

Badenhoop, Nikolai; Mücke, Christian

Working Paper

Do investors care about sustainable investment targets? An assessment using the sustainable finance disclosure regulation

SAFE Working Paper, No. 457

Provided in Cooperation with:

Leibniz Institute for Financial Research SAFE

Suggested Citation: Badenhoop, Nikolai; Mücke, Christian (2025) : Do investors care about sustainable investment targets? An assessment using the sustainable finance disclosure regulation, SAFE Working Paper, No. 457, Leibniz Institute for Financial Research SAFE, Frankfurt a. M., <https://doi.org/10.2139/ssrn.5474749>

This Version is available at:

<https://hdl.handle.net/10419/325502>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Nikolai Badenhoop | Christian Mücke

Do Investors Care about Sustainable Investment Targets? An Assessment Using the Sustainable Finance Disclosure Regulation

SAFE Working Paper No. 457 | September 2025

Leibniz Institute for Financial Research SAFE
Sustainable Architecture for Finance in Europe

info@safe-frankfurt.de | www.safe-frankfurt.de

Do investors care about sustainable investment targets? An assessment using the Sustainable Finance Disclosure Regulation

Nikolai Badenhoop*, and Christian Mücke†

Friday 12th September, 2025

Abstract

This paper analyzes the impact of disclosures of sustainable investment targets under the EU Sustainable Finance Disclosure Regulation (SFDR) on mutual fund flows. Using a staggered difference-in-differences setup and focusing on retail-oriented index funds, we find that sustainable investment targets have a temporarily positive impact on fund flows in comparison to funds without sustainable investment targets. Furthermore, we find a negative linear relationship between sustainable investment targets and fund flows. While lower targets attract higher fund inflows, higher targets result in significantly lower or even no inflows. Our results suggest that up to a target level of 20% in sustainable investments, index funds can attract more inflows. This suggests a trade-off between sustainability commitments and performance considerations.

*Leibniz Institute for Financial Research SAFE e.V. (badenhoop@safe-frankfurt.de)

†ESCP Business School (cmucke@escp.eu)

We thank Florian Heider, Florian Hett, Alexander Hillert, Loriana Pelizzon, Marco Zanotti, the seminar participants at the 32nd Finance Forum, and the Bank of Lithuania research seminar for their helpful comments and suggestions. We gratefully acknowledge research support from the Leibniz Institute for Financial Research SAFE.

1 Introduction

Investors face considerable challenges in assessing mutual funds' future *commitments* to sustainable investing. They can either rely on third-party ratings that are based on historical information (e.g., past asset allocations) or examine fund prospectuses to evaluate how sustainability is integrated into the investment process. However, while ratings provide only limited insight into future commitments, analyzing prospectuses is time-consuming and often complicated by opaque disclosures – especially when fund managers have incentives to obfuscate information.¹

A major step toward improving transparency was the introduction of the Sustainable Finance Disclosure Regulation (SFDR) by the European Union in 2019.² With regard to sustainability commitments, transparency was further enhanced in this regulation in 2022, when funds were required to disclose their sustainable investment targets through the Level 2 disclosures of the SFDR³. These ex-ante targets were also accompanied by ex-post reporting of whether and to what extent these targets were met. A unique feature of these disclosures, apart from their forward-looking behavior, is that they were also disclosed in a standardized and easily interpretable format: targets are expressed as percentages of total assets. This dual reporting mechanism could attract sustainability-oriented investors and increase flows into funds that declare positive targets. Conversely, it may deter *value* investors – i.e. performance-focused investors – who view these targets as too restrictive because they limit the investment universe. Lastly, these targets might also have no impact on fund flows if investors do not value this new information. These hypotheses lead to the following research questions examined in this paper: Which sustainable investment targets do mutual funds commit to, and how do commitments to sustainable investments affect fund flows?

To address these questions, we rely on a unique dataset that contains the dates when funds disclosed their sustainable investment targets and - by assets - covers more than 70% of the fund market disclosing according to the SFDR, i.e. most funds marketed in the

1. deHaan et al. (2021), for example, show that fund managers may use narrative complexity to conceal high fees.

2. Regulation (EU) 2019/2088.

3. Regulation (EU) 2022/1288.

EU⁴. Using these dates we show that the aggregate commitments of medium sustainable funds, i.e. Article 8 funds, are around twice as high compared to funds with the highest sustainability goals according to the SFDR, i.e. Article 9 funds, despite their significant lower average targets. Moreover, funds appear to set these sustainable investment targets at or shortly before their reporting dates of sustainable investments, indicating that they update their targets when the actual values are reported.

The impact of commitments to sustainable investments on mutual fund flows is analyzed within a difference-in-differences framework for the Article 8 index funds with a majority of retail investors share classes. Using similar Article 8 index funds that do not commit to a sustainable investment target as controls, we find that treated funds, i.e. those that introduce sustainable investment targets, experience temporary investment inflows compared to the control funds. A further inspection of the different target values reveals that funds with a low target value receive statistically significant net fund inflows, whereas those with higher values significantly fewer net inflows; their point estimates of net fund flows are close to zero. We find that up to a target level of 10% fund flows are statistically significant positive, whereas at a target level of 25% we cannot reject that fund flows are zero.

These findings can be explained by the different types of investors. As the market perceives Article 8 funds as “light green” investments (ESMA, 2023), they are potentially not only targeted by sustainability-oriented investors but also by performance investors⁵. Setting a sustainable investment target attracts more sustainability-oriented investors, i.e. values investors, however, if the targets are too high, performance investors could disregard this asset as it limits the investment universe and sustainable investments are often perceived to underperform (Riedl and Smeets, 2017; Giglio et al., 2025). Thus, high targets can lead to lower net flows.

This study is related to the literature on the impact of sustainability classifications on mutual fund flows. Hartzmark and Sussman (2019) show that the introduction of the Morningstar Sustainability Rating led to an increased demand for funds with a high sustainability

4. The comparison is based on the reported values in the third quarter of 2022 to the first quarter of 2024 in Bioy et al. (2024).

5. Scheitza and Busch (2024) for example also find that funds that downgraded to Article 8 are less focused on impact.

rating by increased fund flows. However, this effect was only temporary as Gantchev, Giannetti and Li (2024) show; the long-term effect is dependent on the fund’s performance, i.e. upgraded funds with a poor performance received outflows, while upgraded funds with a good performance received inflows. Therefore, investors (in aggregate) value performance more than sustainability. Moreover, Ramos et al. (2024) show that sustainability labels sponsored by government and non-profit organizations increase fund flows as opposed to other sustainability labels. Our findings corroborate the literature by also confirming a temporary impact of higher sustainability on fund flows. Moreover, our findings also point towards the trade-off between performance and sustainability.

There is also a growing literature that analyses the impact of the SFDR on the mutual fund industry. Badenhop et al. (2023) give an overview of the recent changes in the regulation and show that the wave of downgrades from Article 9 to 8 had a cleaning effect in the sustainability dimension. Becker, Martin and Walter (2022) show that the introduction of the SFDR led to an increase in the sustainability ratings of funds and also higher fund inflows, in particular for Article 8 funds. Conversely, when assessing the impact of the Morningstar globes rating and the SFDR regulations jointly, Ferriani (2023) finds that rather Article 9 than Article 8 funds can attract more inflows and that the Morningstar ESG rating impacts fund flows. However, the time frame of his study is rather short ranging only from March to August 2021. Emiris, Harris and Koulischer (2024) also focus on the introduction of the SFDR regulation and report that Article 8 and 9 funds received inflows, where funds that had no ESG rating or a high rating benefited more. A different approach is applied by Scherer and Hasaj (2023) that use the changes in the SFDR classifications of index funds induced by the policy uncertainty of the regulation. They find only a contemporaneous negative effect of downgrades from Article 9 to Article 8 on fund flows. In contrast to the previous studies, we analyze how disclosures about funds’ commitments to sustainability impact mutual fund flows.

Lastly, we also relate to the literature on fund disclosures. Darendeli (2024) studies how retail investors react to factsheets published on Morningstar. He finds that investors tend to overreact to performance measures when these are made salient, highlighting the behavioral

impact. In the context of sustainability, Birk, Jacob and Wilkens (2024) investigate the information content of prospectuses in comparison to sustainability ratings. Their findings suggest that prospectus disclosures are more informative for explaining fund flows, whereas sustainability ratings play a less significant role. Hillert, Niessen-Ruenzi and Ruenzi (2025), on the other hand investigate the impact of shareholder letters on fund flows. They find that a negative tone in narrative communication reduces subsequent fund inflows, thus highlighting the importance of how investors react to the narrative tone of new information. Relative to this literature, our study focuses on a newly mandated disclosure – sustainable investment targets under the SFDR – which offers two advantages: it is standardized and easily interpretable, and it is not subject to narrative manipulation. As a result, our findings shed new light on the impact of mutual funds’ sustainability commitments on fund flows.

2 Institutional Setting and Data

2.1 The Level 2 Disclosures under the SFDR

The SFDR (level 1) was introduced in November 2019. It has three different layers of disclosure duties, which markets have taken up as classifications for financial products, named after the Article that defines them in the regulation: (1) Article 6 products that do not consider sustainability risks, (2) Article 8 products that “promote” social and/or environmental characteristics, and (3) Article 9 products that have social and/or environmental characteristics as an objective. The different disclosure requirements were further specified in April 2022 by the adoption of the regular technical standards Commission Delegated Regulation (EU) 2022/1288 (level 2) that have been applying since January 2023.

The SFDR level 2 focuses mainly on three disclosure dimensions: Consideration of Principal Adverse Impact (PAI) factors, minimum/target values of sustainable investment in prospectuses, and actual levels of sustainable investments in the annual reports. While for the PAI factor the regulation also included a list of categories to select from, the sustainable investment amounts were split into 4 different categories, namely sustainable investments, environmentally sustainable investments, socially sustainable investments, and taxonomy-

aligned investments. While sustainable investments include both environmentally and socially sustainable investments, taxonomy-aligned investments link the disclosure regulation to the EU Taxonomy Regulation⁶, which provides a framework for classifying the environmental sustainability of economic activities.

Sustainable investments are defined in Article 2 (17) SFDR⁷ and follow the do not significant harm method. Therefore, an investment is sustainable if it contributes to an environmental or social objective, but does not significantly harm any other environmental or social objective. Furthermore, it must be subject to good governance practices.

There has been some uncertainty about the definition and applicability of the sustainable investment definition in the SFDR which also led to downgrades of funds (Badenhoop et al., 2023; Scherer and Hasaj, 2023). Therefore, in April 2023 the European Commission clarified that for the evaluation of sustainable investments, companies have to lay out the methodology they use to assess investments (Joint Committee, 2024). This increases the flexibility for funds to define sustainable investments at the cost of more diversity and thus less clarity for end investors.

In line with being seen as the most sustainable category of the regulation, Article 9 products need to disclose all three dimensions of level 2 requirements, i.e. PAI factors, sustainable investment targets and actual sustainable investments. The requirements for Article 8 funds are different. These funds can decide to disclose target values and actual values of sustainable investments, but they do not have to. Subsequently, the Article 8 funds that disclose target and actual values of sustainable investments have been named Article 8.5 funds or Article 8 plus funds (Badenhoop et al., 2023).

Funds are legally bound to make the disclosures under SFDR. In case of non-compliance, they face serious consequences. The national competent authorities supervising them can take supervisory enforcement measures and sanctions ranging from naming and shaming, i.e. naming the non-compliance and thereby damaging the fund's and fund managers' reputation, over pecuniary sanctions until shutdowns of funds or professional bans for fund managers (Badenhoop and Stolte, 2025). This explains why many Article 9 funds down-

6. Regulation (EU) 2020/852.

7. Regulation (EU) 2019/2088.

graded to Article 8 funds at the beginning of 2023 when the above-mentioned stricter and more explicit rules came into force.

2.2 Data

The data on the sustainability dimension of mutual funds are taken from the German version of the European ESG Template (EET) provided by the WM Gruppe, a leading provider of financial information and data. The template was created in March 2022 with the first delivery of information in June 2022 to enable fund providers to comply with the new disclosure requirements set up by the SFDR⁸. The WM Gruppe serves as the data distributor for the German market and delivers information from fund providers to market participants like financial advisors or brokers. The dataset at hand consists of quarterly snapshots of this database from September 2022 to March 2024, with additional snapshots in January 2023, February 2023, and January 2024.⁹ In this instance, the latter dates are important as they cover the first months after the new target value disclosures were mandatory. As the data is provided on the ISIN level, i.e. on the funds' share classes, we aggregate the information on the fund level using the Morningstar FundId to identify the share classes that belong to the same fund. A detailed explanation on the aggregation can be found in Appendix Appendix A1.

In the data, we also observe sustainable investment target reporting dates that are before April 2022. Given that the level 2 disclosures were adopted in April 2022, we consider these dates as errors and drop the respective observations¹⁰.

The remaining data on funds' market characteristics over the period from September 2021 to March 2024 is taken from Morningstar by value weighted aggregation of the available share class level information (i.e. weighted by each share classes total net assets). The fund flows are winsorized at the 1% level. This results in an unbalanced panel spanning from September 2021 to March 2024.

8. The current and old versions of the template can be found here: <https://findatex.eu>.

9. The respective snapshot dates are: 21st September 2022, 15th December 2022, 16th of January 2023, 15th of February 2023, 15th of March 2023, 15th of June 2023, 15th of September 2023, 15th of December 2023, 15th of January 2024, and 15th of March 2024.

10. Note that these observations make up only around 10% of the observations, as evident in *Figure 1*.

Table 1 gives an overview of the different variables used in the analysis split into index funds and investment funds. Index funds are on average smaller, but received higher fund flows over the period under study. They also performed better as their return was on average higher. On average their sustainable investment targets are smaller, except for environmental targets that are higher.

3 Empirical Evidence on Sustainable Investment Targets

3.1 Descriptive Evidence

A more detailed look into the distribution of the reporting dates is presented in *Figure 1*, where reporting dates before April 2022 are included in the March 2022 bin. Panel A shows the distribution of the reporting dates of positive sustainable investment targets. The dashed red line indicates the date of the clarification on the evaluation of sustainable investments of the European Commission, which gave funds more flexibility. The larger flexibility of the measures did not lead to a surge in new sustainable investment target disclosures. Only for social and environmental investment targets, in Panel B and Panel C respectively, there are quite some disclosure updates after April 2023. Still, they are two months later in June which is not directly after the change. An important date across all categories seems to be the introduction of mandatory disclosures in January 2023. In December 2022 and January 2023, there was a significant amount of funds starting to disclose target values for the first time for the social and environmental categories. For the overall sustainable investments and the taxonomy-aligned targets, this date was more important for updates, as many funds started already in mid-2022 to disclose these values.

