Handelshøyskolen BI

GRA 19703 Master Thesis

Thesis Master of Science 100% - W

Predefinert informasjon

Startdato:	09-01-2023 09:00 CET	**Termin:**	202310
Sluttdato:	03-07-2023 12:00 CEST	**Vurderingsform:**	Norsk 6-trinns skala (A-F)
Eksamensform:	T		
Flowkode:	202310||11184||IN00||W||T		
Intern sensor:	(Anonymisert)		

Deltaker

Navn:	Frøydis Dybendal og Ida Kristine Koch-Hagen

Informasjon fra deltaker

Tittel *:	Investor Preferences and the Impact of SFDR Implementation: A Study of Mutual Fund Flow and Sustainable Objectives
Navn på veileder *:	Bruno Gerard

Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Gruppe

Gruppenavn:	(Anonymisert)
Gruppenummer:	172
Andre medlemmer i gruppen:	

Investor Preferences and the Impact of SFDR Implementation: A Study of Mutual Fund Flow and Sustainable Objectives

Master's thesis

BI Norwegian Business School, Oslo

Spring 2023

By,

Frøydis Dybendal and Ida Koch-Hagen

Supervisor:

Bruno Gerard

Hand-in date:

03.07.2023

Campus:

BI Oslo

Program:

Master of Science in Sustainable Finance

ABSTRACT

This paper examines whether the implementation of the SFDR required labeling of mutual funds as brown, green and dark green affects flows into the different funds. We investigate flows into 673 EU mutual fund from November 17 to December 22, and after controlling for known determinators of flows (past return, fee, and size). We find parallel trends and no increase in flow towards sustainable funds. Among article 8 funds, management fees and returns positively affect fund flow compared to article 6 funds. Article 9 funds demonstrate a negative relationship with returns and management fees, indicating investor preference for sustainability. Fund size has a negative relationship across all articles. Our findings suggest minor differences between article 6 and 8 funds, while article 9 investors show a stronger emphasis on sustainability objectives.

Acknowledgements

We wish to express our sincere appreciation to our supervisor, Professor Bruno Gerard, for his invaluable guidance, advice, and encouragement throughout the entire process. His exceptional expertise in the subject and his professional feedback has been highly valuable for this thesis.

Table of Contents

Tables

1.0 Introduction

The financial markets are becoming increasingly aware of social responsibility and sustainability, which suggests that ESG (Environment, Social, and Governance) may have a significant impact on individual investment choices. Increasing demand for Socially Responsible Investments (SRI) has led institutional investors and asset managers of funds to pay more attention to the sustainability objectives of firms. Additionally, large institutional investors are withdrawing from sin stocks with low ESG ratings. Reports show that US-based AUM employing ESG strategies surged from $12.0 trillion in early 2018 to $17.1 trillion in early 2020 (SIF, 2020). This remarkable growth in sustainable investments has led to an increase in research investigating the impact of ESG considerations on portfolio decisions and asset prices over the past few decades. However, the exact information that investors rely on when integrating sustainability remains unclear, given the divergence among agency ratings (Berg et al. 2022; Billio et al. 2021). There is a pressing need for reliable methods to assess sustainability, ensuring that capital flows into low-carbon industries and enabling investors to make well-informed decisions. Hartzmark and Sussmann (2019) further argue that the more informed investors become about the sustainability of funds, the greater the incentive for those funds to invest in a more sustainable manner.

1.1 SFDR

Sustainable development requires not only rethinking how the economic playing field is structured but also the regulatory framework that governs it, as well as ensuring capital flows into sustainable business practices. Due to its capacity and resources, the European Union (EU) has a special opportunity to engage in the transition. As the regulator of one of the world's largest markets, the EU has the power to

shape progress toward sustainable development (Ahlström, 2019). The EU Action Plan on Sustainable Finance represents a major step towards redirecting capital into a sustainable economy. A key part of the plan is the Sustainable Finance Disclosure Regulation (SFDR), which came into effect on 10 March 2021. SFDR emphasizes social and environmental compliance disclosure and reporting obligations for financial services participants such as asset managers and investment funds. Furthermore, it imposes additional requirements for financial products grouped into three categories based on investment strategy and marketing. Funds must comply with one of three sets of rules. Article 6 funds integrate ESG risk considerations or explain why sustainability risk is not relevant. Article 8 (‘*light-green funds’*) funds promote social and environmental characteristics and may invest in sustainability. Article 9 (*‘dark-green funds’*) funds have a sustainable investment objective.

Some institutional investors have already decided to only invest in funds that comply with the requirements in article 8 or article 9. In this manner, these labelling may be expected to have a direct practical impact on financial actors. Taking this into consideration, one cannot rule out the fact that some asset managers are willing to greenwash their portfolios into being categorized as article 8 or 9 to attract inflow. The light green funds are required to consider ESG but do not have any ESG-binding criteria. This emphasizes the potential for greenwashing; asset managers categorize their fund into article 8 but nothing in the investment objective has changed. This may increase the confusion in an already regulatory complex market and may come as a surprise for many investors. However, we highlight the fact that we do not investigate investors’ expectations of the regulatory framework within the different articles.

1.2 Our study

There have been relatively few studies investigating how SFDR affects the actual behavior of financial actors (Becker et al., 2022). In light of this research gap, our thesis aims to contribute to this field by examining the impact of SFDR on the behavior of financial actors. Following the methodology of Becker et al. (2022), we examine if the SFDR regulation makes individual investors allocate more capital into sustainable funds. We also look at how return, management fee and size of the funds affect fund flow within the different categories. The study uses panel data and difference-in-difference analysis to compare investors sustainability objectives of article 8 and 9 funds to article 6 funds. The results do not demonstrate significant increased inflows for article 8 and 9 funds following the SFDR implementation, raising concerns about the effectiveness of the regulation in promoting sustainable investments.

We find that investors place value on ESG alignment, particularly for article 9 funds, regardless of other fund characteristics. In the case of article 8 funds, both management fees and returns exhibit a positive and statistically significant influence on investment decisions. This implies that the ESG objective alone is not sufficient to drive flows into article 8. Furthermore, the size of the fund does not significantly influence its ability to attract investor capital in the context of green investments.

These findings suggest that the presence of a sustainability objective alone may not be the sole driver of investor decisions for investing in article 8 funds. Other factors, such as return, fee, and risk, may carry greater weight in investment choices. Moreover, the lack of substantial differences between article 8 and article 6 funds could indicate limited disparities in sustainability objectives and performance. This could potentially be due to the regulatory framework not fully driving

differentiation and implementation of sustainability practices among funds.

In summary, these insights have implications for both investors and practitioners, highlighting the need for holistic consideration of various factors beyond the mere presence of a sustainability objective. It also calls for further examination and potential refinement of the regulatory framework to effectively incentivize and differentiate sustainable investment options.

The remainder of the thesis is structured as follows:
In section 2, we review the related literature on fund flow, SRI, and fund performance. In section 3 and 4 we describe our hypothesis and our empirical methods. Section 5 and 6 contain descriptions of our data and our results. Finally, in section 7 we draw conclusions from our research.

2.0 Literature review

The focus on ESG factors and sustainable investment strategies has surged in recent decades, leading to a substantial increase in SRI. The Global Sustainable Investment Review 2021 reveals that sustainable investments are continuing to grow in most regions, with the United States and Europe accounting for over 80% of global sustainable investments during 2018 to 2020 (Global Sustainable Investment Alliance, 2021). The significant growth in sustainable investing assets suggests that investors place a higher value of sustainability.

SRI investors may derive financial or non-financial benefits from their investments due to intrinsic or extrinsic motivation, while others may be willing to forego some financial return for closer alignment with their social and ethical values. Additionally, some investors may engage in "greenwashing" to improve their portfolio's image, while others may

invest in SRI based on an unfounded belief that high ESG-firms yield higher returns. However, the empirical research on investors' preferences and SRI performance is mixed, with no clear answer on whether SRI investments outperform conventional funds. Nonetheless, such research has gained traction in top financial journals.

