UNIVERSITÄT LIECHTENSTEIN

the prosperity company

Lab: Sustainability, Prosperity, and Provision

Professorship for Sustainable Finance & Investments
Liechtenstein Business School
University of Liechtenstein
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Executive Summary

This empirical study, conducted in cooperation between the Professorship for Sustainable Finance and Investments at the University of Liechtenstein and *the prosperity company*, investigates the potential for integrating an impact investing component into an equity fund-based provision product. Key outcomes include:

1. **Defining and Categorizing Impact Investments:** Grounded in contemporary definitions for impact investing, we develop a conceptual framework (Figure 1) for the inclusion of an impact component in a provision product. On this basis, we propose that Article 8 and Article 9 Funds (as per the European Sustainable Finance Disclosure Regulation, SFDR) balance financial performance expectations of individual investors and sustainability, making these sustainable funds the most practical options for provision products.

2. **Implementation Strategy:** We apply the conceptual framework for the practical fund selection for provision products with an impact component. The implementation strategy filters funds based on SFDR classification (Article 8 and 9), costs (TER below 1%), size (assets under management greater than 100 million), and diversification (exclude country and industry-specific funds). These constraints ensure that short-listed funds have superior expected financial performance and low costs in alignment with the value for money concept.

3. **Empirical Results:** Unfiltered Global and European SFDR 8 and 9 Funds underperform their respective benchmarks in terms of risk-adjusted performance (CAPM Alpha). Crucially, both groups outperform their benchmarks after applying a simple cost filter (TER below 1%), which is due to a strong negative linear relationship between costs and performance as depicted in Figure 2. Further sub-sample analyses show that historical returns of Article 8 Funds exceeded returns of Article 9 Funds, and passively managed funds outperformed actively managed funds.

4. **Hypothetical Client Portfolios:** The simulation of 10’000 equally weighted hypothetical portfolios based on our short-listed funds shows that portfolios focused on high ESG-rated funds (ESG Score > 70) achieved even higher returns and better risk-adjusted performance than the broader selection (Figure 4 Panel A). The Sharpe Ratio surpassed both global and European benchmarks, highlighting the strength of the short-listed funds (Figure 4 Panel B).

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1 Background and Objective

The "LAB – Sustainability, Prosperity, and Provision" primarily explores the suitability of impact investments for new provision solutions. The project is divided into the following four blocks.

Block	Description	Implementation
I	Define and measure "impact investments". Expected deliverable: clear definition of concepts, segmentation of types of impacts (if applicable) and how they are measured.	Professorship for Sustainable Finance & Investments
II	Assess viability of including an "impact investment" component in a provision product. Expected deliverable: Calculator comparing a "traditional investment" with a "impact investment", namely in terms of returns.	
III	What is the optimal starting point for a private pension provision? And what is the optimal savings rate for a private pension provision in salary %?	Master Lab, Master's Degree Program in Finance
IV	Is the German national pension system sustainable?	

The objective of this final report is to summarize the results pertaining to Block I and II, implemented by the Professorship for Sustainable Finance at the University of Liechtenstein in close collaboration with *the prosperity company.*

2 Defining Impact Investments

2.1 Literature Review

2.1.1 A Brief Review of the Historical Development

Impact investing is rooted in early Islamic banking in the 7th century, with further influences from Quackers of the 17th century and the Shakers of the 19th century, who aligned investing with religious values (Toschi & Metz, 2022). While its principles were previously known as blended value, community investing or venture philanthropy (Pepin, 2005), the term "impact investing" was coined at the Rockefeller Foundation's Bellagio Centre in 2007 (Agrawal & Hockerts, 2021). Modern impact investing integrates economic, social and environmental returns, focusing on supporting organizations with both profit and social objectives (Emerson, 2003).

The evolution of the definition of impact investing can be divided into three phases over the past 20 years (Agrawal & Hockerts, 2021):

1. **2005 – 2012:** The definitions were broad and aimed at distinguishing impact investing from charitable giving and venture capital. Firms focused on both social and financial objectives (Geobey et al., 2012; Nicholls, 2010), using venture capitalist strategies to support enterprises with an earned income component.
2. **2012 – 2016:** Impact investing became more clearly defined, distinguishing it from venture philanthropy, socially responsible investing and microfinance. Investors looked for organizations with a clear social mission and a strong theory of change, with an emphasis on financial

and social returns, capacity building, and performance measurement (Glänzel & Scheuerle, 2016; Hebb, 2013; Jackson, 2013).

3. **Since 2016:** Definitions have become more complex, incorporating elements of return on investment (ROI), social return on investment (SROI), stakeholder engagement, and public policy (Quinn & Munir, 2017; Rizzi et al., 2018; Roundy et al., 2017).

This evolution reflects the increasing emphasis on the measurement of both financial and social outcomes in impact investing.

2.1.2 Contemporary Definitions for Impact Investing

Table 1 shows different definitions for impact investments which are used in practice. In the scientific literature, most studies (e.g., Busch et al., 2021; Paetzold et al., 2022; Scheitza & Busch, 2024) refer to the definition of the Global Impact Investing Network (GIIN) (Hand et al., 2023).

Table 1: Common definitions for impact investments.

Definition	Source
"Impact investments are investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return."	Global Impact Investing Network (GIIN)
"Impact investments are defined as investments made into companies, organizations, and funds with the intention to generate social or environmental impact alongside a financial return."	Rockefeller Philanthropy Advisors
"Impact investing refers to investments made with the specific intent of generating positive, measurable social and environmental impact alongside a financial return (which differentiates it from philanthropy)."	CFA Institute
"Investing to achieve positive, social and environmental impacts—requires measuring and reporting against these impacts, demonstrating the intentionality of investor and underlying asset/investee, and demonstrating the investor contribution."	Global Sustainable Investment Alliance

2.1.3 Measurement of Impact

The impact measurement of investments is extremely challenging and subject to ongoing debate in academic literature. (Wilkens et al., 2022) highlight that the quantification of impact is fraught with difficulties, primarily due to the lack of a unified definition of "impact investing" and the inherent complexities of measuring social and environmental outcomes. The existing literature indicates that while theoretical frameworks for understanding impact are well developed, empirical studies that provide concrete evidence of impact remain scarce (Busch et al., 2021; Hockerts et al., 2022; Kölbel et al., 2020). This

gap underscores the need for further research to establish reliable methodologies for measuring the effectiveness of sustainable investment funds in achieving their intended outcomes. The paper from (Wilkens et al., 2022, 2022) identifies three principal channels through which sustainable investment funds can achieve impact: engagement, portfolio allocation, and further effects. Each channel represents a distinct mechanism by which investments can influence corporate behavior and contribute to societal goals.

- ***Engagement*** refers to the active involvement of investors with companies to influence their practices and policies towards sustainability. This involvement can take various forms, such as:
    - **Voting:** Investors can use their voting rights at shareholder meetings to express support or opposition to management proposals that have implications for sustainability practices.
    - **Voicing:** It is possible for investors to engage in direct communication with company management, thereby expressing their concerns and expectations regarding sustainability issues.
    - **Legal Actions and Campaigns:** The option is available to investors to pursue legal disputes or to organize campaigns with the objective of effecting changes in the behavior of corporations.

Through such engagement, investors may encourage companies to adopt more sustainable practices, enhance transparency, and improve corporate governance in general. The effectiveness of this channel may depend on the scale of the investor's interest in the company in question, as well as their ability to coordinate with other investors. It can be challenging to quantify the direct effects of such engagement, since changes may take time to become evident and may themselves be influenced by various external factors beyond the control of investors.

- ***Portfolio allocation*** is a strategic decision-making process that focuses on the direction of investment capital towards companies that demonstrate sustainable practices. This approach encompasses different mechanisms, including:
    - **Positive screening:** Investment is made in companies that meet specific sustainability criteria.
    - **Negative screening:** The divestment of holdings from companies that fail to meet the requisite sustainability standards.
    - **Thematic Investments:** Allocating capital to sectors or themes that are in accordance with the objectives of sustainable development, including renewable energy sources and social enterprises.

The allocation of capital to sustainable companies allows investors to potentially influence the financial performance of these firms, lowering their cost of capital and enhancing their market valuation. This, in turn, may result in a broader shift in corporate behavior as companies strive to attract investment. However, the impact of portfolio allocation can be challenging to isolate, as companies often receive funding from multiple sources. Additionally, while there may be indirect effects on share prices and cost of capital, the empirical evidence supporting these claims is still limited.

- ***Further Effects*** examines the broader societal and environmental impacts that can arise from sustainable investments, extending beyond the scope of direct engagement and portfolio allocation. The key mechanisms that facilitate this process can be broadly categorized into the following areas:

- **Influencing Reputation:** Sustainable investments can either enhance or damage a company's public reputation. This can subsequently affect its ability to generate sales and attract the requisite talent.
- **Raising Awareness:** Increased reporting and transparency around sustainability can lead to greater public awareness of environmental and social issues, which may in turn shape consumer behavior and influence political action.

These additional effects can create a domino effect, whereby investors' actions trigger broader societal changes, such as an increased demand for sustainable products or support for sustainability-focused policies. Nevertheless, the empirical study of these wider impacts is still in its initial stages, and quantifying their influence can be challenging due to the multitude of factors involved.

2.1.4 Regulatory Uncertainty around Impact Investing

Despite the growing interest in impact investing, the sector is confronted with considerable regulatory uncertainty, which has an impact on investment decisions and may potentially impede market growth. The regulatory environment for impact investing is undergoing a period of rapid evolution, creating challenges for investors and fund managers as they navigate a complex and shifting landscape. The efforts of organizations such as the Global Impact Investing Network (GIIN) in defining impact investment concepts, these frameworks lack regulatory relevance due to their lack of incorporation into regulatory structures. The term "impact investment" is not defined in current regulatory structures. Instead, attempts to derive its meaning can only be made indirectly through the frameworks established by the EU Sustainable Finance Initiative, which comprises the Sustainable Finance Disclosure Regulation (SFDR), EU Taxonomy Regulation (EU TR), and Corporate Sustainability Reporting Directive (CSRD). Each initiative plays a role in creating transparency and setting guidelines for sustainable finance, but none provides a direct or comprehensive definition for impact investments:

- **Sustainable Finance Disclosure Regulation (SFDR):** The SFDR's objective is to enhance transparency by requiring comprehensive disclosure regarding the sustainability characteristics inherent to financial products. The classification of products is based on three categories: Article 6 Funds are defined as those that do not explicitly promote environmental or social characteristics, while Article 8 Funds are those which do promote such characteristics, but do not have sustainable development as their primary objective. Article 9 Funds, on the other hand, are specifically designed with the intention of achieving measurable sustainable investment goals. Although the SFDR provides a fundamental framework for analysis, the practical application of this framework has revealed significant challenges. One of the key challenges lies in distinguishing between the different categories of funds set forth in the SFDR, particularly distinguishing between Articles 8 and 9. This has become evident in the recent wave of reclassification of Article 9 Funds to Article 8, due in part to difficulties faced by funds in meeting the stricter requirements of Article 9. Furthermore, Article 9 Funds are permitted to have 0% EU Taxonomy alignment, which intensifies regulatory ambiguity by enabling funds to assert sustainable objectives without demonstrating measurable alignment with recognized sustainability criteria. A notable aspect of the SFDR is the requirement for the disclosure of Principal Adverse Impact (PAI) information. PAIs refer to negative effects on sustainability factors, such as ESG concerns. These effects may result from investment decisions or advice. The objective of the PAI disclosure requirement is to enhance transparency at both the entity and product levels, while applying a comply or explain principle to ensure flexibility.