The evolution of the average sustainable investment targets using the reporting dates can be seen in *Figures 2 and 3*. Note that by definition it only covers Article 9 and Article 8.5 funds, furthermore, it only focuses on funds that did not change their classification to

investigate if there was in general a shift to higher disclosures within the classification¹¹.

Figure 2 shows that Article 9 funds had already a high level of the target values in September 2022, which gradually increased to the level of around 82% in September 2023, at which it prevailed until March 2024. This number is not surprising given that Article 9 funds should exclusively invest in sustainable investments (Badenhoop et al., 2023). Compared to the percentage targets, the average targeted investment amounts for the sustainability investment target are not significantly increasing over time for Article 9 funds, as can be seen in Panel C. In particular, it seems to be the case that larger funds started to disclose first in September, and as more smaller funds were disclosing in December 2022 the average target investments dropped. Yet, this difference is not statistically significant. Panel B shows that Taxonomy-aligned investment targets play almost no role, as the targets are below 5%. This is also reflected in the targeted investment amounts per fund in Panel D, especially when compared to the overall sustainable investment targets. These amounts start at around 40 million EUR and decrease to 9 million EUR by March 2023, followed by a slight increase to 11 million EUR by March 2024.

The picture is different for Article 8 funds in *Figure 3*. In Panel A, there is a statistically significant decrease in the average sustainable investment targets from 13% in September 2022 to 11% in March 2023. This is followed by a gradual increase to the level of 12% in March 2024. Turning to the average targeted investment amounts in Panel C, we observe a U-shaped evolution over time. The initial decrease from around 78 million EUR in September 2022 to 64 million EUR in December 2022 is also statistically significant. While this decline appears aligned with the decrease in percentage targets shown in Panel A, the increase from 63 million EUR in September 2023 to 75 million EUR in March 2024 could be attributed not only to the slight increase in targets but also to growth in fund sizes, i.e. more investment inflows. Panel B reveals that Article 8 funds, on average, do not target Taxonomy-aligned investments, as their percentage targets remain below 1%. This is also reflected in the average investment amounts in Taxonomy-aligned investments shown

11. Badenhoop et al. (2023) have shown that with beginning of the binding disclosures on the first of January 2023 the average target values of Article 9 funds increased for the overall sustainable and environmentally sustainable investments, whereas the average target value of Article 8 funds did not change. They also found that the funds that changed their classification contributed to this effect.

in Panel D.

Although on average Article 8 funds have lower average target investment amounts, it is important to bear in mind that they are the larger group of funds in numbers. This leads to the fact that the total target amount in March 2024 for Article 8 funds is around 276.750 bn. EUR ($=3682 \times 75$ Mio. EUR), whereas the amount for Article 9 funds is 121.844 bn. EUR (367×332 Mio. EUR) in this sample¹². Thus, Article 8 funds' investments are more than twice as large as those of Article 9 funds, highlighting the importance of Article 8 funds in managing sustainable investments.

To assess how well funds keep up with their targets, the dataset also allows us to examine the sustainable investment gap, i.e., the difference between stated sustainable investment targets and the actual sustainable investments achieved. This investment gap analysis is presented in *Figure 4* for the category of sustainable investments and taxonomy-aligned investments. The figure depicts the fraction of observations in the data according to their sustainable investment gap along the x-axis.

The first observation is that nearly all funds meet their targets and only a tiny minority of funds report lower actual sustainable investments than those targeted (Panels A and B). The second observation is that many funds overachieve their targets. While for sustainable investments, only a quarter of funds meet or exceed their targets by up to 5 percent (Panel A), for taxonomy-aligned investments, nearly all funds do (Panel B). Given the low taxonomy-aligned investment targets, the latter is not surprising. Yet, there is a large group of significant overachievers. The majority of funds exceed their sustainable investment targets by 5 to 70 percent. The last observation is that sustainable investment targets have seen a shift towards more overachievers, as the fraction of underperformers has decreased. In general, after the level 2 disclosures, the share of overachievers is more concentrated within a gap of 0 to 50 percent.

Appendix *Figure A4* also highlights that the gap for environmental investments has shifted towards more significant overachievement, with over 60 percent of funds exceeding their goals by 5 to 80 percent post-Level 2, compared to 30 percent pre-Level 2.

12. Bioy et al. (2024) report in March 2024 a number of 1024 Article 9 funds and 10964 Article 8 funds. Also using these fund numbers indicates a higher total investment target for Article 8 funds.

Another important aspect when looking at the gap between the targets and actual investments is the distance between the target disclosure date and the next reporting date of sustainable investments. This perspective can give insights into fund managers' strategies if they use these targets as real targets set in advance, or if they are just used as a sign-posting device for investors that is just updated shortly after the actual values are reported. Figure 5 shows the distribution of the distance in months from the actual reporting date to the closest target date disclosure for three different time periods, separated by a red line, across the sustainable investment and taxonomy-aligned investment categories (Panels A and B), split by Article 8 and 9 funds. The first time period covers the closest disclosure dates before the reporting month, the second time period covers target dates that appear in the same month as the reporting date, and the last time period covers cases where the closest target disclosure date falls after the reporting month.

Starting with total sustainable investments in Panel A, it is evident that, particularly for Article 8 funds, most target values have been set in the same month as the actual values were reported. Another mass point is clearly one month before the reporting month. However, considering the period after the reporting date, there is only one mass point at the sixth month, which may align with the next reporting date for semiannual reporting. In general, the frequency of target dates set further away from the reporting date is lower for the period before and after the reporting date. This suggests that fund managers tend to set targets shortly before or at the same time as their actual values are reported, indicating that they seem to react to their actual values rather than setting targets way in advance. This could reflect either upward revisions of targets based on newly reported values or adjustments to ensure that targets match actual outcomes. A similar pattern emerges for Article 9 funds, with the only exception that they set their targets more frequently before the actual value is reported. This trend is also observed for taxonomy-aligned investment targets in Panel B. Overall, there appears to be clustering of disclosure dates at quarterly frequencies and shortly before or at the time actual values are reported.

Lastly, we investigate which fund characteristics explain the levels of sustainable investment targets. For this purpose, we focus on Article 8 funds, as Article 9 funds are required

to invest primarily in sustainable investments; thus, their target levels should largely be determined by hedging instruments and cash holdings. The characteristics we consider are considering PAI factors, having a taxonomy aligned investment target, the Morningstar Star Rating, the return in excess of the risk-free rate, fund flows, the fund size, its age, and Morningstar Sustainability Rating. We also split the sample into index and investment funds to capture the difference between passive and active fund strategies.

In *Table 2*, we regress the target values in the next month on the selected fund characteristics for index funds. Columns (1) to (6) present the results where each factor is included individually, while columns (7) and (8) show the ‘kitchen sink’ regression with all variables included simultaneously. Across all specifications, selecting PAI factors is positively associated with higher target values. Specifically, selecting PAI factors is associated with an increase in sustainability targets of 5.133 percentage points in the full model (column (8)). In contrast, taxonomy aligned investments are not statistically significant positively associated with higher targets. This also applies for the remaining characteristics, except for the Morningstar Sustainability Rating. Columns (7) and (8) shows that higher sustainability ratings are associated with higher targets. The highest rating category is statistically significant positively associated with higher targets compared to the medium rating category, and the point estimates generally increase across rating categories – except for the first category in the full model (column (8)). Lastly, including fund company fixed effects significantly increases the explanatory power of the model. The adjusted R^2 increases by 0.129, which can be explained by the fact that fund companies often disclose all their funds simultaneously in a single prospectus. In general, we find that the sustainability targets of index funds are not influenced by the performance characteristics of the funds. Instead, they are primarily driven by sustainability-related characteristics.

Repeating the same analysis for non-index funds, *Table 2* shows again that setting PAI factors is statistically significant positively associated with sustainable investment target levels – by about 6 to 8 percentage points with fund company fixed effects. Interestingly, for non-index funds, setting taxonomy-aligned investment targets is also statistically significant positively associated with higher sustainable investment targets (6.841 percentage points in

column (8)). Turning now to the performance characteristics, we find that higher returns and higher flows are positively associated with higher targets. Additionally, younger funds and those with higher Morningstar Sustainability Ratings also tend to set higher targets. These associations persist in the full model with all controls (column 8), except the relation of fund flows which turns insignificant. Additionally, as in the case of index funds, fund company fixed effects significantly increase the explanatory power for sustainable investment targets – raising the adjusted R^2 by 0.26 from column (7) to column (8). This suggests that, compared to index funds, the sustainability targets of investment funds are not only positively associated with sustainability characteristics but also with performance. That is, funds with better past performance tend to set higher sustainability targets.

The evidence presented on the sustainability target levels so far cannot be seen as indicative that the introduction of the target values led to more fund inflows, although from September 2023 onward, Article 8 funds increased their minimum investments. Consequently, in the next section, we will investigate this relation for Article 8 funds more thoroughly using an event-study approach.

3.2 Empirical Strategy

The reporting dates wherein funds declare a minimum target of sustainable investments are a good event to study the impact of sustainable investment targets on mutual fund flows.

First, as evident in the histogram in *Figure 1* Panel A, there is significant heterogeneity in the disclosure dates of changes across fund companies. This helps us to separate the disclosures from other confounding events at specific time periods through a staggered setup. Additionally, we leverage on this heterogeneity and granularity of the available data and align the timing of disclosures and fund flows, as the latter are measured at month end. Therefore, we associate disclosures made after the 15th of a month with the following month – i.e., the treatment is shifted to December if a fund discloses its target on November 16th – as fund flows in November would mostly capture pre-disclosure flows.

Second, many fund companies issue the prospectuses for all their funds simultaneously. Therefore, individual fund performance should not significantly influence publication dates,

making these reporting dates exogenous to individual fund outcomes. This rules out the concern that fund managers time the publishing of the target dates to boost individual fund performance. Additionally, we focus exclusively on index funds, which do not actively adjust their holdings. This rules out the possibility that funds adapt their investment strategy in response to the publication of new targets. These assertions are further supported by our previous analysis of the determinants of sustainable investment targets. For index funds, target levels are associated only with sustainability characteristics, not with performance. In contrast, the results for investment funds suggest that higher targets are more likely to be set when recent performance is strong. In particular, the positive connection for investment funds of fund flows with target levels could give rise to endogeneity issues in estimating the relationship between sustainable investment targets and fund flows.

Third, not all Article 8 funds publish minimum targets for sustainable investments, in contrast to Article 9 funds that by the clarification of the European Commission need to hold only sustainable investments¹³. According to the disclosure template, Article 8 funds can also decide to promote environmental or social characteristics without targeting sustainable investments. These funds usually use PAI factors in their asset allocation and therefore are a good control group as they also consider sustainability in their asset allocation. To identify these funds we check in the database if funds reported any target values and also rely on a unique Datapoint in the German template of the EET, the alignment with MiFID II sustainability preferences. This data point indicates if a fund is aligned with one of the three MiFID II sustainability preference categories: (i) minimum value of sustainable investments, (ii) minimum value of taxonomy-aligned investments, and (iii) consideration of PAI factors. Moreover, this datapoint also requires fund companies to comply with the United Nations (UN) Principles for Responsible Investment and ensures that they do not violate the UN Global Compact¹⁴. Therefore, our estimates measure the impact of sustainability targets within funds that fulfill the sustainability preferences according to MiFID II.

13. This rules out Article 9 funds for the question at hand, as there should be no fund that does not commit to sustainable investments. Furthermore, the heterogeneity in the minimum targets would only be driven by cash or hedging instruments.

14. For the PAI factors this variable also ensures minimum exclusion criteria for coal, tobacco, and military hardware.

Figure 6 shows the percentage of funds in the sample of index funds that fulfill the different criteria. Panel A shows that among the three categories for Article 8 funds, the PAI preference category is the one that is fulfilled the most. The minimum sustainable investment target follows shortly after and the taxonomy-aligned investment target ranks the last with a very low fraction of around 7%. However, a similar fraction of the data does not indicate to fulfill any category, represented by the two gray-shaded areas that make up around 40-30%. Eligible for the control set are around 18% of the funds, the ones that only consider PAI factors. Note that there is a similar fraction of funds that indicate not fulfilling the sustainability preferences in the fraction labeled “None”.¹⁵

In comparison, Panel B shows the results for Article 9 funds. Here, most funds indicate to fulfill the sustainable investment minimum category, a fraction of around 70% in January 2024, shortly followed by the PAI factor with 61%. Panel B also shows that if investors target taxonomy-aligned investments, they should focus on Article 9 funds rather than Article 8 funds, given that here the fraction is almost twice as large as for the Article 8 funds in recent months. It is also evident that more and more Article 9 funds provided this field, as the fraction of missing information decreases over time.

This setting lends itself to a staggered difference-in-difference setting. Given the recent growing literature on this topic, it is important to verify the assumptions required for unbiased and efficient estimates – particularly the assumption of constant treatment effects (de Chaisemartin and D’Haultfoeuille, 2022). If violated, problems such as bad comparisons and negative weights can arise which have been widely discussed in this context (Roth et al., 2023). Since our control group for Article 8 funds consists of never-treated funds, so that we can rely on “clean” comparisons between treated and control groups, our estimates are not subject to this issue even in the case of heterogeneous treatment effects over time. In particular, we narrowed down the sample to treated funds where data is available at least 4 month after the treatment to estimate the short- to medium-term implications of the changes. Additionally, we focus on retail-oriented funds by excluding those whose institutional share classes account for more than 50% of their assets on average. This assumption

15. These funds likely violated the additional criteria for this field.

is not very restrictive as on average the percentage of retail share classes for index funds in the sample is 95.3%, where the 4.7% of institutional share classes are coming from a few funds that have almost only institutional share classes.¹⁶

We estimate the effect using two different estimation approaches. The first comprises a stacked regression approach combined with matching on the investment universe and domicile using only never-treated funds as controls. The second follows Borusyak, Jaravel and Spiess (2024) and their regression imputation approach, additionally using the not-yet-treated funds. While the first approach allows comparing more similar funds in the 2x2 spirit, the second approach utilises more information as not-yet-treated funds can also serve as a control.