Hartzmark and Sussman (2019) find causal evidence that investors value sustainability. Their research investigates the effect of fund flow and performance on US mutual funds by examining Morningstar Globe Ranking. Over an 11-month time period, the authors found that funds rated highest in terms of sustainability (five globes) experienced inflows of roughly 4% while funds rated lowest in sustainability (one globe) experienced an outflow of about 6%. Their findings also revealed that one-globe funds slightly outperform five-globe funds, suggesting that high sustainability may come at the cost of lower financial performance. However, the authors emphasize the short sample period of their study and the need for longer samples to confirm their results.

Riedl and Smeets (2017) finds that social preferences and signaling explain socially responsible investment decisions, while financial motives play less of a role. The authors capture social preferences by letting investors participate in an anonymous one-shot trust game experiment where the behavior of the participant actions measure intrinsic social preferences. Investors with higher social preferences, who equally distribute money in the experiment, are 14% more likely to hold an SRI equity fund than self-interested investors who keep all the money. The study also finds that investors who more frequently discuss their investments are more likely to make socially responsible choices, indicating that social signaling motivates investment decisions. Moreover, socially responsible investors in the sample pay higher management fees and expect to earn lower returns on their SRI funds than on conventional funds, demonstrating that investors are willing to

forego some financial return in accordance with their social preferences.

Barber, Morse, & Yasuda (2021) explore whether investors would tolerate lower returns for impact investments using a willingness-to-pay (WTP) framework. The results reveal that investors are willing to forego up to 3.7 percentage points in expected internal rate of return (IRR) for such investments. Additionally, impact venture capital (VC) funds were found to earn 4.7 percentage points less than traditional VC funds. Public pensions, financial institutions, and development organizations were found to be more willing to pay for impact investments. Overall, the findings conclude that capital allocation decisions are not only shaped by the classic risk-return trade-off of financial maximization but are also formed by the social consequences of the investments.

Pastor, Stambaugh, & Taylor (2021) analyze both financial and real effects of sustainable investing in a highly tractable equilibrium model. Their findings are that agents' tastes for green holdings affect asset prices. Agents are willing to pay more for greener firms, thereby lowering the firm's cost of capital. Consequently, green assets exhibit negative CAPM alphas, while brown assets have positive alphas. As a result, investors with stronger ESG preferences, whose portfolios are tilted more towards green assets and away from brown assets, earn lower expected returns. Yet such agents are not unhappy because they derive utility from their holdings.

Becker et al. (2022) examines the impact of SFDR on mutual funds and individual investors in the EU. The study finds that the SFDR has successfully encouraged EU-based funds to increase their sustainability ratings, indicating a positive effect on moving capital towards more sustainable investments. Additionally, the study finds that investors respond to the SFDR by allocating more capital to funds classified as green. The paper suggests that asset managers should enhance their sustainability efforts in line with the SFDR’s requirements.

Sirri and Tufano (1998) documented that investors exhibit a preference for high-performing funds and are hesitant to withdraw from underperforming ones. Their research also identifies a relationship between media coverage and fund flows, as media tends to highlight funds with strong or weak performance while giving less attention to those with average performance. Additionally, the study recognizes the influence of mutual fund complexes, noting that membership in larger complexes impacts fund flows, potentially by reducing investors' search costs or through the services offered by these complexes.

Bollen (2017) examines the dynamics of investor cash flows in socially responsible mutual funds. He finds that socially responsible funds exhibit lower monthly volatility in investor cash flows compared to conventional funds, suggesting a greater sense of loyalty among investors. The researcher provides strong evidence that cash flows into socially responsible funds are more responsive to positive past returns, while cash outflows from these funds are less sensitive to negative past returns, although the evidence for the latter is relatively weaker. These findings suggest that investors derive value from socially responsible funds based on their performance history.

In contrast, Renneboog et al. (2010) found that SRI flows are less sensitive to past negative returns, indicating that SRI investors consider nonfinancial attributes. The sensitivity of SRI flows to past positive returns varies depending on the type of screen used. Social screens have a weaker relation between inflows and past positive returns, while environmental screens show a stronger relation. This suggests that the environmental attribute complements fund performance instead of being a substitute.

3.0 Methodology

Becker et al. (2022) provide insight into the impact of SFDR implementation on mutual funds and individual investors in the EU. Their study employs U.S. data as a control group, which lacks the policy intervention, while European mutual funds serve as a treatment group. Our study aims to build upon the findings of Becker et al. (2022) by examining the effect of SFDR on mutual fund flow as well as other fund characteristics, such as return, age, size, management fee and sustainability score. We utilize article 6 funds as a control group, which lack clear sustainability requirements or reporting obligations. Article 8 and 9 funds serve as the treatment group, given the more allegedly pronounced impact of the policy implementation on these funds.

SFDR could have profound consequences for fund flow, encompassing the potential to drive up the demand for sustainable investments and influence investment performance. The increased disclosure requirements under SFDR can promote transparency in the financial sector and enable investors to make more informed decisions. According to a report by the Principles for Responsible Investment (2021); "investors need reliable and comparable information on ESG factors to effectively assess investment opportunities". However, a study conducted by the European Securities and Markets Authority (2021) looked at the disclosures made by financial market participants under SFDR and discovered that many disclosures failed to comply with the regulation's requirements. Other ongoing studies are exploring the effect of SFDR on fund flows into sustainable investment products. They are also investigating the role of ESG rating agencies in promoting transparency and accountability under SFDR. Furthermore, researchers are assessing the potential impact of the regulation on the competitiveness of the European financial industry. Although SFDR is a relatively new regulation, we find it interesting to observe its effects on investor behavior and the flow of capital into green investments. If

we find a positive link between fund labeling and fund flows, it could be caused by either increased demand for green funds or that the labeling has made it easier for investors to identify and invest in such funds.

The following hypothesis is premised on the assumption that greater transparency and disclosure requirements under SFDR will increase awareness and stimulate demand for sustainable investment products among investors. We formulate our first hypothesis as follows:

Hypothesis 1:

H0: SFDR disclosures will lead to increased fund flows into sustainable mutual funds
H1: SFDR disclosures will not lead to increased fund flows into sustainable mutual funds

Assessing the effect on the implementation of SFDR solely through fund flows may not provide a comprehensive understanding of investors true sustainability preferences. By incorporating additional factors that could have a significant impact on investments, we can gain a deeper insight into investors' underlying motivations and discern the extent of their commitment to sustainable investing. While SFDR aims to promote greater transparency and standardization, the mere presence of sustainable fund inflows does not necessarily imply genuine commitment to sustainable principles.

Analyzing the impact of past returns allows us to explore whether investors prioritize sustainable outcomes over financial performance. If sustainable funds consistently exhibit stronger returns, it will provide evidence of sustainable investing's potential financial attractiveness. Conversely, if sustainable funds experience weaker returns, but still attract significant inflows, it would suggest that investors are placing greater emphasis on non-financial considerations, such as environmental or social impact. Similarly, considering the influence of management fees provides insights into investors' willingness to pay a

premium for sustainable investments. If investors demonstrate a greater propensity to invest in sustainable funds despite potentially higher management fees, it suggests a genuine commitment to sustainable principles. Lastly, we look at the variable size, which gives an indication of whether investors focus on the size of the fund. If larger sustainable funds consistently attract higher inflows compared to smaller funds, it could indicate that investors prioritize investing in well-established and more prominent sustainable investment products. To investigate this further we formulate the following hypothesis to test if these other variables have a different impact on the three types of funds:

Hypothesis 2:

H0: Returns have a significant impact on fund flows into sustainable mutual funds
H1: Returns do not have a significant impact on fund flows into sustainable mutual funds

Hypothesis 3:

H0: Management fee have a significant impact on fund flows into sustainable mutual funds
HI: Management fee do not have a significant impact on fund flows into sustainable mutual funds

Hypothesis 4:

H0: Size of the fund have a significant impact on fund flows into sustainable mutual funds
H1: Size of the fund do not have a significant impact on fund flows into sustainable mutual funds

4.0 Empirical methods

4.1 Panel Data Analysis

To evaluate our hypothesis, we use panel regression and robustness test with fund fixed effects which allows for a more comprehensive understanding of the relationships between the variables. In our first hypothesis we use a difference-in-differences methodology to identify the relationship between flow and SFDR.

