact on a sustainability concept (more than 2,000 sustainability concepts are used at that stage). The algorithm identifies instances in the academic literature where a product/service and sustainability concept are cited in the same context and then it establishes whether the product/service positively or negatively affects the sustainability concept. The final step involves mapping these sustainability concepts to the 17 SDGs. Products/services are classified across five categories for each SDG: very negative, negative, neutral, positive, and very positive. These ratings are adjusted geographically to take into account whether a company is selling its products/services where they matter the most, or at least where they are less harmful. To have a score at the company level, the company's product ratings are weighted according to the contribution of the products to the total firm revenues and are aggregated. Util provides both scores at the individual SDGs level, at the macro area level, and at the overall sustainability level, which forms a unique score aggregating all the 17 SDG scores. For each of these dimensions, Util provides a positive impact score, a negative impact score, and a net impact score. The latter is defined as the positive impact score minus the negative impact score.

We use both the overall SDG rating of a fund obtained via its holdings, and four component ratings measuring SDG alignment along the following dimensions: *Economy & Infrastructure* (aggregating SDGs 8, 9, 11 and 17, and namely Decent Work & Economic Growth, Industry, Innovation & Infrastructure, Sustainable Cities & Communities, and Partnerships for the Goals, respectively), *Environment* (aggregating SDGs 12, 13, 14 and 15, namely Responsible Consumption & Production, Climate Action, Life Below Water, and Life on Land), *Basic Needs* (aggregating SDGs 1, 2, 3, 6 and 7, namely No Poverty, Zero Hunger, Good Health & Well Being, Clean Water & Sanitation, and Affordable & Clean Energy, respectively), and *Social Progress* (comprising SDGs 4, 5, 10 and 16 that correspond to Quality Education, Gender Equality, Reduced Inequalities, and Peace, Justice & Strong Institutions, respectively). Util provides SDG ratings at the company level. To calculate a company score for a theme (Overall Sustainability, *Economy & Infrastructure*, *Environment*, *Basic Needs*, and *Social Progress*), Util calculates the average of all of the scores related to the relevant SDGs. Util provides also the scores disaggregated in the positive and negative alignment components. In more details, the positive (resp. negative) component take into account only the company revenues coming from products having a positive (resp. negative) impact on a specific SDG. Then, the overall company score against a particular SDG is defined as the net percentage revenue alignment against the SDG, that is positive percentage revenue alignment diminished by negative percentage revenue alignment. The score per theme per company is calculated as the average of all of the net percentage revenue alignment values for each SDG mapped to the theme, multiplied by 100. The last step reflects the fact that averaging net revenue alignments does not produce a metric that can be interpreted as a percentage revenue alignment, but rather as a scoring metric to evaluate company performance.

In our analysis we use both the net, positive, and negative alignment scores.

We focus our analysis starting from January 2015, that is the first date Util data is available. Table 1 shows descriptive statistics of the Util score at the company level, and Figure 1 displays the average sustainability of companies within each sector.

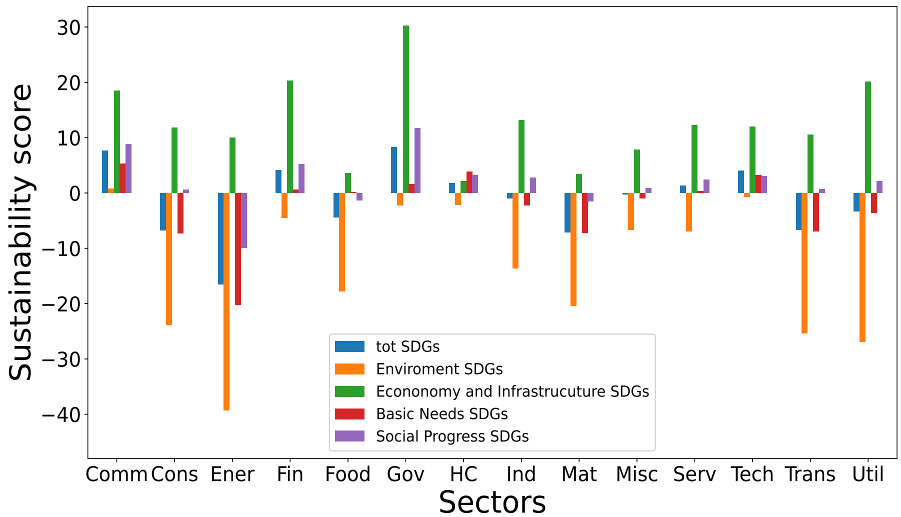
Table 1
Descriptive Statistics of the SDG Alignment Scores at the Company Level

This table presents the descriptive statistics of SDG alignment scores at the holdings level, containing 10,068 securities. *tot SDGs* is the total 17 SDG alignment score of a company. *Basic Needs* combines SDGs 1, 2, 3, 6 and 7. *Social Progress* aggregates SDGs 4, 5, 10 and 16. *Environment* aggregates SDGs 12, 13, 14 and 15. *Econ&Infra* aggregates alignment along SDGs 8, 9, 11 and 17.

		Positive Alignment					Negative Alignment					Net Alignment				
		mean	std	min	median	max	mean	std	min	median	max	mean	std	min	median	max
Basic needs	SDG 1	2.15	5.47	0	0	78.5	2.68	6.53	0	0	87.46	-0.54	9.09	-87.46	0	78.5
	SDG 2	4.22	9.77	0	0	75.86	1.6	7.48	0	0	71.54	2.63	12.77	-71.54	0	75.86
	SDG 3	7.1	11.92	0	0	83.42	12.49	18.22	0	0	87.48	-5.39	24.9	-87.48	0	83.42
	SDG 6	2.47	8.09	0	0	77.19	10.68	19.8	0	0	94.54	-8.21	22.27	-94.54	0	77.19
	SDG 7	3.8	9.87	0	0	72.69	0	0.18	0	0	18.83	3.79	9.87	-17.83	0	72.69
	Basic needs	3.97	5.37	0	2.08	53.66	5.62	8.47	0	0.1	60.32	-1.65	10.45	-53.77	0	53.62
Social Progress	SDG 4	5.76	9.63	0	0.01	90.32	0.12	1.45	0	0	43.88	5.64	9.8	-43.88	0.01	90.32
	SDG 5	2.39	8.39	0	0	83.64	0.58	5.05	0	0	88.15	1.81	9.91	-88.15	0	83.64
	SDG 10	4.12	12.28	0	0	83.78	2.65	8.43	0	0	89.58	1.47	15.54	-89.58	0	83.78
	SDG 16	2.08	6.59	0	0	70.26	2.78	9.48	0	0	75.44	-0.69	11.98	-75.44	0	70.26
	Social Progress	3.59	6.82	0	0.13	61.73	1.53	4.56	0	0	62.07	2.07	8.49	-62.07	0	61.73
Environment	SDG 12	2.48	7.02	0	0	76.66	7.79	13.46	0	0	90.28	-5.31	16.03	-90.28	0	76.66
	SDG 13	5.82	11.24	0	0	84.92	6.78	13.82	0	0	86.94	-0.96	19.51	-86.94	0	84.92
	SDG 14	1.17	6.09	0	0	70.13	19.35	27.4	0	0	96.6	-18.18	28.57	-96.6	0	70.08
	SDG 15	0.93	5.92	0	0	82.19	21.75	27.91	0	1.13	94.18	-20.82	28.98	-94.18	-0.65	82.19
	Environment	2.62	5.45	0	0	56.36	14.25	18.79	0	2.69	73.5	-11.63	20.38	-73.5	-0.66	56.36
Economy and Infrastructure	SDG 8	18.14	15.21	0	17.4	91.82	0.2	2.65	0	0	64.55	17.94	15.65	-64.55	17.4	91.82
	SDG 9	18.2	20.56	0	10.41	93.7	0.88	5.29	0	0	86.94	17.32	21.84	-86.94	10	93.7
	SDG 11	2.79	9.77	0	0	99.62	17.08	25.02	0	0	99.68	-14.29	28.08	-99.68	0	99.62
	SDG 17	11.93	18.23	0	0	91.44	0	0	0	0	0	11.93	18.23	0	0	91.44
	Econ&Infra	13.59	13.35	0	9.94	78.28	2.01	4.18	0	0	38.39	11.57	13.94	-26.95	7.71	78.28
	tot SDGs	5.65	5.86	0	4.14	50.76	6.47	8.56	0	1.64	40.86	-0.82	10.4	-34.06	0	50.76

Figure 1: **Net Average Sustainability Scores Across Sectors at the Company Level**

This figure presents the average sustainability for different dimensions across different sectors. The sectors are defined by Util and are Energy (Ener), Financial Services (Fin), Food & Beverage (Food), Health Care (HC), Industrial (Ind), Materials (Mat), Miscellaneous (Misc), Services (Serv), Technology (Tech), Transport (Trans), Utilities (Util). *tot SDGs* is the total 17 SDG alignment score of a company. *Economy & Infrastructure SDGs* aggregates alignment along SDGs 8, 9, 11 and 17. *Environment SDGs* aggregates SDGs 12, 13, 14 and 15. *Basic Needs SDGs* combines SDGs 1, 2, 3, 6 and 7. *Social Progress SDGs* aggregates SDGs 4, 5, 10 and 16.