- **EU Taxonomy Regulation (EU TR):** The EU Taxonomy establishes a classification system for sustainable economic activities, defining the criteria by which investments may be identified as environmentally sustainable. While the taxonomy provides clarity on environmental objectives, its exclusive focus on environmental factors limits its applicability to broader definitions of impact investing, which often include social and governance dimensions. Moreover, the taxonomy has been mired in contention, most notably in the so-called "Taxonomygate"[1], in which the question of whether industries including nuclear energy and defense should be categorized as environmentally sustainable has been the subject of much debate (Hoepner, 2022). These debates underscore the persistent uncertainty surrounding the question of what constitutes a sustainable investment, as well as the subjective nature of such classifications. The current lack of consensus represents a significant obstacle for impact investing, given that the taxonomy does not yet extend to social objectives and does not provide comprehensive guidelines for the evaluation of activities that extend beyond environmental considerations.
- **Corporate Sustainability Reporting Directive (CSRD):** The CSRD requires that large companies and listed small and medium-sized enterprises (SMEs) make detailed disclosures regarding their sustainability-related activities. While the CSRD enhances corporate transparency and accountability, it does not explicitly delineate the criteria for qualification under SFDR Articles 8 or 9. In consequence, the CSRD indirectly supports these classifications by enhancing the quality and availability of data with which funds align with regulatory requirements.

According to the European Commission's consultation on the SFDR assessment, 79% of financial market participants (FMPs) agree that the current regulatory frameworks are creating legal uncertainty.[2] Key requirements and concepts, such as "sustainable investment" are not sufficiently clear to them. Some respondents specifically voiced the need for a dedicated category for impact-generating funds, which would, in our view, create a more stringent regulatory basis for the marketing of impact investments within a provision product. As of now, the regulatory efforts are centered around the disclosure of negative impacts (i.e., "Principle Adverse Impacts"), rather than the measurement of positive impacts. We believe that this lack of clarity is reflected in the consultation outcome that the vast majority of FMPs and financial advisors agree that regulatory limitations may lead to reputational risk, greenwashing and mis-selling.

An emerging regulatory initiative that could potentially provide a clearer framework for impact investing is the EU Ecolabel for Financial Products.[3] Currently under development and not yet adopted, the EU Ecolabel aims to establish a voluntary certification scheme for retail financial products with strong environmental performance. By setting strict criteria for environmental sustainability, it seeks to help investors identify genuinely green investment options. The Ecolabel would require that a significant portion of a product's underlying investments align with the environmental objectives of the EU Taxonomy Regulation. However, since the criteria are still being formulated and the label has not been officially implemented, its future impact on the regulatory landscape remains uncertain. The ongoing development of the EU Ecolabel highlights both the efforts to address the regulatory gaps in defining impact investments and the challenges inherent in creating a comprehensive and universally accepted

[1]Source: https://www.environmental-finance.com/content/analysis/taxonomygate.html

[2] Source: https://finance.ec.europa.eu/document/download/0f2cfde1-12b0-4860-b548-0393ac5b592b_en?filename=2023-sfdr-implementation-summary-of-responses_en.pdf.

[3] Source: https://susproc.jrc.ec.europa.eu/product-bureau/product-groups/432/home.

standard. Once adopted, it could offer a more stringent regulatory basis for marketing impact investment components within provision products, but until then, the regulatory uncertainty persists. The possibility of regulatory changes means that investments that were previously regarded as "impactful" may subsequently be perceived as misrepresented or lacking adequate rigor (Bour & Touchard-Le Drian, 2023; van Vuuren et al., 2024).

2.1.5 Categorizing an Impact Component in a Provision Product

The spectrum illustrated in Figure 1 demonstrates the trade-off between financial return (y-axis), social and ecological impact (upper x-axis) and evaluates the different investment types with respect to their suitability for a provision product (lower x-axis). In this manner, we categorize the following selection of types of capital allocation:

- **Traditional Investments:** The primary objective of traditional investments is to generate the highest possible financial returns for each unit of risk. Ecological and social characteristics are only incorporated in the investment decision to the degree that they are regarded as financially material, an approach sometimes referred to as the *single materiality principal*. Traditional investments aim for mean-variance optimized returns[4] for investors without any sustainability preferences[5] . Consequently, traditional investments represent one end of the spectrum, where financial performance is the sole focus, regardless of environmental or social considerations.
- **Article 8 Funds:** Often referred to as "light green" funds, these financial products that promote environmental or social characteristics, provided that the companies in which investments are made follow good governance practices. These funds are not required to have sustainability as their core objective but must incorporate some level of ESG factors into their investment processes. They represent a broad category of funds that are not mandated to achieve specific sustainability outcomes; rather, they commit to managing risks and addressing sustainability factors in a general sense. The regulatory basis for Article 8 is laid out in SFDR Article 8, where it specifies that funds must disclose how they incorporate ESG characteristics into their investment decisions and management processes (Regulation (EU) 2019/2088). This includes both pre-contractual and periodic disclosures, providing transparency about ESG factors without requiring precise impact measurement. A synthesis of the relevant academic literature does not provide evidence that investments in these funds come are associated with a trade-off between

[4] This approach, developed by Markowitz (1991), is designed to create an investment portfolio that maximizes the expected return for a given level of risk (or, conversely, minimizes the risk for a given level of expected return). The optimization process involves selecting the proportions of different assets in the portfolio to achieve the best possible trade-off between expected return (mean) and risk (variance). The result is a set of efficient portfolios that lie on the efficient frontier, which represents the optimal portfolios that offer the highest expected return for a given level of risk.

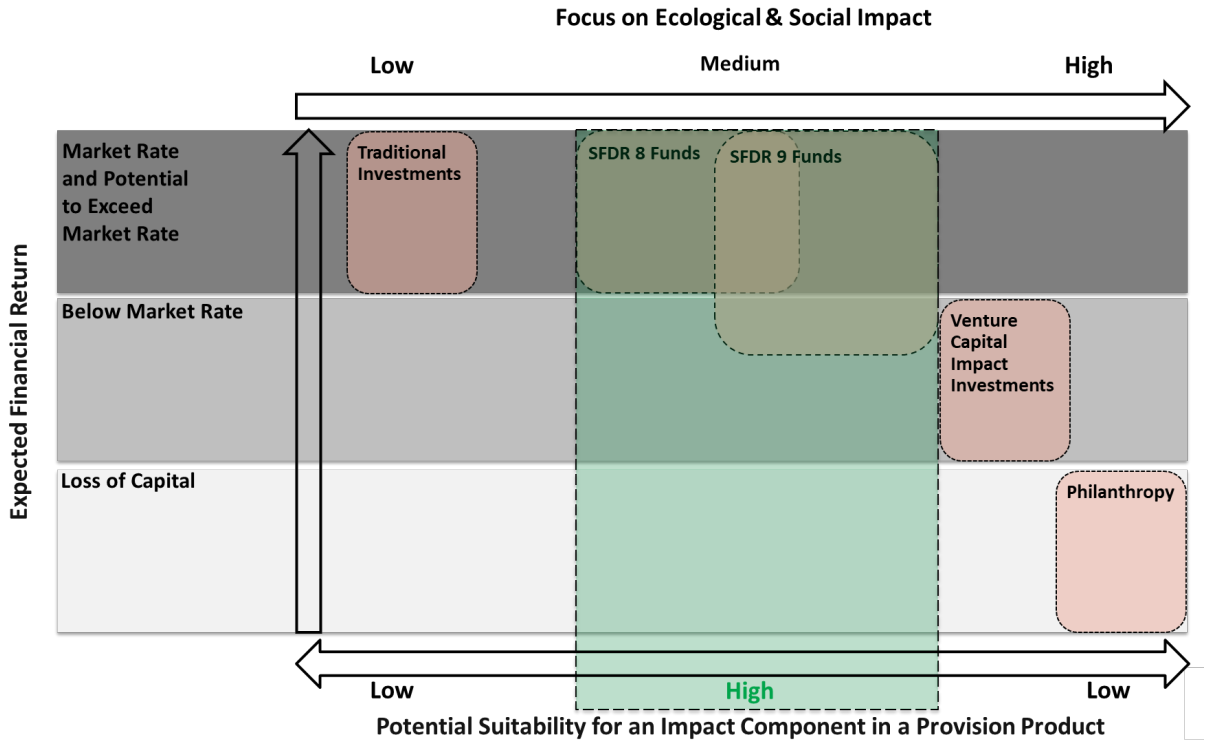
[5] According to Pedersen et al. (2021) investors' sustainability preferences can be categorized into three types based on their environmental, social and governance (ESG) awareness and motivation: **Type-U (ESG-unaware) investors:** These investors are not aware of ESG ratings and do not have them as a factor in their investment decisions. They focus solely on maximizing their unconditional mean-variance utility. This means that they prioritize risk and return without regard to sustainability factors. **Type A (ESG-aware) investors:** These investors are aware of ESG ratings. They integrate this information into their investment decisions. They update their views on risk and expected returns based on asset ESG scores, using this information to make informed decisions while maintaining mean-variance preferences. **Type M (ESG motivated) investors:** These investors actively seek to invest in assets with high ESG scores. They prefer sustainability and are willing to accept a lower return expectation in exchange for a higher average ESG score in their portfolio.

sustainability preferences and risk-adjusted returns. For example, the widely cited meta-study by (Friede et al., 2015), finds that roughly 90% of the over 2000 analyzed empirical studies find a non-negative relation between ESG criteria and corporate financial return.[6] In fact, the large majority of studies reports positive findings, which remain consistent across different regions, asset classes and portfolio versus nonportfolio studies.

