The Financial Performance of Solidarity-based Investment Funds

Philippe Devin

The Financial Performance of Solidarity-based Investment Funds: The French Case[1]

Philippe DEVIN[2]

Abstract:

This article examines the financial performance of French solidarity-based investment funds, also known as "90-10 funds", which combine 90% responsible listed assets and 10% solidarity assets from Social and Solidarity Economy (SSE) enterprises. These funds have grown significantly since the early 2000s, in response to the challenges of sustainable development and SSE financing. However, their dual objectives—stemming from their hybrid structure, which seeks both financial returns and social impact—raise important questions about their (under)performance compared to conventional funds. Based on an original sample of 49 French solidarity-based investment funds, this study investigates the factors influencing their financial performance, with particular attention to the role of their solidarity component and their level of sustainability commitment over the period 2020-2023. Key insights emerge from this study: i) the in-depth statistical analysis reveal that these funds perform close to their benchmarks, while displaying lower volatility and risk exposure, as evidenced by beta coefficients and information ratios; ii) the econometric analysis, highlights a statistically significant and substantial negative impact of the solidarity component on financial performance. However, this factor alone does not fully account for the observed underperformance, which also reflects the influence of sustainability constraints and the presence of a non-linear relationship between ESG intensity and returns.

Keywords: *solidarity-based funds, financial performance, ESG, responsible investment, impact investing*

Code JEL: A13, D14, G11

[1] This article was presented at the 19th RIODD congress at the ICHEC, ULB (Brussels) in September 2024, and at the Impact Investing Days congress à Audencia (Nantes) in April 2025.

[2] PhD Student at Sorbonne Paris Nord University, Chair Energy and Prosperity. The author acknowledges the support of the Chair Energy and Prosperity, under the aegis of the *Fondation du Risque*.

1. Introduction

Because they aim to reconcile financial returns with social impact, solidarity-based funds are increasingly seen in France as an innovative, committed, and effective means of financing projects that address socio-environmental challenges. Solidarity-based funds, also referred to as "90-10 funds," combine 90% listed assets such as equities and bonds and 10% unlisted solidarity assets originating from Social and Solidarity Economy (SSE) enterprises, particularly those certified as Social Utility Solidarity Enterprises (SUSE)[3]. Solidarity assets include shares in solidarity enterprises (capital, debt), as well as stakes in so-called solidarity "FPS" (*Fonds Professionnels Spécialisés*), which are professional funds dedicated to solidarity investment. These FPS enable "90-10" solidarity-based funds to outsource the management of solidarity assets, which, in turn offers greater liquidity. They play a key role in the solidarity-based fund ecosystem.

To maintain a consistent socially responsible approach across both the "90" and the "10" segments, most solidarity-based funds adopt responsible investment principles for the "90" segment. This involves a stringent screening process based on Environmental, Social, and Governance (ESG) criteria, whereby securities are evaluated and selected according to their sustainability practices. Companies that fail to meet these standards—or operate in heavily polluting or otherwise controversial sectors—are excluded. Consequently, these funds not only fall under the category of solidarity-based investments but also qualify as socially responsible investment (SRI) funds.

Despite the Social and Solidarity Economy's significant weight in the French economy (ESS France, 2020) and its contribution to social and local development, it continues to face chronic underfunding. The limited number of financial institutions specializing in this sector (ESS France, 2017, p. 31) is partly due to the perception that many SSE organisations — which prioritise social and environmental objectives over profitability — are higher-risk or less profitable in the eyes of traditional lenders.