The final sample is composed of 1,709 US mutual funds for which we observe the Util scores for at least 67% of their holdings during at least one period.[3] The holdings contains 10,068 securities and the funds have 5,660 fund share classes. Our sample is composed by funds in the following Morningstar global categories: US Equity Large Cap Blend, US Equity Large Cap Growth, US Equity Large Cap Value, US Equity Mid Cap, and US Equity Small Cap. Our sample covers the period January 2015 - June 2023. We merge holdings with Util ratings by using 8-digit CUSIP codes.

To create our sustainability ratings at the fund level, we use Util's *net alignment score*, as well as its two components, the *positive alignment score*, and the *negative alignment score* at the company level.[4] These metrics measure the alignment of a fund with a particular underlying SDG theme. The themes are: overall SDGs, economy & infrastructure, environment, basic needs, and social progress. We refer to overall SDGs as the overall sustainability, whereas to the last four themes as the four different dimensions of sustainability. For

[3]To determine the threshold 67%, we follow Morningstar's methodology for its sustainability rating.
[4]A similar bottom-up approach is implemented by Morningstar to create their sustainability ratings.

each of the five themes, we obtain the positive, negative, and net alignment scores. To obtain a score at the fund level, we adopt the following methodology. The first step is to compute the weighted average score of the fund holdings by using the company-level ratings. We define $s_{i,t}^{k*}$ as the sustainability rating at time t for the fund i according to the dimension $k \in \{$*tot SDGs*, *economy* & *infrastructure*, *environment*, *basic needs*, *social progress*$\}$, and the alignment $* \in \{$*pos*, *neg*, *net*$\}$ as:

$$s_{i,t}^{k*} = \sum_{j \in i} w_{j,i,t} \mathrm{SUS}_{j,t}^{k*} \,, \tag{1}$$

where $w_{j,i,t}$ is the weight of security j in fund i at time t, and $\mathrm{SUS}_{j,t}^{k*}$ is the sustainability score at the security level in dimension k^* at time t. Figure 2 displays the average sustainability level for each dimension for funds in different categories. Large funds have the highest SDG alignment scores and they are positive on average. Mid-cap and small funds display a neutral SDG alignment on average. The total SDG scores however hide a substantial degree of heterogeneity in the alignment of fund portfolios along different sustainability goals. Funds are highly positively aligned on average with *economy* & *infrastructure* goals, while they are highly negatively aligned with *environment* SDGs.

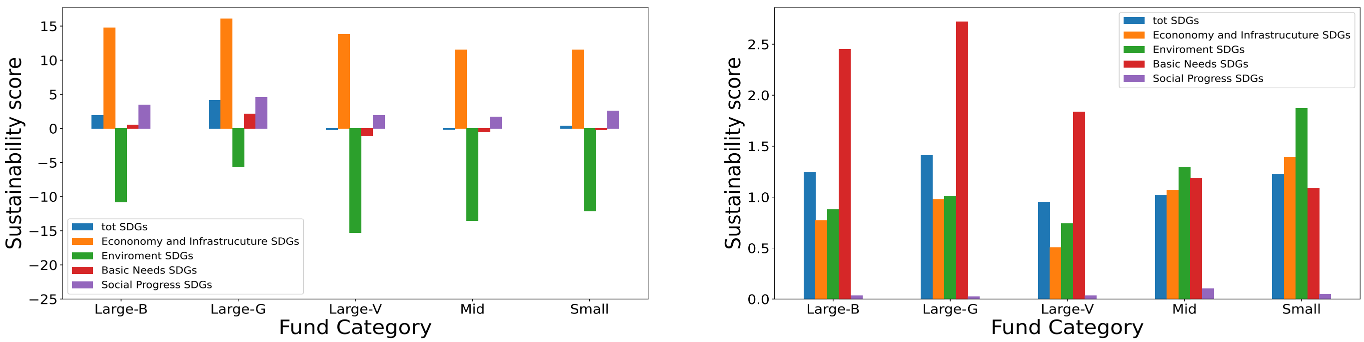
For comparison, in Panel B of Figure 2, we show similar metrics based on the Morningstar Average Revenue Percentage scores. The Average Revenue Percentage score is at the fund level and is available for each SDG with the exception of SDGs 1, 8, 16, and 17.[5] This score gives for a particular fund the weighted average of the holding-level revenue percentage contributing to a particular SDG. By using the same mapping scheme used by Util, we aggregate these different scores at the SDGs level in the four different dimensions *economy* & *infrastructure*, *environment*, *basic need*s, and *social progress* plus a metric of overall sustainability. Morningstar scores reveal a substantially different pattern. Funds, especially large ones, appear to fare best along the *basic needs*. Small and mid-cap funds, on the other hand, perform best along *environment* SDGs. Comparing the two panels in Figure 2, we can conclude that Util and Morningstar sustainability metrics reflect different information.

Alongside these sustainability metrics, we also use standard fund characteristics. We retrieve total net

[5]SDGs 1, 8, 16 and 17 are: *no poverty*, *decent work & economic growth*, *peace, justice & strong institutions*, and *partnership for the 17 goals*, respectively. Morningstar's motivation for not providing the score related to these SDGs is that the contribution of companies to these SDGs is difficult to quantify.

Figure 2: **Average Sustainability Scores Across Fund Categories at the Fund Level**

This figure presents the average sustainability for different dimensions across different fund categories. Panel A shows sustainability based on Util net scores, while Panel B shows the sustainability scores based on SDGs scores provided by Morningstar. Fund categories are defined by Morningstar and are US Equity Large Cap Blend (Large-B), US Equity Large Cap Growth (Large-G), US Equity Large Cap Value (Large-V), US Equity Mid Cap (Mid), US Equity Small Cap (Small). *tot SDGs* is the total 17 SDG alignment score of a company. *Economy & Infrastructure SDGs* aggregates alignment along SDGs 8, 9, 11 and 17. *Environment SDGs* aggregates SDGs 12, 13, 14 and 15. *Basic Needs SDGs* combines SDGs 1, 2, 3, 6 and 7. And *Social Progress SDGs* aggregates SDGs 4, 5, 10 and 16.



(a) *Util*

(b) *Morningstar*

assets (mtna) and monthly returns from CRSP (mret); and expense ratio, age, and Morningstar overall rating from Morningstar. Following Sirri and Tufano (1998), flows of fund i are defined as the monthly growth of total net assets, net of returns:

$$\text{Flow}_{i,t} = \frac{\text{mtna}_{i,t} - \text{mtna}_{i,t-1}(1 + \text{mret}_{i,t-1})}{\text{mtna}_{i,t-1}} \, . \tag{2}$$

We define monthly excess returns (mxret) as the monthly fund returns in excess of the risk-free asset and the monthly abnormal returns as in Kaniel et al. (2023). Abnormal return for each fund-month observation are relative to the Fama-French five factor model and momentum (Fama and French, 2015; Carhart, 1997). First, factor loadings are estimated over the prior 36 months:

$$\text{mxret}_{i,t-36:t-1} = \alpha_i + f_{t-36:t-1}\hat{\beta}_{i,t-1} + \epsilon_{i,t-36:t-1} \, , \tag{3}$$

where $\text{mxret}_{i,t-36:t-1}$ and $f_{t-36:t-1}$ are the vector and the matrix containing respectively fund i's and factors excess returns from $t-36$ to $t-1$, and $\hat{\beta}_{i,t-1}$ is the vector containing the factor loadings estimated in the time window $[t-36:t-1]$. Then abnormal returns $\text{mabn}_{i,t}$ are computed as:

$$\text{mabn}_{i,t} = \text{mxret}_{i,t} - f_t \hat{\beta}_{i,t-1} \ . \tag{4}$$

We winsorize all the continuous variables at the 1% level. Table 2 shows descriptive statistics of fund characteristics and fund sustainability.