3.2.1 Stacked Regression

Given that funds can have different investment universes, it is important to consider these factors in comparing treated and control groups. To do so, we first match control funds to treated funds with the same GlobalCategory¹⁷ and domicile¹⁸. The latter is also an important control as it not only controls for changing disclosure requirements per country, but also for potential different national supervisory treatments of disclosures. *Table 4* gives an overview over the funds and event dates before and after the matching. Of the 274 funds we retrieve a sample of 162 matched funds for 38 matching groups¹⁹, of which 75 are treated funds. Note that we retain all the funds that are in the same matching categories to prevent randomly dropping funds in the same category to have a one-to-one matching, and we use matching with replacement as control funds can be used multiple times across the different event times.

Next, we use the following regression setup to estimate the impact of the change in total

16. This fact unfortunately makes it nearly impossible for us to conduct an heterogeneity analysis of retail versus institutional share classes behaviour to the disclosures with our set of controls.

17. The GlobalCategory is a categorization by Morningstar that classifies funds according to their investment universe. Compared to the MorningstarCategory it is more coarse and therefore less restrictive in the matching. However, it is still granular in the sense that it considers asset class and geography among other things. See <https://www.morningstar.com/content/dam/marketing/shared/research/methodology/860250-GlobalCategoryClassifications.pdf>.

18. We rely on the coarsened exact matching tool in Stata to conduct this matching.

19. A matched group is a group that has the same characteristics for the two matched variables, i.e Global-Category and domicile bin.

sustainable investment targets:

$$\begin{aligned}
Flow_{ig,tg} = & \beta + \beta_1 R_{i,t-1}^{ex} + \beta_2 Rating_{i,t-1}^{Sus.} + \beta_3 Rating_{i,t-1}^{Morningstar} + \beta_4 Log(1 + FundAge) \\
& + \tau D_{ig,tg} + \gamma_{ig} + \gamma_{tg} + \epsilon_{ig,te}
\end{aligned} \tag{1}$$

where $Flow_{ig,tg}$ are the winsorized monthly fund flows in percent, $D_{ig,tg}$ is the indicator variable being equal to one if a fund changed its sustainable investment target, $R_{i,t-1}^p$ is the excess portfolio return from the previous month²⁰, $Rating_{i,t-1}^{Sus.}$ is the globe's sustainability rating of Morningstar from the previous month, $Rating_{i,t-1}^{Morningstar}$ is the overall five-star rating from Morningstar from the previous month, $Log(1 + FundAge)$ is the fund's age since its inception in logs²¹, γ_{ig} is the fund times group fixed effect, and γ_{tg} is the time times group fixed effect. We added the control variables of the Morningstar Rating and the excess portfolio return as Ben-David et al. (2022) show that these two factors explain mutual fund flows. $Rating_{i,t-1}^{Sus.}$ is the proxy for the fund's sustainability and helps to control for the fund's ESG risk exposure.

To accommodate the fact that per event group there are sometimes more or less control and treated funds, we use a weighted regression approach where the weights are the weights obtained by coarsened exact matching, i.e. they ensure that there is a balance between treated and control funds per matched group.

3.2.2 Regression Imputation Approach

We apply the regression imputation approach following Borusyak, Jaravel and Spiess (2024), augmenting their default setting with time-varying control variables and additional fixed effects.

At first, a model of non-treated potential outcomes is estimated using the never-treated and not-yet-treated funds in the sample. The model follows Equation (1), but excludes the

20. The results stay quantitatively and qualitatively the same using return quartiles within the same MorningstarCategory as control variable.

21. We use the specification of fund age plus one, to not drop the months in the initiating year of the fund.

treatment dummy and sets the fixed effects on the funds and month level. Additionally, GlobalCategory times month as well as Domicile times month fixed effects are included to facilitate the comparison with the stacked approach. In the second step, these estimates, $\widehat{FundFlow}_{i,t}(D=0)$, are used to impute the non-treated counterfactual fund flows for the treated funds, allowing to calculate the treatment effect for each fund and month, i.e. $FundFlow_{i,t} - \widehat{FundFlow}_{i,t}(D=0)$. In the last step, these treatment effects are averaged.

3.3 Results

The results can be seen in *Table 5*. Column (1) shows the estimation results of Equation (1). The coefficient on the treatment dummy is positive with a magnitude of around 2.92 percentage points and significant at the 10% significance level. Regarding the control variables, only the excess return of the fund and the age of the fund appear to significantly affect the fund flows, with positive and significant coefficients at the 5% level. As there is not much variation over time for the $Rating^{Morningstar}$ as well as the $Rating^{Sus}$, it is not surprising that these controls do not have a significant impact on fund flows. Most of their impact is already captured by the fund fixed effects.²² One downside of the estimates in column (1) is that $Rating^{Morningstar}$ is not available for all funds, as Morningstar needs past performance data of the funds to create it²³. Therefore, in column (2) we omit this control variable and extend the sample by funds where there is no morningstar rating available. Thus, the sample increases by younger funds to 154 funds, almost double the amount compared to column (1). The treatment effect point estimate increases slightly to 3.63 while its standard error even decreases, resulting in a statistically significant effect at the 1% level. Moreover, the impact of the excess portfolio return and age turn statistically insignificant. To support that this effect is rather driven by the increase of the sample size than the exclusion of the control, we also verify in *Table A1* in the Appendix that removing the control $Rating^{Morningstar}$ within the same sample does not bias our estimates in a meaningful way.

22. Excluding fund fixed effect yields a positive relation of these controls to fund flows.

23. One building block of the Morningstar Star Rating is the past performance. Therefore, Morningstar requires that funds have 36 months of past performance. See The Morningstar Rating™ for Funds Data Content Guide available here: <https://www.morningstar.com/api-corporate/midway/v1/research/download/1175661?timestamp=16922885400000500&token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJkYXRhIjp7ImRvY3VtZW50SWQiOjExNzU2NjF9LCJpYXQiOjE3MTkwODU0MzZ9.ApaKWo6W1Ry0ZA8aMLMLzw0k16kYWxhCBFuZ3ju0YJA.>

The results of the regression imputation approach can be seen in *Table 5* columns (3) and (4). In column (3) we again use the specification including the *Rating^{Morningstar}*, where in column (4) we use the unrestricted sample. The treatment effect estimate in column (3) is 2.02 percentage points and statistically significant at the 5% level. This again indicates a positive impact of target value disclosures on fund flows. The estimate is similar to its counterpart in column (1) using the other estimation methodology. Again, the excess portfolio return is positive and significant at the 5% level as well. Using in column (4) the unrestricted sample, we can see that the point estimates increase to the level of 3.414 percentage points and the estimate is now also statistically significant at the 1% level.

Across the estimation methods, there is a consistent picture that target level disclosures lead to more net fund flows. In particular, fund flows increase in between 2.0 to 3.6 percentage points. With average index fund flows of 1.972 over the full sample, this implies more than a doubling of flows through target level disclosures.

To further study the dynamics of the effect and also inspect if there are no confounding trends before the disclosure of the targets, we also estimate an event study specifications of the two estimation approaches. The results for the different estimation approaches are plotted in *Figure 7*.²⁴ Across all the specifications, we can see that there are no pre-trends in the first three months visible. In Appendix *Table A3*, we also report a joint test of whether the pre-treatment point estimates are jointly equal to zero across all specifications. In all cases, we fail to reject the null hypothesis that the pre-treatment estimates are zero increasing the confidence that there are no confounding trends. Yet, all specifications show an statistically significant increase in the point estimates one month after the disclosure of the sustainability targets. Estimates range from around 2.4 to around 4.3 percentage points and are significant at least at the 10% level. For the stacked approach in columns (1) and (2) estimates remain high – around 3 to 4 percentage points – though mostly not statistically significant. In contrast the imputation-based approach yields markedly lower estimates, dropping to around 1 percentage point as early as the second month after treatment. Within the stacked approach method we can see that all post treatment estimates

24. The regression table with the estimates can be found in the Appendix *Table A3*

are not significantly different from each other between the different samples (column (1) compared to column(2)), indicating that using the larger sample without the morningstar rating does not meaningfully affect the estimates. The same applies for the imputation based method although here the difference is slightly larger.

Taken together, the results in *Figure 7* indicate a delayed temporary effect, the impact on fund flows materializes one month later. Moreover, for the imputation approach there is a drop in the magnitude of the estimates in period two. This is different compared to the stacked regression and could indicate a possible heterogeneous impact on fund flows. In the next section, we will investigate how different levels of sustainable investment targets influences fund flows.

3.3.1 Target Value Heterogeneity

The previous results focused only on the Article 8 funds that implemented a sustainable investment target. As shown in *Figure 3* Panel A and in *Table 4* the average minimum investment target for these funds is very low. In the matched sample, the average is around 10.32%. Therefore, the rather transitory effect could be driven by low sustainable targets. Investors may not view such low values as a credible signal, and thus do not move their money to these funds. We will therefore exploit the existing heterogeneity in the fund dimension to see if higher targets imply higher fund flows. The median value of the samples used in the empirical analysis is 10 but this value is reported by around two-fifths of the funds. Consequently, we will use a linear specification to see if there is a relation between the level of the set target value and net fund flows and will abstract from a sample split at the median.

The results are displayed in *Table 6*. Across the different specifications for the stacked approach in column (1) and (2), the coefficient on the disclosure dummy – without considering the target value – is positive and statistically significant at least at the 5% level. This suggests a positive relationship between fund flows and the sustainable investment target disclosures, independent of the actual target magnitude. The estimated effects are also large in magnitude, ranging from 6.525 to 7.603 percentage points. However, these estimates

should not be interpreted in isolation, as no fund disclosed a target of zero. Instead, they must be viewed in conjunction with the interaction terms between the disclosure dummy and the target level. These interaction terms are negative and statistically significant—at the 5% level. Specifically, the estimate without the *Rating^{Morningstar}* control suggests that a one percentage point increase in the sustainability target reduces fund flows by 0.285 percentage points. This indicates a negative relationship between higher sustainability targets and fund flows: investors appear to penalize funds that commit to more ambitious sustainable investment targets, favoring those with more modest commitments.

Applying the imputation-based method in columns (3) and (4) yields a qualitatively similar pattern, except that the negative point estimate on the interaction term is not statistically significant at conventional levels when the sample includes the *Rating^{Morningstar}* control. This lack of significance appears to be driven more by the smaller sample size and reduced heterogeneity in target-level disclosures than by the inclusion of the control itself, as the control does not meaningfully affect the estimates, as shown in the Appendix *Table A2*. Overall, the estimates from the imputation-based approach are also smaller in magnitude compared to those from the stacked approach. For example, without the *Rating^{Morningstar}* control, a one percentage point increase in the sustainability target reduces fund flows by 0.146 percentage points. However, this reduction starts from a level of 5.046 percentage points, which is the magnitude of the estimate on the treatment dummy.

The smaller magnitudes observed in the imputation-based estimates may be explained by the different benchmark levels used by the two methods and the available heterogeneity in the target levels. The imputation-based approach compares to the overall pre-treatment mean, whereas the stacked approach uses the period immediately before the treatment as the benchmark. Another important point is that the distribution of sustainable investment targets is fairly left-skewed for the stacked sample, as the maximum and 75th percentile are much lower, evident in *Table 1*. Additionally, the variation in this sample is much lower, as the standard deviation is only 5.490 versus 8.618 in the full sample.

In the specification used so far, we include funds that use PAI factors in the control set. Although this gave the advantage that we could also rely on never-treated controls, it

might be the case that PAI funds might not be perceived by investors to be comparable in contrast to target value disclosing funds. Indeed, they fulfill a different MiFID II sustainability preferences and might have a different investment approach. One advantage with the imputation based approach is that we can also use only not-yet-treated funds as controls and still retrieve unbiased and efficient estimates. We pursue this strategy in *Table 7*.

Using the alternative control set, we no longer find a significant positive aggregate effect. However, the new specification confirms our previous results of a negative linear relationship of target levels and fund flows. In particular, the estimates in column (4), without the *Rating^{Morningstar}* control, align with the estimates in column (4) of *Table 6*, although their magnitude is lower and they are only statistically significant at the 10% level instead of the 5% level. Focusing on the sample including the Morningstar control shows that here the interaction term is larger in magnitude and is now also statistically significant at the 1% level. However, the treatment dummy itself becomes insignificant compared to column (3) and is smaller in magnitude.

The results in *Table 6* show that disclosing low target values can benefit funds in terms of higher net fund flows, while funds with higher values seem to be punished by investors with lower fund flows. To assess whether we can reject the null hypothesis that fund flows are zero at those levels according to our linear specification, we also perform statistical tests for different levels of sustainable investment targets, as reported in *Table 6*.

Across all specifications with the PAI fund controls, funds with a 10% sustainable investment target have statistically significant inflows – at the 5% significance level. Yet, at higher target levels, the results vary across specifications. Using the more conservative estimates from the sample that includes higher target levels and where the dispersion of targets is closer to the full sample (column (4)), we find that for targets of 25% and above, we can no longer reject the null hypothesis that fund flows are zero at conventional significance levels. Thus, funds setting their sustainable investment targets at 25% and above will likely not receive positive fund flows due to the disclosure.

We can also derive from the estimates of *Table 6* the point estimates of the level of sustainability targets that would lead to zero fund flows. Given the linear specification, we

solve for the target level using the treatment dummy as the intercept and the interaction term as the slope coefficient. To do so, we rely on the estimates with the larger sample size, i.e. the specifications without the *Rating^{Morningstar}* control in columns (2) and (4).

For the stacked approach, our back-of-the-envelope calculation yields a sustainable investment target level of 22.89 ($=6.525/0.285$), whereas for the imputation-based approach, we get a level of 34.56 ($=5.046/0.146$). However, the estimate of the stacked approach is extrapolated, as it falls outside of the sustainable investment target levels in this sample.

Taken together, we find negative linearity, i.e. fund flows decline with increasing levels of sustainability targets, but funds with low targets still receive positive net flows. This can be explained by investors who value sustainability but may be concerned about its potential impact on fund performance. It is important to note that Article 8 funds are not considered highly committed to sustainability under the SFDR framework. As a result, they attract not only sustainability-minded investors but also those primarily focused on performance. Higher sustainability targets may constrain the investment universe, potentially reducing the Sharpe ratio, as shown by Pedersen, Fitzgibbons and Pomorski (2021). Furthermore, investors' return expectations are lower for sustainability-focused funds as survey evidence shows (Riedl and Smeets, 2017; Giglio et al., 2025). Similarly, Gantchev, Giannetti and Li (2024) show that, ultimately, investors care more about performance than sustainability.