To address these challenges, public authorities in France have, since the 2000s, introduced a series of legal measures aimed at encouraging private individuals to invest part of their savings in solidarity projects through employee savings funds. These measures include the Fabius (2001), Fillon (2003), and Modernisation of the Economy (LME) (2008) laws, which made it

[3] In the French legal framework, the "Entreprise solidaire d'utilité sociale" (ESUS) is a public accreditation granted to solidarity-based organizations recognized for their social utility. To obtain this accreditation, organizations must comply with strict criteria regarding their articles of association, economic model, social objectives, and employee remuneration.

mandatory to include these funds in workplace savings plans, and later in collective retirement plans. More recently, under the PACTE law (2020), this obligation was extended to life insurance. Consequently, solidarity-based funds have become a valuable tool for financing the SSE. By 2023, these funds managed €22 billion in assets —up from €255 million in 2003 — representing an average annual growth rate of 25% over 20 years. However, they remain modest in size compared to the broader responsible investment market (€2.5 trillion for SRI funds[4]). This model of financing solidarity through employee savings remains a distinctive feature of the French financial landscape.

Despite this growth, the hybrid structure of these funds along with their dual objectives (financial returns alongside social impact), raises questions about their financial performance. They are often perceived as less attractive than conventional funds due to their solidarity component (Finansol, 2014), and remain underexplored in academic research. Only a few studies have focused on them, notably Brière & Ramelli (2021) on asset allocation by savers and Darpeix & Mosson (2021), who investigate the performance drivers of funds with extra-financial labels. While research on solidarity-based funds is limited, their similarities with SRI practices, particularly through their responsible investment approach, offers an opportunity to build on the broader literature examining SRI fund performance.

However, the extensive literature on SRI funds, which primarily focuses on financial performance (Barroso & Araújo, 2020; Capelle-Blancard & Monjon, 2012), remains inconclusive as to whether SRI funds outperform or underperform their conventional counterparts. Most meta-analyses emphasise the absence of significant differences between the performance of responsible and conventional funds (AitElMekki, 2020; Kim, 2019; Revelli & Viviani, 2015). Several theoretical frameworks are generally mobilized in these empirical studies.

Neoclassical finance—through frameworks such as Modern Portfolio Theory (MPT) and the Fama-French models—has long shaped the analysis of SRI fund performance. From this viewpoint, narrowing the investment universe to responsible firms may curtail diversification, thereby potentially lowering returns, while also imposing higher costs associated with responsible practices (e.g. limiting negative externalities, increasing labour costs, enhancing environmental protection or transparency). But empirical evidence challenges the neoclassical

[4] By the end of 2023, the French market for funds aiming for sustainable investment or promoting environmental or social characteristics accounted for €2,500 billion in assets under management (AFG, 2024). By the end of 2024, the assets under management of funds labelled "SRI" amounted to €800 billion.

assumption: some studies show that SRI funds and conventional funds often exhibit no significant differences in performance (Atz et al., 2023; Coelho et al., 2023; Kim, 2019).
In contrast, stakeholder-oriented approaches contend that integrating corporate social responsibility (CSR) can enhance long-term financial performance. Conversely, others studies suggest that higher levels of corporate social responsibility (CSR) may lead to superior financial results (Eccles et al., 2014; Ghoul & Karoui, 2022). These conflicting findings reflect ongoing debates and underline the lack of consensus regarding the financial impact of responsible investment.
Moreover, research specifically focused on solidarity-based funds remains scarce. Examining the performance of these funds, therefore, provides a valuable opportunity to explore how social and financial objectives may be reconciled in practice.

In light of the limited research dedicated to solidarity-based funds and the broader debates surrounding responsible investment, this study aims to shed light on the key factors influencing their financial performance—particularly the role of their solidarity component and responsible investment strategies.
This article investigates the main determinants of the financial performance of French solidarity-based funds, thus contributing to scholarly debates on how to balance financial returns with social objectives. To achieve this, we assembled an original dataset of 49 French solidarity-based funds with annual data collected from fund managers by the FAIR association[5]. Employing panel data econometric methods, we evaluate the effect of various asset classes such as equities, bonds, funds and solidarity assets on financial performance over four years (2020-2023).
We also investigate how management fees and the level of sustainability commitment influence performance. To achieve this goal, we created an original composite indicator to approximate the level of sustainability of the funds. This original contribution allows us to explore whether higher levels of commitment to responsible investment correlate with stronger or weaker financial performance. The score encompasses several sustainability criteria drawn from extra-financial labels and regulatory requirements: the Finansol label indicating solidarity

[5] FAIR is an association promoting solidarity finance and impact investing in France. FAIR is also a collective of social impact finance players in France and a French centre of expertise in this field at international level. FAIR brings together more than 140 social enterprises, banks and asset managers. It distributes the 'finansol' label, recognising banking and financial products that have a strong social impact. See: https://www.finance-fair.org - consulted in March 2025.

investments and responsible investing, ISR and Greenfin labels recognising responsible practices of investments, and SFDR[6] compliance.