- **Article 9 Funds** Article 9 funds are explicitly focused on sustainable investments that aim to generate positive environmental or social impact, as defined by the regulation. This aligns explicitly with the *double materiality principle*, which recognizes that an organization's financial performance is not only impacted by external environmental and social factors but also that the organization itself can have a significant effect on environmental and social outcomes. Thus, these funds are, in principle, closely aligned with the objectives of impact investing, as they are designed to deliver both financial returns and measurable positive outcomes. However, the focus on measurable impact may result in financial returns that are below the market rate in certain circumstances. This is mainly due to the significantly smaller investment universe, which can limit the opportunities for diversification and make it more difficult to optimize the mean-variance. Furthermore, higher compliance costs associated with meeting stringent regulatory requirements also contribute to potentially lower returns. Despite these challenges, Article 9 funds are an exemplar of a financial product that is designed to achieve both positive environmental and social change alongside financial performance. There is still a lack empirical studies on the impact-related differences between Article 8 and 9 Funds. We therefore compare various sustainability metrics in our empirical analysis in subsection 3.2.
- **Venture Capital Impact Investment Funds:** These funds, also referred to dual-objective venture capital funds, usually invest in early-stage companies with innovative business models aimed at addressing critical social and environmental issues. Because the investee companies are not publicly listed, these investments are highly illiquid and risky. The lack of historical monthly returns for these funds makes them rather unsuitable for a provision product at this time. In a recent empirical study, Barber et al. (2021) find that they earn 4.7 percentage points lower internal rates of return ex-post than traditional VC funds.
- **Philanthropy** is situated at the extreme end of the spectrum, where funds are provided in the form of donations or grants without any expectation of a financial return. The principal objective of philanthropy is to address social and environmental requirements, frequently in locations where the financial means to sustain such activities are lacking. Philanthropic efforts may concentrate upon issues such as disaster relief, the advancement of education, healthcare, and other areas in which assistance is required. Philanthropy is purely impact-oriented, with no financial gain anticipated.

[6] Note however that this study does not examine Article 8 Funds specifically, but instead synthesizes the results of primary studies that examine the performance effects of sustainability integration in investment decisions more generally.

Figure 1: Categorizing an Impact Component in a Provision Product.



Based on this categorization of capital allocation, we propose that SFDR 8 and SFDR 9 funds are currently best suited the implementation of an impact component in a provision product. Crucially, these funds are likely to select investee firms following the double materiality principle, while also delivering financial returns at the market rate. In our view, a sole focus on SFDR 9 funds is currently not suitable because there are currently not enough of these funds with also a low-cost structure. The importance of low-cost funds is empirically assessed under section 3.2.3.1.

3 Including an "Impact Investment" Component in a Provision Product

3.1 Implementation Strategy for a Provision Product

In the first part of our LAB, we focused on defining and measuring "impact investments". As described in Chapter 2, it became evident that there is no universally accepted or clear classification for what constitutes "impact". This lack of a standardized classification presents a significant challenge when trying to develop a structured approach to identifying impactful funds.

As a result, this chapter aims to propose a practical and implementable selection strategy for identifying funds, that fulfil the expectations in terms of suitability and sustainability. This chapter is divided into two parts:

- Suitability Requirements – The funds must meet several basic criteria to be considered suitable. They must offer historical price data for performance evaluation. The fund must be an equity fund with a geographical focus on either global markets or Europe. Additionally, it must be denominated in USD or EUR and have assets under management (AuM) exceeding 100 million.
- Definition of the Impact Investment Component - To qualify as an impact investment, the funds must be classified under SFDR Article 8 or Article 9.

3.1.1 Suitability Requirements

To be considered suitable for selection, funds must meet several basic criteria that ensure their alignment with expectations and the objectives of impact investing. First and foremost, the funds must offer historical price data, which is essential for the performance evaluation in the next step. Additionally, in our analysis we focused on equity funds to ensure tradability. The geographical focus of the fund is also crucial; it should concentrate on either global markets or European markets. This focus helps to exclude exotic single-country funds. Moreover, the fund must be denominated in either USD or EUR, which facilitates the suitability and tradability. This also avoids any confounding effects of changes in currency exchange rate with regards to the performance evaluation of the funds. Finally, the fund must have assets under management (AuM) exceeding 100 million. This threshold indicates a certain level of market validation and stability, ensuring that the fund has the capacity to manage investments effectively while maintaining sufficient liquidity for its investors. By adhering to these filter criteria, a more standardized and meaningful comparison can be achieved.

3.1.2 Definition of the Impact Investment Component

While the previous suitability requirements—such as assets under management (AuM), currency denomination, and fund type—ensure that the funds meet basic investment criteria, they do not address sustainability considerations. To adequately evaluate the impact investment component, it is essential to incorporate specific sustainability requirements.

To qualify as a suitable investment, funds must be classified under SFDR Articles 8 or 9. Article 8 pertains to funds that promote environmental or social characteristics, requiring them to demonstrate how their investment strategies integrate sustainability considerations into their decision-making processes. These funds actively seek to provide positive impacts alongside financial returns, investing in companies that adhere to specific sustainability criteria. Article 9, on the other hand, is designated for funds with a specific sustainable investment objective. These funds aim to achieve positive environmental or social outcomes and must show how their investments contribute to sustainability goals. This classification provides investors with greater confidence that their capital supports activities leading to tangible benefits (EUROSIF, 2022).

By focusing on these classifications, the selection strategy can ensure that identified funds are genuinely committed to generating meaningful impacts. Funds classified under SFDR Articles 8 and 9 not only meet regulatory requirements but also align with the values and expectations of investors seeking to make a positive difference through their investments.

3.2 Empirical Analysis

3.2.1 Sample Description and Summary Statistics

3.2.1.1 Variable Description

We downloaded ESG-related data (Composite and Pillar Scores) as well as EU taxonomy-related data from Refinitiv to further analyze our sample.

- **ESG Score:** The ESG Score from Refinitiv offers a detailed evaluation of a company's performance across the Environmental, Social, and Governance (ESG) dimensions [7]. It consolidates a broad array of data points into a single score, providing a comprehensive overview of a company's sustainability practices. The score is derived from publicly available data, including annual reports, sustainability disclosures, and third-party sources. Refinitiv's methodology assesses companies based on their management of ESG risks and opportunities across three primary pillars:
  - **Environmental (E):** This pillar measures a company's impact on and management of environmental factors such as carbon emissions, energy efficiency, resource use, and climate change mitigation efforts.
  - **Social (S):** This pillar evaluates a company's policies and practices related to social responsibility, including labor practices, human rights, community relations, and diversity and inclusion initiatives.
  - **Governance (G):** This pillar assesses the effectiveness of a company's governance structure, including board diversity, executive pay, shareholder rights, and transparency.

  Each pillar contributes to the overall ESG score, which is normalized to enable comparisons across industries and regions. A higher score indicates stronger ESG practices and alignment with sustainability objectives.
- **SFDR Sust. Inv. Planned (%):** This variable is derived from the "SFDR Templates" provided by the ESMA.[8] It indicates the percentage of the fund's portfolio that is planned to be allocated to sustainable investments. An investment is deemed as "sustainable" when it meets the following requirements: a) it is in an economic activity contributing to an environmental or social objective; b) the investment does not significantly harm any environmental or social objective; and c) the investee companies follow good governance practices. However, according to the EUROSIF (2022) report, the definition of sustainable investment has proven extremely challenging for financial market participants (FMPs) to operationalize. This is largely due to the lack of any framework or screening criteria for assessing a 'contribution' to a sustainability objective, and/or 'significant harm' to the others. FMPs thus must provide their own interpretation and criteria for 'sustainable investment' often through the development of internal frameworks to evidence their analysis. As a result, it is challenging to compare the definition and share of sustainable investments across products from different FMPs. The absence of a standardized classification makes it challenging to fully assess the true impact of these sustainability commitments, as funds may apply different criteria or interpretations when reporting their sustainable investments (ESMA, 2023).

[7] Source: https://www.lseg.com/content/dam/data-analytics/en_us/documents/methodology/lseg-esg-scores-methodology.pdf

[8] Source: https://www.esma.europa.eu/document/sfdr-templates

- **SFDR Sust. Inv. Reported (%):** This variable represents the percentage of a fund's portfolio that is reported as being allocated to sustainable investments, based on disclosures provided by FMPs in compliance with SFDR reporting standards. The variable indicates the actual allocation reported, which may vary from planned percentages due to adjustments in portfolio composition or shifts in sustainability assessment criteria. Given the flexibility FMPs have in interpreting "sustainable investments", there is potential variability in how these percentages are calculated across funds. Consequently, while the reported figure provides insight into a fund's sustainability alignment, it is important to consider that methodologies and definitions may differ across FMPs, potentially affecting cross-comparability.
- **SFDR Taxonomy Aligned Planned (%)**: This variable represents the percentage of a fund's portfolio that is intended to be allocated to investments aligned with the EU Taxonomy's strict environmental sustainability criteria. This planning figure is based on forward-looking expectations as disclosed in the SFDR Templates, indicating the portion of assets the fund anticipates meeting EU Taxonomy standards. The EU Taxonomy framework provides a clear, standardized classification for environmentally sustainable activities, defining precise criteria that investments must meet. By setting these planned targets, financial market participants (FMPs) convey their sustainability intentions, even though actual allocation can vary due to market conditions or adjustments in the fund's portfolio strategy.
- **SFDR Taxonomy Aligned Reported (%)**: This variable denotes the actual, current percentage of a fund's investments that meet EU Taxonomy alignment criteria, as reported by the FMPs. Unlike the planned percentage, this reported figure is based on the present allocation of assets and reflects the degree to which the fund's portfolio has achieved taxonomy alignment in practice. The EU Taxonomy's standardized framework provides transparency in environmental sustainability reporting, allowing for greater consistency and comparability across funds.
- **Positive & Negative Screening:** Positive Screening and Negative Screening variables reflect the extent to which funds engage in selective investment practices to enhance their sustainability profile. Negative Screening indicates the percentage of funds that exclude certain companies or sectors due to ESG-related concerns, while Positive Screening measures the proactive inclusion of companies with strong sustainability practices.
- **Total Expense Ratio (TER %):** The Total Expense Ratio (TER) is a key financial metric that measures the total annual costs associated with managing and operating an investment fund, expressed as a percentage of the fund's average net assets. It includes management fees, administrative expenses, and other operational costs, but typically excludes transaction costs and performance fees.
- **Total Net Assets (TNA $ Mil.):** Total Net Assets (TNA) for funds represents the total value of a fund's assets minus its liabilities. It is a crucial metric used to assess the size and overall value of investment funds such as mutual funds and ETFs. TNA is typically calculated at the end of each trading day using the closing market prices of the fund's holdings.

3.2.1.2 Summary Statistics: Global Funds

The examination of global funds denominated in USD and classified under SFDR Articles 8 and 9, as illustrated in Table 2 Panel A, reveals notable differences between the two groups. Our sample includes 336 funds classified under Article 8 and 82 funds classified under Article 9, all meeting our suitability criteria.

