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 impact on the 17 UN's Sustainable Development Goals (SDGs). We document that mutual funds performing well according to the *economy & infrastructure* and *social progress* SDG dimensions experience higher abnormal returns, while the opposite impact—returns relationship holds for *environment* and *basic needs*. Institutional investors appear to infer the relation between different sustainability dimensions and fund abnormal returns and reflect it in their allocation decisions. Funds with increased sustainability performance in less profitable SDG impact domains experience capital outflows. Funds that improve their sustainability standing in areas with positive impact—return relationship attract institutional investor flows. The institutional investors' taste for remunerative sustainability that we document cannot be revealed using standard ESG metrics.

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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.

Sustainability is often perceived as an unambiguous one-dimensional metric. Yet, the concept of sustainability is vastly complex and its various dimensions do not necessarily correlate. Additionally, there are different approaches to assessing the sustainability profile of firms, as evidenced by the substantial degree of disagreement that exists across the metrics of different ratings providers (Berg et al., 2022). While more and more investors require sustainable assets when it comes to capital allocation (Bialkowski and Starks, 2016), the choice of a truly sustainable portfolio can be challenging.

ESG metrics overwhelmingly rely on the transparency of company-disclosed policies that are then used to assess companies' exposure to financially relevant ESG-related risks and opportunities. The absence of widely-accepted standards that define a company's ESG profile further exacerbates the bias resulting from self-reported data. 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

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

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 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 hold a sustainable portfolio and therefore to misallocate 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 Sustainable Development Goals (SDGs). 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.

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

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 120m peer-reviewed academic articles to identify the presence of relationships, as well as the magnitude and the direction of impact of firms' products and services categories on these fine-grained sustainability concepts. Firm's 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 extend sustainable mutual funds are effectively taking into account ESG/sustainability aspects. Our study is also not the first to measure sustainability with SDGs alignment. 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 fully based on objective scientific literature. In our analysis, we consider the sustainability footprint of equity mutual funds along four dimensions aggregated across SDGs: *economy and infrastructure*, *environment*, *basic needs*, and *social progress*. We document that on average, funds' portfolios are negatively aligned with environmental and basic needs goals, while having a positive alignment with economic/infrastructure and social goals.

It is worth mentioning that also Morningstar provide a score for each SDG at the fund level that is similar to our metrics based on Util scores: the "Average Revenue Percentage". It is calculated as a weighted average of the holding-level revenue percentage contributing to a particular SDG. However, many differences exist between Util and Morninigstar scores. First, Morningstar metrics are based on Sustainalytics, that relies heavily om company-reported data.Then, Util covers 5 years more than Morningstar (data starts in 2015 vs 2020), and Morningstar does not provide the score for SDGs 1, 8, 16, and 17 because difficult to quantify.

Given an objective measure of the sustainability profile of a mutual fund based on Util data, our paper addresses three main questions as follows. First, we investigate the relationship between the sustainability profile of a fund and its market performance. We find that on average, funds investing in more positively

SDGs-aligned companies, experience lower returns than funds investing in less SDGs-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). Importantly, we find that the different dimensions of sustainability have distinct effects on abnormal returns. Funds with higher positive impact with respect to *environment* and *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* and *social progress* have higher abnormal returns.

Second, 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 not associated with the extent to which a fund is aligned with the achievement of sustainability goals. However, when we consider the investment decisions of retail investors vs. those of institutional ones, we find that institutional investors direct significantly more capital towards funds that score high along the *economy & infrastructure* and *social progress* dimensions of sustainability, and away from funds that fare well in terms of *environment* and *basic needs* alignment.

Third, the information content contained in the sustainability impact scores we employ in our analyses has distinct implications from that of traditional ESG ratings. The sustainability—return relationship we uncover remains robust to the inclusion of the Morningstar Sustainability ratings in the analysis. As with the overall SDG alignment score, funds whose sustainability is highly rated by Morningstar tend to have significantly lower abnormal returns. However, investor flows do not appear to react to changes in the Morningstar 'globe' ratings, while continuing to display the same robust relationship, differentiated across sustainability impact dimensions.

Our findings highlight the fact that (i) being sustainable in some dimensions rather than others can be more profitable, and (ii) institutional investors somehow recognize these differences and they direct their capital towards (away from) the most (least) remunerative dimensions. We contribute towards understanding investors' preferences when it comes to sustainability and the limits of "sustainable investing". Our empirical evidence suggests that institutional investors prefer remunerative sustainability. Funds aligned with SDGs related to the

environment or that address basic needs are less remunerative and chosen less frequently by investors. This evidence suggests that policy makers would need to implement new instruments to facilitate the achievement of these more costly SDGs.

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 the Principles for Responsible Investment (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.

We also contribute to the literature on the determinants of mutual fund flows related to sustainability. 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. 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. Furthermore, Kim and Yoon (2022) observe that funds attracting below average flows are more likely to be repurposed as ESG funds.