4.1.2 Endogeneity

We note that endogeneity and omitted variables poses a significant challenge in empirical studies within the field of ESG-financial performance (Gerard, 2019). Insufficient attention has been given to the fact that decisions to engage in sustainable activities are likely to be associated with unobservable firm characteristics that simultaneously influence financial performance (Gerard, 2019). This means that the presence of endogeneity can lead to inconsistent and biased estimates of the model's parameters. This occurs when relevant variables related to both the explanatory and dependent variables are omitted from the regression model. Failing to account for these omitted variables can compromise the validity and accuracy of the results obtained from the analysis (Rakowski and Yamani 2021).

There is a problem that there is no way to statistically ensure that the endogeneity issue is solved. We attempt to deal with this by using fixed effects which controls for industry- and year-fixed effects in our robustness model. This allows us to control time-invariant unobserved heterogeneity at the firm level. The fixed effects estimator helps mitigate concerns about omitted variable bias that may arise from

unobserved time-invariant factors affecting both the dependent and independent variables.

4.1.3 Robustness checks

We also conduct robustness checks by employing alternative panel data estimators to assess the robustness of our results to different model specifications. Model diagnostics are conducted to assess the validity of the underlying assumptions and the robustness of our findings. To account for potential heteroscedasticity and correlation of errors within firms over time, we compute clustered standard errors at the firm level (Petersen 2009). This adjustment helps ensure the validity of the statistical inference and provides more accurate standard errors for our estimated coefficients. All statistical analyses are performed using the statistical software package R programming.

4.2 Diagnostic tests

The following section describes what model to include in the robustness test and if we need to include robust standard errors.

4.2.1 Difference-in-differences: Parallel trend assumption

When applying the difference-in-differences (DID) methodology to analyze the relationship between SFDR and fund flow, several key assumptions come into play. DID is a widely used econometric technique that allows for causal inference by comparing the treatment group with the control group before and after the regulatory change. One crucial assumption is the parallel trends assumption, which posits that, in the absence of SFDR, the treatment and control groups would have followed similar trends in terms of fund flow (Hill, 2018). This assumption implies that any observed differences in fund flow between

the two groups post-SFDR can be attributed to the regulation and not to pre-existing divergent trends.

4.2.2 Restricted F-test for individual effects

To examine the heterogeneity among companies in the cross-section, we employ the restricted F-test (Hill, 2018). The objective of this test is to determine whether the company-specific intercepts collectively have a significant effect. The null hypothesis of the F-test assumes that all the differential intercepts are equal to zero, indicating that there is no variation among companies. In contrast, the alternative hypothesis suggests that there is significant heterogeneity among companies. Rejecting the null hypothesis provides evidence that the companies do differ from each other and using pooled ordinary least squares (OLS) estimation would not be appropriate. The F-test helps us assess the presence of heterogeneity and guides our decision on the appropriate estimation method to use.

4.2.3 Hausman test for model specification

We conduct a Hausman test to evaluate the appropriateness of the Fixed Effects Estimator (FEE) and the Random Effects Estimator (REE). The null hypothesis of the test suggests that there is no substantial difference between the FEE and REE (Gujarati, 2009). If we fail to reject the null hypothesis, indicating that there is no significant difference between the two estimators, the REE is considered the preferred model for our analysis. However, rejecting the null hypothesis suggests that the unobservable individual effects correlate with the regressors, making the FEE the more suitable estimator (Baltagi et al., 2012). The Hausman test assists us in selecting the appropriate estimator based on the presence or absence of correlation between the unobserved individual effects and the regressors.

4.2.4 F-test for joint significance of time fixed effects

Consistent with prior studies (Khan et al., 2016), we recognize the importance of accounting for factors that influence the entire cross-section of firms but vary over time. These factors, known as time fixed effects, capture the impact of time-varying macroeconomic variables that affect firms uniformly. To assess the need for incorporating time fixed effects in our models, we employ an F-test. The null hypothesis of the test examines whether all the time dummies are collectively equal to zero (Hill, 2018). Rejection of the null hypothesis indicates that the inclusion of time fixed effects is warranted in the model, acknowledging their influence on the observed outcomes.

4.2.5 Breusch-Pagan Lagrange multiplier for time-fixed effects

The Lagrange Multiplier Test allows us to assess whether the inclusion of time effects is necessary to account for heteroscedasticity in the model. The significance of the auxiliary regression indicates the presence of time-varying factors that affect the variability of the dependent variable, thereby supporting the inclusion of time effects in the analysis. Rejection of the null hypothesis indicates that the inclusion of time-fixed effects is warranted in the model, acknowledging their influence on the observed outcomes.

4.2.6 Wooldridge test for serial correlation

To test for first-order autocorrelation, we employ Wooldridge's AR (1) serial correlation test. The null hypothesis of this test is that there is no first-order autocorrelation in the error term. In other words, if we fail to reject the null hypothesis, it suggests that the error terms are not correlated over time, indicating the absence of first-order autocorrelation.

4.2.7 Pesaran CD test for cross-sectional dependence

To assess the presence of cross-sectional dependence, we employ a Pesaran CD test. This test allows us to evaluate whether there is a significant correlation between the residuals of different companies within our sample. The null hypothesis of the test states that there is no correlation between the error terms of different groups. However, if we reject the null hypothesis, it indicates the existence of cross-sectional dependence, and we need to consider appropriate methods or models that account for this correlation among the error terms.

4.2.8 Testing for heteroskedasticity

The Breusch-Pagan test is a statistical test used to assess the presence of heteroscedasticity in regression models. Heteroscedasticity refers to the situation where the variability of the error term is not constant across all levels of the independent variables. The Breusch-Pagan test provides valuable information about the adequacy of the assumption of homoscedasticity in regression analysis. The null hypothesis assumes that the error term in a regression model is homoscedastic.

4.2.9 Robust standard errors

In our analysis, it is essential to account for potential correlations in the residuals across years for individual firms (time-series dependence) or across different firms (cross-section dependence). To address this issue, we employ the method of clustered standard errors, as proposed by Petersen (2009). The key concept behind clustering is that the correlation structure of residuals within a cluster can take any form. As the number of clusters increases, the clustered standard errors become consistent estimators of the true standard errors (Donald and Lang 2007; Wooldridge 2010). By using clustered standard errors, we can effectively address and mitigate the potential issues arising from time-series and cross-section dependence in our analysis.

4.3 Econometric models

Following is a description of the final specifications of the models used after each test mentioned above is completed. In that manner, the independent variables are lagged one period as in Becker et. al (2022) and we use robust standard errors.

We chose not to include fixed effects in our regression models because fixed effects are excessively stringent for our dataset and the specific hypotheses we intend to examine. However, we believe it is important to account for these fixed effects and we have included it in a robustness test.

Hypothesis 1

$$Flow_{i,t} = \beta_0 + \beta_1*time*D_9 + \beta_2*time*D_{After} + \beta_3*time* D_{After} *D_9 + \beta_4*time*D_8 + \beta_5*time*D_{After}*D_8 + \beta_6*Return_{t-1} + \beta_7*fee_{t-1} + \beta_8*Size_{t-1} + \beta_9*Age_{t-1} + \beta_{10}*Sustainability_{t-1} + \varepsilon$$

With $Flow_{i,t}$ being the net flows of fund *i* in month *t*. Time is the monthly time trend from November 2019 to December 2022. D_{after} marks the effective date of the intervention, i.e., all observations beginning with March 2021. D_8 and D_9 take the value one for all funds classified as article 8 or article 9, respectively, and zero otherwise.

Hypothesis 2

$$Flow_{i,t} = \delta_0 + \delta_1*time*D_8 + \delta_2*time*D_9 + \delta_3*Return_{t-1} + \delta_4*Return_{t-1}*D_8 + \delta_5*Return_{t-1}*D_9 + \delta_6*fee_{t-1} + \delta_7*Size_{t-1} + \delta_8*Age_{t-1} + \delta_9*Sustainability_{t-1} + \varepsilon$$

$Flow_{i,t}$ is still the net flows of fund *i* in month *t*. *t* are the months from November 2019 to December 2022. The coefficient "δ" represents the effect of past returns, $Return_{t-1}$, on flow, holding other variables

constant. It captures the relationship between past returns and flow, indicating how changes in returns are associated with changes in flow.