Table 2

Descriptive Statistics at the Fund Level

This table presents the descriptive statistics of our data containing 1,709 mutual funds over the period Jan 2015 - June 2023. The top three panels present the descriptive of the sustainability ratings of the funds in the sample. *Net alignment* is computed as the *Positive alignment* minus *Negative alignment*, *Positive alignment* measures the positive impact of the fund on the different SDG dimensions, and *Negative alignment* measures the negative impact of the fund on the different SDG dimensions. The SDG dimensions are following: *tot SDGs* is the total SDG alignment score of a fund. *Econ&Infra* aggregates alignment along SDGs 8, 9, 11 and 17. *Environment* aggregates SDGs 12, 13, 14 and 15. *Basic Needs* combines SDGs 1, 2, 3, 6 and 7. And *Social Progress* aggregates SDGs 4, 5, 10 and 16. The bottom panel reports the descriptive statistics of the following fund characteristics and performance metrics: total net assets, monthly returns (*mret*), monthly returns in excess of the risk free rate (*mxret*), monthly abnormal returns (*mabn*) obtained from the Fama-French five factor model augmented with momentum (Fama and French, 2015; Carhart, 1997), fund flows defined as the monthly growth of total net assets, net of returns (*flows*), fund *expense ratio*, fund *age* in years, and the overall fund rating from Morningstar (*MS stars*).

		mean	std	min	median	max
Net alignment	tot SDGs	1.56	2.41	-13.16	1.21	11.04
	Econ&Infra	13.66	3.01	5.18	13.68	24.21
	Environment	-10.74	5.24	-42.4	-10.66	13.14
	Basic Needs	0.44	1.89	-15.32	0.44	11.56
	Social Progress	3.18	1.78	-7.39	2.89	9.82
Positive alignment	tot SDGs	6.49	1.24	2.36	6.6	13.54
	Econ&Infra	15.08	2.9	3.28	15.53	28.14
	Environment	2.69	0.74	0.24	2.68	16.53
	Basic Needs	4.41	0.8	0.83	4.43	13.42
	Social Progress	4.69	1.58	0.15	4.53	12.08
Negative alignment	tot SDGs	5.32	2.04	0.35	5.34	19.5
	Econ&Infra	1.5	0.76	-0.05	1.46	8.5
	Environment	10.98	4.29	0.43	11.05	41.36
	Basic Needs	4.27	1.82	0.14	4.19	19.43
	Social Progress	1.77	0.86	-0.24	1.65	10.25
Fund characteristics	total net assets (mil)	887.72	2501.36	1.3	107.5	17301.52
	mret (%)	1.02	4.89	-12.07	1.31	13.47
	mxret (%)	0.92	4.90	-12.54	1.23	13.47
	mabn (%)	-0.09	1.74	-23.67	-0.11	25.18
	flows (%)	-0.44	4.99	-19.27	-0.62	29.24
	expense ratio (%)	0.91	0.43	0.05	0.85	2.32
	age (Y)	16.29	10.25	1.53	15.31	98.53
	MS stars	3.02	0.98	1	3	5

3 Discussion of Results

We start by obtaining the sustainability ratings of individual funds based on the SDG alignment scores of their holdings: we compute both the positive, negative, and net alignment rating as described in Section 2 for each one of the five sustainability dimension (*tos SDGs*, *Economy & Infrastructure*, *Environment*, *Basic Needs*, and *Social Progress*). In a first step, we assess whether investors have any preference for fund sustainability, and if so, which dimensions drive this relation. Then we analyze the impact of sustainability on fund returns.

3.1 Fund Flows and Sustainability

We first study whether investors preferences are related to different dimensions of sustainability. We run a series of panel regressions and, in particular, regress fund flows (defined in Equation 2) on each sustainability measure alongside a set of fund characteristics as controls. We also include Morningstar category-by-year-month fixed effects to control for time variation by category. We run a panel regression for each sustainability measure $s^k_{i,t-1}$ to study the effect of different sustainability metrics on fund flows:

$$\text{flow}_{i,t} = \gamma^k_{gc,t} + \alpha^k + \beta^k s^k_{i,t-1} + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \,. \tag{5}$$

We regress fund flows on each sustainability measure $s^k_{i,t-1}$ in the prior month.We include $\gamma^k_{gc,t}$ as Morningstar global category-by-year-month fixed effects to control for time variation by category alongside a set of lagged fund characteristics as controls $x_{i,t-1}$. Controls are the fund return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the log fund size in the prior month, the expenses ratio, the Morningstar rating in the prior month, the flow in the prior month, and the log of fund age.

Table 3 presents the results for the overall SDG score, reflecting the net alignment of funds along all SDGs, as well as for its decomposition into the *Economy & Infrastructure*, *Environment*, *Basic Needs*, and *Social Progress*) dimensions. The overall net sustainability score does not appear to be associated with subsequent fund flows. However, when we consider the separate components of the score, a different pattern emerges. Within fund category and time cells, funds with high economy, infrastructure, and social progress alignment attract significantly less inflows relative to their peers that fare worse along these SDGs. Environmental and basic needs alignment does not appear to be associated with subsequent investor flows. In all regressions, we include a set of controls. We note that flows are positively related with past returns, past flows, and Morningstar star ratings, whereas they are negatively related with expenses ratios, fund age and size.

Table 3

Sustainability Alignment and Fund Flows

This table reports parameter estimates of the regression of fund flows on the sustainability score of the fund in the prior month (*sus. score*$_{t-1}$) and a set of controls, as given in Equation (5). The dependent variable is fund flows, which is regressed on different proxies for funds sustainability: the sustainability score *tot SDGs*, and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All columns include as additional controls the log of size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the log of fund age, and the fund flow in the prior month. In addition, all columns include the year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans Jan 2015—June 2023, and our analysis is at the share class level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$		-0.0002	-0.0004***	0	-0.0001	-0.0005***
		(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)
constant	-0.0083***	-0.0083***	-0.0033**	-0.0079***	-0.0084***	-0.0069***
	(0.0012)	(0.0012)	(0.0016)	(0.0014)	(0.0012)	(0.0012)
log TA$_{t-1}$	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
MS stars$_{t-1}$	0.0047***	0.0047***	0.0047***	0.0047***	0.0047***	0.0048***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
r_{t-1}	0.0567***	0.0566***	0.057***	0.0567***	0.0567***	0.0568***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$r_{t-12:t-1}$	0.4595***	0.4513***	0.4814***	0.4648***	0.4563***	0.4625***
	(0.0412)	(0.0418)	(0.0417)	(0.0429)	(0.0424)	(0.0412)
$r_{t-24:t-1}$	0.5488***	0.5653***	0.517***	0.5383***	0.5539***	0.5441***
	(0.0673)	(0.0686)	(0.0668)	(0.0692)	(0.0685)	(0.0673)
exp ratio	-0.0015***	-0.0014***	-0.0015***	-0.0015***	-0.0015***	-0.0015***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
log age	-0.0068***	-0.0067***	-0.0067***	-0.0068***	-0.0067***	-0.0067***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
flows$_{t-1}$	0.1752***	0.1751***	0.1749***	0.1752***	0.1752***	0.175***
	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)
observations	191423	191423	191423	191423	191423	191423
R^2	0.0773	0.0774	0.0776	0.0773	0.0773	0.0775
R^2 between	0.2361	0.236	0.2333	0.236	0.2362	0.2362
Cat by YM FE	YES	YES	YES	YES	YES	YES

We further consider a decomposition of the net sustainability scores into positive and negative alignment scores. This distinction is motivated by the different criteria that investors might have in choosing funds to invest in: investors who apply exclusions criteria can have different sustainability preferences compared to investors who apply a best-in-class approach. A single metric of net alignment would mask this distinction. Therefore, we also run the panel regression in the following specification:

$$\text{flow}_{i,t} = \gamma_{gc,t}^{k} + \alpha^{k} + \beta^{k^{+}} s_{i,t-1}^{k^{+}} + \beta^{k^{-}} s_{i,t-1}^{k^{-}} + \delta^{k} x_{i,t-1} + \epsilon_{i,t}^{k}\ . \tag{6}$$

where $s_{i,t-1}^{k^{+}}$ and $s_{i,t-1}^{k^{-}}$ correspond to positive, resp. negative alignment with sustainability score k.