Parise and Rubin (2023) 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 policy-makers, 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 fist to use this data. There are two main reasons of why the features of this data set are innovative. First, the ratings are related to the 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 (they find more than 2,000 sustainability concepts). The algorithm identifies instances in 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 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 aggregated. Util provides both scores at the individual SDGs level, at the macro area level, and at the overall sustainability level, that is a unique score aggregating all the 17 SDG scores.

In this paper, 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 and Infrastructure* (aggregating SDGs 8, 9, 11 and 17, and namely Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Sustainable Cities and Communities, and Partnerships for the Goals, respectively), *Environment* (aggregating SDGs 12, 13, 14 and 15, namely Responsible Consumption and 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 and Well being, Clean Water and Sanitation, and Affordable and 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 and 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. The 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 like this does not produce a metric that can be interpreted as a percentage revenue alignment, rather

as a scoring metric to evaluate company performance. We focus our analysis starting from January 2015, that is the first date Util data is available. Table 6 shows descriptive statistics of Util score at the company level, Figure 2 displays the average sustainability of companies within each sector.

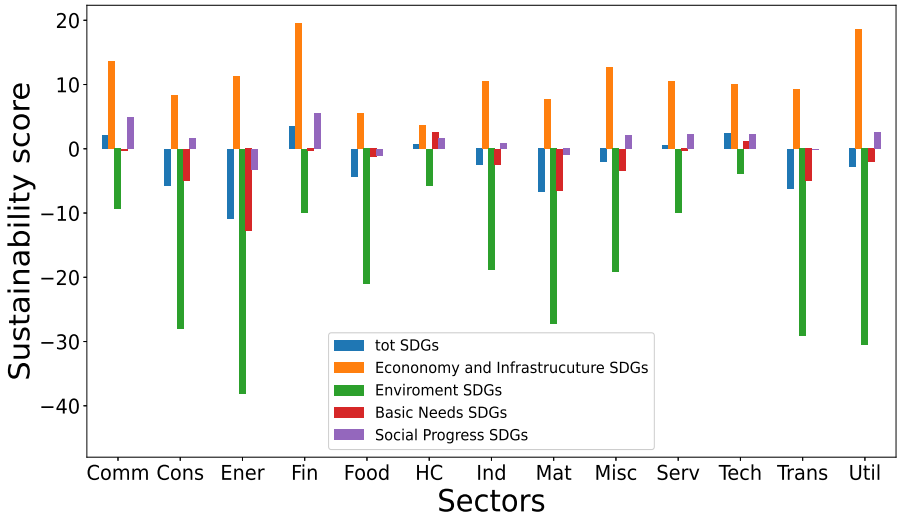
Table 1
Descriptive Statistics of the SDG Alignment Scores at the Company Level

This table presents the descriptive statistics of SDG alignment scores at the holdings level, containing 8,505 securities. *tot SDGs* is the total 17 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.

		mean	std	min	25thpcnt	median	75thpcnt	max
Basic needs	SDG 1	-1.71	21.36	-179.24	-1.57	0.00	3.17	211.73
	SDG 2	3.66	23.90	-147.14	0.00	0.00	0.04	117.14
	SDG 3	-13.99	53.68	-165.7	-52.6	0.00	19.11	145.93
	SDG 6	-21.92	50.4	-189.02	-38.98	0.00	0.00	160.28
	SDG 7	6.57	18.88	0.00	0.00	0.00	0.00	155.47
	Basic needs	-1.67	9.6	-52.53	-5.80	0.00	3.72	49.33
Social Progress	SDG 4	11.07	24.14	-122.3	0.00	0.00	8.68	181.11
	SDG 5	3.07	18.7	-167.69	0.00	0.00	0.00	156.66
	SDG 10	4.55	31.33	-182.98	0.00	0.00	0.00	172.01
	SDG 16	-0.26	25.94	-163.55	0.00	0.00	0.00	147.39
	Social Progress	2.06	8.01	-41.96	0.00	0.00	4.04	50.32
Environment	SDG 12	-14.72	33.48	-177.37	-31.42	0.00	0.00	146.23
	SDG 13	-35.68	60.62	-193.47	-80.53	0.00	0.00	192.49
	SDG 14	-42.47	60.18	-229.18	-82.16	-0.25	0.00	186.46
	SDG 15	-45.15	60.18	-300.48	-94.2	-3.34	0.00	164.8
	Environment	-15.41	24.96	-77.59	-31.72	0.00	0.00	69.05
Economy and Infrastructure	SDG 8	43.6	34.21	-140.19	12.54	41.99	71.96	171.04
	SDG 9	16.44	59.04	-226.94	0.00	4.75	49.52	208.56
	SDG 11	-1.18	39.89	-175.72	-0.71	0.00	7.57	170.71
	SDG 17	21.29	33.79	-82.53	0.00	0.00	38.88	190.6
	Econ&Infra	11.01	12.59	-32.61	0.28	8.20	18.34	65.98
	tot SDGs	-1.04	10.39	-33.1	-7.33	0.81	4.65	40.44

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

This chart presents the average sustainability for different dimensions across different sectors. The sectors are defined by Util and are Energy (Ener), Financial Services (Fin), Food and 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 and 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.