In terms of **ESG scores**, Article 8 funds average 70.52, while Article 9 funds have a slightly higher average score of 70.78. A significant difference is observed in "**SFDR Sust. Inv. Planned (%)**": Article 8 funds plan to allocate 27.73% of their portfolios to sustainable investments, whereas Article 9 funds aim for a substantial 82.25%, indicating a stronger commitment to sustainability among Article 9 funds. However, this metric's comparability is limited due to the lack of a universally accepted definition for "sustainable" investments. Funds disclose planned allocations, but the regulatory ambiguity regarding "sustainable" qualifications introduces inconsistencies across reported figures, as different funds may apply varying criteria when defining and reporting their sustainable investments (ESMA, 2023).

For **SFDR Sust. Inv. Reported (%)**, there is substantial differentiation between Article 8 and Article 9 funds. Article 8 funds report an average of 54.35% of assets as sustainable, while Article 9 funds report 94.13%, with no statistically significant difference (p-value = 0.00). Interestingly, the reported percentages are consistently higher than the planned allocations for both Article 8 and Article 9 funds. This discrepancy may stem from an intentional underestimation of planned sustainable investments by fund managers. By setting more conservative targets in their planning, funds may position themselves to exceed these goals, thereby presenting stronger performance in sustainability metrics (Cochran et al., 2024). For Article 8 funds, the reported percentage (54.35%) significantly surpasses the planned allocation (27.73%), while Article 9 funds report 94.13%, far exceeding the planned 82.25%.

This modest difference suggests that while Article 9 funds plan to allocate a substantially larger share of their portfolios to sustainable investments, actual reported allocations do not reflect this distinction as clearly. This may highlight the challenges and inconsistencies in applying sustainable investment definitions across funds, which can vary due to the regulatory ambiguities and differing interpretations by financial market participants.

With the **SFDR Taxonomy Aligned Planned and Reported (%)** variables, which follow a more precisely defined approach, there is still a reporting gap. In our sample, only 4 Article 8 funds provide data on taxonomy-aligned planned investments, and 13 Article 9 funds do so. Additionally, only 51 Article 8 funds and 25 Article 9 funds report their actual EU Taxonomy-aligned investments, limiting transparency despite the clarity provided by the EU Taxonomy standards. This lack of disclosure is likely due to the missing data with respect to firm-level EU Taxonomy-related KPIs. Large European firms were required to disclose these KPIs for the first time for the financial year of 2022 (published in 2023) and international firms are generally not at all required to disclose this information. This circumstance currently impedes the funds' ability to disclose actual EU Taxonomy-aligned investments.

The **Positive Screening and Negative Screening** variables further highlight differences in selective investment practices. Negative Screening averages 81.25% for Article 8 funds and 82.93% for Article 9 funds, showing that both fund categories actively avoid investments in sectors or companies deemed unsustainable. Positive Screening, in contrast, averages 24.40% for Article 8 funds and 32.93% for Article 9 funds, suggesting that even Article 9 funds mostly do not engage in positive screening.

In terms of the **Total Expense Ratio (TER),** Article 8 funds have an average of 1.22%, while Article 9 funds have a higher ratio of 1.51%, highlighting the increased management costs for funds focused on sustainability. Based on the analysis from the Financial Times (2023) and the ESMA (2023)report, Article 9 funds generally exhibit varying trends in terms of total expense ratios (TER) when compared to non-sustainable funds. Additionally, Article 8 funds have an average **Total Net Assets (TNA)** of $902.93 million, significantly larger than the $261.95 million managed by Article 9 funds.

3.2.1.3 Summary Statistics: European Funds

For European funds denominated in EUR and classified under SFDR Articles 8 and 9, as illustrated in Table 2 Panel B, the data reveals notable distinctions that mirror trends observed in the global sample. Our European sample includes 302 funds classified under Article 8 and 39 funds classified under Article 9, all meeting our suitability criteria. The average **ESG scores** between Article 8 and Article 9 funds show a slight difference, with Article 8 funds scoring marginally higher at 76.56 compared to 75.17 for Article 9 funds. While this gap is minor, it reaches statistical significance in the European sample (p-value = 0.08). The **S Score** follows a similar trend, showing a small difference of 80.49 for Article 8 funds and 79.17 for Article 9 funds, with statistical significance (p-value = 0.01) indicating a slightly stronger emphasis on the social aspects of ESG for Article 8 funds.

A notable difference appears in the **SFDR Sust. Inv. Planned (%)**, with Article 9 funds allocating an average of 82.36% to sustainable investments, aligning closely with the 82.25% seen globally for Article 9 funds. In comparison, European Article 8 funds target a lower average of 27.02%, slightly lower than their global counterparts yet displaying a significant gap. This pattern underscores that Article 9 funds consistently commit more of their portfolios to sustainable investments, reinforcing their focus on sustainability goals regardless of geography.

For **SFDR Sust. Inv. Reported (%)**, European Article 8 funds report an average of 57.27% of assets as sustainable, compared to Article 9 funds which report a statistically significant higher average of 89.82%. For Article 8 funds, the reported percentage of 57.27% is more than double the planned allocation of 27.02%, highlighting a consistent pattern where reported figures surpass planned targets. This discrepancy may reflect a strategic underestimation of planned allocations by fund managers, as conservative planning makes it easier to surpass stated goals, thereby enhancing the fund's perceived alignment with sustainability criteria (Cochran et al., 2024). Similarly, for Article 9 funds, the reported average of 89.82% exceeds the planned 82.36%, reinforcing the observation that reported figures are often inflated compared to the initially stated intentions.

The **SFDR Taxonomy Aligned Planned and Reported (%)** variables provide further insights, though based on limited sample sizes. European Article 9 funds report higher taxonomy alignment in both planned (9.67%) and reported (10.03%) figures than Article 8 funds with planned (0.64%) and reported (5.85%), aligning with the trends observed in the global dataset. In the European sample, data on taxonomy-aligned planned investments is available for only 15 Article 8 funds and 9 Article 9 funds. Furthermore, actual taxonomy-aligned investments are reported by just 68 Article 8 funds and 15 Article 9 funds. Despite the clarity offered by the EU Taxonomy standards, the limited availability of this data significantly hampers transparency.

In terms of screening practices, European Article 8 funds display higher **Negative Screening** at 79.49%, compared to 84.11% for Article 9 funds. **Positive Screening** shows a more pronounced divergence, with European Article 9 funds averaging 35.90%, statistically significantlyhigher than the 19.54% for Article 8 funds (p-value = 0.02), indicating a stronger emphasis on proactively including sustainable assets, consistent with global trends.

From a financial perspective, the **Total Expense Ratio (TER)** for European Article 9 funds is higher at 1.83% compared to 1.43% for Article 8 funds, echoing the global pattern of higher expenses for Article 9 funds. Additionally, Article 8 funds manage an average Total Net Assets (TNA) of $537.23 million, which is larger than the $276.49 million managed by Article 9 funds.

Table 2: Summary Statistics Global Funds (in USD) and European Funds (in EUR).

Panel A: Global Funds (in USD)	SFDR 8 (N = 336)			SFDR 9 (N = 82)			Unpaired Two-Tailed T-Test			
VARIABLES	(1) N	(2) Mean	(3) SD	(4) N	(5) Mean	(6) SD	(5) - (2)	T-Value	P-Value	Sig.
ESG Score	312	70.52	5.51	79	70.78	4.42	0.26	0.44	0.70	
E Score	312	67.18	7.42	79	67.83	6.28	0.65	0.81	0.43	
S Score	312	74.07	5.65	79.	74.55	4.43	0.48	0.79	0.42	
G Score	312	67.61	4.84	79	67.59	4.34	-0.02	-0.04	0.97	
SFDR Sust. Inv. Planned (%)	212	27.73	17.71	77	82.25	15.84	**54.52**	25.05	0.00	***
SFDR Sust. Inv. Reported (%)	198	54.35	22.60	67	94.13	11.53	**39.78**	13.8	0.00	***
SFDR Taxonomy Aligned Planned (%)	4	2.75	2.63	13	5.85	10.74	3.10	0.95	0.36	
SFDR Taxonomy Aligned Reported (%)	51	7.82	15.82	25	10.37	13.58	2.55	0.73	0.47	
Negative Screening (%)	336	81.25	39.09	82	82.93	37.86	1.68	0.36	0.72	
Positive Screening (%)	336	24.40	43.02	82	32.93	47.28	8.53	1.49	0.14	
TER (%)	331	1.22	0.72	82	1.51	0.63	**0.29**	3.58	0.00	***
TNA ($ Mil.)	336	902.93	2147.74	82	261.95	506.4	**-640.98**	-4.9371	0	***

Panel B: EU Funds (in EUR)	SFDR 8 (N = 302)			SFDR 9 (N = 39)			Unpaired Two-Tailed T-Test			
VARIABLES	(1) N	(2) Mean	(3) SD	(4) N	(5) Mean	(6) SD	(5) - (2)	T-Value	P-Value	Sig.
ESG Score	291	76.56	4.43	37.	75.17	5.47	**-1.39**	-1.75	0.08	*
E Score	291	75.87	5.51	37	73.35	6.39	**-2.52**	-2.57	0.01	**
S Score	291	80.49	4.21	37	79.17	5.60	**-1.32**	-1.73	0.09	*
G Score	291	71.23	4.94	37	71.18	5.92	-0.05	-0.05	0.96	
SFDR Sust. Inv. Planned (%)	196	27.02	16.82	36	82.36	17.95	**55.34**	17.95	0.00	***
SFDR Sust. Inv. Reported (%)	190	57.27	22.62	27	89.82	20.47	**32.55**	7.07	0.00	***
SFDR Taxonomy Aligned Planned (%)	15	0.64	0.71	9	9.67	11.84	**9.03**	2.99	0.01	***
SFDR Taxonomy Aligned Reported (%)	68	5.85	11.32	15	10.03	9.78	4.18	1.32	0.19	
Negative Screening (%)	302	84.11	36.62	39	79.49	40.91	-4.62	-0.73	0.47	
Positive Screening (%)	302	19.54	39.71	39	35.90	48.60	**16.36**	2.356	0.02	**
TER (%)	294	1.46	0.66	38	1.83	1.69	**0.37**	2.54	0.01	**
TNA ($ Mil.)	302	537.23	994.08	39	276.49	366.69	-260.74	-1.62	0.11	

*Note: Variables are defined in section 3.2.1.1. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.*

3.2.2 Discussion of Fund-Level Sustainability Metrics

The previous sub-section presents summary statistic of various sustainability metrics for funds. These metrics are broadly designed to capture any positive or adverse impacts of the fund investee companies on ecological or social impacts. They can be divided into two categories:

- **ESG-Related Metrics**: Metrics such as composite ESG scores, ESG pillar scores, Positive Screening and Negative Screening fall under this category. These metrics assess the general sustainability characteristics of funds by examining the environmental, social, and governance practices of their investee companies. ESG scores offer a broad perspective on sustainability, without strict adherence to specific regulatory frameworks.
- **Taxonomy-Related Metrics**: These include SFDR Sust. Inv. Planned (%), SFDR Sust. Inv. Reported (%), SFDR Taxonomy Aligned Planned (%), and SFDR Taxonomy Aligned Reported (%). These metrics are directly related to the EU Taxonomy for sustainable activities and are intended to reflect the extent to which funds align with the EU's standardized environmental sustainability criteria.