Yet, for low sustainability targets, we still find a positive effect on fund flows. This cannot be explained solely by performance-oriented investors avoiding funds with higher sustainability targets. Instead, this behavior is consistent with investors who prefer a certain degree of sustainability as long as it does not limit performance too much. Recall that investment advisors must assess their clients' sustainability preferences using PAI factors, sustainable investment targets, or taxonomy-aligned investment targets. Therefore, funds that disclose even a low sustainability target may meet the minimum sustainability requirements and thus be included in the investment universe for investors with such preferences.

Our tests indicate that investors seem to demand funds that have a target value of up to 20%, which seems to meet the preferences of investors when pondering between sustainability and performance. This is particularly relevant since investment advisors are not required to

ask clients for a specific minimum share of sustainable investments. As clarified by ESMA, it is sufficient to use standardized minimum proportions – for example, a 20% minimum.²⁵

Importantly, our estimates do not just capture the impact of having sustainability preferences according to MiFID II. Our estimates use as a control set funds that fulfill the PAI criteria under MiFID II, and thus show the impact of the targets compared to funds that are already fulfilling one of the sustainability preferences. Therefore, we isolate the effect of sustainable investment targets conditional on already meeting sustainability preference criteria. Moreover, our robustness test using only the not-yet-treated funds as controls shows that we can still retain the relationship, although it is weaker. Thus, we confirm that it holds also within the set of disclosing funds.

4 Conclusion

The SFDR enforced ESG-related disclosures for mutual funds in the European market. It not only created a new classification for sustainable funds but since 2023 also requested more granular disclosures of sustainable investments and their targets. However, it remained unclear whether fund investors value those targets and if they help to attract more fund flows and therefore also increase the amount of sustainable investments.

This paper tries to answer this question by analyzing sustainable investment targets of mutual funds marketed in Germany using a unique dataset that contains the disclosure dates. While Article 9 funds disclose higher sustainable investment targets compared to Article 8 funds, the latter are even more important for sustainable investments in the aggregate. Taking into account the roughly 10 times higher number of Article 8 funds, a back-of-the-envelope calculation of the minimum investments held by the two groups shows that the aggregate investments of Article 8 funds are around twice as large.

The introduction of these minimum requirements also had an impact on mutual fund flows. The results of the introduction of positive sustainable investment targets shows that

25. ESMA, Guidelines on certain aspects of the MiFID II suitability requirements, 23 September 2022, Guideline no. 27, p. 46, https://www.esma.europa.eu/sites/default/files/library/esma35-43-3172_final_report_on_MiFID_ii_guidelines_on_suitability.pdf.

fund investors valued these by rewarding funds with higher inflows. However, having more ambitious investment targets leads to significantly lower inflows compared to the ones with a lower sustainable investment target. At a level of sustainability targets above 25% we cannot reject anymore that fund flows are zero. This effect can be explained by investors wanting a low share of sustainable investments potentially in order not to reduce their performance too much. Thus, ticking the box of a minimum target for the MiFID II sustainability preferences might lead to higher inflows, but a commitment to a high target makes the fund less attractive. Thus, investors trade off sustainability to potential performance.

Thus, investors do value sustainable investment targets, as long as they are not too demanding for funds that are not entirely geared towards sustainable investments. While the data used in this study only allowed a look at the changes in the sustainable investment targets, an examination of the different dimensions of sustainable investment targets, i.e. social, environmental, and taxonomy-aligned sustainable investment targets, is left for future research.

References

- Badenhoop, Nikolai, and Julian Stolte.** 2025. “Befugnisse der BaFin zur Verhinderung von Greenwashing.” *Zeitschrift für Bank- und Kapitalmarktrecht - BKR*, 25(12): 532–542.
- Badenhoop, Nikolai, Angelina Hackmann, Christian Mücke, and Loriana Pelizzon.** 2023. “Quo vadis sustainable funds? Sustainability and taxonomy-aligned disclosure in Germany under the SFDR.” SAFE White Paper 94.
- Becker, Martin G., Fabio Martin, and Andreas Walter.** 2022. “The power of ESG transparency: The effect of the new SFDR sustainability labels on mutual funds and individual investors.” *Finance Research Letters*, 47: 102708.
- Ben-David, Itzhak, Jiacui Li, Andrea Rossi, and Yang Song.** 2022. “What Do Mutual Fund Investors Really Care About?” *The Review of Financial Studies*, 35(4): 1723–1774.

- Bioy, Hortense, Boya Wang, Noemi Pucci, Arthur Carabia, and Biddappa A R.** 2024. “SFDR Article 8 and Article 9 Funds: Q1 2024 in Review.” Morningstar.
- Birk, Kevin, Stefan Jacob, and Marco Wilkens.** 2024. “What attracts sustainable fund flows? Prospectus versus ratings.” *Journal of Asset Management*, 1–22.
- Borusyak, Kirill, Xavier Jaravel, and Jann Spiess.** 2024. “Revisiting Event-Study Designs: Robust and Efficient Estimation.” *The Review of Economic Studies*, rdae007.
- Darendeli, Alper.** 2024. “How do retail investors respond to summary disclosure? Evidence from mutual fund factsheets.” *Review of Accounting Studies*, 1–45.
- deHaan, Ed, Yang Song, Chloe Xie, and Christina Zhu.** 2021. “Obfuscation in mutual funds.” *Journal of Accounting and Economics*, 72(2): 101429.
- de Chaisemartin, Clément, and Xavier D’Haultfoeulle.** 2022. “Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: a survey.” *The Econometrics Journal*, 26(3): C1–C30.
- Emiris, Marina, Joanna Harris, and François Koulischer.** 2024. “Regulating ESG disclosure.” *SSRN Work. Pap*, 4457989.
- ESMA.** 2023. “Progress Report on Greenwashing.” European Securities and Markets Authority.
- Ferriani, Fabrizio.** 2023. “The importance of labels for sustainable investments: SFDR versus Morningstar globes.” *Applied Economics Letters*, 31(18): 1813–1819.
- Gantchev, Nickolay, Mariassunta Giannetti, and Rachel Li.** 2024. “Sustainability or performance? Ratings and fund managers’ incentives.” *Journal of Financial Economics*, 155: 103831.
- Giglio, Stefano, Matteo Maggiori, Johannes Stroebe, Zhenhao Tan, Stephen Utkus, and Xiao Xu.** 2025. “Four facts about ESG beliefs and investor portfolios.” *Journal of Financial Economics*, 164: 103984.

- Hartzmark, Samuel M., and Abigail B. Sussman.** 2019. “Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows.” *The Journal of Finance*, 74(6): 2789–2837.
- Hillert, Alexander, Alexandra Niessen-Ruenzi, and Stefan Ruenzi.** 2025. “Mutual Fund Shareholder Letters: Flows, Performance, and Managerial Behavior.” *Management Science*, 71(5): 4453–4473.
- Joint Committee.** 2024. “Consolidated questions and answers (Q&A) on the SFDR (Regulation (EU) 2019/2088) and the SFDR Delegated Regulation (Commission Delegated Regulation (EU) 2022/1288).” Joint Committee of the European Supervisory Authorities.
- Pedersen, Lasse Heje, Shaun Fitzgibbons, and Lukasz Pomorski.** 2021. “Responsible investing: The ESG-efficient frontier.” *Journal of Financial Economics*, 142(2): 572–597.
- Ramos, Sofia Brito, Maria C. Cortez, Svetoslav Covachev, and Florinda Silva.** 2024. “Labels we Trust? The Influence of Sustainability Labels in Mutual Fund Flows.” *SSRN Work. Pap*, 4748816.
- Riedl, Arno, and Paul Smeets.** 2017. “Why Do Investors Hold Socially Responsible Mutual Funds?” *The Journal of Finance*, 72(6): 2505–2550.
- Roth, Jonathan, Pedro H.C. Sant’Anna, Alyssa Bilinski, and John Poe.** 2023. “What’s trending in difference-in-differences? A synthesis of the recent econometrics literature.” *Journal of Econometrics*, 235(2): 2218–2244.
- Scheitza, Lisa, and Timo Busch.** 2024. “SFDR Article 9: Is it all about impact?” *Finance Research Letters*, 62: 105179.
- Scherer, Bernd, and Milot Hasaj.** 2023. “Greenlabelling: How valuable is the SFDR Art 9 label?” *Journal of Asset Management*, 24(7): 541–546.

5 Figures

Figure 1

Distribution of Sustainable Investment Target Disclosure Days

Figure 1 shows the distribution of the disclosure dates of sustainable investment targets in the dataset. The left-hand side shows the distribution of the first mentioned date in the dataset by month, the right-hand side shows the distribution of disclosure dates afterward by month. Panel A shows the disclosure dates of sustainable investments, Panel B shows the disclosure dates of socially sustainable investments, Panel C shows the disclosure dates of environmentally sustainable investments, and Panel D shows the disclosure dates of taxonomy-aligned investments. Disclosure dates with zero targets are excluded. The red solid line indicates April 2022, the red dashed line April 2023.

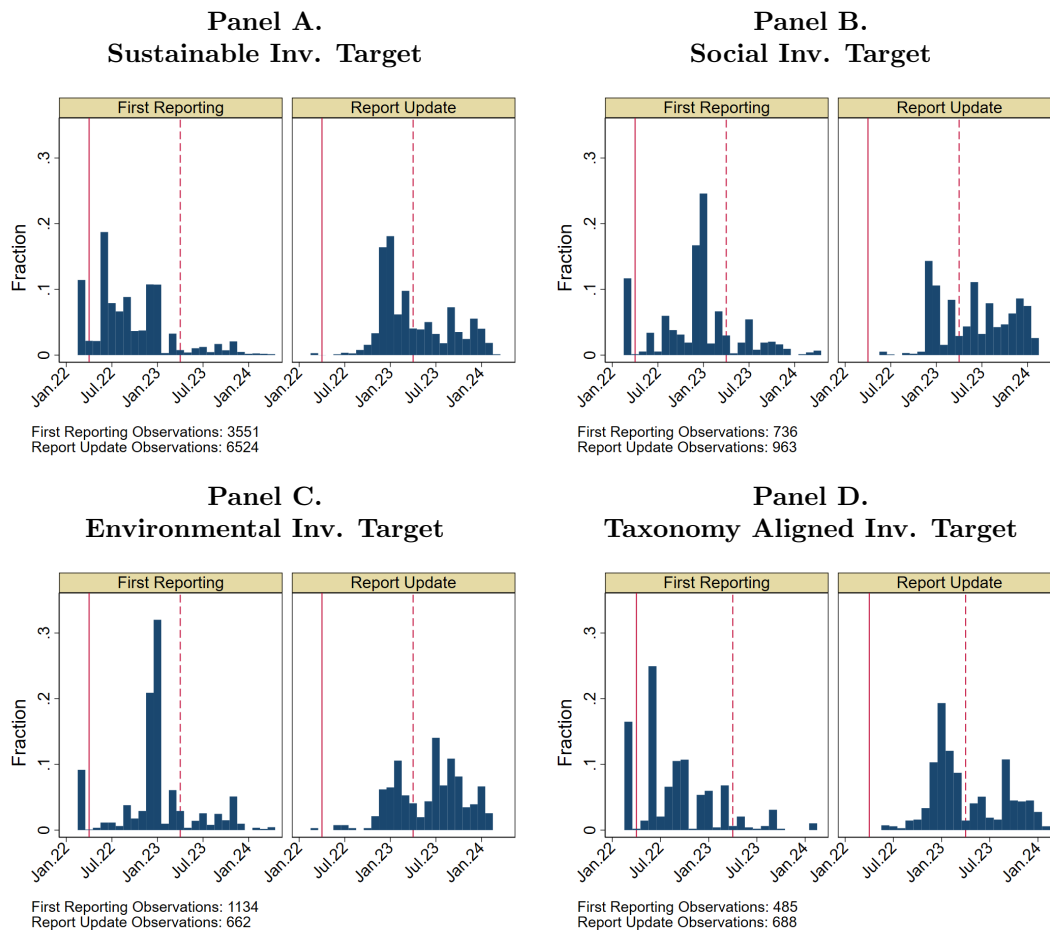


Figure 2
Investment Targets Over Time: Article 9 Funds

Figure 2 shows the average disclosed target values of Article 9 funds of sustainable investments and taxonomy aligned investments (left axis) and the dots represent the number of funds that disclose values (right axis). Panel A shows the results for sustainable investment targets in percent of the funds' assets market value, Panel B shows the results for taxonomy-aligned investment targets in percent of the funds' assets market value, Panel C shows the results for sustainable investment targets market value per fund, and Panel D shows the results for taxonomy-aligned investment targets market value per fund. Market values are in Mio. EUR. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

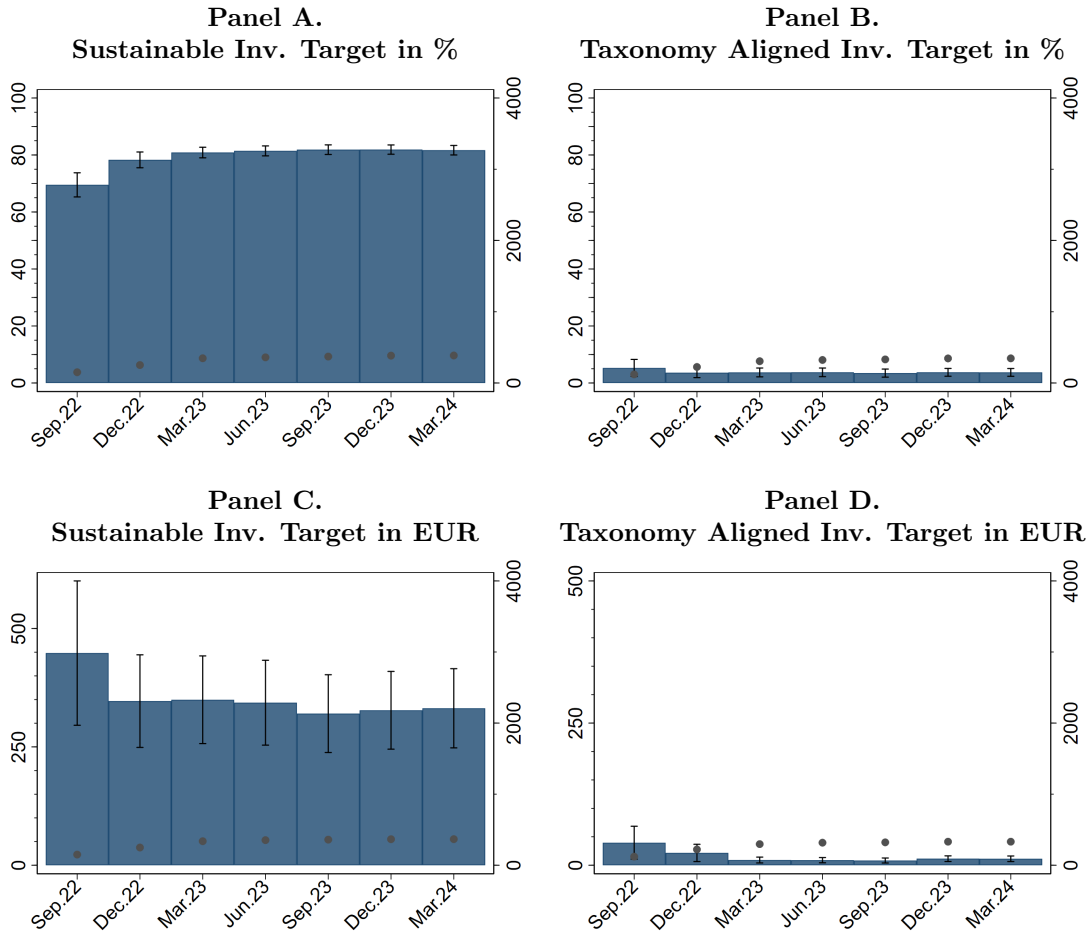


Figure 3
Investment Targets Over Time: Article 8 Funds

Figure 3 shows the average disclosed target values of Article 8 funds of sustainable investments and taxonomy aligned investments (left axis) and the dots represent the number of funds that disclose values (right axis). Panel A shows the results for sustainable investment targets in percent of the funds' assets market value, Panel B shows the results for taxonomy-aligned investment targets in percent of the funds' assets market value, Panel C shows the results for sustainable investment targets market value per fund, and Panel D shows the results for taxonomy-aligned investment targets market value per fund. Market values are in Mio. EUR. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