Hypothesis 3

$Flow_{i,t} = \delta_0 + \delta_1*time*D_8 + \delta_2*time*D_9 + \delta_3*Fee_{t-1} + \delta_4*Fee_{t-1}*D_8 + \delta_5*Fee_{t-1}*D_9+\delta_6*Return_{t-1}+\delta_7*Size_{t-1}+\delta_8*Age_{t-1}+ \delta_9*Sustainability_{t-1} + \varepsilon$

The coefficient "δ" represents the effect of past management fees, Fee_{t-1}, on flow, holding other variables constant. It captures the relationship between management fees and flow, indicating how changes in management fees are associated with changes in flow.

Hypothesis 4

$Flow_{i,t} = \delta_0 + \delta_1*time*D_8 + \delta_2time*D_9 + \delta_3*Size_{t-1} + \delta_4*Size_{t-1}*D_8 + \delta_5*Size_{t-1}*D_9+\delta_6*Return_{t-1}+\delta_7*Fee_{t-1}+\delta_8*Age_{t-1} + \delta_9*Sustainability_{t-1} + \varepsilon$

The coefficient "δ" represents the effect of size, $Size_{t-1}$, on flow, holding other variables constant. It captures the relationship between size and flow, indicating how changes in fund size are associated with changes in flow.

5.0 Data

Our research is based on monthly data of 673 EU mutual funds over a period spanning from November 2019 to December 2022. We use Morningstar Direct to collect all our variables used in the study.

Morningstar provides data on each fund's SFDR classification, either labeled as article 8 fund, article 9 fund or not classified (article 6 fund). We collect data on Morningstar Sustainability Rating, management fee, fund age, total net asset values and total return for each SFDR classification. The screening criteria for all labeled funds was consistent with those applied to open-end equity mutual funds throughout the EU.

5.1 Aggregated fund score

Morningstar provides information on various share classes associated with each fund, including all the relevant fund variables. To ensure a comprehensive analysis of each fund, we consolidated the data from the different share classes by calculating average weight scores based on the share classes propionate assets under management within the fund for management fee, return and flow:

$$\sum_{1-n}^{n=n\ of\ asset\ classes} \frac{AUM_{AC,d}}{\sum AUM_d} * X_{d+1,AC}$$

Where AUM is asset under management, for a specific asset class, *AC*, in month *d*. X_d represent the various factors such as the return, management fee charged, or flows of capital in that particular month.

5.1.1 Flow

Following Becker et al. (2022) and Sirri and Tufano (1998) net mutual inflows are calculated as the growth in total assets reduced by the monthly returns as a percentage of total net assets at the beginning of the previous month:

$$Flow_{i,t} = \frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1}\,(1 + R_{i,t})}{\text{TNA}_{i,t-1}}$$

Whereby $\text{TNA}_{i,t}$ indicates the total net assets of a given fund *i* at the end of month *t* and $R_{i,t}$ is the return of the fund during the month.

5.1.2 Total Return

Total return is expressed in percentage terms. The calculation of total return is determined each month by taking the change in monthly net asset value, reinvesting all income and capital-gains distributions during that month, and dividing by the starting NAV. The total returns do account for management, administrative, 12b-1 fees and other costs taken out of fund assets (Morningstar, n.d).

5.1.3 Management fee

The management fee is the most recently reported actual percentage that was deducted from an investment's average net assets to pay the investment's management (Morningstar, n.d).

5.1.4 Sustainability score

Morningstar rates the corporate and sovereign sustainability of funds within a Morningstar global category by ranking the respective corporate and sovereign historical sustainability scores. The funds are ranked and divided into five groups, based on a normal distribution, and each group is assigned a rating from "High" to "Low." For each peer group, the median scoring portfolio receives a '3' rating, while other portfolios receive ratings to achieve a normal distribution, except in cases where scores within the peer group are not

significantly different. This means that all portfolios within some peer groups may receive the same corporate or sovereign rating. It is important to note that a higher rating (globe) indicates lower risk. Funds with higher ratings, invest on average, in fewer companies or sovereign debt with high ESG risk under Sustainalytics' ESG Risk and Country Risk methodologies, and are therefore exposed to less risk. (Morningstar, n.d).

Rating Description:

Top 10% - High - 5 globes
Next 22.5% - Above Average - 4 globes
Next 35% - Average - 3 globes
Next 22.5% - Below Average - 2 globes
Bottom 10% - Low - 1 globe

5.1.5 Age

The variable age of the funds is calculated based on the first inception date of the fund asset classes and converted into monthly data.

5.2 Summary statistics

Table 1: Summary statistics

Summary statistics. This table reports summary statistics of the monthly values for the different fund characteristics measures. Fund flow is winsorized at a 5% and 95 % level. Return and size are winsorized at a 1% and 99% level.

Article 6						
	No. of Obs	*Mean*	*Median*	*SD*	*Min*	*Max*
Sustainability rating	5471	2.8310	3.0000	1.0886	1.0000	5.0000
Fund age (in Months)	5471	4.5580	4.7180	0.9570	0.0000	5.9050
Fund size (in Million Dollar)	5471	18.1800	18.1400	1.5536	13.5400	21.8300
Total returns (in %)	5471	0.2615	0.9100	6.5000	-18.0000	17.7400
Fund flows (in % of TNA)	5471	-0.1700	-0.1000	2.7400	-6.2200	6.9300
Management fee (in %)	5471	0.8200	0.8800	0.6300	0.0000	2.4000
Article 8						
Sustainability rating	11325	3.3540	3.0000	1.0410	1.0000	5.0000
Fund age (in Months)	11325	4.5790	4.7960	1.0502	0.0000	6.1360
Fund size (in Million Dollar)	11325	19.1200	19.2600	1.5827	14.8100	22.4100
Total returns (in %)	11325	0.2552	0.9700	6.5100	-17.0400	16.6200
Fund flows (in % of TNA)	11325	0.3970	-0.1600	4.3500	-6.7500	13.2500
Management fee (in %)	11325	0.7800	0.8600	0.5100	0.0000	2.5200
Article 9						
Sustainability rating	1188	3.8710	4.0000	0.9266	1.0000	5.0000
Fund age (in Months)	1188	4.1666	4.3170	1.0683	1.0000	5.6590
Fund size (in Million Dollar)	1188	18.6700	18.7600	1.4500	13.9600	21.8300
Total returns (in %)	1188	0.3652	0.8900	6.5100	-14.7000	15.5400
Fund flows (in % of TNA)	1188	2.0500	0.1000	5.8700	-4.6300	20.9700
Management fee (in %)	1188	0.7800	0.8500	0.4200	0.0000	1.6100

Notes. This table present summary statistics of the monthly values for the different fund characteristics measures. The time period is between November 2019 until December 2022. Sustainability rating is the Moriningstar Sustainabilty rating of the fund during month t. Fund age (ln) is the natural logarithm measured in months and represent the age since the funds inception date. Fund size (ln) is the natural logarithm of the total AUM of the fund in month t, expressed in million dollars. Total returns is the return of the fund in month t. Fund flow are calculated as the growth in total assets reduced by the monthly returns as a percentage of total net assets at the beginning of previous month. Management fee is reported as the annual percentage fee.

Table 1 provides an overview of the fund characteristics of article 6, 8, and 9 funds within our sample. Our findings reveal that article 9 funds exhibit the highest average sustainability rating, followed by article 8 and article 6 funds, respectively. This outcome aligns with the findings of Becker et al. (2022), which posits that article 9 funds, as per their classification, should reflect a higher level of sustainability. Notably, article 9 funds tend to be relatively young, suggesting a possible influx of new funds in this category. The variable size tends to be highest for

article 8 funds, while return appears to be on average higher for article 9 funds. Return for article 6 funds are slightly higher than for article 8. In terms of fund inflow, article 9 funds received a significantly greater amount during our study period compared to article 6 and 8 funds, where 6 experienced the lowest level of inflow. Article 6 funds have the highest management fee, which we find a bit surprising, as it contradicts the notion that more sustainable funds typically require more active management and, thus, higher fees (Bofinger, et. al 2022).