Table 4 reports the results. We document a markedly different relationship between fund portfolio sustainability scores and subsequent fund flows along positive and negative SDG alignment scores. Funds with portfolios that are more negatively aligned with SDGs attract significantly higher investor flows in the next period. The opposite holds for funds with positively aligned portfolios. The pattern is confirmed across the four different dimensions of sustainability in terms of sign, while significance in the flow—sustainability relationship is established predominantly for the negative component of sustainability metrics (with the exception of the social progress dimension): the more negative the SDG impact of the fund is, the higher the inflows.

In their allocation decisions, investors might be motivated by the stated sustainability objective of the fund rather than by its sustainability score as inferred by the companies held in its portfolio. In addition, retail and institutional investors may differ in their preferences for sustainability, while some institutional investors may be bound by a mandate to invest along sustainability-linked objectives. Therefore, we also account for funds with a clear sustainability objective[6] and for the prevalence of institutional investors in the following specifications in Equation (7):

[6] Morningstar defines a fund as sustainable investment product if in the prospectus or other regulatory filings it is described as focusing on sustainability, impact investing, or environmental, social or governance factors. Funds must claim to have a sustainability objective, and/or use binding ESG criteria for their investment selection. Funds that employ only limited exclusions or only consider ESG factors in a non-binding way are not considered to be a sustainable investment product. Sustainable funds, on average, have higher sustainability alignment scores than their non-sustainable peers. However, these funds are negatively aligned on average with some sustaninability goals (e.g. along the environmental dimension).

Table 4
Positive and Negative Sustainability Alignment and Fund Flows

This table reports parameter estimates of the regression of fund flows on the sustainability score of the fund in the prior month disaggregate in the positive alignment (*sus. score*$_{t-1}$ pos) and the negative alignment (*sus. score*$_{t-1}$ neg), and a set of controls, as given in Equation (6). The dependent variable is fund flows, which is regressed on different proxies for funds sustainability: the sustainability score *tot SDGs*, and the four component scores *Econ*&*Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All columns include as additional controls the log of size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the log of fund age, and the fund flow in the prior month. In addition, all columns include the year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans Jan 2015—June 2023, and our analysis is at the share class level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$ pos		-0.0005*	-0.0001	-0.0002	-0.0005	-0.0004**
		(0.0003)	(0.0001)	(0.0004)	(0.0004)	(0.0002)
sus. score$_{t-1}$ neg		0.0006***	0.0012**	0.0003***	0.0007***	0.0006
		(0.0002)	(0.0005)	(0.0001)	(0.0002)	(0.0004)
constant	-0.016***	-0.0168***	-0.0165***	-0.0193***	-0.0175***	-0.015***
	(0.0015)	(0.0027)	(0.0025)	(0.0023)	(0.0028)	(0.002)
log TA$_{t-1}$	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
MS stars$_{t-1}$	0.0044***	0.0044***	0.0044***	0.0043***	0.0044***	0.0044***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
r_{t-1}	0.0772***	0.0758***	0.0764***	0.0749***	0.0753***	0.0779***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)
$r_{t-12:t-1}$	0.5232***	0.4944***	0.508***	0.4838***	0.4822***	0.5289***
	(0.0531)	(0.0571)	(0.0571)	(0.0566)	(0.0558)	(0.0546)
$r_{t-24:t-1}$	0.6584***	0.7754***	0.7263***	0.8072***	0.7986***	0.6399***
	(0.0894)	(0.107)	(0.1049)	(0.1053)	(0.1034)	(0.0923)
$expratio$	-0.0009	-0.0008	-0.0009	-0.0008	-0.0009	-0.0009
	(0.0006)	(0.0006)	(0.0007)	(0.0007)	(0.0006)	(0.0006)
log age	-0.0069***	-0.0069***	-0.0069***	-0.0069***	-0.0069***	-0.0069***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
flows$_{t-1}$	0.1648***	0.1644***	0.1646***	0.1645***	0.1645***	0.1646***
	(0.0088)	(0.0088)	(0.0088)	(0.0088)	(0.0089)	(0.0088)
observations	98269	98269	98269	98269	98269	98269
R^2	0.078	0.0783	0.0782	0.0782	0.0783	0.0782
R^2 between	0.2657	0.2687	0.268	0.2674	0.2687	0.2697
Cat by YM FE	YES	YES	YES	YES	YES	YES

$$
\begin{aligned}
\text{flow}_{i,t} = \quad & \gamma^k_{gc,t} + \alpha^k + \gamma^k \mathbb{S} + \iota^k \mathbb{I} \\
& + \beta^k s^k_{i,t-1} + \zeta^k s^k_{i,t-1} \mathbb{S} + \eta^k s^k_{i,t-1} \mathbb{I} \\
& + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \ ,
\end{aligned} \tag{7}
$$

where $\mathbb{S}$ and $\mathbb{I}$ are dummies indicating whether the fund has a clear sustainability objective, and whether the share class is for institutional investors, respectively. We interact these two dummies with the sustainability scores $s^k_{i,t-1}$.

We report results in Table 5. In general, institutional investor share classes attract significantly more investor capital. Similarly, funds with a sustainability mandate attract significantly higher inflows relative to funds without such a mandate. Interestingly, when we account for funds with such a mandate, the relationship between the overall fund's SDG score and subsequent investor flows becomes significantly negative. Columns (3)—(7) of Table 5 report estimates of the specifications in which we allow for an interaction between the sustainability fund and the institutional share class dummies with the sustainability score of the fund. Investors appear to allocate more capital to sustainable funds when they are more aligned with overall SDGs. The same holds for the environmental and the basic needs dimension. On the other hand, institutional investors allocate significantly less capital to funds that are more aligned with economy and infrastructure SDGs.

Finally, we augment the specification in Equation (7) by considering the positive and negative alignment of funds to SDGs:

$$
\begin{aligned}
\text{flow}_{i,t} = \quad & \gamma^k_{gc,t} + \alpha^k + \gamma^k \mathbb{S} + \iota^k \mathbb{I} \\
& + \beta^{k^+} s^{k^+}_{i,t-1} + \zeta^{k^+} s^{k^+}_{i,t-1} \mathbb{S} + \eta^{k^+} s^{k^+}_{i,t-1} \mathbb{I} \\
& + \beta^{k^-} s^{k^-}_{i,t-1} + \zeta^{k^-} s^{k^-}_{i,t-1} \mathbb{S} + \eta^{k^-} s^{k^-}_{i,t-1} \mathbb{I} \\
& + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \ ,
\end{aligned} \tag{8}
$$

where we interact the sustainable fund and institutional investor dummies $\mathbb{S}$ and $\mathbb{I}$ with the sustainability scores $s^{k^+}_{i,t-1}$ and $s^{k^-}_{i,t-1}$. Results are reported in Table 6.