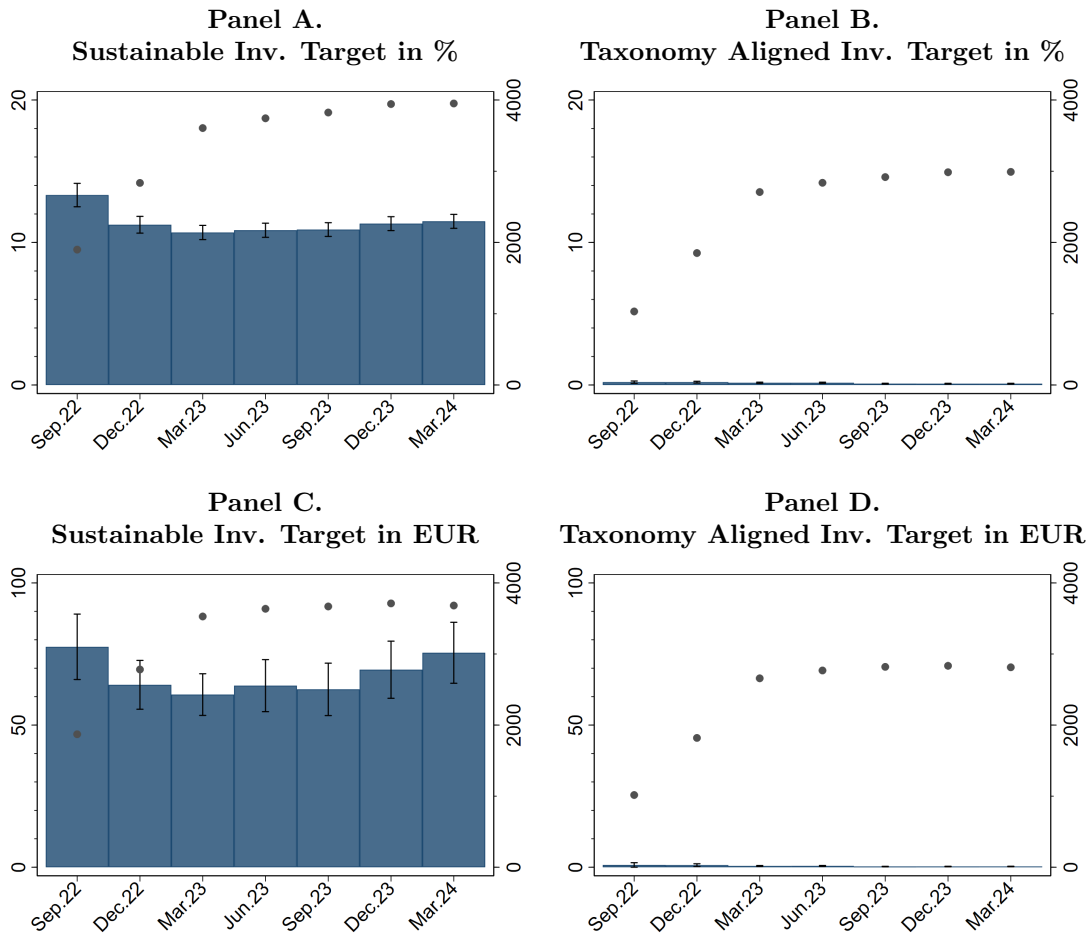


Figure 4
Distribution of Investment Gap

Figure 4 shows the distribution of investment gaps between disclosed target values and actual reported values in percentage points of the funds investments. Panel A shows the results for sustainable investments and Panel B shows the results for taxonomy-aligned investments. Gaps represent the difference between the most recent target value to the actual reported sustainable investment value. The distributions are split before and after the level 2 disclosures came into effect, i.e. 1st of January 2023, where the reporting date defines the cutoff. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

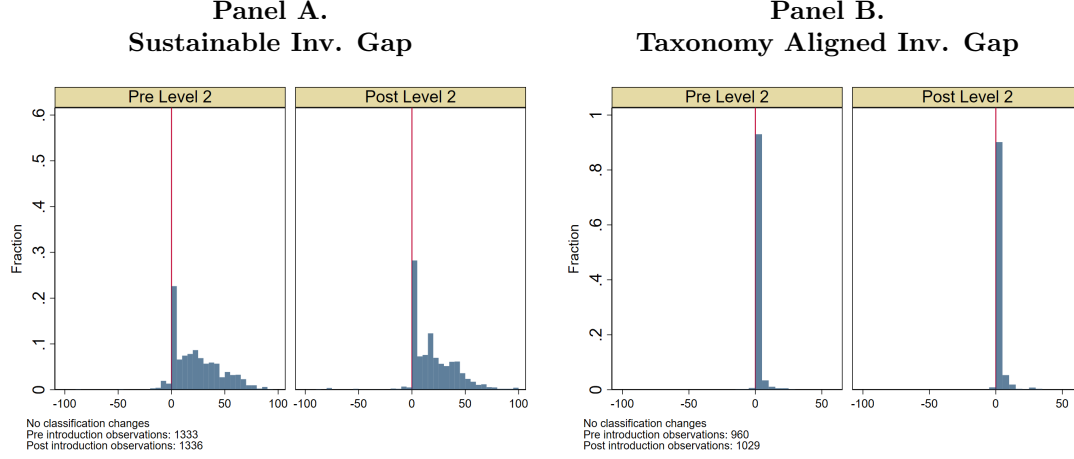


Figure 5
Distance to Target Disclosure Date

Figure 5 shows the distribution of the distance in months from the actual sustainable investment reporting date to the closest disclosure date of a target for three different time period, (i) before the reporting date, (ii) on the reporting date and (iii) after the reporting date. Panel A shows the results for sustainable investments and Panel B shows the results for taxonomy-aligned investments. Until the first red line the distance to the closest disclosure date before the reporting date is displayed (i), in between the red lines is the frequency of reporting dates in the same month as disclosure dates is displayed (ii), and after the second red line the distance to the closest disclosure date after the reporting date is displayed (iii). This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

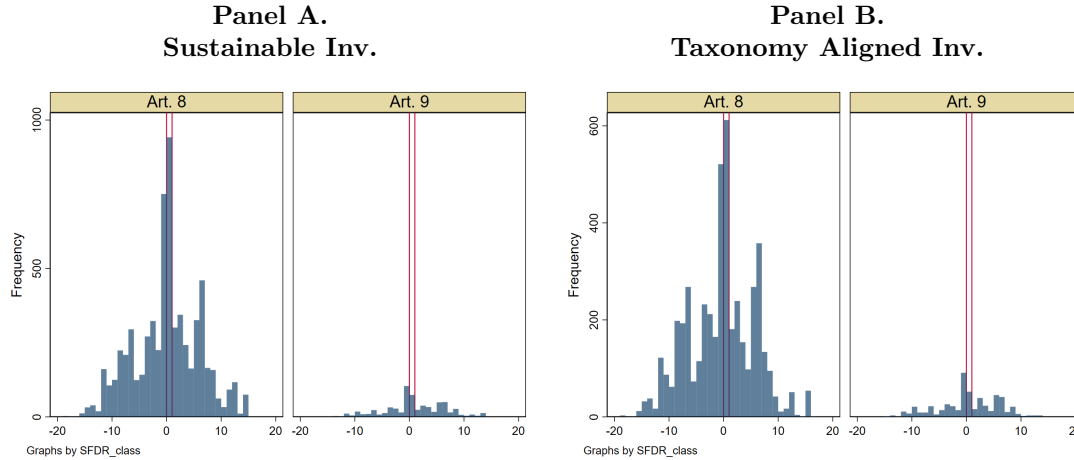
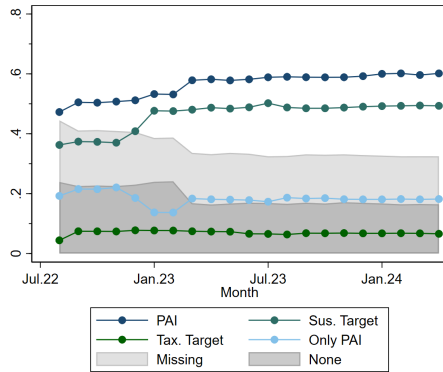


Figure 6
MiFID II Sustainability Preferences Alignment

Figure 6 shows the fraction of funds index funds in the event study sample that are aligned with the respective MiFID II defined sustainability preferences according to the German EET. PAI represents consideration of PAI factors, Sus. Target represents the use of a sustainable investment target value, Tax. Target represents the use of a taxonomy-aligned investment target, only PAI represents the fraction considering only PAI factors. The shaded area None shows the fraction of funds that did not indicate to fulfill one of the criteria, and the area Missing shows the fraction with missing information. Panel A shows the results for Article 8 funds, and Panel B shows the results for Article 9 funds. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

Panel A.
Article 8



Panel B.
Article 9

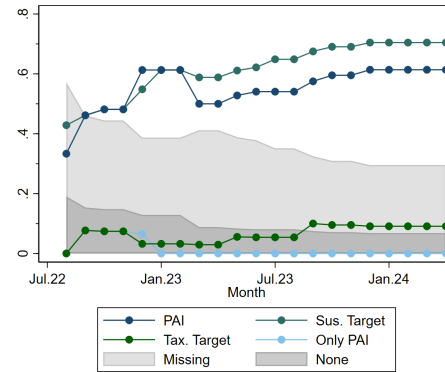
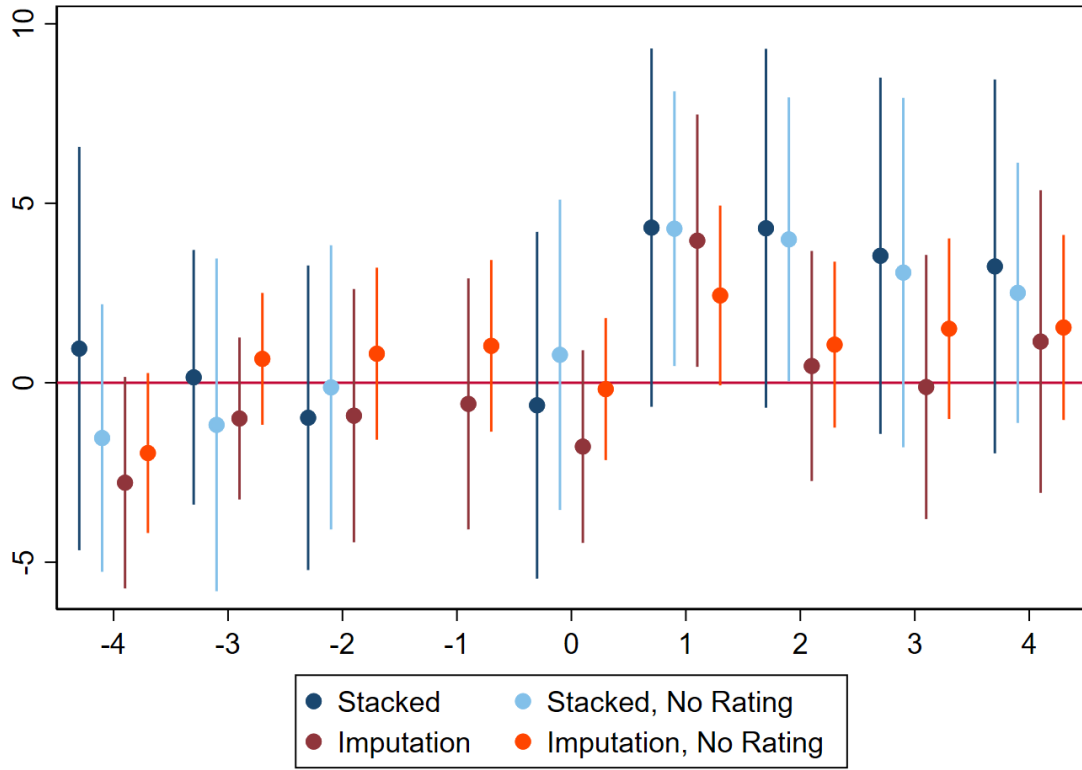


Figure 7
Event Study Plot

Figure 7 plots the event study estimates of Equation (1) and their imputation based method equivalents. The x-axis shows the distance in months to the sustainable investment target disclosure. Stacked represents the specification of column (1) in Table A3. Stacked, No Rating represents the specification of column (2) in Table A3. Imputation represents the specification of column (3) in Table A3. Imputation, No Rating represents the specification of column (4) in Table A3. The spikes represent the 95% confidence intervals for clustered standard errors on funds. Except for the imputation base method, all coefficients measure the impact compared to month before the sustainable investment target disclosure.