5.3 Mean difference

Table 2: Mean differences

Test of Mean Differences. This table reports the mean difference and the t-statistics for the fund characteristics between the different SFDR labeling. A8 represents Article 8 funds, A6 represents Article 6 funds, and A9 represents Article 9 funds.

	A8-A6		*A9-A6*		*A9-A8*	
	Mean Diff	*T-stat*	*Mean Diff*	*T-stat*	*Mean Diff*	*T-stat*
Sustainability rating	0.5231	29.603	1.0403	33.9420	0.5171	18.076
Fund age (in Months)	0.0212	1.3064	-0.3922	-11.6790	-0.4135	-12.713
Fund Size (in Million Dollar)	0.9380	36.4470	0.4827	10.2550	-0.4553	-10.192
Total returns (in %)	-0.0000	-0.0589	0.0001	0.4972	0.0011	0.5534
Fund Flows (in % of TNA)	0.0056	10.2960	0.0223	12.7800	0.0166	9.4737
Management fee (in %)	-0.0004	-4.0977	-0.0005	-3.0444	-0.0000	-0.4140

The results highlight distinct variations in sustainability rating, fund age, fund size, fund flows, and management fee across the different groups. The mean difference provides valuable insights into the characteristics and performance metrics of the groups, enabling a deeper understanding of the dynamics within the dataset. We especially notice that fund flow is statistically significant different from zero across the different articles. This indicates that the SFDR implementation is influencing investor behavior and the flow across the various funds.

5.4 Correlation

Table 3: Correlation SFDR

Correlation matrix. This table reports the correlation between the fund charcteristics within the different SFDR labeling.

Article 6&8&9	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(1) Total returns (in %)	1.0000	0.0746	-0.0059	0.0184	0.0003	-0.0096
(2) Fund flows (in % of TNA)	0.0746	1.0000	-0.1582	0.0146	-0.0664	0.0617
(3) Fund age (in Months)	-0.0059	-0.1582	1.0000	0.3308	0.3746	-0.0929
(4) Fund size (in Million Dollar)	0.0184	0.0146	0.3308	1.0000	0.0807	0.0455
(5) Management fee (in %)	0.0003	-0.0664	0.3746	0.0807	1.0000	-0.0395
(6) Sustainability score	-0.0096	0.0617	-0.0929	0.0455	-0.0395	1.0000

Table 3 displays the correlation matrix for the various fund categories. The table presents correlations between the fund variables and all the articles in our sample. The results indicate a generally low level of correlation between the dependent variable and the fund variables, suggesting the absence of multicollinearity issues (Hill, 2018). The highest correlation is observed between fund age and management fee, showing a correlation coefficient of 0.3746.

The section below presents the correlation matrix for each SFDR labeling category. The correlation between the dependent variable and the fund variable is generally low across all the articles. The highest correlation for article 6 and 8 is between fund size and fund age, showing a correlation of 0.3064 and 0.3655, respectively. As for article 9, the highest correlation is observed between management fee and fund age, indicating a correlation coefficient of 0.3883.

Table 4: Correlation article 6

Correlation matrix Article 6. This table reports the correlation between the fund charcteristics for Article 6.

Article 6	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(1) Total returns (in %)	1.0000	0.0386	-0.0003	0.0213	-0.0027	0.0045
(2) Fund flows (in % of TNA)	0.0386	1.0000	-0.1810	-0.0038	-0.0670	0.0393
(3) Fund age (in Months)	-0.0003	-0.1810	1.0000	0.3064	0.3059	-0.0846
(4) Fund size (in Million Dollar)	0.0213	-0.0038	0.3064	1.0000	0.0509	-0.0602
(5) Management fee (in %)	-0.0027	-0.0670	0.3059	0.0509	1.0000	0.0027
(6) Sustainability score	0.0045	0.0393	-0.0846	-0.0602	0.0027	1.0000

Table 5: Correlation article 8

Correlation matrix Article 8. This table reports the correlation between the fund charcteristics for Article 8.

Article 8	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(1) Total returns (in %)	1.0000	0.0835	-0.0080	0.0186	0.0005	-0.0186
(2) Fund flows (in % of TNA)	0.0835	1.0000	-0.1420	-0.0026	-0.0750	0.0414
(3) Fund age (in Months)	-0.0080	-0.1420	1.0000	0.3655	0.4198	-0.0778
(4) Fund size (in Million Dollar)	0.0186	-0.0026	0.3655	1.0000	0.1104	0.0279
(5) Management fee (in %)	0.0005	-0.0750	0.4198	0.1104	1.0000	-0.0508
(6) Sustainability score	-0.0186	0.0414	-0.0778	0.0279	-0.0508	1.0000

Table 6: Correlation article 9

Correlation matrix Article 9. This table reports the correlation between the fund charcteristics for Article 9.

Article 9	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(1) Total returns (in %)	1.0000	0.1103	-0.0034	0.0161	0.0182	-0.0053
(2) Fund flows (in % of TNA)	0.1103	1.0000	-0.1678	0.0382	-0.0053	-0.0498
(3) Fund age (in Months)	-0.0034	-0.1678	1.0000	0.2280	0.3883	-0.1337
(4) Fund size (in Million Dollar)	0.0161	0.0382	0.2280	1.0000	0.1797	-0.1343
(5) Management fee (in %)	0.0182	-0.0052	0.3882	0.1797	1.0000	-0.0706
(6) Sustainability score	-0.0053	-0.0498	-0.1337	-0.1343	-0.0706	1.0000

6.0 Results and analysis

This section outlines the results from our empirical hypothesis on SFDR on fund flow. In section 6.1, we estimate a difference-in-differences regression and a robustness test. Section 6.2 to 6.4 discuss the results from regressions testing for return, management fee and size. Finally, we comment on our data limitations in section 6.5.

6.1 Difference-in-difference

Table 7 : Difference in difference

The impact of SFDR on fund flow. The dummy *Post* indicate the time period beginning with March 2021. The dummy *Article 9* and *Article 8* takes the value one for all funds classified as Article 8 or Article 9, respectively, and zero otherwise. T-statistics (in parantheses) are based on clustered standard errors. ***, **, * denote statistical significance at the 0%, 0,1% and 1% level, respectively. · represent statistical significance at 5% level. Fund size (ln) is the natural logarithm of the total AUM of the fund in month t, expressed in million dollars. Fund age (ln) is the natural logarithm measured in months and represent the age since the funds inception date. All fund characteristics are lagged by one period.

	(1)	(2)	(3)
Intercept	0.0005	0.0007	0.0006
Article 9	0.0005	0.0007·	0.0006·
	(1.2370)	(1.6906)	(1.6868)
Post	-0.0000	0.0000*	0.0000*
	(-1.0713)	(2.1828)	(2.2574)
Post × Article 9	-0.0009**	-0.0009**	-0.0008**
	(-3.2332)	(-3.0179)	(-3.0134)
Article 8	-0.0003**	-0.0004**	-0.0004**
	(-2.6890)	(-3.2496)	(-3.2667)
Post × Article 8	-0.0000	0.0000	0.0000
	(-0.2920)	(0.9044)	(0.8317)
Management fee		-0.6876·	-0.7199·
		(-1.8604)	(-1.9479)
Total Return		0.0528***	0.0528***
		(11.9925)	(12.0039)
Fund size		-0.0090***	-0.0089***
		(-11.0184)	(-10.8552)
Fund age		-0.0102***	-0.0101***
		(-7.1268)	(-7.0080)
Sustainable score			0.0014*
			(2.1861)
R^2	0.0110	0.0304	0.0307
Observations	17410	17410	17410

Article 8 funds show a significant parallel trend. After the intervention in March, light green funds are not able to attract more fund inflow than brown funds (-0.000). The finding persists even after controlling for other variables. We find no significant result for parallel trend for article 9 funds in model 1 (0.0005). This is in line with what Becker et al. (2022) finds. However, when controlling for other variables, article 9 funds get significant at a 5% level. Given the result from the summary statistics and the mean difference test, this is in line with our expectations.