Table 5

Sustainability Alignment, Sustainability Mandate, and Institutional Investor Fund Flows

This table reports parameter estimates of the regression of fund flows on the sustainability score of the fund in the prior month (*sus. score*$_{t-1}$), an interaction term including the sustainability score in the prior month and a sustainable fund dummy variable (*sus. score*$_{t-1}$ *Sust Fund), an interaction term including the sustainability score in the prior month and an institutional investor dummy variable (*sus. score*$_{t-1}$*Inst) and a set of controls, as given in Equation (7). The dependent variable is fund flows, which is regressed on different proxies for funds sustainability: the sustainability score *tot SDGs*, and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All columns include as additional controls the log of size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the log of fund age, and the fund flow in the prior month. In addition, all columns include the year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans Jan 2015—June 2023, and our analysis is at the share class level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$		-0.0003*	-0.0002	-0.0002	0	-0.0002	-0.0005***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
sus. score$_{t-1}$ *Sust Fund			0.001***	-0.0001	0.0006***	0.0017***	0.0006
			(0.0004)	(0.0004)	(0.0002)	(0.0004)	(0.0005)
sus. score$_{t-1}$ *Inst			-0.0002	-0.0004***	0	-0.0001	-0.0003
			(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
constant	-0.0103***	-0.0103***	-0.0104***	-0.0081***	-0.0101***	-0.0104***	-0.009***
	(0.0013)	(0.0013)	(0.0013)	(0.0019)	(0.0016)	(0.0013)	(0.0013)
Sust Fund	0.0042***	0.0043***	0.002*	0.006	0.0095***	0.002*	0.002
	(0.001)	(0.001)	(0.0012)	(0.0052)	(0.0022)	(0.001)	(0.002)
Inst	0.0014***	0.0014***	0.0017***	0.0063***	0.0011	0.0014***	0.0022***
	(0.0004)	(0.0004)	(0.0004)	(0.0019)	(0.001)	(0.0004)	(0.0007)
log TA$_{t-1}$	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
MS stars$_{t-1}$	0.0047***	0.0048***	0.0047***	0.0047***	0.0047***	0.0047***	0.0048***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
r_{t-1}	0.0565***	0.0565***	0.0564***	0.0568***	0.0564***	0.0563***	0.0567***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$r_{t-12:t-1}$	0.4598***	0.4494***	0.4465***	0.4821***	0.4589***	0.4464***	0.4631***
	(0.0412)	(0.0418)	(0.0418)	(0.0417)	(0.0429)	(0.0424)	(0.0412)
$r_{t-24:t-1}$	0.5458***	0.5666***	0.5682***	0.5121***	0.5427***	0.563***	0.5392***
	(0.067)	(0.0684)	(0.0684)	(0.0664)	(0.069)	(0.0683)	(0.067)
exp ratio	-0.0013***	-0.0013***	-0.0013***	-0.0014***	-0.0013***	-0.0013***	-0.0014***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
log age	-0.0063***	-0.0063***	-0.0063***	-0.0063***	-0.0063***	-0.0063***	-0.0063***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
flows$_{t-1}$	0.1746***	0.1746***	0.1744***	0.1742***	0.1745***	0.1744***	0.1744***
	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)
observations	191423	191423	191423	191423	191423	191423	191423
R^2	0.0777	0.0778	0.0779	0.0781	0.0779	0.0779	0.078
R^2 between	0.2379	0.2378	0.2388	0.2351	0.239	0.2395	0.2382
Cat by YM FE	YES	YES	YES	YES	YES	YES	YES

Table 6

Positive-Negative Sustainability Alignment, Sustainability Mandates and Institutional Investor Fund Flows

This table reports parameter estimates of the regression of fund flows on the sustainability score of the fund in the prior month disaggregate in the positive alignment (*sus. score*$_{t-1}$ pos) and the negative alignment (*sus. score*$_{t-1}$ neg), an interaction term including the sustainability scores in the prior month and a sustainable fund dummy variable, an interaction term including the sustainability scores in the prior month and an institutional investor dummy variable, and a set of controls, as given in Equation (8). The dependent variable is fund flows, which is regressed on different proxies for funds sustainability: the absolute sustainability score *tot SDGs* (defined in Equation 1), and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All columns include as additional controls the log of size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the log of fund age, and the fund flow in the prior month. In addition, all columns include the year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans Jan 2015—June 2023, and analysis is at the fund level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_t$ pos		0	0.0001	0.0001	-0.0004	-0.0001
		(0.0003)	(0.0001)	(0.0005)	(0.0005)	(0.0003)
sus. score$_t$ pos *Sust Fund		-0.0002	-0.0006	0.0035*	0.0018	-0.0004
		(0.0012)	(0.0005)	(0.0018)	(0.0016)	(0.0008)
sus. score$_t$ pos *Inst		-0.0009**	-0.0004**	-0.0009	-0.0011*	-0.0004
		(0.0004)	(0.0002)	(0.0007)	(0.0006)	(0.0003)
sus. score$_t$ neg		0.001***	0.002***	0.0004***	0.0011***	0.0024***
		(0.0002)	(0.0006)	(0.0001)	(0.0003)	(0.0005)
sus. score$_t$ neg *Sust Fund		-0.0017**	-0.0032**	-0.0006**	-0.0018**	-0.006***
		(0.0007)	(0.0016)	(0.0003)	(0.0008)	(0.0017)
sus. score$_t$ neg *Inst		-0.0002	-0.0003	-0.0001	-0.0001	-0.0018***
		(0.0003)	(0.0007)	(0.0001)	(0.0003)	(0.0006)
constant	-0.0182***	-0.0244***	-0.0239***	-0.0237***	-0.0222***	-0.0221***
	(0.0016)	(0.0031)	(0.0029)	(0.0026)	(0.0031)	(0.0023)
Sust Fund	0.009***	0.0178*	0.0212**	0.0054	0.0067	0.0192***
	(0.0013)	(0.0096)	(0.0088)	(0.0056)	(0.0094)	(0.0049)
Inst	0.0011**	0.0079***	0.007**	0.0041*	0.0066**	0.0062***
	(0.0005)	(0.003)	(0.0027)	(0.0024)	(0.0029)	(0.0018)
log TA$_{t-1}$	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
MS stars$_{t-1}$	0.0043***	0.0043***	0.0043***	0.0043***	0.0043***	0.0044***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
r_{t-1}	0.0774***	0.0749***	0.0754***	0.0745***	0.0743***	0.0775***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)
$r_{t-12:t-1}$	0.5204***	0.4713***	0.4847***	0.4677***	0.4556***	0.5104***
	(0.0531)	(0.0574)	(0.0575)	(0.0567)	(0.0561)	(0.0551)
$r_{t-24:t-1}$	0.6676***	0.8451***	0.8025***	0.8507***	0.868***	0.6861***
	(0.0892)	(0.1069)	(0.1048)	(0.1049)	(0.103)	(0.0923)
exp ratio	-0.0007	-0.0006	-0.0007	-0.0006	-0.0007	-0.0007
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
log age	-0.0065***	-0.0064***	-0.0065***	-0.0065***	-0.0065***	-0.0065***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
flows$_{t-1}$	0.1628***	0.162***	0.1623***	0.1621***	0.1619***	0.162***
	(0.0088)	(0.0088)	(0.0088)	(0.0088)	(0.0088)	(0.0088)
observations	98269	98269	98269	98269	98269	98269
R^2	0.0795	0.0801	0.0799	0.0799	0.0802	0.0802
R^2 between	0.2715	0.2768	0.2753	0.2758	0.2781	0.2783
Cat by YM FE	YES	YES	YES	YES	YES	YES

Focusing on column (2) of Table 6 that reports the results for the overall SDG score, decomposed into positive and negative alignment, we confirm the results in Table 4: funds with higher negative SDG alignment attract more flows. That is not the case for flows to funds with a sustainability mandate, as a higher negative alignment is associated with lower flows for that category of funds. This result holds across all SDG dimensions, as sustainable funds see an increase in the inflow of capital if they reduce their negative alignment to SDGs. However, on the other hand, sustainable funds do not attract more flows if they improve the positive alignment of their portfolios, apart from alignment to environmental goals. Interestingly, institutional investors direct even less flows to funds that increase the positive SDG alignment of their portfolios.

Overall, to the extent that we can proxy investor preferences for sustainability via the capital allocated to funds with a clear sustainability mandate, we find that investors interested in sustainability divest from funds negatively aligned with SDGs, but there is not a symmetric effect with opposite sign on funds hat are tpositively aligned with SDGs. These findings suggest that sustainable investors are more likely to use an exclusionary approach rather than a best-in-class approach in their portfolio allocation decisions.

3.2 The Information Content of Sustainability Ratings

Our results indicate that, in their capital allocation decisions, investors incorporate information related to the alignment of the assets in their portfolios to sustainable goals. To what extent is that information already available in published fund sustainability ratings? Sustainability has become salient among investors, especially after Morningstar launched their sustainability ratings in 2016 (Hartzmark and Sussman, 2019). In what follows, we incorporate the Morningstar sustainability ratings in our analysis of mutual fund flows.

The Morningstar sustainability fund ratings are obtained as a function of the ESG risk ratings of the underlying portfolio companies as provided by Sustainalytics. The ratings are expressed as categories ranging from 1 to 5 globes, whereby the highest category of 5 globes indicates that the fund portfolio has the lowest ESG risk across peers. Notably, the rating a fund receives is determined relative to other funds in the same Morningstar global category. Relative ratings imply that a fund's portfolio could face a higher ESG risk than another fund's, yet still receive a better rating if both funds belong to different global categories, with their own unique qualification of what is a relatively low or relatively high amount of ESG risk.