6 Tables

Table 1
Descriptive Statistics

Table 1 shows the descriptive statistics for the sample of Article 8 and Article 9 funds. Tot. sustainable target is the minimum value of sustainable investments declared by the fund. Environmental target is the minimum value of environmentally sustainable investments declared by the fund. Social target is the minimum value of socially sustainable investments declared by the fund. Taxonomy target is the minimum value of taxonomy-aligned investments declared by the fund. $\mathbb{1}_{\Delta}$ Tot. sustainable target is an indicator being one when the fund changed its sustainable investment target. $\mathbb{1}_{\Delta}$ Environmental target is an indicator being one when the fund changed its environmentally sustainable investment target. $\mathbb{1}_{\Delta}$ Social target is an indicator being one when the fund changed its socially sustainable investment target. $\mathbb{1}_{\Delta}$ Taxonomy target is an indicator being one when the fund changed its taxonomy-aligned investment target. No target & only PAI is an indicator being one for funds that only indicate to consider PAI factors. SFDR Article is a variable being 2 for Article 8 funds and 3 for Article 9 funds. *Fund Flows* are the funds net flows in percentage points, winsorized at the 1 % level. Size in mio. EUR is the total net assets of the fund in mio. EUR. R^{ex} is the portfolio return in excess of the 1 month treasury bill rate, winsorized at the 1 % level. $Rating^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability). $Rating^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5. Fund Age is the age of the fund in years since its inception.

Investment Fund	mean	sd	min	p25	p50	p75	max	count
Tot. sustainable target	17.678	25.442	0.000	0.000	5.000	20.000	100.000	70334
Environmental target	7.354	19.556	0.000	0.000	0.000	1.000	100.000	39620
Social target	3.022	11.908	0.000	0.000	0.000	0.000	90.000	43909
Taxonomy target	0.525	4.785	0.000	0.000	0.000	0.000	100.000	51910
$\mathbb{1}_{\Delta}$ Tot. sustainable target	0.021	0.143	0.000	0.000	0.000	0.000	1.000	149210
$\mathbb{1}_{\Delta}$ Environmental target	0.006	0.076	0.000	0.000	0.000	0.000	1.000	149210
$\mathbb{1}_{\Delta}$ Social target	0.005	0.068	0.000	0.000	0.000	0.000	1.000	149210
$\mathbb{1}_{\Delta}$ Taxonomy target	0.004	0.060	0.000	0.000	0.000	0.000	1.000	149210
No target & only PAI	0.121	0.326	0.000	0.000	0.000	0.000	1.000	149210
SFDR Article	2.083	0.276	2.000	2.000	2.000	2.000	3.000	149210
% Retail Share Class	0.887	0.278	0.000	1.000	1.000	1.000	1.000	135084
<i>Fund Flows</i>	-0.034	5.723	-24.460	-1.293	-0.142	0.712	32.260	138126
Size in mio. EUR	625.367	2099.754	0.000	48.873	154.126	484.882	66184.323	138685
R^{ex}	-0.242	3.702	-44.039	-2.164	-0.249	1.648	44.690	136739
$Rating^{Sus.}$	3.562	1.020	1.000	3.000	4.000	4.000	5.000	114823
$Rating^{Morningstar}$	3.240	1.015	1.000	3.000	3.000	4.000	5.000	102040
Fund Age	12.526	10.582	0.000	4.000	10.000	19.000	87.000	138126

Continued on next page

Table 1 – continued from previous page

Index Fund	mean	sd	min	p25	p50	p75	max	count
Tot. sustainable target	14.548	23.794	0.000	0.000	10.000	20.000	100.000	8521
Environmental target	10.576	28.119	0.000	0.000	0.000	0.000	100.000	3351
Social target	1.623	11.064	0.000	0.000	0.000	0.000	100.000	5576
Taxonomy target	0.322	2.815	0.000	0.000	0.000	0.000	50.000	5952
1_{Δ} Tot. sustainable target	0.023	0.150	0.000	0.000	0.000	0.000	1.000	17967
1_{Δ} Environmental target	0.003	0.054	0.000	0.000	0.000	0.000	1.000	17967
1_{Δ} Social target	0.001	0.038	0.000	0.000	0.000	0.000	1.000	17967
1_{Δ} Taxonomy target	0.002	0.047	0.000	0.000	0.000	0.000	1.000	17967
No target & only PAI	0.107	0.309	0.000	0.000	0.000	0.000	1.000	17967
No target & no PAI, no MIN	0.126	0.332	0.000	0.000	0.000	0.000	1.000	17967
SFDR Article	2.078	0.269	2.000	2.000	2.000	2.000	3.000	17967
% Retail Share Class	0.953	0.207	0.000	1.000	1.000	1.000	1.000	14879
<i>Fund Flows</i>	1.972	9.086	-24.460	-0.262	0.000	2.846	32.260	14665
Size in mio. EUR	506.731	1012.504	0.126	25.211	117.585	494.765	9547.281	14909
R^{ex}	-0.040	4.582	-31.714	-2.808	-0.177	2.623	40.387	14674
Rating ^{Sus.}	3.522	0.954	1.000	3.000	4.000	4.000	5.000	13561
Rating ^{Morningstar}	3.344	0.981	1.000	3.000	3.000	4.000	5.000	7450
Fund Age	4.445	5.162	0.000	1.000	3.000	6.000	35.000	14665

Table 2

Sustainable Investment Target's Determinants: Index Funds

Table 2 shows the regression results for the sample of Article 8 index funds that do not change their classification. The dependent variable is the level of the total sustainable target in the next month, $Sus. Target_{t+1}$. $Rating^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5. R^{ex} is the portfolio return in excess of the 1 month treasury bill rate. $\text{Log}(\text{Size in Mio. EUR})$ is the logarithm of total net assets of the fund in mio. EUR. $\text{log}(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Fund Flows are the fund net flows per month. PAI is an indicator variable if the fund takes into account PAI factors according to MiFID II. Tax. Target is an indicator variable if the fund has set a minimum target for taxonomy aligned investments according to MiFID II. $Rating^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability). Standard errors are in parentheses and are clustered on funds. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) Sus. Target _{t+1}	(2) Sus. Target _{t+1}	(3) Sus. Target _{t+1}	(4) Sus. Target _{t+1}	(5) Sus. Target _{t+1}	(6) Sus. Target _{t+1}	(7) Sus. Target _{t+1}	(8) Sus. Target _{t+1}
$Rating^{Morningstar}$	-0.078 (0.488)						-0.376 (0.702)	0.058 (0.520)
R^{ex}		-0.052 (0.046)					-0.081 (0.069)	0.028 (0.055)
<i>Fund Flows</i>			-0.027 (0.019)				-0.063 (0.038)	-0.014 (0.030)
$\text{Log}(\text{Size in mio. EUR})$				0.115 (0.224)			0.540 (0.478)	-0.335 (0.420)
$\text{log}(1 + \text{Fund Age})$					-0.599 (0.495)		-2.176 (1.595)	-2.031 (1.567)
PAI	5.293*** (1.539)	3.794*** (1.067)	3.865*** (1.069)	3.851*** (1.028)	3.759*** (1.082)	3.513*** (1.131)	6.222*** (1.525)	5.133*** (1.795)
Art. 9	81.467*** (2.155)	80.145*** (3.019)	80.228*** (3.039)	80.469*** (2.921)	79.814*** (2.963)	80.680*** (2.802)	79.107*** (2.849)	79.275*** (2.664)
Tax. Target	3.093 (1.961)	1.703 (1.677)	1.630 (1.667)	1.862 (1.698)	1.410 (1.732)	1.858 (1.726)	1.625 (2.433)	1.902 (2.657)
$Rating^{Sus.} = \text{"Low"}$						-2.455 (1.882)	-10.762*** (3.588)	0.212 (1.715)
$Rating^{Sus.} = \text{"Below Average"}$						0.524 (1.065)	-3.237 (2.276)	-0.034 (1.459)
$Rating^{Sus.} = \text{"Above Average"}$						0.137 (0.898)	-0.170 (1.463)	1.561 (1.354)
$Rating^{Sus.} = \text{"High"}$						0.927 (1.505)	3.925* (2.240)	6.182*** (1.929)
const.	6.666*** (2.097)	6.433*** (0.750)	6.364*** (0.748)	5.748*** (1.341)	7.235*** (1.159)	6.618*** (0.803)	8.524* (5.113)	11.068** (4.629)
Observations	1945	3760	3765	3784	3765	3489	1775	1775
R_a^2	0.859	0.871	0.870	0.870	0.870	0.872	0.735	0.864
#Funds	276	498	497	501	497	470	260	260
Month FE	X	X	X	X	X	X	X	X
Global Category FE	X	X	X	X	X	X	X	X
Fund Company FE	X	X	X	X	X	X		X

Table 3
Sustainable Investment Target's Determinants: Investment Funds

Table 3 shows the regression results for the sample of Article 8 investment funds that do not change their classification. The dependent variable is the level of the total sustainable target in the next month, $Sus. Target_{t+1}$. $Rating^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5. R^{ex} is the portfolio return in excess of the 1 month treasury bill rate. $\log(\text{Size in Mio. EUR})$ is the logarithm of total net assets of the fund in mio. EUR. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Fund Flows are the fund net flows per month. PAI is an indicator variable if the fund takes into account PAI factors according to MiFID II. Tax. Target is an indicator variable if the fund has set a minimum target for taxonomy aligned investments according to MiFID II. $Rating^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability). Standard errors are in parentheses and are clustered on funds. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) Sus. Target _{t+1}	(2) Sus. Target _{t+1}	(3) Sus. Target _{t+1}	(4) Sus. Target _{t+1}	(5) Sus. Target _{t+1}	(6) Sus. Target _{t+1}	(7) Sus. Target _{t+1}	(8) Sus. Target _{t+1}
$Rating^{Morningstar}$	0.187 (0.169)						0.432 (0.283)	0.101 (0.183)
R^{ex}		0.057*** (0.022)					0.036 (0.035)	0.050** (0.025)
<i>Fund Flows</i>			0.037** (0.016)				0.033 (0.034)	0.030 (0.019)
$\log(\text{Size in mio. EUR})$				-0.024 (0.112)			-0.043 (0.212)	0.196 (0.145)
$\log(1+Fund\ Age)$					-1.304*** (0.234)		-0.643 (0.477)	-1.374*** (0.373)
PAI	8.479*** (0.748)	6.705*** (0.704)	6.643*** (0.699)	6.641*** (0.699)	6.473*** (0.692)	6.625*** (0.734)	2.441*** (0.620)	7.563*** (0.745)
Art. 9	62.141*** (1.386)	61.610*** (1.282)	61.667*** (1.277)	61.685*** (1.261)	60.809*** (1.286)	60.272*** (1.333)	62.608*** (1.300)	60.271*** (1.469)
Tax. Target	7.241*** (0.979)	7.544*** (0.952)	7.575*** (0.949)	7.542*** (0.952)	7.416*** (0.959)	7.282*** (0.982)	4.490*** (1.152)	6.841*** (1.011)
$Rating^{Sus.} = \text{"Low"}$						-1.804** (0.883)	-4.156*** (1.551)	-2.266*** (0.837)
$Rating^{Sus.} = \text{"Below Average"}$						-1.733*** (0.520)	-3.453*** (0.815)	-1.823*** (0.524)
$Rating^{Sus.} = \text{"Above Average"}$						1.072** (0.440)	2.130*** (0.692)	0.863* (0.455)
$Rating^{Sus.} = \text{"High"}$						3.612*** (0.626)	5.674*** (0.990)	3.795*** (0.633)
const.	6.626*** (0.661)	8.054*** (0.362)	8.118*** (0.359)	8.231*** (0.684)	11.276*** (0.667)	7.757*** (0.430)	9.914*** (1.755)	9.525*** (1.287)
Observations	23448	30971	31243	31202	31243	26803	21478	21478
R_a^2	0.822	0.824	0.825	0.825	0.826	0.826	0.561	0.821
#Funds	2839	3706	3742	3736	3742	3339	2700	2700
Month FE	X	X	X	X	X	X	X	X
Global Category FE	X	X	X	X	X	X	X	X
Fund Company FE	X	X	X	X	X	X		X

Table 4
Sample Compositions

Table 4 shows the composition of the full sample and the two samples used in the empirical analysis of Article 8 funds that disclosed a target for the treated set and funds that only consider PAI factors for the control set. "Funds" reports the number of funds in the sample, "Event Dates" lists the available disclosure event months, "Matched Groups" indicates the number of unique combinations of the two matched categories, and "Sus. Target Treated" provides distributional statistics for the sustainability targets of funds that disclosed such a target. The "Full" column refers to the full sample, the "Stacked" column to the sample used in the matching and weighted regression approach, and the "Imputation" column to the sample used for the imputation-based estimation.