The final sample is composed of 1,723 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 8,505 securities and the funds have 5,680 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 - May 2022. We merge holdings with Util ratings by using the 8-digit CUSIP codes.

To create our *objective* sustainability rating at the fund level, we use Util's *net company performance score* at the company level alongside the bottom-up methodology implemented by Morningstar to create their sustainability rating. This is the base of our objective measures of fund sustainability, furthermore we apply the same methodology with Util scores at the SDG-themes level. The themes are environment, social progress, basic needs, and economy & infrastructures. We refer to these different themes as the different dimensions of sustainability. Util scores are at the security level, in order to have a score based on these data at the fund

[3]To determine the threshold 67% we follow Morningstar's methodology for its sustainability rating

level we follow Morningstar methodology. The first step is to compute the weighted average score of the fund holdings by using Util ratings. We define $s^k_{i,t}$ 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*$\}$ as:

$$s^k_{i,t} = \sum_{j \in i} w_{j,i,t} \text{SUS}_{j,k,t} \ , \tag{1}$$

where $w_{j,i,t}$ is the weight of security j in fund i at time t, and $\text{SUS}_{j,k,t}$ is the sustainability score at the security level in dimension k at time t. Our absolute sustainability rating is similar to the Morningstar portfolio sustainability score[4]. Figure 2 displays the average sustainability level for each dimension for funds in different categories. For comparison, in Panel B of Figure 2 we show similar metrics based on Morningstar Average Revenue Percentage scores provided by Morningstar. 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. By comparing the two panels in Figure 2, it is clear that Util and Morningstar metrics are based on different information.

Alongside these sustainability metrics, we also use standard fund characteristics. We retrieve total net assets (mtna) and monthly returns from CRSP (mret); expense ratio, age, and Morningstar overall rating from Morningstar. We define the fund flows following Sirri and Tufano (1998), i.e., flows of fund i are defined as the monthly growth of total net assets (TNA), net of returns:

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

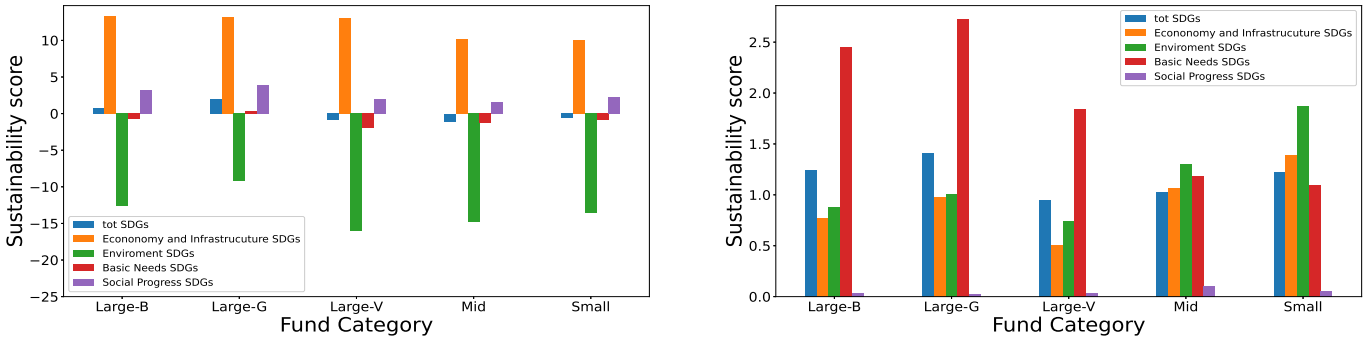
We define monthly excess returns (mxret) as the monthly fund returns in excess of the risk-free asset and the

[4]Morningstar defines sustainability *score* as an absolute measure of the sustainability of a fund whereas sustainability *rating* refers to sustainability of the fund compared to their peers in the same global category. In this work we focus on the absolute sustainability measure.

[5]SDGs 1, 8, 16, and 17 are: *no poverty*; *decent work and economic growth*; *peace, justice and 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 chart presents the average sustainability for different dimensions across different fund categories. Panel A shows sustainability based on Util scores. For comparison, 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 and 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*

monthly abnormal returns as in Kaniel et al. (2023). Abnormal return for each fund-month observation 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:

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

where $r_{i,t-36:t-1}$ 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 $t-1$, $\hat{\beta}_{i,t-1}$ is the vector containing the factor loadings estimated in the time window $[t-36:t-1]$. Then abnormal returns $r_{i,t}^{\text{abn}}$ are computed as:

$$r_{i,t}^{\text{abn}} = r_{i,t} - f_t\hat{\beta}_{i,t-1} \ . \tag{4}$$

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 1,723 mutual funds over the period Jan 2015 - May 2022. The top panel presents the descriptive of the sustainability ratings of the funds in the sample. *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	25*th*pcnt	median	75*th*pcnt	max
Sustainability ratings	tot SDGs	0.04	1.69	-4.89	-1.05	-0.03	1.2	5.44
	Econ&Infra	11.83	2.46	5.7	10.19	12.33	13.57	18.2
	Environment	-13.17	4.46	-26.37	-15.97	-13.02	-9.97	-1.63
	Basic Needs	-0.87	1.4	-5.39	-1.78	-0.86	0.08	2.99
	Social Progress	2.57	1.26	-0.66	1.68	2.45	3.4	6.84
Fund characteristics	total net assets (mil)	2786.86	6749.3	3.5	144.43	616.79	2169.93	47872.51
	mret (%)	0.69	0.74	-6.68	0.33	0.84	1.04	5.08
	mxret (%)	0.63	0.74	-6.7	0.26	0.77	0.97	5.07
	mabn (%)	0.01	0.44	-2.59	-0.16	-0.03	0.15	5.14
	flows (%)	-0.03	4.29	-31.71	-1.31	-0.62	0.45	43.18
	expense ratio (%)	1.00	0.67	0.01	0.65	0.88	1.20	4.49
	age (Y)	19.45	13.54	3.1	9.41	18.17	24.94	94.31
	MS stars	3.15	0.85	1	2.56	3.14	3.78	5

3 Discussion of Results

We start by creating for each fund the sustainability ratings based on Util data: We compute the absolute and relative ratings as described in Section 2 for each one of the five Util score (*tos SDGs*, *economy & infrastructure*, *environment*, *basic needs*, and *social progress*). In the first analysis, we assess the impact of sustainability on fund returns. Then we analyze whether investors have any preference for fund sustainability, and in case which dimensions drive more this relation.

3.1 Sustainability and Fund Performance

Our first analysis is to study 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, we regress fund abnormal returns (defined

in Equation 4) on each sustainability measure alongside a set of fund characteristics as controls. In addition, 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 performance:

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

where $r^{\text{abn}}{}_{i,t}$ is the abnormal return of fund i at time t, $s^k_{i,t}$ is the sustainability measure k. 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). 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 3 shows the results.

In the first column we run the panel regression without any sustainability rating. Coherently with Kaniel et al. (2023), we find momentum ($r_{t-12:t-1}$) and flow to be strongly significant and positive related with future abnormal returns. We further find that expenses ratio, the Morningstar overall rating, and the log of fund age to be negatively related with future abnormal returns. Then, we run the regressions by including also the absolute ratings. We find that overall sustainability is negatively related to returns (column 1). By analysing in more detail the relation of different aspects of sustainability with returns, we find that on average, funds with a positive effect on economy & infrastructure and on social progress SDGs are earning higher returns (columns 3 and 6), whereas funds with a positive effect on environment and basic needs SDGs are earning lower returns (columns 4 and 5).

These results highlight the fact that different dimensions of sustainability can have different effect on abnormal returns. In particular, funds investing in companies positively aligned with *tot SDGs*, *environmental* SDGs, and *basic needs* SDGs, experience lower abnormal returns; funds with a positive impact on *economy & infrastructure* SDGs and *social progress* SDGs experienced higher abnormal returns. To give an idea of the economic magnitude of these coefficients we present an example related to the coefficients -0.0001 related to *tot SDGs*: Say that all the companies held by a fund increase of one point their Util sore related to total SDGs, then the fund experiences lower monthly abnormal returns of 0.01%.

Table 3
Sustainability and Fund Performance

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 - May 2022, 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$_t$		-0.0001**	0.0001***	-0.0001***	-0.0002***	0.0001*
		(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
constant	0.0011***	0.001**	-0.0002	0.0001	0.0008*	0.0008*
	(0.0004)	(0.0004)	(0.0006)	(0.0005)	(0.0004)	(0.0004)
log TA$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MS stars$_{t-1}$	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
r_{t-1}	-0.0013	-0.0016	-0.0015	-0.0019	-0.0018	-0.0013
	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0059)
$r_{t-12:t-1}$	0.2376***	0.2356***	0.2335***	0.2315***	0.233***	0.2367***
	(0.0232)	(0.0232)	(0.0235)	(0.0233)	(0.0233)	(0.0232)
$r_{t-24:t-1}$	-0.1788***	-0.1687***	-0.1605***	-0.1471***	-0.1583***	-0.1756***
	(0.0361)	(0.0364)	(0.0372)	(0.0373)	(0.0368)	(0.036)
$expratio$	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log age	-0.0002**	-0.0002**	-0.0002**	-0.0002**	-0.0002**	-0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
flows$_{t-1}$	0.006***	0.0059***	0.0059***	0.0058***	0.0059***	0.006***
	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0018)
observations	73917	73917	73917	73917	73917	73917
R^2	0.0044	0.0045	0.0046	0.0047	0.0047	0.0045
R^2 between	0.074	0.0856	0.0727	0.0958	0.0922	0.0692
Cat by YM FE	YES	YES	YES	YES	YES	YES

3.2 Fund Flows and Sustainability

This section investigates how investors preferences are related to different dimensions of sustainability. As in the previous analysis, 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:[6]

$$\text{flow}_{i,t} = \gamma^k_{gc,t} + \alpha^k + \beta^k s^k_{i,t-1} + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \,. \tag{6}$$

In particular, 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-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 rating in the prior month, the flow in the prior month, and the log of fund age.