Table 7 shows descriptive statistics of fund SDG alignment ratings across Morningstar sustainability cate-

Table 7

Descriptive Statistics: SDG Alignment Scores Across Morningstar Sustainability Rating Categories

This table presents the descriptive statistics of Util SDG alignment scores of 1,709 mutual funds over the period Aug 2018 - May 2022 across Morningstar sustainability rating categories. Each panel shows the descriptive statistics of fund SDG scores for a particular Morningsar sustainability rating category represented by the number of globes. *tot SDGs* is the total SDG alignment score of a company. *Econ&Infra* aggregates alignment along SDGs 8, 9, 11, and 17. *Environment* aggregates SDGs 12, 13, 14, and 15. *Basic Needs* combines SDGs 1, 2, 3, 6, and 7. And *Social Progress* aggregates SDGs 4, 5, 10, and 16.).

		Positive alignment					Negative alignment					Net alignment				
Morningstar	Util	mean	std	min	median	max	mean	std	min	median	max	mean	std	min	median	max
	tot SDGs	6.57	1.13	3.14	6.61	12.05	5.92	2.42	0.63	6.19	17.53	0.42	2.5	-10.75	0.06	7.77
	Econ&Infra	15.19	2.89	6.15	15.58	23.49	1.74	0.94	0	1.76	5.88	13.39	2.83	5.18	13.44	20.91
1 globes	Environment	2.83	1.11	0.52	2.72	16.53	11.97	5.14	0.68	12.65	35.28	-12.99	6.46	-41.45	-13.86	6.91
	Basic Needs	4.47	0.82	2.46	4.47	10.31	4.97	2.22	0.16	5.21	16.7	-0.76	2.24	-12.37	-1.03	6.43
	Social Progress	4.71	1.41	1.31	4.56	10.02	2.09	0.96	0.1	1.91	5.14	2.35	1.69	-6.31	2.22	9.17
	tot SDGs	6.68	1.13	2.97	6.78	12.22	5.25	1.93	0.38	5.25	17.97	1.33	2.35	-12.83	0.87	8.94
	Econ&Infra	15.28	2.74	5.59	15.63	23.84	1.46	0.73	0	1.39	5.62	13.84	2.8	4.49	13.86	23.24
2 globes	Environment	2.78	0.69	0.33	2.77	11.56	10.62	4.03	0.5	10.7	35.96	-11.37	5.22	-42.4	-11.69	8.62
	Basic Needs	4.59	0.72	1.81	4.57	8.83	4.33	1.73	0.14	4.23	17.19	0.09	1.85	-14.93	0.03	6.1
	Social Progress	5.04	1.43	0.67	4.91	10.11	1.88	0.82	0.14	1.75	5.92	3.06	1.66	-7.39	2.84	9.2
	tot SDGs	6.59	1.33	3.16	6.69	12.39	4.99	1.89	0.43	4.88	18.76	1.55	2.4	-13.16	1.08	11.04
	Econ&Infra	15.04	3.1	5.38	15.61	24.56	1.37	0.69	0	1.29	8.5	13.71	3.11	4.05	13.72	24.21
3 globes	Environment	2.7	0.66	0.34	2.74	13.82	10.24	4.01	0.77	10.08	34.82	-10.88	5.16	-41.16	-10.9	13.14
	Basic Needs	4.55	0.79	1.86	4.58	12.57	4.03	1.63	0.23	3.9	15.27	0.43	1.78	-15.32	0.4	11.56
	Social Progress	4.98	1.67	0.64	4.79	10.89	1.68	0.69	0.01	1.61	10.25	3.23	1.78	-7.28	2.9	9.93
	tot SDGs	6.45	1.37	3.03	6.49	12.93	4.59	1.9	0.39	4.37	13.16	1.84	2.43	-12.57	1.52	8.19
	Econ&Infra	14.64	3.13	5.32	15.01	22.78	1.23	0.67	0	1.19	4.68	13.48	3.19	4.88	13.47	22.52
4 globes	Environment	2.59	0.68	0.37	2.61	14.26	9.49	4	0.76	9.11	25.43	-9.96	5.05	-40.07	-9.44	1.73
	Basic Needs	4.51	0.82	1.99	4.52	7.56	3.65	1.71	0.36	3.42	12.48	0.79	1.88	-14.66	0.72	5.19
	Social Progress	4.88	1.79	0.33	4.59	10.17	1.55	0.73	0.03	1.44	6.04	3.32	1.87	-6.86	2.98	9.46
	tot SDGs	6.39	1.19	3.2	6.48	12.51	4.49	1.93	0.48	4.14	16.64	2.09	2.29	-12.08	2.17	10.79
	Econ&Infra	14.42	2.69	8.21	14.58	22.14	1.26	0.79	0.01	1.1	7.16	13.35	2.85	5.9	13.32	20.79
5 globes	Environment	2.56	0.76	0.51	2.56	14.48	9.39	4.07	1.12	8.75	32.48	-9.35	5	-39.29	-8.52	12.88
	Basic Needs	4.65	0.87	1.78	4.68	12.16	3.48	1.79	0.43	3.08	12.94	1.27	1.84	-14.05	1.51	10.86
	Social Progress	4.67	1.49	0.31	4.68	9.14	1.5	0.86	0.02	1.32	7.06	3.29	1.67	-6.14	3.13	8.97

gories. We restrict the sample period from April 2018 to May 2022 to reflect the availability as Morningstar globe ratings. [7] The net SDG alignment scores of funds increase from 0.42 on average for funds belonging to the lowest Morningstar sustainability category to 2.09 for 5-globe funds. There is a similar increase in alignment scores across the specific dimensions of sustainability. It is worth noting that funds in all globe categories remain negatively aligned with environmental goals. However, when we decompose the SDG scores into negative and positive alignment, we find that it is the reduction in negative alignment across globe categories that contributes to the increase in net alignment for funds moving from 1 to 5 globes. We find no evidence that funds increase their positive SDG alignment as they move from 1 to a 5-globe rating.

We augment the specification in Equation (8) to include Morningstar sustainability ratings. We then run a panel regression of fund flows on SDG alignment scores, globe category ratings and a set of controls for all funds in our sample for the period 2018–2022. Table 8 shows the results.

Column (1) of Panel A in Table 8 reports the estimation outcome when the only sustainability metric included in the regression is the Morningstar globe fund category. On average, investors allocate less to funds with high globe ratings, except when they consider funds with a sustainability mandate. For such funds, investor flows increase for sustainable funds that have received a higher globe rating in the previous month. These findings confirm the results documented in Table 5 for SDG alignment scores.

Once the SDG scores are included in the analysis, however, we find that Morningstar globe ratings are no longer significantly associated with subsequent fund flows. Investor allocation decisions continue to show a strongly significant and positive association with past negative SDG alignment scores, as documented in Tables 4 and 6. On average, investors allocate more capital to funds that display a higher *negative* alignment of their portfolios to sustainability goals. The result is robust to considering different SDG dimensions. Investors do not show a symmetrical interest in funds that have a higher positive alignment with sustainable goals. If anything, institutional investors invest even less in positively aligned funds (except when the funds are aligned with social progress goals). With the exceptions of environmental goals, investors in funds with a sustainability mandate also do not increase their allocations when these funds improve their alignment to SDGs. Nevertheless, they tend to limit their exposure to negatively aligned funds, primarily driven by social progress considerations.

Overall, our results indicate that it is the *negatively* aligned funds that capture investor flows, across the

[7] Morningstar launched the sustainability rating in March 2016. However, due to a methodology change in 2018, data are available from August 2018.