We observe a limited influence on fund flow following March 2021, as evidenced by the interaction term “Post x Article 9" and “Post x Article 8”. This suggests that there might not be a systematic and consistent disparity in the pre-treatment trends between the different articles. Since the overall parallel trends are showing significant results, but the effect is weak we cannot rule out the fact that some funds may started reporting on the SFDR labeling before the EU policy intervention was implemented. As the pre-treatment period is relatively short or insufficient to capture any potential changes in trends, it could result in the low effect on fund flow. Extending the time frame or including additional data points might help identify a stronger relationship that becomes more significant over a longer period. Another explanation could be that there are other common factors or confounding variables that are driving the flow between the articles, overshadowing the policy intervention effect. These common factors might be influencing all articles differently, leading to a weak flow for article 8 and 9 funds.

6.1.1 Robustness

To assess the robustness of our findings, we conduct a robustness test with fund fixed effects. We can confirm that the robustness test strengthens our analysis by addressing potential biases and providing additional insights into the relationships between the variables of interest. The results from this robustness test, presented in the appendix, support the validity and reliability of our findings.

6.2 Return

Table 8: Return

Return impact on fund flow. Return represents total return for article 6, 8 and 9. The dummy *Article 9* and *Article 8* takes the value one for all funds classified as Article 8 or Article 9, respectively, and zero otherwise. T-statistics (in parantheses) are based on standard clustrered errors. ***, **, * denote statistical significance at the 0%, 0,1% and 1% level, respectively. · represent statistical significance at 5% level. Fund size (ln) is the natural logarithm of the total AUM of the fund in month t, expressed in million dollars. All fund characteristics are lagged by one period.

	(1)	(2)	(3)
Intercept	-0.0007	-0.0004	-0.0004
Article 9	-0.0007*** (-6.0603)	-0.0004*** (-3.5041)	-0.0004*** (-3.4762)
Article 8	-0.0004*** (-9.7959)	-0.0002*** (-4.3041)	-0.0002*** (-4.4876)
Return	0.0230** (2.9110)	0.0242** (3.0735)	0.0241** (3.0681)
Return × Article 8	0.0428*** (4.4416)	0.0443*** (4.6301)	0.0445*** (4.6521)
Return × Article 9	-0.0138 (-0.6037)	-0.0088 (-0.4728)	-0.0094 (-0.5045)
Management fee		-0.7189· (-1.9472)	-0.7358* (-1.9927)
Fund size		-0.0090*** (-11.2056)	-0.0089*** (-11.0521)
Fund age		-0.0093*** (-6.9384)	-0.0091*** (-6.7707)
Sustainable score			0.0014* (2.2572)
R^2	0.0183	0.0310	0.0313
Observations	17410	17410	17410

In general, we see that past return significantly affects flow by 2.30 % and this positive relationship seems to be mainly driven by article 8 funds. The positive relationship between flow and return aligns with

previous literature (Chevalier and Ellison 1997; Ferreira et al. 2012; Huang et el. 2007; Sirri and Tufano 1998).

A positive coefficient for the interaction between article 8 and return suggests that the effect of past returns on flow is stronger for article 8 funds compared to article 6 funds. Return for article 8 funds has on average 4.28% higher effect on fund flow. The result is statistically significant at ($p < 0.00$). The relationship yields different results when incorporating dark green funds. The coefficient for the interaction between article 9 and return represents a negative effect of past returns on flow. Return for article 9 funds has a –1.38 % average effect on flow compared to article 6. However, the result is not statistically significant.

If article 9 investors value return in the same way as article 8 investors, we would most likely expect to see a positive coefficient and significant results. However, our results indicate that investors that invest in article 9 funds do care about other attributes than return. This is in line with Riedl and Smeets (2017) who finds that social preferences and signaling explain socially responsible investment decisions, while financial motives play less of a role. This is also backed by Reeneboog et al. (2010) who indicate that SRI funds are less sensitive to past returns. This suggests that investors derive non-financial satisfaction or utility from their investments, beyond pure financial returns.

Further, Article 9 funds may attract investors who have a long-term perspective on sustainability and are willing to forgo short-term financial gains for the sake of long-term environmental or social benefits. These investors may be more focused on the positive impact of their investments and less concerned about immediate returns. Green and sustainable investments may take into account risk factors such as reliance on emerging technologies, regulatory changes, or market acceptance. If investors of article 9 funds are conscious of these risks, they may be more cautious about allocating funds based solely on return potential.

6.3 Management fee

Table 9: Management fee

Management fee impact on fund flow. Fee represents management fee for article 6, 8 and 9. The dummy *Article 9* and *Article 8* takes the value one for all funds classified as Article 8 or Article 9, respectively, and zero otherwise. T-statistics (in parantheses) are based on clustered standard errors. ***, **, * denote statistical significance at the 0%, 0,1% and 1% level, respectively. · represent statistical significance at 5% level. Fund size (ln) is the natural logarithm of the total AUM of the fund in month t, expressed in million dollars. Fund age (ln) is the natural logarithm measured in months and represent the age since the funds inception date. All fund characteristics are lagged by one period.

	(1)	(2)	(3)
Intercept	-0.0007	-0.0004	-0.0004
Article 9	-0.0007***	-0.0004***	-0.0004***
	(-5.9700)	(-3.3639)	(-3.3343)
Article 8	-0.0004***	-0.0002***	-0.0002***
	(-11.2079)	(-4.3514)	(-4.5346)
Fee	-0.8871	-1.1057·	-1.0914·
	(-1.4642)	(-1.8430)	(-1.8192)
Fee × Article 8	2.1052**	1.1624	1.1158
	(2.7182)	(1.5060)	(1.4452)
Fee × Article 9	-5.2174**	-4.3647**	-4.4461**
	(-3.1792)	(-2.6839)	(-2.7337)
Return × Article 8		0.0443***	0.0445***
		(4.6314)	(4.6537)
Return × Article 9		-0.0099	-0.0105
		(-0.5305)	(-0.5630)
Return		0.0240**	0.0240**
		(3.0536)	(3.0483)
Fund size		-0.0086***	-0.0085***
		(-10.6347)	(-10.4886)
Fund age		-0.0095***	-0.0093***
		(-7.0608)	(-6.8906)
Sustainable score			0.0014*
			(2.2681)
R^2	0.0108	0.0317	0.0320
Observations	17410	17410	17410

A positive coefficient for the interaction between article 8 and management fee suggests that the influence of past fees on fund flow is more pronounced for article 8 funds in comparison to article 6 funds. Management fee has 2.1052 % more to say for flows into 8 compared to 6 funds. This is statistically significant at a 0.1% level. The coefficient is not statistically significant when controlling for other control variables. Indicating that the cost of investing is less important when considering several attributes of an article 8 fund.

When examining the interaction between article 9 and management fee, we observe a statistically significant negative coefficient of –5.2174%. This indicates an average adverse impact of past fees on fund flow relative to article 6 funds. This finding reinforces the notion that fees have a limited effect on investors' decision-making process when considering investment in article 9 funds. Furthermore, the significance of this coefficient persists even after controlling for other variables, implying that investors who prioritize social investing are not particularly sensitive to the costs associated with these funds. This is in line with Riedl and Smeets (2007), who finds that responsible investors pay higher management fees for SRI funds. If article 9 funds demonstrate superior performance or risk-adjusted returns compared to article 6 funds, investors may be inclined to overlook higher management fees in pursuit of potential gains linked to sustainability.

Like the result for return, it seems like socially conscious investors are driven by sustainability and not the cost associated with the dark green funds. In contrast to Riedl and Smeets (2007), Gil-Baso et. al (2010) finds that fees for SRI funds are no different from those for conventional funds, except that the fees for SRI funds are run by the same management firm. They were proven to be less expensive.

6.4 Size

Table 10: Size

Size impact on fund flow. Size represents size of the fund for article 6, 8 and 9. The dummy *Article 9* and *Article 8* takes the value one for all funds classified as Article 8 or Article 9, respectively, and zero otherwise. T-statistics (in parantheses) are based on standard clustered errors. ***, **, * denote statistical significance at the 0%, 0,1% and 1% level, respectively. · represent statistical significance at 5% level. Fund size (ln) is the natural logarithm of the total AUM of the fund in month t, expressed in million dollars. Fund age (ln) is the natural logarithm measured in months and represent the age since the funds inception date. All fund characteristics are lagged by one period.