We are also interested to disentangle the different preferences between institutional and retail investors: for each funds having both institutional and retail share classes we separate the flows between the institutional and retail investors component. We do the same for each characteristic at the share class level and we run also the panel regression in the following specification:

$$\text{flow}_{i,t} = \gamma^k_{gc,t} + \alpha^k + D^k s^k_{i,t-1}\mathbb{I}_{II} + \beta^k s^k_{i,t-1} + \delta^k x_{i,t-1} + \epsilon^k_{i,t} \,. \tag{7}$$

Compared to the specification in Equation (6), we add the new term $D^k s^k_{i,t-1}\mathbb{I}_{II}$. We interact the sustainability score $s^k_{i,t-1}$ with the dummy $\mathbb{I}_{II}$ that indicates whether the observation is related to institutional investors. Tables 4 and 5 presents the results.

In column 1 of tables 4 and 5, we examine the effect of controls on the flows. Flows are positively related with past returns, past flows, and Morningstar stars, whereas are negatively related with expenses ration, age and total assets. Then columns from 2 through 6 show the results when sustainability ratings are added and no metrics have an impact on flows. These results highlight the fact that on average, investors either do not recognize or are not able to infer sustainability as a signal for their investment decisions.

In the specification with the dummy indicating institutional investors, coefficients of ratings keep remaining statistically insignificant with the only exception of social progress, but, on the other hand, coefficients related to different dimensions of sustainability interacted with the dummy are significant. This means that institutional

[6]Here, we note that the sustainability measures are lagged, because we assume that investors first observe the holdings, and then make their investment decisions.

Table 4
Sustainability 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 6. 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 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—May 2022, 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$_{t-1}$		-0.0001	0.0000	-0.0001	0.0000	-0.0002
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
constant	-0.0066***	-0.0067***	-0.007***	-0.0075***	-0.0066***	-0.006***
	(0.0017)	(0.0017)	(0.0021)	(0.0019)	(0.0017)	(0.0018)
log TA$_{t-1}$	-0.0016***	-0.0016***	-0.0016***	-0.0016***	-0.0016***	-0.0016***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
MS stars$_{t-1}$	0.0046***	0.0046***	0.0046***	0.0046***	0.0046***	0.0046***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
r_{t-1}	0.0709***	0.0705***	0.0707***	0.0701***	0.0708***	0.071***
	(0.0123)	(0.0122)	(0.0123)	(0.0123)	(0.0123)	(0.0123)
$r_{t-12:t-1}$	0.5159***	0.5132***	0.5144***	0.5096***	0.5148***	0.5175***
	(0.053)	(0.0534)	(0.0533)	(0.0539)	(0.0535)	(0.0535)
$r_{t-24:t-1}$	0.4878***	0.4996***	0.4937***	0.5157***	0.4921***	0.4809***
	(0.0914)	(0.0911)	(0.0905)	(0.0911)	(0.0908)	(0.0914)
exp ratio	-0.0018***	-0.0018***	-0.0018***	-0.0018***	-0.0018***	-0.0018***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
log age	-0.0035***	-0.0035***	-0.0035***	-0.0035***	-0.0035***	-0.0035***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
flows$_{t-1}$	0.1988***	0.1987***	0.1988***	0.1987***	0.1988***	0.1987***
	(0.0146)	(0.0146)	(0.0146)	(0.0147)	(0.0146)	(0.0146)
observations	74176	74176	74176	74176	74176	74176
R^2	0.1059	0.1059	0.1059	0.1059	0.1059	0.1059
R^2 between	0.4277	0.4286	0.4273	0.4281	0.4279	0.4304
Cat by YM FE	YES	YES	YES	YES	YES	YES

investors have preferences related to sustainability, and in particular they like funds positively aligned with *economy and infrastructure* and *social progress* SDGs; at the same time they dislike funds positively aligned with *environmental* and *basic needs* SDGs.