However, as highlighted earlier, taxonomy-related metrics face significant limitations in data coverage compared to ESG-related figures. For instance, only a limited number of Article 8 and Article 9 funds report taxonomy-aligned investments in both planned and actual allocations. This discrepancy may be due to the recent implementation of the EU Taxonomy and the complexities involved in meeting its strict sustainability criteria.

Due to these limitations in taxonomy-related data, the following sections will focus on ESG scores, which are more widely reported and allow for a broader comparative analysis across funds. Although taxonomy alignment provides a valuable lens on regulatory compliance, the current limitations in reporting restrict its applicability for comparative analysis. By concentrating on ESG metrics, this study aims to provide more consistent insights into fund-level sustainability practices without being constrained by data availability issues in taxonomy-related metrics. This approach is consistent with market practices performed by other entities, which also emphasizes ESG scores to assess fund sustainability.

3.2.3 Performance in Terms of Risk and Return

As outlined in the introduction, one key objective is to compare investments with an impact component to a traditional investment in terms of risk and return. We therefore assess the performance of SFDR Article 8 and 9 Funds against the common proxies for the traditional market portfolio, i.e., MSCI market indexes. The subsequent analysis aims to identify a list of the best funds with impact components for a potential provision product.

To assess the performance of the funds, we conducted a CAPM (Capital Asset Pricing Model) Alpha analysis. CAPM Alpha provides an indication of a fund's ability to generate returns above the expected level for its risk level, by adjusting returns in relation to the market benchmark. Specifically, the CAPM model allows us to determine whether a fund outperforms or underperforms after accounting for systematic risk, offering an insightful measure of risk-adjusted performance.

Our approach followed a three-step methodology designed to explore the influence of cost, fund characteristics and other factors on the CAPM Alpha. In the first step, we analyzed the relationship between CAPM Alpha and Total Expense Ratio (TER) across the entire sample. For this, we employed the Fama & French Developed Market Factor as the market benchmark for the global sample and the Fama &

French European Market Factor as the market benchmark for the European sample. By applying a minimum threshold of 24 monthly observations, we ensured statistical robustness and reliability in our Alpha calculations, avoiding performance measurements based on insufficient data.

Based on insights from this preliminary analysis, the second step focused on a subset of funds with a TER below 1%. This segmentation allowed us to examine the performance of cost-efficient funds more closely. We then compared the cumulative mean returns of this low-cost group against the benchmark to capture a clearer picture of long-term performance trends among cost-efficient funds.

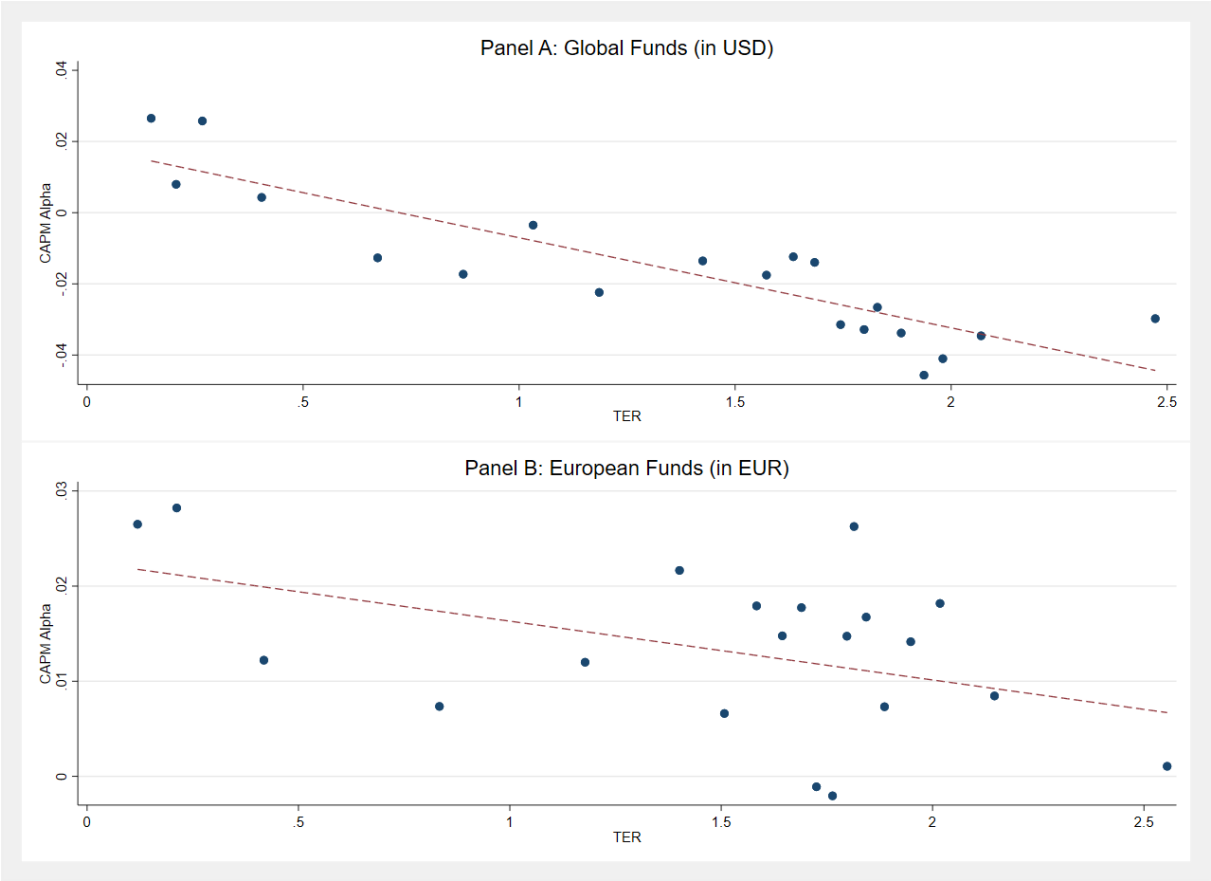
In the third step, we carried out a more detailed subgroup analysis. Breaking down the sample into different sub-groups allowed for a more granular performance assessment. We calculated the CAPM Alpha for groups with a Total Expense Ratio (TER) below 1%, as well as sub-groups based on SFDR classification (Articles 8 and 9), management style (active vs. passive), and fund launch year (pre- and post-2019). This segmented analysis helps us understand how different fund characteristics, such as cost structure, sustainability focus, and management approach, may influence performance in relation to the market.

This performance analysis, based on the calculation of CAPM Alpha, differs from the methodology used in the Fund Policy Report and the Value for Money concept. However, it shares a common focus on cost-efficiency. Like these other approaches, we place significant emphasis on fund expenses, recognizing the impact of costs on net returns. In line with this, we conducted a sub-group analysis based on Total Expense Ratio (TER), allowing us to specifically examine how cost levels correlate with performance. By incorporating TER as a key variable, our analysis provides insights into whether lower-cost funds tend to deliver better risk-adjusted returns, thus aligning with the broader emphasis on value for money within fund evaluation frameworks.

3.2.3.1 Cost vs. Performance Analysis

In the first step of our analysis, we plotted the relationship between CAPM Alpha and Total Expense Ratio (TER) across the two samples, covering both global and European funds, as shown in Figure 2 Panel A and B. The resulting diagrams for both regions reveal a clear negative relationship between CAPM Alpha and TER, suggesting that as TER increases, CAPM Alpha tends to decrease. This finding indicates that higher costs are generally associated with poorer risk-adjusted performance across both the global and European markets. The negative correlation observed in both datasets aligns with our hypothesis that cost efficiency plays a critical role in fund performance. Funds with lower expense ratios appear to deliver better returns relative to their systematic risk, underscoring the importance for investors to consider management fees and other costs when selecting sustainable investment options.

Figure 2: Comparison of Costs and CAPM Alpha for actively and passively managed Global Funds (in USD) and European Funds (in EUR).



Note: CAPM Alpha for Global Funds is calculated versus the Fama & French (2012) Developed Market Factor using a minimum of 24 monthly observations. CAPM Alpha for European Funds is calculated versus the Fama & French (2012) European Market Factor using a minimum of 24 monthly observations.

3.2.3.2 Cumulative Performance Evaluation

In the second step of our analysis, we concentrated on funds with a Total Expense Ratio (TER) below 1% to capture performance trends among cost-efficient funds. Figure 3 illustrates the cumulative mean return of this low-cost group compared to the benchmark across both the global and European samples over the analyzed period. For this analysis, we first calculated the cumulative return (*CR*) for fund *i* over *T* months as:

$$\mathrm{CR}_i = \exp\left(\sum_{t=1}^{T} \ln(1 + r_{i,t})\right) - 1$$

The mean return for all sustainable funds in month *t*, where *N* is the number of funds is calculated as:

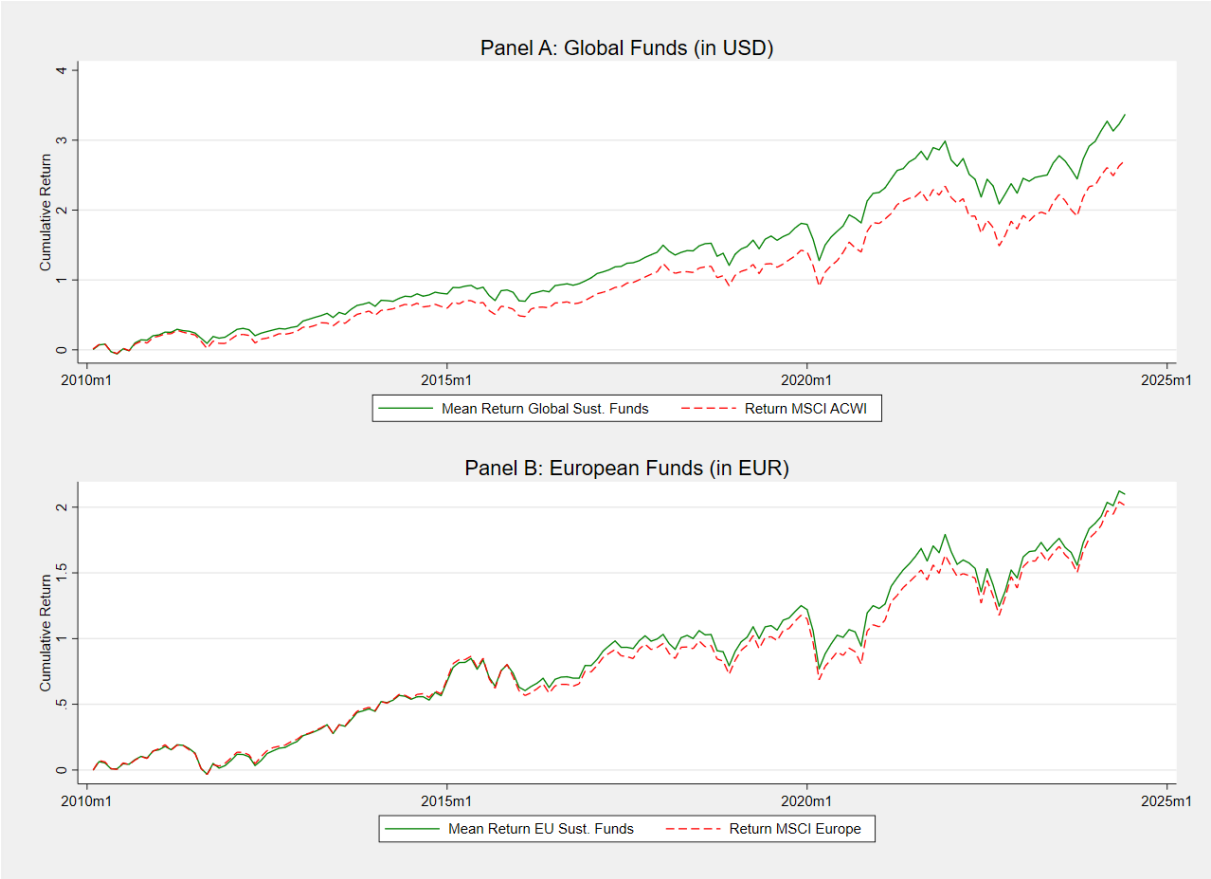
$$\text{Mean Return Sust. Funds}_t = \frac{1}{N}\sum_{i=1}^{N} r_{i,t}$$

Finally, the monthly mean returns are accumulated over time:

$$CR_{\text{Mean Sust. Funds}} = \exp\left(\sum_{t=1}^{T} \ln\left(1 + \frac{1}{N}\sum_{i=1}^{N} r_{i,t}\right)\right) - 1$$

The results consistently indicate that sustainable funds within this cost-efficient group achieved a higher mean cumulative return than the benchmark, underscoring the potential advantages of low-cost, sustainability-focused investments. This outperformance across both regions suggests that sustainable investments can offer competitive, and even superior, returns when constrained by lower expense ratios. The findings support the view that when costs are minimized, sustainable funds have the potential to deliver enhanced value relative to the market. By focusing on funds with a TER below 1%, our results highlight that cost-efficiency, paired with a sustainability mandate, may yield favorable risk-adjusted returns for investors in both global and European markets.

Figure 3: Cumulative Mean Return of low-cost sustainable Global Funds (in USD) and European Funds (in EUR).



Note: The benchmark for the Global Funds (in USD) is the MSCI All-Country World Index and the benchmark for the European Funds (in EUR) is the MSCI Europe Index.

3.2.3.3 Sub-group Performance Analysis

In the third step of our analysis, we conducted a detailed subgroup examination to explore how specific fund characteristics influence risk-adjusted performance, measured by CAPM Alpha, across both the global and European samples. Table 3 provides the CAPM Alpha results across various subgroups, segmented by Total Expense Ratio (TER), SFDR classification, management style, and launch year.

The overall mean CAPM Alpha for the global sample was -0.015, with a significant negative t-value of -6.987, indicating underperformance relative to the benchmark. In contrast, European funds showed a distinctly positive mean CAPM Alpha of 0.014 (t-value of 9.916), suggesting a regional difference, with European funds outperforming their benchmark. However, for both regions, focusing on funds with a

TER below 1% revealed a positive relationship between lower costs and better performance. The global sample's low-cost funds had a mean CAPM Alpha of 0.006 (t-value of 1.812), while the European sample's low-cost funds showed a more pronounced mean CAPM Alpha of 0.019 (t-value of 7.540). This stronger positive relationship in the European sample emphasizes cost-efficiency as a potentially more impactful performance factor in EU markets.

Examining SFDR classifications, both the global and European samples indicated that Article 8 funds with a TER below 1% achieved higher alphas (0.007 for global funds, 0.019 for European funds) compared to Article 9 funds (0.003 globally and 0.016 in the EU). While the performance gap between Article 8 and Article 9 funds is wider in the global sample, the positive trend remains consistent across both, suggesting that cost-efficient Article 8 funds tend to slightly outperform Article 9 funds in both regions.

When considering management style, both global and European samples demonstrate that passive funds with TER below 1% achieved higher CAPM Alpha than their active counterparts. Global passive funds recorded a mean CAPM Alpha of 0.020 (t-value of 4.171), while European passive funds showed an even higher alpha of 0.024 (t-value of 8.283), significantly outperforming active funds in both regions. This consistency highlights the benefits of cost-efficient passive management in producing superior risk-adjusted returns, especially within sustainability-focused funds.

The fund launch year, however, did not reveal a significant influence on performance in either the global or European sample. CAPM Alpha remained relatively consistent across both newer and older funds, indicating that other factors, such as cost efficiency and management style, exert a more substantial impact on fund performance than fund age.

Overall, this analysis shows that cost-efficient funds—particularly those following a passive management approach—are associated with superior CAPM Alphas across both global and European samples, underscoring the impact of cost efficiency and management style on sustainable investment performance.

Table 3: Sub-group Performance Analysis for Global Funds (in USD) and European Funds (in EUR).

Panel A: Global Funds (in USD)			
VARIABLES	Mean	T-Value	Obs
CAPM Alpha	-0.015	-6.987	332
CAPM Alpha, TER < 1	0.006	1.812	105
CAPM Alpha, TER < 1, SFDR 8	0.007	1.804	92
CAPM Alpha, TER < 1, SFDR 9	0.003	0.318	13
CAPM Alpha, TER < 1, Active	-0.003	-0.675	59
CAPM Alpha, TER < 1, Passive	0.020	4.171	45
CAPM Alpha, TER < 1, Launch Year > 2019	0.006	1.069	59
CAPM Alpha, TER < 1, Launch Year <= 2019	0.007	1.773	46
Panel B: EU Funds (in EUR)			
VARIABLES	Mean	T-Value	Obs
CAPM Alpha	0.014	9.916	323
CAPM Alpha, TER < 1	0.019	7.540	61
CAPM Alpha, TER < 1, SFDR 8	0.019	7.627	55
CAPM Alpha, TER < 1, SFDR 9	0.016	1.359	6
CAPM Alpha, TER < 1, Active	0.012	3.166	28
CAPM Alpha, TER < 1, Passive	0.024	8.283	33
CAPM Alpha, TER < 1, Launch Year > 2019	0.020	4.002	24
CAPM Alpha, TER < 1, Launch Year <= 2019	0.018	6.849	37

Note: CAPM Alpha is calculated versus the Fama & French (2012) Developed Market (Panel A) and European Market (Panel B) Factor using a minimum of 24 monthly observations.

3.2.4 Hypothetical Client Portfolios

The selection strategies outlined in the previous subsections yields a short-list of 98 sustainable funds that are proposed as suitable for a provision product in light of their potential for a positive ecological and social impact and low-cost structure and exceeding market returns. Nonetheless, the inclusion of both Article 8 and 9 funds enables further selection within this short-list for clients with different degrees of sustainability preferences. As can be seen from the descriptive statistics presented in Table 2 these funds fall within a range of sustainability metrics. Clients with the highest preferences for sustainability are assumably best served with a portfolio tilt towards funds with superior sustainability assessments.

As outlined above, the SFDR and EU TR-related sustainability metrics are not yet available for a large subsection of funds, which, at this stage, deems them rather inappropriate for the portfolio selection process. Instead, traditional ESG ratings are well-established in fund evaluations (e.g., the "Fundpoliceneport") and are available for almost all of the short-listed funds. Therefore, we will consider funds' ESG Ratings for the portfolio construction for hypothetical client portfolios.

Specifically, we simulate the performance of hypothetical fund portfolios consisting of 10 randomly drawn, equally weighted funds from the full universe of short-listed funds described in the previous section. This approach seeks to validate the appropriateness of the fund selection process for potential client portfolios, which commonly include no more than 10 individual funds. The simulation of 10.000 random and equally weighted portfolios attempts to average out any confounding effects of additional individual fund characteristics, which are not subject of this present study. These effects include differences in the funds' geographic and industry allocation, currency effects, and stock-picking skills of active fund managers.

We implement this approach for (1) the full fund universe and (2) only funds with high ESG ratings above 70. This way we can discern any historical wealth effects of investing in the presumably most impactful funds included in our proprietary fund selection strategy. The historical performance simulations are calculated from January 2020 to June 2024. This back-testing window allows for a sufficient monthly return observations and a sufficient number of available funds. Since we assume that the typical client does not dynamically rebalance his fund portfolio, the simulations are based in a buy-and-hold strategy.

The simulation results for the hypothetical client portfolios, as presented in Figure 4, provide valuable insight into the performance of the selected funds. Using a rigorous methodological approach, 10'000 random, equally weighted portfolios were simulated to reflect realistic client investment scenarios. Each portfolio consisted of 10 funds drawn from the short-listed universe, ensuring that the results accounted for the diversity within the fund selection. Due to the unavailability of detailed fund portfolio holding data, we are unable to guarantee the absence of overlap at the company level. The use of equally weighted portfolios aligns with finding in the literature, which suggest that simple diversification strategies often outperform more complex weighting approaches by effectively balancing risk and return (e.g., DeMiguel et al., 2009; Malladi & Fabozzi, 2017).