Table 8

Sustainability and Fund Flows: Controlling for the Morningstar Sustainability Ratings

This table reports parameter estimates of the regression of fund flows on the sustainability score of the fund in the prior month disaggregate in the positive alignment ($sus.\ score_{t-1}$ pos) and the negative alignment ($sus.\ score_{t-1}$ neg), an interaction term including the sustainability scores in the prior month and a sustainable fund dummy variable, an interaction term including the sustainability scores in the prior month and an institutional investor dummy variable, and a set of controls. Panel A includes the Morningstar Sustainability rating (a category of 1 to 5 'globes') both alone and interacted with the dummies. The dependent variable is fund flows, which are regressed on different proxies for funds sustainability: the absolute sustainability score *tot SDGs* (defined in Equation 1), and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14, and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6, and 7, and *Social Progress* which aggregates SDGs 4, 5, 10, and 16. All columns include as additional controls the log of fund size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the log of fund age and the fund flow in the prior month. In addition, all columns include the year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans the period from Oct 2018 to June 2023, and analysis is at the fund level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

Panel A: Morningstar globes included

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$ pos		-0.0001	0.0001	0	-0.0004	-0.0001
		(0.0003)	(0.0001)	(0.0005)	(0.0005)	(0.0003)
sus. score$_{t-1}$ pos *Sust Fund		-0.0001	-0.0005	0.004**	0.0016	-0.0005
		(0.0011)	(0.0005)	(0.0018)	(0.0015)	(0.0008)
sus. score$_{t-1}$ pos *Inst		-0.0008**	-0.0004**	-0.0008	-0.0011*	-0.0004
		(0.0004)	(0.0002)	(0.0007)	(0.0006)	(0.0003)
sus. score$_{t-1}$ neg		0.0009***	0.0019***	0.0004***	0.001***	0.0023***
		(0.0003)	(0.0006)	(0.0001)	(0.0003)	(0.0005)
sus. score$_{t-1}$ neg *Sust Fund		-0.0013*	-0.0019	-0.0004	-0.0014	-0.0052***
		(0.0007)	(0.0018)	(0.0003)	(0.0009)	(0.0019)
sus. score$_{t-1}$ neg *Inst		-0.0001	-0.0002	0	0	-0.0017***
		(0.0003)	(0.0007)	(0.0001)	(0.0003)	(0.0006)
MS globes$_{t-1}$	-0.0006*	-0.0004	-0.0005	-0.0005	-0.0004	-0.0003
	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
MS globes$_{t-1}$ *Sust Fund	0.0028**	0.0021	0.0025*	0.0029**	0.002	0.0018
	(0.0012)	(0.0013)	(0.0013)	(0.0012)	(0.0013)	(0.0013)
MS globes$_{t-1}$*Inst	0.0007	0.0005	0.0005	0.0005	0.0006	0.0003
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
constant	-0.0163***	-0.0229***	-0.0223***	-0.0218***	-0.021***	-0.021***
	(0.0019)	(0.0035)	(0.0033)	(0.003)	(0.0033)	(0.0026)
Sust Fund	-0.0022	0.0069	0.0094	-0.0099	-0.0016	0.0112
	(0.0047)	(0.0114)	(0.0103)	(0.0077)	(0.0109)	(0.0074)
Inst	-0.0009	0.0059*	0.0051	0.002	0.0046	0.005**
	(0.0015)	(0.0035)	(0.0033)	(0.0031)	(0.0033)	(0.0024)
observations	98269	98269	98269	98269	98269	98269
R^2	0.0796	0.0802	0.08	0.0801	0.0803	0.0803
R^2 between	0.271	0.2763	0.2747	0.2754	0.2775	0.2778
Cat by YM FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

Table 8 (cont'd)

Sustainability and Fund Flows: Controlling for the Morningstar Sustainability Ratings

Panel B: Morningstar globes not included

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$ pos		0.0001	0.0002	0.0003	-0.0003	0
		(0.0003)	(0.0001)	(0.0005)	(0.0005)	(0.0002)
sus. score$_{t-1}$ pos *Sust Fund		-0.0002	-0.0006	0.0033*	0.0017	-0.0004
		(0.0012)	(0.0005)	(0.0017)	(0.0015)	(0.0008)
sus. score$_{t-1}$ pos *Inst		-0.0009**	-0.0004**	-0.0009	-0.0012**	-0.0004
		(0.0004)	(0.0002)	(0.0007)	(0.0006)	(0.0003)
sus. score$_{t-1}$ neg		0.0009***	0.0018***	0.0003***	0.001***	0.0023***
		(0.0002)	(0.0006)	(0.0001)	(0.0003)	(0.0004)
sus. score$_{t-1}$ neg *Sust Fund		-0.0019***	-0.0039**	-0.0008**	-0.002***	-0.0062***
		(0.0007)	(0.0016)	(0.0003)	(0.0008)	(0.0016)
sus. score$_{t-1}$ neg Inst		-0.0001	-0.0002	0	-0.0001	-0.0017***
		(0.0002)	(0.0006)	(0.0001)	(0.0003)	(0.0006)
constant	-0.018***	-0.0246***	-0.0241***	-0.0237***	-0.0221***	-0.0222***
	(0.0016)	(0.003)	(0.0028)	(0.0025)	(0.003)	(0.0022)
Sust Fund	0.0089***	0.0189**	0.0217**	0.0067	0.0077	0.0189***
	(0.0013)	(0.0094)	(0.0088)	(0.0055)	(0.009)	(0.0048)
Inst	0.0012**	0.0079***	0.0069***	0.004*	0.0069**	0.0062***
	(0.0005)	(0.003)	(0.0027)	(0.0023)	(0.0029)	(0.0018)
observations	104812	104812	104812	104812	104812	104812
R^2	0.0803	0.0809	0.0807	0.0807	0.081	0.081
R^2 between	0.2859	0.2927	0.2904	0.2907	0.2936	0.2919
Cat by YM FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

whole spectrum of sustainable development goals. The result is not subsumed by the inclusion of Morningstar globe ratings. In general, institutional investors allocate less capital to funds that do well in terms of SDG alignment. Investor's interest in sustainability increases only for funds with a clearly stated sustainability mandate, as long as such funds also have a higher Morningstar globe rating.

3.3 Sustainability and Fund Performance

In the following, we investigate whether there exists a relation between the level of sustainability of a fund and its performance. We run a series of panel regressions and, in particular, regress fund abnormal returns (defined in Equations (3) and (4)) on each sustainability measure alongside a set of fund characteristics as controls. We include Morningstar category-by-year-by-month fixed effects to control for time variation by category. We run a panel regression for each sustainability measure $s^k_{i,t}$ to study the effect of different sustainability metrics on fund excess returns and abnormal returns:

$$\text{xret}_{i,t} = \gamma^k_{gc,t} + \alpha^k + \gamma^k \mathbb{S} + \iota^k \mathbb{I} + \beta^k s^k_{i,t} + \zeta^k s^k_{i,t} \mathbb{S} + \eta^k s^k_{i,t} \mathbb{I} + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \; , \tag{9}$$

$$\text{mabn}_{i,t} = \gamma^k_{gc,t} + \alpha^k + \gamma^k \mathbb{S} + \iota^k \mathbb{I} + \beta^k s^k_{i,t} + \zeta^k s^k_{i,t} \mathbb{S} + \eta^k s^k_{i,t} \mathbb{I} + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \; , \tag{10}$$

where $\text{xret}_{i,t}$ and $\text{mabn}_{i,t}$ are the excess return and abnormal return of fund i at time t, respectively; $s^k_{i,t}$ is the SDG alignment measure k; and $\mathbb{S}$ and $\mathbb{I}$ are dummies indicating whether the fund has a sustainability mandate, and whether the share class is for institutional investors, respectively. Since our sustainability measures are derived by holdings, we use them at the same time of returns to overcome the possible problem of *green dressing window* (Parise and Rubin, 2023; Huang et al., 2024). We include $\gamma^k_{gc,t}$ as Morningstar global category-by-year-by-month fixed effects to control for time variation by category alongside a set of lagged fund characteristics as controls $x_{i,t-1}$. Controls are the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the log size in the prior month, the expenses ratio, the Morningstar overall rating in the prior month, the flow in the prior month, and the log of fund age. Table 9 shows the results for excess return, Table 10 for abnormal return.