Table 5

Sustainability 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 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 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 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—May 2022, 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$_{t-1}$		-0.0002	-0.0001	0.0000	0.0002	-0.0007***
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
sus. score$_{t-1}$* Inst		-0.0002	0.0003***	-0.0002***	-0.0009***	0.0009***
		(0.0002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)
constant	-0.0101***	-0.0104***	-0.0112***	-0.0124***	-0.0106***	-0.0098***
	(0.0017)	(0.0017)	(0.0022)	(0.002)	(0.0018)	(0.0018)
log TA$_{t-1}$	-0.002***	-0.002***	-0.0021***	-0.0021***	-0.002***	-0.0021***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
MS stars$_{t-1}$	0.005***	0.005***	0.0051***	0.0051***	0.005***	0.0051***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
r_{t-1}	0.0943***	0.0934***	0.0941***	0.0927***	0.0935***	0.0943***
	(0.0131)	(0.013)	(0.0131)	(0.0131)	(0.013)	(0.0131)
$r_{t-12:t-1}$	0.7221***	0.7148***	0.7219***	0.71***	0.714***	0.7259***
	(0.053)	(0.0578)	(0.0579)	(0.0584)	(0.058)	(0.0576)
$r_{t-24:t-1}$	0.6313***	0.6644***	0.6159***	0.6713***	0.6588***	0.6035***
	(0.096)	(0.0957)	(0.0948)	(0.0964)	(0.0951)	(0.0962)
exp ratio	-0.0013***	-0.0013***	-0.0012***	-0.0013***	-0.0013***	-0.0012***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
log age	-0.0035***	-0.0034***	-0.0032***	-0.0031***	-0.0034***	-0.0032***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0005)
flows$_{t-1}$	0.1973***	0.1972***	0.1958***	0.1957***	0.1969***	0.1962***
	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)
observations	118470	118470	118470	118470	118470	118470
R^2	0.0943	0.0944	0.0954	0.0956	0.0947	0.0951
R^2 between	0.3918	0.3942	0.3783	0.3801	0.3907	0.3831
Cat by YM FE	YES	YES	YES	YES	YES	YES

3.3 Util and Morningstar Sustainability Ratings

Sustainability has become salient among investors especially after Morningstar launched its sustainability rating. In this section we narrow down the focus of our analysis on data starting from August 2018, when Morningstar sustainability rating starts to be available.[7] This rating is expressed as 1 to 5, whereby 5 indicates that the portfolio has lower ESG risk. Notably, the rating a fund receives is determined relative to other funds in the same Morningstar global category. This means that a fund could have more ESG risk than another fund yet still receive a better rating if those funds are in different global categories, with their own unique qualification of what is a relatively low or relatively high amount of ESG risk. The Morningstar sustainability rating is calculated using Sustainalytics' ESG risk ratings and is based on the portfolio's holdings.

We run the panel regression in Equation 5 by using data starting from October 2018, and including among the controls the Morningstar sustainability rating. Table 7 show the results. Morningstar sustainability rating present a negative and significant coefficient, that is funds with higher sustainability ratings experiences lower abnormal returns, coherently with Hartzmark and Sussman (2019). This negative relation is driven by *environment* and *basic needs*, whereas *economy and infrastructure* and *social progress* sustainability dimensions present a positive relation with abnormal returns. These results are coherent with Table 2.

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

Table 6

Descriptive Statistics - Util ratings vs Morningstar sustainability rating

This table presents the descriptive statistics of our data containing 1,723 mutual funds over the period Aug 2018 - May 2022. Each panel shows the descriptive statistics for a particular Morningsar sustainability rating, that is 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.).

Morningstar	Util	mean	std	min	median	max
1 globes	tot SDGs	-0.33	2.22	-9.85	-0.35	5.78
	Econ&Infra	12.07	2.86	4.93	12.23	22.21
	Environment	-14.13	6.08	-36.24	-14.47	5.7
	Basic Needs	-1.31	2.08	-12.03	-1.36	4.57
	Social Progress	2.32	1.42	-4.6	2.38	5.81
2 globes	tot SDGs	0.06	2.21	-12.48	-0.15	8.28
	Econ&Infra	12.12	2.78	4.46	12.23	24.86
	Environment	-13.28	5.58	-46.92	-12.96	7.39
	Basic Needs	-0.93	2	-15.58	-0.81	10.21
	Social Progress	2.6	1.5	-3.51	2.51	7.2
3 globes	tot SDGs	0.4	2.23	-11.41	0.18	8.67
	Econ&Infra	12.07	2.98	3.5	12.41	26.51
	Environment	-12.48	5.22	-43	-12.09	5.13
	Basic Needs	-0.59	1.79	-14.62	-0.47	9.51
	Social Progress	2.83	1.64	-3.18	2.61	8.91
4 globes	tot SDGs	0.54	2.27	-9.4	0.34	8.71
	Econ&Infra	11.93	3.08	2.34	12.16	25.96
	Environment	-12.02	5.39	-40.63	-11.69	3.9
	Basic Needs	-0.43	1.8	-7.69	-0.33	4.37
	Social Progress	2.9	1.71	-2.56	2.61	9.57
5 globes	tot SDGs	0.39	2.51	-13.41	0.42	7.44
	Econ&Infra	11.77	3.01	4.78	11.98	21.12
	Environment	-12.23	6.33	-49.68	-11.38	5.1
	Basic Needs	-0.55	2.24	-16.17	-0.33	9.23
	Social Progress	2.81	1.7	-2.9	2.6	8.15

Table 7

Sustainability and Fund Abnormal Returns: Controlling for the Morningstar Sustainability Ratings