	(1)	(2)	(3)
Intercept	-0.0005	-0.0003	-0.0003
Article 9	-0.0005***	-0.0003*	-0.0003*
	(-4.0708)	(-2.4766)	(-2.4430)
Article 8	-0.0004***	-0.0002***	-0.0002***
	(-10.4229)	(-4.4035)	(-4.5880)
Size	-0.0076***	-0.0076***	-0.0076***
	(-4.5378)	(-4.5499)	(-4.5324)
Size × Article 8	-0.0015	-0.0006	-0.0005
	(-0.7925)	(-0.3213)	(-0.2671)
Size × Article 9	-0.0121***	-0.0092*	-0.0092*
	(-3.3260)	(-2.5267)	(-2.5190)
Return × Article 8		0.0044***	0.0447***
		(4.6459)	(4.6646)
Return × Article 9		-0.0069	-0.0075
		(-0.3694)	(-0.4026)
Fee × Article 8		1.1865	1.1455
		(1.5235)	(1.4706)
Fee × Article 9		-3.8068*	-3.8833*
		(-2.3199)	(-2.3664)
Return		0.0237**	0.0237**
		(3.0025)	(3.0007)
Man fee		-1.0799·	-1.0675·
		(-1.7966)	(-1.7760)
Age		-0.0094***	-0.0092***
		(-7.0047)	(-6.8382)
Sus score			0.0015*
			(2.2789)
R^2	0.0187	0.0321	0.0324
Observations	17410	17410	17410

As compared to article 6 funds, the size of article 9 funds has less impact on fund flow by –0.0121%. Similar results are seen for article 8 funds, where the fund's size has a -0.0015% smaller impact than for article 6 funds. Nonetheless, the effect is not significant.

One possible explanation for our findings pertains to investors' expectations of fund performance. Muller and Ward (2010) have identified fund size as a contributing factor to fund performance. Our findings suggest that socially conscious investors assign less importance to the fund size, thereby placing less value on the financial aspects of their investments.

Furthermore, investor perception plays an important role in influencing fund flows, with fund size serving as a significant signal affecting investors' perceptions of fund quality, stability, and success. Larger funds often enjoy advantages such as enhanced marketing capabilities, broader distribution networks, and improved access to financial advisors and institutional investors. These factors contribute to heightened visibility and awareness, attracting a larger investor base and may result in increased fund flows. Research by Lou (2014) demonstrates a positive relationship between advertising expenditures and contemporaneous rises in retail buying and abnormal stock returns. However, irrational investors might rely more heavily on marketing efforts and pre-existing information when making investment decisions. In the context of article 9 funds, the importance of fund size diminishes in relation to fund flows. One could argue that article 9 investors might be well-informed and discerning investors who place less reliance on marketing and branding associated with fund size. Instead, they prioritize investments in funds they perceive to have the highest commitment to sustainability, irrespective of the fund's size.

6.5 Limitations and Suggestions for Further Research

In our research paper, several limitations and shortcomings are worth acknowledging. Firstly, the analysis is constrained by a relatively short time horizon, which may restrict the ability to capture longer-term trends and potential effects of the SFDR legislation on sustainability and fund flows. A longer observation period could provide a more comprehensive understanding of the impact.

Secondly, the availability of data for article 9 and article 6 funds is comparatively limited compared to article 8 funds. This data scarcity may affect the robustness and generalizability of the findings for these specific categories. Obtaining more comprehensive and representative data on article 9 and article 6 funds would enhance the depth of analysis and improve the reliability of conclusions drawn.

Thirdly, an important distinction between institutional investors and retail investors is not accounted for in our study. Considering the differing investment behaviors, objectives, and decision-making processes between these two investor types could provide additional insights into the observed relationships between fund characteristics and fund flows. Future research could explore this segmentation to capture potential divergent preferences and behaviors.

Lastly, the low R^2 value suggests that the identified factors, including management fee, return, and fund size, explain only a limited portion of the variation in fund flows. Other unobserved or unaccounted-for factors may contribute to the remaining variation. Further research could explore additional variables or methodologies to enhance the explanatory power and comprehensiveness of the analysis.

Overall, while our study contributes valuable insights, it is important to acknowledge these limitations. Addressing these limitations in future research would bolster the robustness and applicability of the findings in the context of the SFDR legislation.

7.0 Summary and conclusion

This research paper examines the influence of the Sustainable Finance Disclosure Regulation (SFDR), a legislative measure pertaining to sustainability disclosure for mutual funds. Employing panel data on monthly data, we conduct a comparative analysis between funds that possess a sustainability objective (i.e., article 8 and 9 funds) and those lacking a sustainability objective (i.e., article 6 funds). Our findings do demonstrate statistically significant evidence of parallel trends for the dark green funds when including control variables. For article 8 funds the parallel trend is consistent within all models. We don't find any result for positive inflow into green funds after March 2021. We believe this is due to two effects. The market started to report on the SFDR labeling before the policy intervention and secondly, the market takes time to absorb the new intervention. This result thereby preventing us from concluding that the announcement of the SFDR led to a discernible impact of increased inflows for article 9 and 8 funds.

The findings presented in section 6 raise concerns regarding the efficacy of the implemented interventions in achieving their intended objective of channeling capital towards more sustainable investments at the fund level. To assess the influence of the legislation on investors, we delve into the impact of various fund characteristics, such as past return, size, and management fee on fund flows.

Remarkably, our analysis reveals that investors exhibit a greater appreciation for a higher level of ESG alignment specifically in relation to article 9 funds. Consequently, these results hold significant implications for both investors and practitioners. It becomes evident that investors who are actively allocating their capital towards article 9 funds, irrespective of other fund characteristics, are signaling to asset managers to intensify their sustainability endeavors in accordance with the provisions outlined in article 9 of the SFDR.

For article 8 funds the findings indicate a positive impact of management fee and return on fund flows compared to article 6 funds. This suggests that these factors hold significance for investors in both categories, regardless of the presence or absence of a specific sustainability objective. This implies that article 8 investors consider management fees and past returns as important fund characteristics. Moreover, the negative relationship between fund size and fund flow for article 8 and 9 indicates that fund size is not a distinguishing factor in terms of attracting investor capital into green investments.

Taken together, these findings suggest that while there may be some distinctions between article 6 and article 8 funds in certain fund characteristics, there may not be a significant divergence in sustainability objectives. The presence of a sustainability objective alone, as observed in article 8 funds, may not be the sole driver of investor decisions. As a result, it's possible that investors, when considering sustainability objectives, place more emphasis on other factors (such as returns, fees, or risk) rather than the specific categorization of funds under article 8 or article 6.

If investors think that there is a lack of substantial differences between article 8 and article 6 funds it may indicate that the regulatory framework has not led to significant disparities in sustainability objectives and performance among funds. This could suggest that the regulations have not yet fully influenced the differentiation and implementation of sustainability practices.

8.0 Literature

Ahlström, H. (2019). Policy Hotspots for Sustainability: Changes in the EU.Regulation of Sustainable Business and Finance. Department of Private Law, University of Oslo. Retrieved from https://www.mdpi.com/2071-1050/11/2/499

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. Journal of Financial Economics,139(1),162-185. https://www.sciencedirect.com/science/article/pii/S0304405X2030194X?casa_token=OakmiZ9LY_kAAAAA:0T_A_m6NaWSx4rWv8zfkMVkn85kOjJmHBRP3_-UnuH5AR7DCMH3u_98kzt6FVtE4rnu3_bzoyA

Becker, M.G., Martin, F., & Walter, A. (2022). The power of ESG transparency: The effect of the new SFDR sustainability labels on mutual funds and individual investors. Finance Research Letters, 47(Part B), 102708. https://www.sciencedirect.com/science/article/abs/pii/S1544612322000332

Bengo, I., Boni, L., & Sancino, A. (2022). EU financial regulations and social impact measurement practices: A comprehensive framework on finance for sustainable development. Corporate Social Responsibility and Environmental Management, 29(4), 809-819. https://onlinelibrary.wiley.com/doi/full/10.1002/csr.2235

Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate Confusion: The Divergence of ESG Ratings. Review of Finance, 26(6), 1315-1344. https://doi.org/10.1093/rof/rfac033

Billio, M., Costola, M., Hristova, I., Latino, C., & Pelizzon, L. (2021). Inside the ESG ratings: (Dis)agreement and performance. Corporate Social Responsibility and Environmental Management, 28(5), 1426-1445. https://doi.org/10.1002/csr.2177

Bloomberg Intelligence. (2021, April 29). ESG May Surpass $41 Trillion Assets in 2022, but Not Without Challenges, Finds Bloomberg Intelligence. Bloomberg. Retrieved from https://www.bloomberg.com/company/press/esg-may-surpass-41-trillion-assets-in-2022-but-not-without-challenges-finds-bloomberg-intelligence/

Bofinger, Y., Heyden, K. J., Rock, B., & Bannier, C. E. (2022). The sustainability trap: Active fund managers between ESG investing and fund overpricing. Finance Research Letters, 45, 102160. The sustainability trap: Active fund managers between ESG investing and fund overpricing - ScienceDirect Bollen, N. P. B. (2007). Mutual fund attributes and investor behavior. Journal of Financial and Quantitative Analysis, 42(3), 683-708. https://www.jstor.org/stable/27647316

Chevalier, J., & Ellison, G. (1997). Risk Taking by Mutual Funds as a Response to Incentives.