Portfolios constructed from the full universe of short-listed funds achieved an average total return of 10.50%, while those restricted to high ESG-rated funds (ESG scores above 70) demonstrated a slightly higher average return of 10.65%. These results suggest that focusing on funds with superior sustainability ratings may offer a marginal performance advantage. Both portfolio categories underperformed the MSCI ACWI Benchmark, which recorded a mean return of 11.72%, but they significantly outperformed the MSCI Europe Benchmark, with an average return of 8.87%. Since the mean return of EU funds is

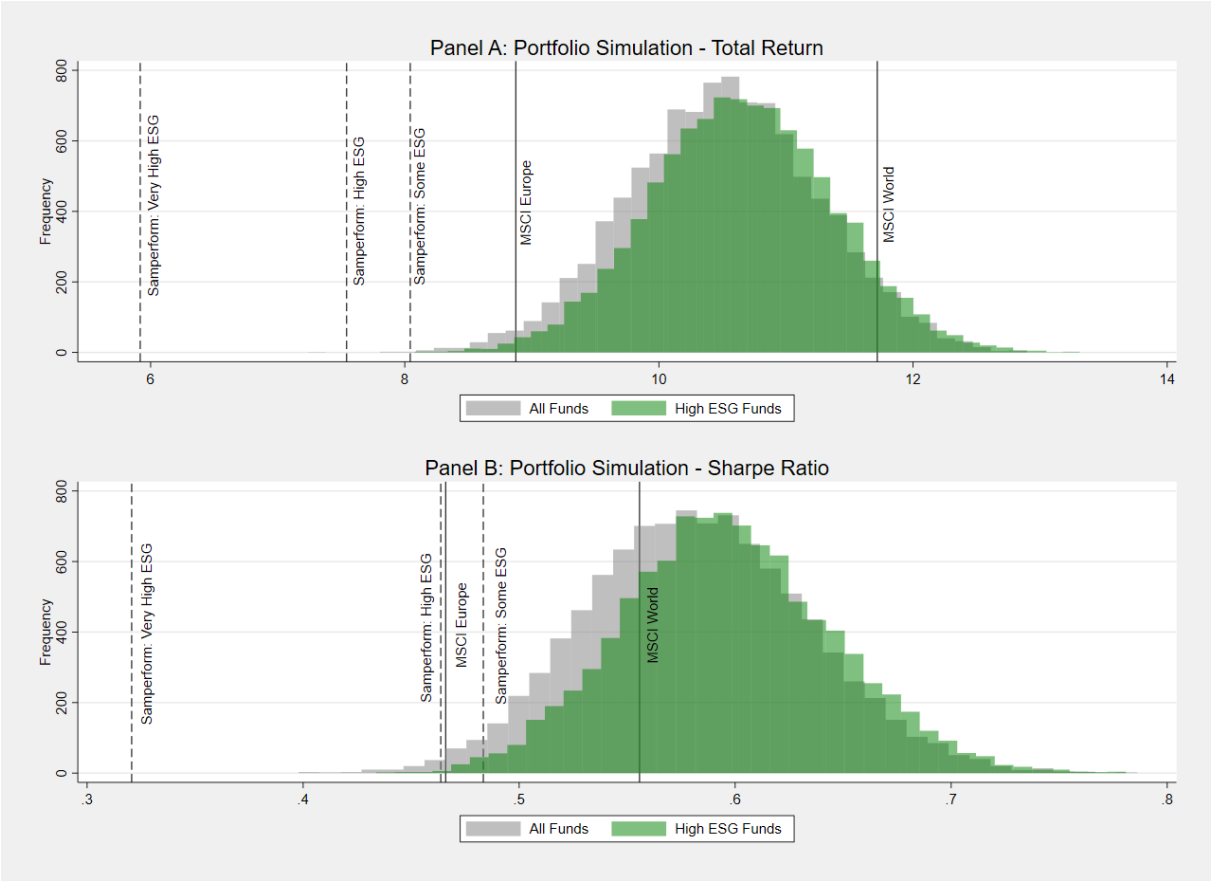
lower than that of US funds, the hypothetical portfolios' mean return naturally falls between these two extremes. The equal weighting approach and the random selection process ensure that the combined portfolio reflects a balance between the typically lower returns of EU funds and the higher returns of US funds, resulting in an average performance that is logically situated between the two benchmarks.

In terms of risk-adjusted returns, portfolios composed of the full universe of funds achieved a Sharpe Ratio of 0.58, reflecting positive performance relative to risk. Portfolios of high ESG-rated funds slightly outperformed with a Sharpe Ratio of 0.60, surpassing both the MSCI USD Benchmark (0.56) and the MSCI Europe Benchmark (0.46). This indicates that high ESG portfolios deliver better risk-adjusted returns compared to broader market benchmarks, reinforcing their attractiveness for risk-conscious investors.

Furthermore, the distribution of returns and Sharpe Ratios for high ESG-rated funds exhibited positive skewness, suggesting a greater likelihood of achieving above-average returns. This characteristic highlights the potential upside for portfolios focusing on high ESG-rated funds, making them particularly appealing for clients with strong sustainability preferences and a desire for competitive performance.

Overall, the simulation results underscore the effectiveness of the selection strategy in constructing portfolios that balance sustainability objectives with competitive financial performance. By leveraging 10'000 simulations and adopting an equally weighted approach, the analysis provides robust evidence that high ESG-rated portfolios not only align with sustainability preferences but also demonstrate enhanced performance metrics. This balance offers a compelling proposition for tailoring portfolios to meet varying client goals.

Figure 4: Portfolio Simulation Results in Terms of Total Return (Panel A) and Sharpe Ratio (Panel B).



Note: The Sharpe Ratio calculation assumes a 2% risk free rate over the sample period.

4 Limitations and Outlook

This analysis provides valuable insights into the performance and sustainability characteristics of equity funds suitable for a provision product, but it is not without its limitations.

One major limitation is the absence of a direct measurement of the actual ecological and social impact of the selected funds. While the analysis utilizes sustainability metrics such as ESG ratings and SFDR classifications, these indicators do not explicitly quantify the real-world outcomes of the investments, leaving the link between fund selection and tangible impact indirect.

Additionally, the scope of the study is restricted to equity funds. This focus excludes other asset classes, such as fixed income or alternative investments, which might also contribute to a well-rounded impact investment strategy. Broadening the scope to include these classes in future analyses could enhance diversification and offer a more comprehensive view of impact investment opportunities.

Another limitation is the reliance on historical performance data and simulated portfolios. While the simulations are robust and based on a large number of random portfolios, they do not guarantee future outcomes. The performance of the selected strategy in out-of-sample contexts remains untested. Future monitoring will be necessary to evaluate the robustness of the selection strategy over time and across varying market conditions.

Finally, the study does not account for dynamic client preferences or market shifts, which could influence the relevance and suitability of the selected funds. Incorporating adaptive mechanisms to account for such changes could strengthen the applicability of the strategy.

Looking ahead, the key focus will be on out-of-sample performance evaluation to validate the strategy's effectiveness in real-world settings. Regular monitoring and adjustment of the selection methodology, including potential integration of direct impact measurement tools and other asset classes, will be essential to ensure alignment with evolving market conditions and sustainability goals. These efforts will contribute to refining the strategy and maintaining its relevance for a diverse range of client preferences.

Additionally, our proprietary fund selection strategy could serve as the foundation for a more advanced portfolio construction and back-testing tool. Such a tool could incorporate additional dimensions of client preferences, such as country, industry, or currency allocation; risk factor exposure; and specific impact themes. This development would allow for tailored solutions that better reflect individual client objectives and enhance the strategy's practical applicability in diverse investment contexts.

5 Conclusion

This paper develops a novel implementation strategy for the inclusion of an impact component in an equity-based provision product. We identify short-listed funds for both a global and European investment focus. After filtering these funds with respect to costs (TER below 1%), empirical analyses provide support for superior financial performance of both groups compared to their respective benchmarks. Likewise, the CAPM-alpha is positive and statistically significant, which further substantiates the financial feasibility of these funds for a provision product. This is true for both Article 8 and 9 Funds, even though Article 8 Funds historically outperformed Article 9 Funds. Moreover, passively managed funds outperformed actively managed funds. Using short-listed global and European funds for simulated client portfolios produces encouraging performance distributions. The respective Sharpe Ratios generally outperform the global and European benchmarks Additional performance improvements are achieved by conditioning on the funds' ESG Rating above 70. In summary these results provide strong support for the financial benefits of including sustainability characteristics in the fund selection for provision products.

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7 Appendix

Table 4: Global Funds Shortlist

Fund Name	ISIN	ESG Score	TER	SFDR	Management Approach	Launch Year	Annualized Return
Schroder ISF QEP Global Core C Dis USD	LU0062905749	71	0.41	8	Active	1995	10.24
iShs Dow Jones Gbl Sust Scrnd UCITS ETF USD A	IE00B57X3V84	79	0.60	8	Passive	2011	10.18
UBS LFS MSCI Wld Soc Resp UCITS ETF (USD) A-dis	LU0629459743	73	0.22	8	Passive	2011	13.00
Sands Capital Global Growth USD A	IE00B737Q755	58	0.92	8	Active	2010	11.64
Dimensional Global Sustainability Core Eq USD Acc	IE00B8DMPF88	68	0.27	8	Active	2013	9.75
State Street Multi-Factor Global ESG Eq I USD Acc	LU1110725071	72	0.45	8	Active	2014	7.02
Wellington Global Research Equity N USD Acc	LU1111098858	71	0.84	8	Active	20124	9.00
Baillie Gifford Wldwd Global Alp Chc B USD Acc	IE00B88JT962	66	0.64	8	Active	2012	10.60
State Street World Screened Index Eq P USD Acc	LU1159234803	72	0.65	8	Passive	2015	10.89
State Street World ESG Index Equity I USD Acc	LU1159235362	73	0.26	8	Passive	2015	11.49
BNPPE MSCI Wld SRI S-Srs PAB 5% Cp TC C	LU1291108303	71	0.70	8	Passive	2016	10.54
iShares Ageing Population UCITS ETF USD (Acc)	IE00BYZK4669	59	0.40	8	Passive	2016	5.10
LO Funds - TargetNetZero Global Equity USD PA	LU1490632186	72	0.85	8	Active	2017	8.20
LGT Sustainable Equity Global E USD	IE00BYVQ3P07	77	0.80	8	Active	2017	7.68
LGT Sustainable Quality Equity B USD	IE00BYVTJV78	79	0.10	8	Active	2017	9.84
UBS Global Gender Equality UCITS ETF USD Aacc	IE00BDR5GV14	75	0.20	8	Passive	2017	6.80
Variopartner SICAV 3-Alpha Gl Q Achvrs G USD Acc	LU1743053230	76	0.65	8	Active	2018	6.90
Fiera Capital Global Equity C USD Acc	IE00BZ60KF30	73	0.91	8	Active	2018	11.96
Xtrackers MSCI World ESG UCITS ETF 1C	IE00BZ02LR44	74	0.20	8	Passive	2018	13.66
Amundi Funds Global Eq Dynamic Mlt Fctrs A USD C	LU1691801309		0.98	8	Active	2018	9.09
BlackRock Sust Advantage World Equity A Acc USD	IE00BDDRHD06	73	0.80	8	Active	2018	10.68
JPM Gbl Resrch Enhncd Idx Eq ESG UCITS ETF USD A	IE00BF4G6Y48	73	0.25	8	Active	2018	14.60
iShares MSCI World ESG Screened UCITS ETF USD Acc	IE00BFNM3J75	72	0.20	8	Passive	2018	12.80
L&G Global Equity UCITS ETF USD Acc	IE00BFXR5S54	73	0.10	8	Passive	2018	12.78
Nordea 2 - Global Responsible Enhcd Equity BP USD	LU1909042456	72	0.89	8	Active	2018	10.99
Xtrackers Future Mobility UCITS ETF 1C	IE00BGV5VR99	75	0.35	8	Active	2019	14.05
iShares MSCI World ESG Enhanced UCITS ETF USD Dist	IE00BG11HV38	74	0.20	8	Passive	2019	11.82
Invesco Qnt Stgs ESG Global Eq MF UCITS ETF Acc	IE00BJQRDN15	75	0.30	8	Active	2019	14.85
Invesco MSCI World ESG Univ Screened UCITS ETF Acc	IE00BJQRDK83	73	0.19	8	Passive	2019	12.68
UBS MSCI ACWI ESG Univ LwC Sel UCITS ETF USD Adist	IE00BDQZMX67	74	0.23	8	Passive	2019	8.13
UBS MSCI ACWI SR UCITS ETF USD Aacc	IE00BDR55471	72	0.25	8	Passive	2020	18.26
GS Gbl EnhIn Sus EQ-P Cap USD	LU2037301012	73	0.55	8	Active	2019	11.18
HSBC Developed World Sust Equity UCITS ETF USD	IE00BKY59K37	77	0.18	8	Passive	2020	13.25
T. Rowe P Global Growth Equity Q USD	LU2102926917	69	0.92	8	N/A	2020	5.87
T. Rowe Price Global Focused Growth Eq Fd Q USD	LU2102926248	69	0.92	8	Active	2020	12.31