This table reports estimates of the regression of fund abnormal returns on the sustainability score of the fund, the Morningstar Sustainability rating (a category of 1 to 5 'globes') 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. The parameter estimates for the controls are omitted for brevity. In addition, all columns include year $\times$ Morningstar global category $\times$ month fixed effects. The sample spans the period Oct 2018 - May 2022, 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
		tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_t$		-0.0002***	0.0003***	-0.0001***	-0.0004***	0.0002***
		(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
MS globes$_{t-1}$	-0.0003***	-0.0003***	-0.0002***	-0.0002**	-0.0002**	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
observations	33588	33588	33588	33588	33588	33588
R^2	0.0074	0.0076	0.0088	0.0086	0.0082	0.0076
R^2 between	0.0859	0.0943	0.057	0.097	0.0956	0.0685
Cat by YM FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

Panel B: Morningstar globes not included

	tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$	-0.0002***	0.0003***	-0.0002***	-0.0003***	0.0002***
	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
observations	44874	44874	44874	44874	44874
R^2	0.0068	0.0075	0.0078	0.0072	0.0067
R^2 between	0.0954	0.0498	0.1175	0.1009	0.0511
Cat by YM FE	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES

Our second analysis is to study flows. As for abnormal returns, we repeat the analysis in Section 3.2 by including the Morningstar sustainability rating among the controls. In Table 8 we show the results. Also in this

case findings in Table 4 are robust. Indeed, institutional investors appear to prefer *economy and infrastructure* and *social progress* SDGs. On the other hand, they dislike *environment* SDGs. Furthermore, Morningstar sustainability rating does not seem to explain fund flows.

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. Importantly, we disaggregate this measure in four components representative of different dimensions of sustainability: economy & infrastructure, environment, basic needs, and social progress. We document that different dimensions of sustainability have different relation with fund abnormal returns and fund flows. Being sustainable in some dimensions can be more profitable than others and institutional investors seem to prefer profitable dimensions. These results shed light on the limits of the broad concept of sustainable investing and the 'doing well by doing good' paradigm.

Our main findings are twofold: first different dimensions of absolute sustainability differently affect abnormal returns. More precisely, funds with a positive impact on the *economy & infrastructure* and *social progress* SDGs are associated with higher returns whereas funds with a positive impact on *environment* and *basic needs* have lower returns. Second, institutional investors seem to infer this sustainability—returns relationship and show a preference for sustainability dimensions that are positively correlated with abnormal returns.

This suggests two possible interpretations. The first explanation is that institutional investors cherry-pick sustainability and they go for it only if it is also profitable, i.e. they have a taste for sustainability dimensions that are positively related to fund abnormal returns. On the the other hand, they value less sustainability dimensions that are negatively related to funds abnormal returns. The second interpretation could be that institutional investors do not value sustainability, but are sophisticated in choosing more profitable funds that are also the funds more aligned with some SDGs rather than others.

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 (*sus. score*$_{t-1}$), 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. Panel A includes the Morningstar Sustainability rating (a category of 1 to 5 'globes'). 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 May 2022, 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$_{t-1}$		-0.0004*	-0.0002	0.0000	-0.0002	-0.0006***
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0003)
sus. score$_{t-1} *$ Inst		0.0002	0.0002***	-0.0002***	-0.0002	0.0007***
		(0.0002)	(0.0000)	(0.0000)	(0.0003)	(0.0001)
MS globes$_{t-1}$	-0.0003	-0.0002	-0.0003	-0.0002	-0.0002	-0.0002
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
observations	71891	71891	71891	71891	71891	71891
R^2	0.0845	0.0846	0.0852	0.0852	0.0846	0.0851
R^2 between	0.4016	0.4038	0.3912	0.392	0.4028	0.3953
Cat by YM FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

Panel B: Morningstar globes not included

	tot SDGs	Econ& Infra	Env.	Basic Needs	Social Progress
sus. score$_{t-1}$	-0.0005**	-0.0001	0.0000	-0.0002	-0.0007***
	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
sus. score$_{t-1} *$ Inst	0.0002	0.0002***	-0.0002***	-0.0003	0.0007***
	(0.0002)	(0.0000)	(0.0000)	(0.0003)	(0.0001)
observations	73343	73343	73343	73343	73343
R^2	0.0862	0.0867	0.0868	0.0862	0.0866
R^2 between	0.3747	0.3624	0.3637	0.3735	0.367
Cat by YM FE	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES

References

AMMANN, M., C. BAUER, S. FISCHER, AND P. MÜLLER (2019): "The impact of the Morningstar Sustainability Rating on mutual fund flows," *European Financial Management*, 25 (3), 520–553.

ATTA-DARKUA, V., S. GLOSSNER, P. KRUEGER, AND P. MATOS (2023): "Decarbonizing institutional investor portfolios: helping to green the planet or just greening your portfolio?" *Working Paper, Available at SSRN 4212568*.

BAKER, M., M. L. EGAN, AND S. K. SARKAR (2022): "How do investors value ESG?" *NBER Working Paper 30708*.

BEKAERT, G., R. ROTHENBERG, AND M. NOGUER (2023): "Sustainable investment - exploring the linkage between alpha, ESG, and SDGs," *Sustainable Development*, 31 (5), 3831–3842.

BERG, F., J. F. KÖLBEL, AND R. RIGOBON (2022): "Aggregate confusion: the divergence of ESG ratings," *Review of Finance*, 26 (6), 1315–1344.