	Full	Stacked	Imputation
Funds	274	162	184
Event Dates	18	9	12
Matched Groups		38	
Sus. Target Treated:			
mean	11.079	10.320	11.311
sd	8.618	5.490	8.238
min	1	1	1
p25	5	5	5
p50	10	10	10
p75	18	10	20
max	60	20	35
count	216	75	103

Table 5
Difference-in-Difference Estimates: Article 8

Table 5 shows the results for the event study estimates following the stacked approach and the approach by Borusyak, Jaravel and Spiess (2024) in the last column. The dependent variable are net fund flows, *FundFlows*. $D_{ig,tg}$ is an indicator equal to one after funds changed their sustainable investment target. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and are in columns (1) to (2) clustered on funds, and in column (3) and (4) the standard errors of Borusyak, Jaravel and Spiess (2024). ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>FundFlows</i>	(2) <i>FundFlows</i>	(3) <i>FundFlows</i>	(4) <i>FundFlows</i>
$D_{ig,tg}$	2.920* (1.573)	3.630*** (1.123)	2.020** (1.024)	3.414*** (0.731)
R_{t-1}^{ex}	0.214** (0.093)	0.129 (0.108)	0.432** (0.171)	0.031 (0.071)
$Rating_{t-1}^{Sus.}$	-0.352 (1.026)	-1.031 (0.923)	-0.436 (1.086)	0.694 (0.694)
$Rating_{t-1}^{Morningstar}$	-0.841 (1.024)		-0.108 (0.636)	
$\log(1 + FundAge)$	-17.463** (8.702)	2.260 (2.409)	-2.782 (6.513)	-0.961 (1.522)
const.	37.873** (15.760)	2.717 (4.299)		
Observations	667	1372	1541	3759
R_a^2	0.224	0.170		
#Funds	83	154	84	184
Fund FE	X	X	X	X
Month FE	X	X		
Month \times Global Category & Month \times Domicile FE			X	X

Table 6

Difference-in-Difference Estimates: Target Value Heterogeneity

Table 6 shows the results of the heterogeneity analysis in the target values for the event study estimates following the stacked approach and the approach by Borusyak, Jaravel and Spiess (2024) in columns (3) and (4). The dependent variable are net fund flows, $FundFlows$. $D_{ig,tg}$ is an indicator equal to one after funds changed their sustainable investment target. Target is the level of the sustainability target as a continuous variable. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and are in columns (1) to (2) clustered on funds, and in column (3) and (4) the standard errors of Borusyak, Jaravel and Spiess (2024). Target=X reports estimated fund flows at the sustainable target value of X for the respective model. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>Fund Flows</i>	(2) <i>Fund Flows</i>	(3) <i>Fund Flows</i>	(4) <i>Fund Flows</i>
$D_{ig,tg}$	7.603** (2.992)	6.525*** (1.696)	3.787** (1.647)	5.046*** (1.006)
$D_{ig,tg} \times Target$	-0.417** (0.204)	-0.285** (0.130)	-0.152 (0.105)	-0.146** (0.063)
R_{t-1}^{ex}	0.215** (0.092)	0.129 (0.108)	0.432** (0.171)	0.031 (0.071)
$Rating_{t-1}^{Sus.}$	-0.387 (0.995)	-1.088 (0.899)	-0.436 (1.086)	0.694 (0.694)
$Rating_{t-1}^{Morningstar}$	-0.767 (0.987)		-0.108 (0.636)	
$\log(1 + Fund Age)$	-15.663* (8.861)	2.396 (2.359)	-2.782 (6.513)	-0.961 (1.522)
Constant	34.390** (16.294)	2.745 (4.192)		
Observations	667	1372	1541	3759
R_a^2	0.231	0.172		
p(Pre-Treat=0)			0.477	0.125
#Funds	83	154	84	184
Fund FE	X	X	X	X
Month FE	X	X		
Month \times Global Category & Month \times Domicile FE			X	X
Target=10	3.432**	3.679***	2.267**	3.589***
Target=15	1.347	2.255*	1.507	2.860***
Target=20	-0.739	0.832	0.747	2.132**
Target=25	-2.824	-0.591	-0.013	1.403
Target=30	-4.909	-2.015	-0.773	0.674
Target=35	-6.994	-3.438	-1.533	-0.054

Table 7
Difference-in-Difference Estimates: Robustness

Table 6 shows the results of the heterogeneity analysis in the target values for the event study estimates following the stacked approach and the approach by Borusyak, Jaravel and Spiess (2024). The control set includes only not-yet-treated funds, i.e. fund that will disclose a target value later. The dependent variable are net fund flows, *Fund Flows*. $D_{ig,tg}$ is an indicator equal to one after funds changed their sustainable investment target. Target is the level of the sustainability target as a continuous variable. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and are the standard errors of Borusyak, Jaravel and Spiess (2024). ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>Fund Flows</i>	(2) <i>Fund Flows</i>	(3) <i>Fund Flows</i>	(4) <i>Fund Flows</i>
$D_{ig,tg}$	-2.018 (1.235)	0.632 (0.856)	1.796 (1.661)	2.058* (1.183)
$D_{ig,tg} \times Target$			-0.414*** (0.127)	-0.136* (0.071)
R_{t-1}^{ex}	0.568** (0.266)	0.302 (0.243)	0.568** (0.266)	0.302 (0.243)
$Rating_{t-1}^{Sus.}$	-1.261 (1.608)	-0.790 (1.054)	-1.261 (1.608)	-0.790 (1.054)
$Rating_{t-1}^{Morningstar}$	0.259 (0.810)		0.259 (0.810)	
$\log(1+Fund Age)$	-4.307 (7.057)	-0.030 (2.429)	-4.307 (7.057)	-0.030 (2.429)
Observations	769	1848	769	1848
R_a^2				
p(Pre-Treat=0)	0.187	0.160	0.187	0.160
#Funds	69	130	69	130
Fund FE	X	X	X	X
Global Category \times Month & Domicile \times Month FE	X	X	X	X

A Appendix

Appendix A1 Data: Aggregation on the Fund Level

The dataset provided by the WM Gruppe is based on the ISIN level, i.e. each share class of a fund has its own observation. To aggregate the data we retrieve from Morningstar the associated FundId per ISIN. Cases where no FundId was found, were dropped from the sample (11.2% of the ISINs in the database).

For the SFDR sustainability classifications, i.e. Article 6, Article 8, or Article 9, there existed some cases where across the share classes different values were reported. To aggregate the share classes, we assume that these differences are not systematic and therefore use the most frequently reported value per fund and snapshot date where more than 9 observations are available. For cases of ties between values or fewer observations, we looked up the value in Morningstar or at Fund’s historic prospectus.

For the information on the disclosure dates, we first drop all dates where the target values are missing. Next, there are occasions where within a snapshot there are different target values and/or different reporting dates are reported across the share classes. We identify those funds and drop them. Lastly, we identify funds that within a reporting date report different target values across share classes and also drop them.

There are also occasions in the dataset, where target values have been not inserted as percentages, but as decimals. For example, 10% are not reported as 10, but rather as 0.1. We check if all reported values are below 1, as we assume that this error would occur across all reporting values. Furthermore, we check if the values before or after those are equal to the percentage value. If this is the case we replace the values with the percentage values.

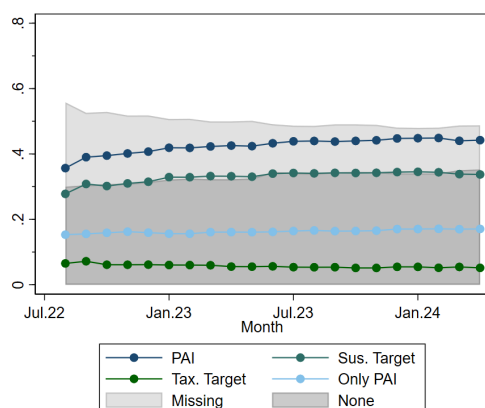
Appendix A2 Additional Results

Figure A1

MiFID II Sustainable Preferences Aligned - Full Sample

Figure A1 shows the fraction of funds in the overall sample that are aligned with the respective MiFID II defined sustainability preferences according to the German EET template. PAI represents consideration of PAI factors, Sus. Target represents the use of a sustainable investment target value, Tax. Target represents the use of a taxonomy-aligned investment target, only PAI represents the fraction considering only PAI factors. The shaded area None shows the fraction of funds that did not indicate to fulfill one of the criteria, and the area Missing shows the fraction with missing information. Panel A shows the results for Article 8 funds, and Panel B shows the results for Article 9 funds. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

**Panel A.
Article 8**



**Panel B.
Article 9**

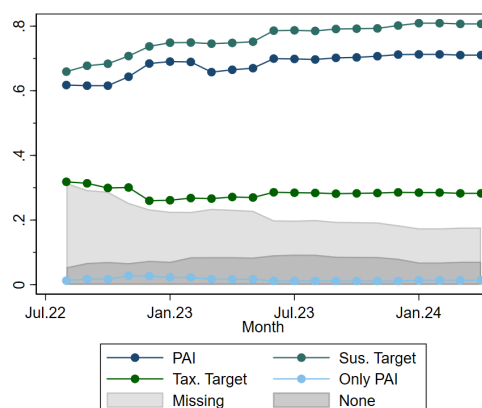


Figure A2

Environmental and Social Investment Targets Over Time: Article 9 Funds

Figure A3 shows the average disclosed target values of Article 9 funds of environmental investment and social investments (left axis) and the dots represent the number of funds that disclose values (right axis). Panel A shows the results for environmental investment targets in percent of the funds' assets market value, Panel B shows the results for social investment targets in percent of the funds' assets market value, Panel C shows the results for environmental investment targets market value per fund, and Panel D shows the results for social investment targets market value per fund. Market values are in Mio. EUR. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

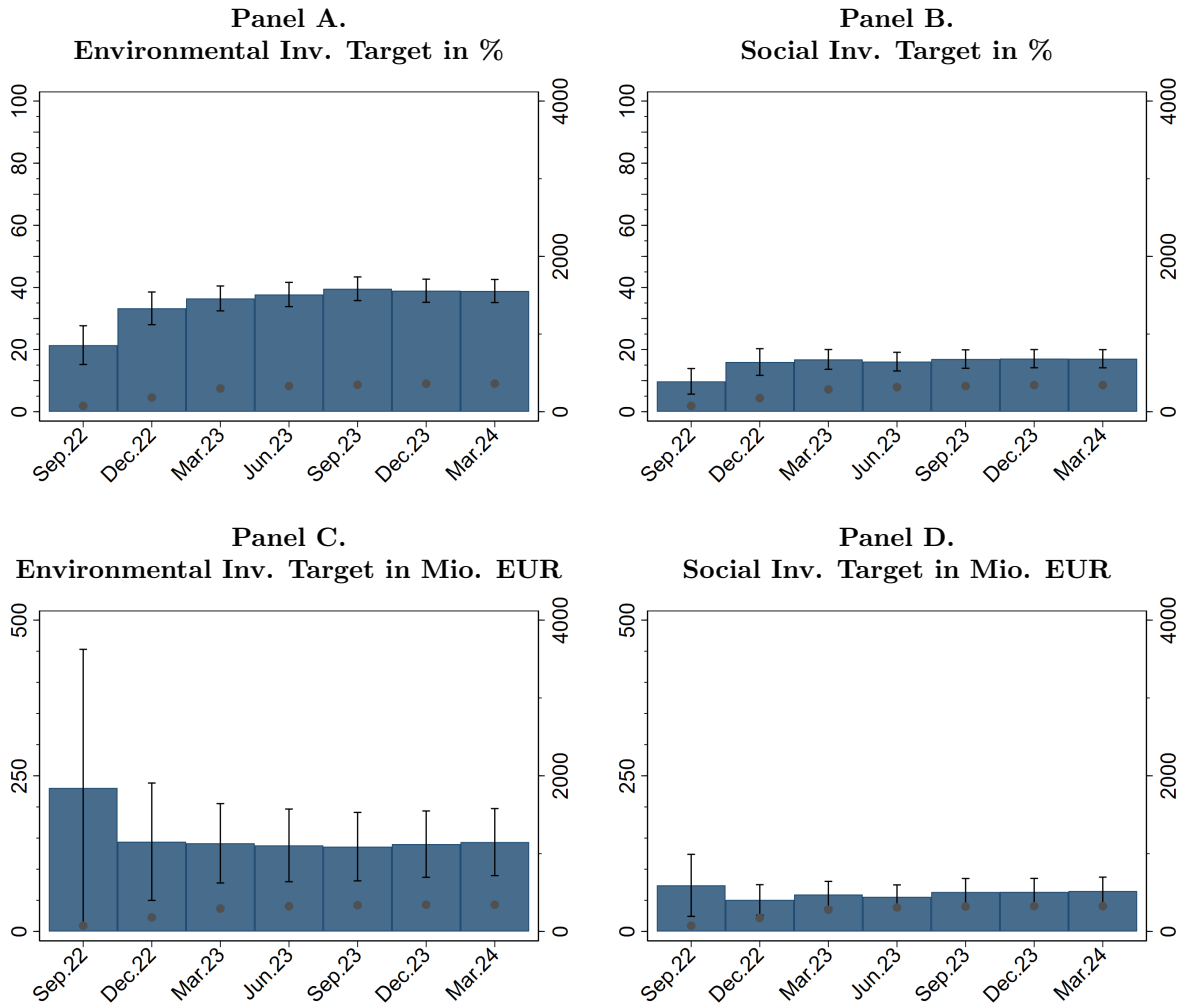


Figure A3

Environmental and Social Investment Targets Over Time: Article 8 Funds

Figure A3 shows the average disclosed target values of Article 8 funds of environmental investment and social investments (left axis) and the dots represent the number of funds that disclose values (right axis). Panel A shows the results for environmental investment targets in percent of the funds' assets market value, Panel B shows the results for social investment targets in percent of the funds' assets market value, Panel C shows the results for environmental investment targets market value per fund, and Panel D shows the results for social investment targets market value per fund. Market values are in Mio. EUR. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

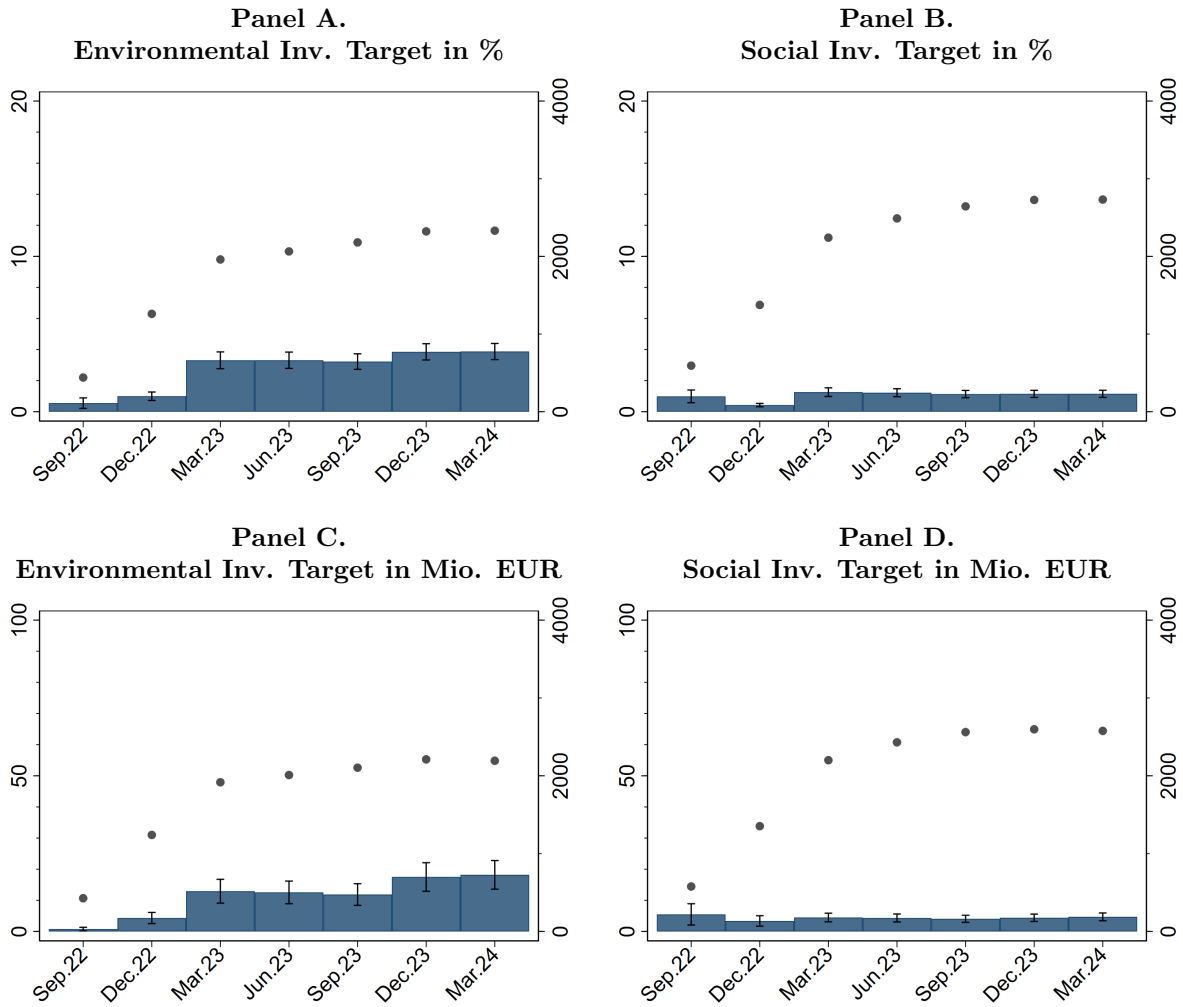


Figure A4**Distribution of Investment Gap for Environmental and Social Investments**