The first column of Table 9 and Table 10 show the panel regression estimates without any sustainability rating. Coherently with Kaniel et al. (2023), we find momentum ($r_{t-12:t-1}$) and that flows in the previous month are strongly significant and positive related with future abnormal returns. We further find that expenses ratio and the Morningstar overall rating to be negatively related with future returns. Also funds with a sustainable mandate have lower returns as it is highlighted by the dummy $Sust\ Fund$. Then, we run the regressions by including also the sustainability ratings based on the fund holdings. We find that overall sustainability is negatively related to abnormal returns (Table 10 column 2) but does not affect excess returns. With the exception of funds with a positive impact on *economy & infrastructure* SDGs that have higher abnormal returns, in general to be more alignment with SDGs does not imply higher returns. However, when we interact the sustainability ratings with the dummy indicating funds with a clear sustainable object, we find that the more sustainable their holdings, the higher abnormal and excess returns. In other words we find a double effects driven by our sustainability scores: (i) in general funds with a clear sustainability objective experienced lower abnormal and excess returns, (ii) funds positively aligned with the SDGs, depending on the sustainability dimension, experienced lower or similar returns with fund not aligned, (iii) however if the fund has a clear sustainability objective and is positively aligned with the SDGs, the the fund experienced higher returns compared to the other funds with a clear sustainability object.

Table 9

Sustainability and Fund Excess Returns

This table reports estimates of the regression of fund abnormal returns on the sustainability score of the fund and a set of controls. Fund abnormal returns are obtained from the Fama-French five factor model augmented with momentum (Fama and French, 2015; Carhart, 1997), as defined in Equation 3, and are regressed on the following proxies for funds sustainability: the absolute fund sustainability rating *tot SDGs* (defined in Equation 1), and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All specifications include as additional controls the logarithm of fund size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the logarithm of fund age, and the fund flows in the prior month. All columns include year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans the period Jan 2015 - Jun 2023, and our analysis is at the fund level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_t$		0	0	0	-0.0001***	-0.0001*
		(0)	(0)	(0)	(0)	(0)
sus. score$_t$* Sust Fund		0.0004***	0.0003***	0.0002***	0.0005***	0.0005***
		(0.0001)	(0)	(0)	(0.0001)	(0.0001)
sus. score$_t$* Inst		0	0	0	0	0
		(0)	(0)	(0)	(0)	(0)
constant	0.0068***	0.0069***	0.0065***	0.0067***	0.0068***	0.007***
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0002)
Sust Fund	-0.0004***	-0.0014***	-0.0043***	0.0013***	-0.0011***	-0.0022***
	(0.0001)	(0.0002)	(0.0006)	(0.0003)	(0.0002)	(0.0003)
Inst	0.0004***	0.0004***	0.0002	0.0005***	0.0004***	0.0004***
	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0001)	(0.0001)
log TA$_{t-1}$	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
	(0)	(0)	(0)	(0)	(0)	(0)
MS stars$_{t-1}$	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(0)	(0)	(0)	(0)	(0)	(0)
r_{t-1}	0.0597***	0.0597***	0.0597***	0.0597***	0.0596***	0.0597***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$r_{t-12:t-1}$	0.4362***	0.4351***	0.4344***	0.4353***	0.4309***	0.4366***
	(0.0118)	(0.0118)	(0.012)	(0.012)	(0.0118)	(0.0118)
$r_{t-24:t-1}$	-0.468***	-0.467***	-0.4652***	-0.4675***	-0.4582***	-0.4691***
	(0.0191)	(0.0189)	(0.0194)	(0.0192)	(0.019)	(0.0191)
exp ratio	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log age	0	0	0	0	0.0001	0.0001
	(0)	(0)	(0)	(0)	(0)	(0)
flows$_{t-1}$	0.0034***	0.0034***	0.0034***	0.0034***	0.0033***	0.0034***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
observations	255681	255681	255681	255681	255681	255681
R^2	0.0184	0.0186	0.0185	0.0185	0.0186	0.0185
R^2 between	0.0395	0.0394	0.0396	0.0393	0.0393	0.0396
Cat by YM FE	YES	YES	YES	YES	YES	YES

Table 10
Sustainability and Fund Abnormal Returns

This table reports estimates of the regression of fund abnormal returns on the sustainability score of the fund and a set of controls. Fund abnormal returns are obtained from the Fama-French five factor model augmented with momentum (Fama and French, 2015; Carhart, 1997), as defined in Equation 3, and are regressed on the following proxies for funds sustainability: the absolute fund sustainability rating *tot SDGs* (defined in Equation 1), and the four component scores *Econ&Infra*, which aggregates alignment along SDGs 8, 9, 11 and 17, *Environment* aggregating SDGs 12, 13, 14 and 15, *Basic Needs* which combines SDGs 1, 2, 3, 6 and 7, and *Social Progress* which aggregates SDGs 4, 5, 10 and 16. All specifications include as additional controls the logarithm of fund size in the prior month, the Morningstar star rating in the prior month, the return in the prior month, the return over the prior 12 months, the return over the prior 24 months, the expense ratio, the logarithm of fund age, and the fund flows in the prior month. All columns include year × Morningstar global category × month fixed effects. The sample spans the period Jan 2015 - Jun 2023, and our analysis is at the fund level. $*$, $**$, and $***$ indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses.

		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_t$		-0.0001**	0.0001***	0.00	-0.0002***	0
		(0)	(0)	(0)	(0)	(0)
sus. score$_t$*Sus Fund		0.0004***	0.0003***	0.0002***	0.0005***	0.0004***
		(0.0001)	(0)	(0)	(0.0001)	(0.0001)
sus. score$_t$*Inst		0	0	0	0	0
		(0)	(0)	(0)	(0)	(0)
constant	-0.0001	-0.0001	-0.0011***	-0.0008***	-0.0003	-0.0001
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0002)
Sus Fund	-0.0004***	-0.0013***	-0.0044***	0.0012***	-0.001***	-0.0018***
	(0.0001)	(0.0002)	(0.0007)	(0.0004)	(0.0002)	(0.0003)
Inst	0.0003***	0.0002***	0.0003	0.0005***	0.0003***	0.0002*
	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0001)	(0.0001)
log TA$_{t-1}$	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
	(0)	(0)	(0)	(0)	(0)	(0)
MS stars$_{t-1}$	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0)	(0)	(0)	(0)	(0)	(0)
r_{t-1}	-0.0105***	-0.0106***	-0.0106***	-0.0105***	-0.0107***	-0.0105***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$r_{t-12:t-1}$	0.2696***	0.2671***	0.2655***	0.2632***	0.2603***	0.2696***
	(0.0124)	(0.0124)	(0.0126)	(0.0126)	(0.0126)	(0.0124)
$r_{t-24:t-1}$	-0.2005***	-0.1958***	-0.1936***	-0.1866***	-0.1828***	-0.2009***
	(0.0185)	(0.0185)	(0.0187)	(0.0189)	(0.0188)	(0.0184)
exp ratio	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log age	0	0	0	0	0	0
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
flows$_{t-1}$	0.0043***	0.0042***	0.0043***	0.0042***	0.0042***	0.0042***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
observations	248943	248943	248943	248943	248943	248943
R^2	0.0054	0.0056	0.0057	0.0056	0.0059	0.0055
R^2 between	0.011	0.0205	0.0065	0.0268	0.0351	0.0105
Cat by YM FE	YES	YES	YES	YES	YES	YES

4 Conclusion

In this paper, we revisit the question whether investors care about sustainability. We define a new bottom-up measure of fund sustainability that links this concept to the alignment of the fund with the SDGs. We break down the overall sustainability assessment (which gauges the average alignment with all 17 SDGs) into four distinct dimensions: economy & infrastructure, environment, basic needs, and social progress. Within each dimension, we evaluate both the positive and negative alignment of the fund with specific aspects of sustainability. It's worth noting that funds may simultaneously hold companies that contribute positively to SDGs and those that have a negative impact on them. By focusing solely on the "net" impact (i.e., positive impact minus negative impact), we're unable to distinguish between investor preferences influenced by only one aspect of sustainability (such as investors employing exclusionary screening).

We observe that, on average, funds that align with the SDGs experience increased inflows only when they have a sustainability mandate. Conversely, for funds without a sustainability mandate, the relationship is reversed: those with greater alignment with the SDGs attract fewer inflows. Upon breaking down the scores into their positive and negative components, we find that it is primarily the negative component that drives these results. These findings underscore the tendency of sustainable investors to primarily employ an exclusionary approach when allocating their assets.

This suggests that, while investors exhibit a preference for sustainable funds, their actions are primarily focused on excluding funds that are negatively aligned with the SDGs, rather than actively increasing investments in positively aligned funds. These findings highlight the phenomenon of investors divesting from non-sustainable funds and reallocating to "neutral" funds, rather than actively contributing to the advancement of the SDGs by investing in positively aligned funds.

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