BIALKOWSKI, J. AND L. T. STARKS (2016): "SRI funds: investor demand, exogenous shocks and ESG profiles," *Working Paper, University of Canterbury, Department of Economics and Finance*.

BOLTON, P. AND M. T. KACPERCZYK (2021): "Do investors care about carbon risk?" *Journal of Financial Economics*, 142 (2), 517–549.

——— (2023): "Global pricing of carbon-transition risk," *The Journal of Finance*, 78 (6), 3677–3754.

BRANDON, R. G., S. GLOSSNER, P. KRUEGER, P. MATOS, AND T. STEFFEN (2022): "Do responsible investors invest responsibly?" *Review of Finance*, 26 (6), 1389–1432.

CARHART, M. M. (1997): "On persistence in mutual fund performance," *Journal of Finance*, 52 (1), 57–82.

CECCARELLI, M., S. RAMELLI, AND A. WAGNER (2024): "Low carbon mutual funds," *Review of Finance*, 28 (1), 45–74.

CHEN, S. (2022): "Green investors and green transition efforts: talk the talk or walk the walk?" *Working Paper, Available at SSRN 4254894*.

CHEN, Y. AND W. DAI (2023): "Seeking green? Mutual fund investment in ESG stocks," *Working Paper, Available at SSRN 4378284*.

COUVERT, M. (2022): "What is the impact of mutual funds' ESG preferences on portfolio firms?" *Swiss Finance Institute Research Paper Series No. 21-42*.

DIOUF, D. AND O. BOIRAL (2017): "The quality of sustainability reports and impression management: A stakeholder perspective," *Accounting, Auditing Accountability Journal*, 30 (3), 643–667.

EL GHOUL, S. AND A. KAROUI (2017): "Does corporate social responsibility affect mutual fund performance and flows?" *Journal of Banking & Finance*, 77 (4), 53–63.

FAMA, E. F. AND K. R. FRENCH (2015): "A five-factor asset pricing model," *Journal of Financial Economics*, 116 (1), 1–22.

GREEN, D. AND B. N. ROTH (2021): "The allocation of socially responsible capital," *Working Paper, Available at SSRN 3737772*.

HARTZMARK, S. M. AND A. B. SUSSMAN (2019): "Do investors value sustainability? A natural experiment examining ranking and fund flows," *Journal of Finance*, 74 (6), 2789–2837.

HEEB, F., J. F. KÖLBEL, F. PAETZOLD, AND S. ZEISBERGER (2022): "Do investors care about impact?" *Review of Financial Studies*, 36 (5), 1737–1787.

HONG, H. AND M. KACPERCZYK (2009): "The price of sin: The effects of social norms on markets," *Journal of Financial Economics*, 93 (1), 15–36.

KANIEL, R., Z. LIN, M. PELGER, AND S. VAN NIEUWERBURGH (2023): "Machine-learning the skill of mutual fund managers," *Journal of Financial Economics*, 150 (1), 94–138.

KAUSTIA, M. AND W. YU (2021): "Greenwashing in mutual funds," *Working Paper, Available at SSRN 3934004*.

KIM, S. AND A. S. YOON (2022): "Analyzing active managers' commitment to ESG: evidence from United Nations principles for responsible investment," *Management Science*, 69 (2), 741–758.

LOWRY, M., P. WANG, AND K. D. WEI (2023): "Are all ESG funds created equal? Only some funds are committed," *ECGI Working Paper Series in Finance, No. 874/2023*.

MARQUIS, C., M. W. TOFFEL, AND Y. ZHOU (2016): "Scrutiny, norms, and selective disclosure: A global study of greenwashing," *Organization Science*, 27 (2), 483–504.

OEHMKE, M. AND M. OPP (2023): "A theory of socially responsible investment," *Swedish House of Finance Research Paper No. 20-2*.

ORLOV, V., S. RAMELLI, AND A. F. WAGNER (2023): "Revealed beliefs about responsible investing: evidence from mutual fund managers," *Swiss Finance Institute Research Paper No. 22-98*.

PARISE, G. AND M. RUBIN (2023): "Green window dressing," *Working Paper, Available at SSRN 4459352*.

PASTOR, L., R. F. STAMBAUGH, AND L. A. TAYLOR (2021): "Sustainable investing in equilibrium," *Journal of Financial Economics*, 142 (2), 550–571.

——— (2023): "Green tilts," *NBER Working Paper 31320*.

PEDERSEN, L. H., S. FITZGIBBONS, AND L. POMORSKI (2021): "Responsible investing: the ESG-efficient frontier," *Journal of Financial Economics*, 142 (2), 572–597.

RZEŹNIK, A., K. W. HANLEY, AND L. PELIZZON (2022): "Investor reliance on ESG ratings and stock price performance," *SAFE Working Paper No. 310*.

SIRRI, E. R. AND P. TUFANO (1998): "Costly search and mutual fund flows," *Journal of Finance*, 53 (5), 1589–1622.