Figure A4 shows the distribution of investment gaps between disclosed target values and actual reported values in percentage points of the funds investments. Panel A shows the results for socially sustainable investments and Panel B shows the results for environmentally sustainable investments. Gaps represent the difference between the most recent target value to the actual reported sustainable investment value. The distributions are split before and after the level 2 disclosures came into effect, i.e. 1st of January 2023, where the reporting date defines the cutoff. This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

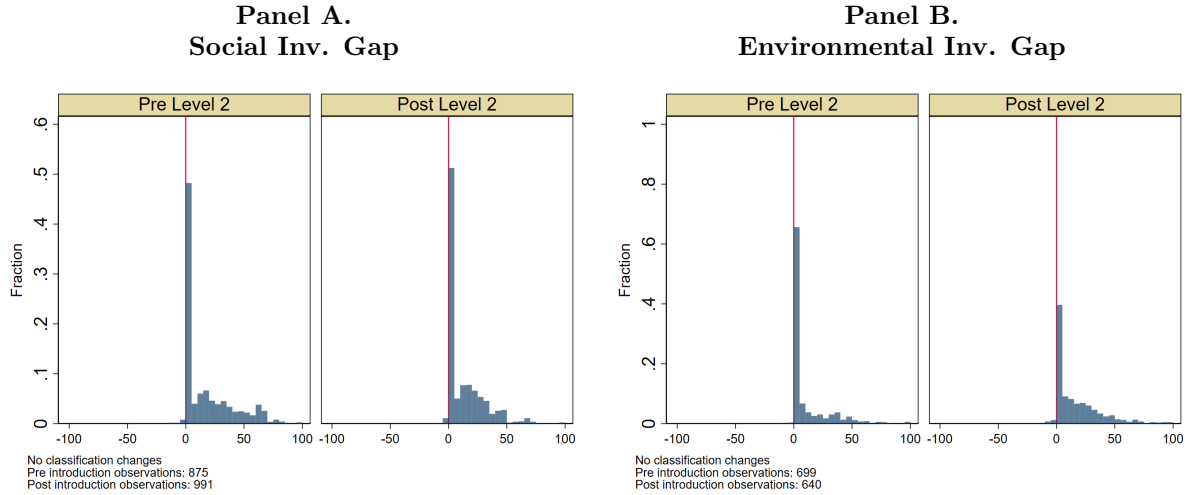
**Figure A5****Distance to Target Disclosure Date for Environmental and Social Investments**

Figure A5 shows the distribution of the distance in months from the actual sustainable investment reporting date to the closest disclosure date of a target for three different time period, (i) before the reporting date, (ii) on the reporting date and (iii) after the reporting date. Panel A shows the results for socially sustainable investments and Panel B shows the results for environmentally sustainable investments. Until the first red line the distance to the closest disclosure date before the reporting date is displayed (i), in between the red lines is the frequency of reporting dates in the same month as disclosure dates is displayed (ii), and after the second red line the distance to the closest disclosure date after the reporting date is displayed (iii). This figure omits funds that change their SFDR classification, e.g. from Article 8 to Article 9 or vice versa.

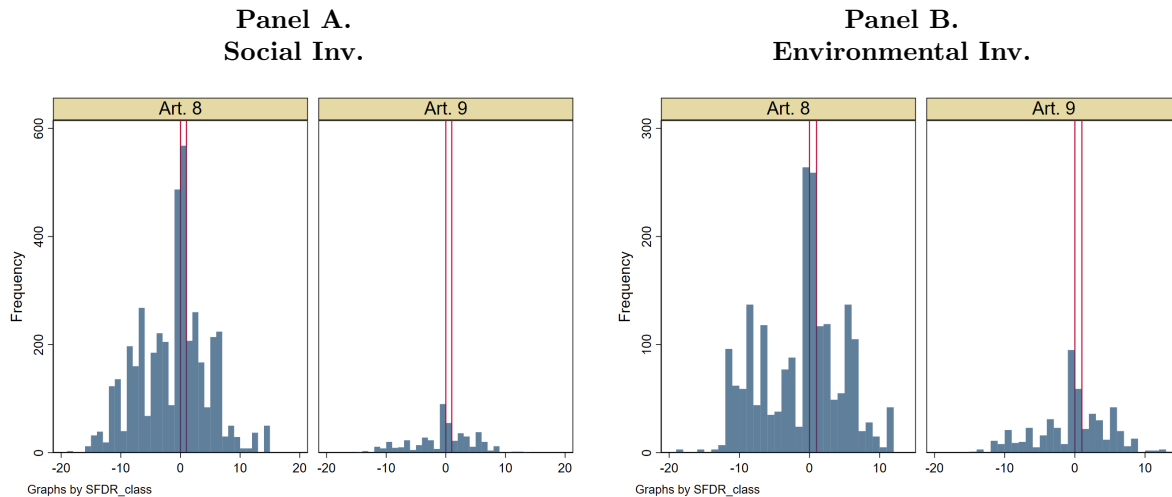


Table A1

Difference-in-Difference Estimates: Robustness Stacked

Table A1 shows additional results of the heterogeneity analysis in the target values for the event study estimates following the stacked approach. The dependent variable are net fund flows, $Fund\ Flows$. $D_{ig,tg}$ is an indicator equal to one after funds changed their sustainable investment target. Target is the level of the sustainability target as a continuous variable. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and are clustered on funds. ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>Fund Flows</i>	(2) <i>Fund Flows</i>	(3) <i>Fund Flows</i>	(4) <i>Fund Flows</i>
$D_{ig,tg}$	7.603** (2.992)	7.834*** (2.878)	7.841** (3.114)	6.264*** (1.672)
$D_{ig,tg} \times Target$	-0.417** (0.204)	-0.462** (0.191)	-0.424** (0.208)	-0.269** (0.125)
R_{t-1}^{ex}	0.215** (0.092)	0.211** (0.089)	0.211** (0.092)	0.155 (0.103)
$Rating_{t-1}^{Sus.}$	-0.387 (0.995)	-0.597 (1.001)	-0.478 (1.001)	
$Rating_{t-1}^{Morningstar}$	-0.767 (0.987)	-1.072 (0.969)		
$\log(1+Fund\ Age)$	-15.663* (8.861)		-16.732* (8.791)	
Constant	34.390** (16.294)	7.551 (4.690)	33.832** (16.623)	2.200*** (0.281)
Observations	667	667	667	1455
R_a^2	0.231	0.224	0.231	0.172
p(Pre-Treat=0)				
#Funds	83	83	83	162
Fund & Month FE	X	X	X	X

Table A2
Difference-in-Difference Estimates: Robustness Imputation

Table A2 shows additional results of the heterogeneity analysis in the target values for the event study estimates following the imputation approach by Borusyak, Jaravel and Spiess (2024). The dependent variable are net fund flows, $FundFlows$. $D_{ig,tg}$ is an indicator equal to one after funds changed their sustainable investment target. Target is the level of the sustainability target as a continuous variable. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and follow Borusyak, Jaravel and Spiess (2024). ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>Fund Flows</i>	(2) <i>Fund Flows</i>	(3) <i>Fund Flows</i>	(4) <i>Fund Flows</i>
$D_{ig,tg}$	3.787** (1.647)	3.698** (1.617)	3.810** (1.636)	3.818** (1.546)
$D_{ig,tg} \times Target$	-0.152 (0.105)	-0.154 (0.106)	-0.152 (0.106)	-0.157 (0.105)
R_{t-1}^{ex}	0.432** (0.171)	0.433** (0.172)	0.429** (0.171)	0.430** (0.172)
$Rating_{t-1}^{Sus.}$	-0.436 (1.086)	-0.404 (1.079)	-0.434 (1.084)	
$Rating_{t-1}^{Morningstar}$	-0.108 (0.636)	-0.150 (0.602)		
$\log(1+Fund Age)$	-2.782 (6.513)		-2.916 (6.258)	
Observations	1541	1541	1541	1541
R_a^2				
p(Pre-Treat=0)	0.477	0.481	0.474	0.481
#Funds	84	84	84	84
Fund FE	X	X	X	X
Month \times Global Category & Month \times Domicile FE	X	X	X	X

Table A3
Event Study Estimates: Article 8

Table A3 shows the results for the event study estimates following the stacked approach and the approach by Borusyak, Jaravel and Spiess (2024) in the last two columns. The dependent variable are net fund flows, *Fund Flows*. pre_4 to pre_1 represent the estimates for the 4 pre-treatment periods. τ_0 to τ_4 represents the estimate for the treatment time and the 4 periods after the change. R_{t-1}^{ex} is the portfolio return from the previous month in excess of the 1 month treasury bill rate. $Rating_{t-1}^{Sus.}$ is the Morningstar Sustainability Rating for funds ranging from 1 (low sustainability) to 5 (high sustainability) from the previous month. $Rating_{t-1}^{Morningstar}$ is the Morningstar Star Rating ranging from 1 to 5 from the previous month. $\log(1 + FundAge)$ is the logarithm of the age of a fund in years since its inception plus one. Standard errors are in parentheses and are in columns (1) to (2) clustered on funds, and in columns (3) and (4) the standard errors of Borusyak, Jaravel and Spiess (2024). ***, **, and * indicate statistically different from zero at the 1%, 5%, and 10% level of significance, respectively.

	(1) <i>Fund Flows</i>	(2) <i>Fund Flows</i>	(3) <i>Fund Flows</i>	(4) <i>Fund Flows</i>
pre_4	0.952 (2.825)	-1.540 (1.886)	-2.785* (1.503)	-1.958* (1.137)
pre_3	0.151 (1.784)	-1.174 (2.346)	-0.996 (1.151)	0.665 (0.937)
pre_2	-0.976 (2.133)	-0.129 (2.003)	-0.917 (1.800)	0.809 (1.223)
pre_1			-0.589 (1.784)	1.028 (1.220)
τ_0	-0.628 (2.429)	0.778 (2.188)	-1.778 (1.369)	-0.177 (1.009)
τ_1	4.321* (2.509)	4.292** (1.937)	3.958** (1.793)	2.432* (1.278)
τ_2	4.303* (2.513)	3.994** (2.002)	0.466 (1.635)	1.061 (1.180)
τ_3	3.537 (2.495)	3.069 (2.464)	-0.119 (1.877)	1.505 (1.283)
τ_4	3.241 (2.618)	2.505 (1.835)	1.147 (2.151)	1.540 (1.315)
R_{t-1}^{ex}	0.205** (0.094)	0.127 (0.108)	0.432** (0.171)	0.031 (0.071)
$Rating_{t-1}^{Sus.}$	-0.406 (1.039)	-1.010 (0.923)	-0.436 (1.086)	0.694 (0.694)
$Rating_{t-1}^{Morningstar}$	-0.830 (1.028)		-0.108 (0.636)	
$\log(1 + Fund\ Age)$	-17.482** (8.365)	2.368 (2.454)	-2.782 (6.513)	-0.961 (1.522)
const.	38.026** (15.231)	2.828 (4.361)		
Observations	667	1372	1183	3048
R_a^2	0.223	0.168		
p(Pre-Treat=0)	0.891	0.862	0.477	0.125
#Funds	83	154	84	184
Fund FE	X	X	X	X
Month FE	X	X		
Month \times Global Category & Month \times Domicile FE			X	X

Recent Issues

No. 456	Winta Beyene, Manthos Delis, Steven Ongena, Kathrin de Greiff	Bond Versus Banks Financing In The Climate Transition: The Role Of Stranded-Asset Risk
No. 455	Winta Beyene	Disasters and Lending Signals: From Borrower Information to Community Characteristics
No. 454	Dvir Aviam Ezra	Disclosure Regulations During Crisis: The Case of TASE after October 7th
No. 453	Aoife Claire Fitzpatrick	Understanding Electric Vehicle Adoption: The Role of Information Frictions and Heterogeneous Beliefs
No. 452	Olga Balakina, Charlotte Christiansen, Malene Kallestrup-Lamb	Greener Pensions, Greener Choices: Linking Investments to Sustainable Behavior
No. 451	Can Gao, Brandon Yueyang Han	When No News is Good News: Multidimensional Heterogeneous Beliefs in Financial Markets
No. 450	Luca Enriques, Casimiro Antonio Nigro, Tobias Tröger	Can U.S. Venture Capital Contracts Be Transplanted into Europe? Systematic Evidence from Germany and Italy
No. 449	Christiane Buschinger, Markus Eyting, Florian Hett, Judd B. Kessler	Extreme Justifications Fuel Polarization
No. 448	Carmelo Latino, Lorian Pelizzon, Max Riedel, Yue Wang	Mutual Funds' Appetite for Sustainability in European Auto ABS
No. 447	Vittoria Battocletti, Alfredo Desiato, Alessandro Romano, Chiara Sotis, Tobias Tröger	Climate Pledges and Greenwashing: Information Provision Does Not Work
No. 446	Luca Enriques, Casimiro A. Nigro, Tobias H. Tröger	Mandatory Corporate Law as an Obstacle to Venture Capital Contracting in Europe: Implications for Markets and Policymaking