UBS MSCI World SR UCITS ETF USD Aacc	IE00BK72HJ67	72	0.19	8	Passive	2020	15.51
CSIF (IE) MSCI World ESG Lds Blue UCITS ETF B USD	IE00BJBYDQ02	74	0.15	8	Passive	2020	18.76
iShares Smart City Infrastructure UCITS ETF USDAcc	IE00BKTLJC87	63	0.40	8	Passive	2020	14.62
iShares Edge MSCI Wld Min Vol ESG UCITS ETF USD A	IE00BKVL7778	72	0.30	8	Active	2020	8.09
CSIF(IE) MSCI Wld ESG Lds MinVltBl UCITS ETF BUSD	IE00BMDX0M10	72	0.25	8	Active	2020	8.99
JPM Carbon Transition Glb Eq CTB UCITS ETF USD A	IE00BMDWYZ92	74	0.19	9	Passive	2020	12.17
Lyxor MSCI Wld Catholic Princip ESG DR UCITS ETF A	LU2216829809	69	0.30	8	Passive	2020	16.45
Vanguard ESG Global All Cap UCITS ETF (USD) Acc	IE00BNG8L278	70	0.24	8	Passive	2021	8.87
iShares MSCI Wrld Par-Align Clim UCITS ETF USD Acc	IE00BMXC7W70	71	0.20	8	Passive	2021	6.52
iShares S&P 500 ParisAlign Climate UCITS ETF USD A	IE00BMXC7V63	73	0.07	8	Passive	2021	11.04
HSBC MSCI World Cl Paris Aligned UCITS ETF USD	IE00BP2C1V62	71	0.18	8	Passive	2021	5.17
iShares EM Screened Eqty Idx USD D Acc	IE00BKPTWZ06	67	0.20	8	Passive	2021	-5.11
Schroder ISF Sus Glo Growth and Inc C Acc USD	LU2352516632	80	0.85	8	Active	2021	6.48
Amundi MSCI Wld Cl PA PAB Umwltch UCITS ETF DR C/D	FR0014003FW1	72	0.25	8	Passive	2021	11.45
UBS (Lux) Eq Fd-Global Sust Improvers (USD) UX-acc	LU2391792749	62	0.02	8	Active	2021	1.46
iShares MSCI World Mom Factor ESG UCITS ETF USD A	IE000L5NW549	74	0.30	8	Active	2021	7.12
iShares MSCI Wld Value Factor ESG UCITS ETF USD A	IE000H1H16W5	77	0.30	8	Active	2021	8.93
Fiera Atlas Global Companies I Acc USD	IE00020JBI88	61	0.85	8	Active	2022	1.64
LLB Impact Climate Aktien Glbl Passiv USD Klasse P	LI1146685196	71	0.32	9	Active	2022	7.87
MSCI World (ex EMU) Low Carbon Tgt Idx-USD I-B-acc	IE000JN5OIJ6		0.10	8	Active	2022	15.37
State Street Sust Climate World Eq I USD Acc	LU2199568788	74	0.40	8	Active	2022	11.75
AXA IM ACT Biodiversity Equity UCITS ETF USD Acc	IE000SBHVL31	74	0.50	8	Active	2022	12.83
AXA IM ACT Climate Equity UCITS ETF USD Acc	IE000Z8BHG02	73	0.50	8	Active	2022	20.41
HSBC MSCI World Value ESG UCITS ETF USD Acc	IE000LYBU7X5	78	0.25	8	Active	2022	14.74
iShares MSCI World Qlty Factor ESG UCITS ETF USD A	IE000U1MQKJ2	75	0.30	8	Active	2023	25.32
L&G Gerd Kommer Multifactor Eq UCITS ETF USD Acc	IE0001UQQ933	68	0.50	8	Active	2023	17.80
Xtrackers MSCI World Quality ESG UCITS ETF 1C	IE0003NQ0IY5	73	0.25	8	Active	2023	30.50
Amundi MSCI World ESG Leaders UCITS ETF DR USD A	IE00016PSX47	74	0.18	8	Passive	2023	24.41
JPM GblRsrch EnhIdx EqtSRI PrsAln UCITS ETF USD A	IE000BXC49I6	76	0.25	9	Active	2023	24.73
BNPPE ICAV MSCI Wld ESG FltrdMin TE UCITS ETF USD	IE0008FB2WZ1	73	0.15	8	Passive	2023	46.76
Amundi MSCI World Cl Nt Zr Ambtn PAB UCITS ETF Acc	IE000CL68Z69	71	0.20	8	Passive	2023	32.13

Table 5: European Funds Shortlist

Fund Name	ISIN	ESG Score	TER	SFDR	Management Approach	Launch Year	Annualized Return
UniInstitutional European MinRisk Equities	DE0009750554	79	0.62	8	Active	1998	7.74
LLB Aktien Europa ESG (EUR)	LI0013255646	80	0.82	8	Active	1997	6.10
Eurizon Fund - Equity Europe LTE Z	LU0335977384	79	0.27	8	Active	2008	7.46
Vanguard ESG Developed Europe Index EUR Acc	IE00B526YN16	79	0.14	8	Passive	2010	8.04
OssiamStoxxEuro600ESGEqualWeightNR UCITS ETF 1CEUR	LU0599613147	73	0.35	8	Active	2011	6.96
iShares MSCI Europe SRI UCITS ETF EUR (Acc)	IE00B52VJ196	77	0.20	8	Passive	2011	7.98
UniInstitutional Eupn Eq Concentrated Acc	LU1131313493	77	0.90	8	Active	2014	8.90
BNPPE MSCI Europe ESG Filtered Min TE TC C	LU1291099395	79	0.70	8	Passive	2016	7.17
Amundi MSCI Europe PAB Net Zero Ambition AE A	LU1437020222	77	0.49	8	Passive	2016	7.19
BNPP Easy Low Crbn 100 Europe PAB UCITS ETF C	LU1377382368	79	0.31	8	Passive	2017	7.46
IndexIQ Factors Sust Europe Equity S Cap	LU1603778108	78	0.31	8	Active	2017	6.14
Xtrackers MSCI Europe ESG UCITS ETF 1C	IE00BFMNHK08	78	0.20	8	Passive	2018	8.85
Amundi Funds European Eq Dynamic Mlt Fctrs A E C	LU1691800913	80	0.98	8	Active	2018	6.34
BlackRock Advantage Europe Equity A EUR Acc	IE00BDDRH300	79	0.70	8	Active	2018	8.72
JPM Europe Rsrch Enhcd Idx Eq ESG UCITS ETF EUR A	IE00BF4G7183	81	0.25	8	Active	2018	10.57
iShares MSCI Europe ESG Screened UCITS ETF EUR Acc	IE00BFNM3D14	79	0.12	8	Passive	2018	8.65
Amundi Index MSCI Europe SRI PAB - A3E D	LU1932918052	77	0.10	8	Passive	2019	10.34
Amundi MSCI Europe ESG Leaders UCITS ETF Acc	LU1940199711	79	0.20	8	Passive	2019	10.14
iShares MSCI Europe ESG Enhanced UCITS ETF EUR Dis	IE00BHZPJ676	79	0.12	8	Passive	2019	8.34
Invesco MSCI Europe ESG Univ Scrnd UCITS ETF Acc	IE00BJQRDL90	79	0.16	8	Passive	2019	8.20
L&G Europe ESG Exclusions PA UCITS ETF EUR Acc	IE00BKLTRN76	78	0.16	9	Passive	2019	7.52
GS Europ EnhIn SusEQ-P Cap EUR	LU2037300634	79	0.55	8	Active	2019	8.80
NT Europe Sustainable Select SDG Index FGR Fund A	NL0014275372		0.13	8	Passive	2020	14.92
Fidelity Sust Rs Enh Europe Eq UCITS ETF Acc EUR	IE00BKSBGT50	78	0.25	8	Active	2020	11.64
iShares Edge MSCI Eu Min Vol ESG UCITS ETF EUR A	IE00BKVL7D31	78	0.25	8	Active	2020	8.97
Deka MSCI Europe Climate Change ESG UCITS ETF EUR	DE000ETFL565	78	0.27	9	Passive	2020	11.72
UBS LFS MSCI Eu Soc Resp UCITS ETF (EUR) A-acc	LU2206597804	76	0.18	8	Passive	2021	9.39
CSIF (Lux) Equiy Europe ESG Blue QBX EUR	LU2427870725	79	0.10	8	Passive	2022	7.92
Amundi Index MSCI Europe ESG Broad CTB I14E Cap	LU2469334648	79	0.05	8	Passive	2022	9.73
Vanguard ESG Dev Europe All Cap UCITS ETF EUR Acc	IE000QUOSE01	77	0.12	8	Passive	2022	15.29
UBS (Lux) Inst Fd - Key Sel European Equity IA2acc	LU2571468474	82	0.60	8	Active	2023	13.89
Amundi MSCI Europe Climate Action UCITS ETF Dist	LU2608817958	81	0.09	8	Passive	2023	13.78