Journal of Political Economy, 105(6), 1167-1200. https://www.jstor.org/stable/10.1086/516389?fbclid=IwAR2nd4QkCEVK_Mz-Nbm-y4JexKw89cGsCmruB0oJqggNc4Gj89VXaXyX5LI

Donald, S. G., & Lang, K. (2007). Inference with Difference-in-Differences and Other Panel Data. The Review of Economics and Statistics, 89(2), 221-233. https://www.jstor.org/stable/40043055?fbclid=IwAR2wTauHcULTfPAWPBBgshfzu56SbiK_X_KgSWJeBS5fj2o5KgMWnDBqq7s

European Securities and Markets Authority (ESMA). (2021). Overview of the implementation of the SFDR: First report. Retrieved from https://www.esma.europa.eu/sites/default/files/library/esma71-99-1349_sfdr_overview_of_the_implementation_of_the_sfdr_first_report.pdf

Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2012). The flow-performance relationship around the world. Journal of Banking & Finance, 36(6), 1759-1780. https://www.sciencedirect.com/science/article/abs/pii/S0378426612000349

Gerard (2019). ESG and Socially Responsible Investment: A Critical Review. https://biopen.bi.no/bixmlui/handle/11250/2602369?fbclid=IwAR3WXnRj0Nhvm5E0EqXpe7L0QknMpRjz_ug-Gsz74VOIgcljXPVvcSRLrwI

Global Sustainable Investment Alliance. (2021). Global Sustainable Investment Review 2020. Retrieved from https://www.gsi-alliance.org/wp-content/uploads/2021/08/GSIR-20201.pdf

Hammerich, P. Lene E. Nygård, L. Heistad M. (2022). ESG og bærekraft for kapitalforvaltere og investeringsrådgivere. BAHR. file:///C:/Users/47476/Downloads/BAHR-ESG-og-baerekraft-for-kapitalforvalte-re-og-investeringsr%C3%A5dgivere-versjon-3-2%20(1).pdf

Hartzmark, S. M., & Sussman, A. B. (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. Journal of Finance, 74(6), 2789-2830. https://onlinelibrary-wiley com.ezproxy.library.bi.no/doi/10.1111/jofi.12841?fbclid=IwAR1zh7ZzkWhpP-KzP1Pwv70Rdh5z8YavJ7OtGJfMD6ctz8RZT42xMJ3-mfM

Hill, R. C. (n.d.). Principles of Econometrics (5th ed.). Retrieved from https://ebookcentral-proquest-com.ezproxy.library.bi.no/lib/bilibrary/detail.action?pq-origsite=primo&docID=6488420&fbclid=IwAR3ECVeHTivfNeT4ZunmrHsb5ULJ9nOE16X6Xd7JOTE4dOYaRnhCiUAmn8I

Huang, J., Wei, K. D., & Yan, H. (2007). Participation Costs and the Sensitivity of Fund Flows to Past Performance. The Journal of Finance, 62(3), 1273-1311. https://www.jstor.org/stable/4622301

Khan, M., Serafeim, G., & Yoon, A. (2016). Corporate Sustainability: First Evidence on Materiality. The Accounting Review, 91(6), 1697-1724. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2575912&fbclid=IwAR2FTXBqqkGM-6VuLPhzohh_SLLC5woGkcjEFsckBQTRhvvDQLHW0g5fq3M

Lou, D. (2014). Attracting Investor Attention through Advertising. The Review of Financial Studies, 27(6), 1797-1829. https://www.jstor.org/stable/24465651

Morningstar. (n.d.). Fees and expenses. Morningstar Office. https://admainnew.morningstar.com/webhelp/glossary_definitions/mutual_fund/Fees_and_Expenses.htm

Morningstar. (n.d.). Total Return. Morningstar Office. https://awgmain.morningstar.com/webhelp/glossary_definitions/mutual_fund/mfglossary_Total_Return.html

Pastor, L., Stambaugh, R. F., & Taylor, L. M. (2021). Sustainable investing in equilibrium. Journal of Financial Economics, 142(2), 550-571. https://www.sciencedirect.com/science/article/pii/S0304405X20303512

Petersen, M. A. (2009). Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. The Review of Financial Studies, 22(1), 435–480. https://academic.oup.com/rfs/article-abstract/22/1/435/1585940?redirectedFrom=fulltext

Principles for Responsible Investment (PRI). (2021). PRI Academic Network Conference 2021: Investing for a better world. Retrieved from https://www.unpri.org/pri-events/pri-academic-network-conference-2021-investing-for-a-better-world/4605.article

Rakowski, D., & Yamani, E. (2021). Endogeneity in the mutual fund flow–performance relationship: An instrumental variables solution. Journal of Empirical Finance, 64, 247-271. https://www-sciencedirect-com.ezproxy.library.bi.no/science/article/pii/S0927539821000773?fbclid=IwAR0YJZ1Ui4incg72ZHFRIx2pR-PDJp2nH8CcwggOnP81itrGR4agDD0tFEU

Renneboog, L., Ter Horst, J., & Zhang, C. (2010). Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds. Journal of Financial Intermediation, 20(4), 562-588. https://www.sciencedirect.com/science/article/abs/pii/S1042957310000537

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? Journal of Finance, 72(6), 2505-2550. https://onlinelibrary-wiley-com.ezproxy.library.bi.no/doi/pdf/10.1111/jofi.12547

Sirri, E. R., & Tufano, P. (1998). Costly search and mutual fund flows. The Journal of Finance, 53(5), 1589-1622. https://onlinelibrary.wiley.com/doi/abs/10.1111/0022-1082.00066

US SIF. (2020). Report on US Sustainable and Impact Investing Trends 2020. file:///C:/Users/47476/Downloads/Trends-Report-2020-Executive-Summary.pdf

Wooldridge, J. M. (2010). Econometric Analysis of Cross Section and Panel Data. The MIT Press. Retrieved from https://www.jstor.org/stable/j.ctt5hhcfr

Appendix

Statistical tests. This table represents the different statistical test and their results.

Model tested	*P-value*	*F-test*	*Chi-square*	*Z-test*	*Result*
F-test	2.20E-16	1.8624			Fixed effects
Hausman	2.20E-16		116.35		Fixed effects
Breusch-Pagan LM	2.20E-16		231854		Cross-sectional dependence
Pesaran CD	2.20E-16			124.05	Cross-sectional dependence
Breusch-Godfrey	5.69E-01		0.32452		No serial correlation
Breusch-Pagan	2.20E-16				Heteroskedasticity

Robustness check with fixed effects.

	(1)
Intercept	0.0006
Article 9	0.0006 (1.6868)
Post	0.0000 (2.2574)
Post × Article 9	-0.0008 (-3.0134)
Article 8	-0.0004 (-3.2667)
Post × Article 8	0.0000 (0.8317)
Management fee	-0.7027 (-1.9011)
Total Return	0.0520 (12.0039)
Fund size	-0.0088 (-10.8552)
Fund age	-0.0101 (-7.0080)
Sustainable score	0.0013 (2.1861)
R^2	0.0307
Observations	17410