The statistical analysis reveals that, across various risk levels, the performance of solidarity-based funds remains generally close to their benchmarks, although equity and mixed funds exhibit underperformance. The econometric study highlights a significant negative impact of the solidarity component on performance (ranging from -0.36% to -0.65%). The sustainability score also contributes to underperformance, although its effect remains limited.

In fact, this original sustainability score reveals a curvilinear relationship with performance: while financial returns increase with sustainability up to a certain threshold, they decline beyond that point. This inverted U-shaped relationship contrasts with earlier findings by Barnett and Salomon (2006) and Capelle-Blancard and Monjon (2014), who identified a U-shaped pattern. However, this apparent divergence is consistent with the fact that the funds analysed here display significantly higher levels of sustainability. The two curves may reflect different segments along the same continuum, where initial improvements in sustainability enhance returns, but excessive intensity may eventually generate constraints that weigh on performance. These findings confirm the nuanced influence of ESG practices and strengthen the case for more granular analyses of responsible fund strategies. They partially align with Darpeix and Mosson (2021), who observe limited effects of extra-financial approaches. However, unlike previous studies, this article introduces an original measure of sustainability intensity and empirically isolates, for the first time, the impact of solidarity assets on fund performance. It also shows that solidarity-based funds tend to be less sensitive to market fluctuations, thereby contributing to ongoing discussions on the risk profiles of SRI funds.

Overall, these results shed new light on how solidarity-based funds navigate the dual objectives of financial returns and social impact. Their focus on direct investment in social economy enterprises raises important questions about the links between financial strategies and social goals.

This article is structured as follows: a literature review on SRI fund performance (Section 2), a description of the data and statistical analysis (Section 3), followed by the methodology (Section 4), and econometric results (Section 5), with the final section concluding.

[6] The SFDR (Sustainable Finance Disclosure Regulation) is a European regulation aimed at promoting sustainability in the financial sector by requiring transparency on ESG criteria from its stakeholders. In force since 2021, the SFDR classifies investment funds based on their level of sustainable commitment: Article 6 for funds without ESG objectives, Article 8 for those promoting ESG characteristics, and Article 9 for those targeting measurable sustainability objectives. Fund managers designate their products according to these categories and provide the corresponding information.

2. Literature review and research hypotheses

Over the past few decades, the rise of responsible investment has raised important questions about its compatibility with the assumptions of neoclassical finance, which emphasise rationality, profit maximisation, and portfolio diversification. Within this framework, the integration of ESG criteria is often seen as a constraint that may limit financial performance. Yet, growing empirical evidence invites a re-examination of these assumptions and opens the discussion to alternative theoretical approaches, including stakeholder theory.

In the framework of neoclassical finance, economic agents are assumed to be rational and driven by profit or utility maximisation. From this perspective, Friedman (1970) argues that the primary responsibility of firms is to maximise shareholder profits, implying that social or environmental objectives should not be considered. This approach aligns with Modern Portfolio Theory (MPT), initially developed by Markowitz and later extended through Sharpe's Capital Asset Pricing Model (CAPM), as well as the multifactor models of Fama-French and Carhart. These models are among the key pillars of neoclassical financial theory (Charreaux & Albouy, 2017). Indeed, these financial theories share the underlying assumption of rationality and the systematic pursuit of optimal risk-adjusted returns, thus firmly situating them within the neoclassical paradigm.

SRI funds are frequently analysed within these neoclassical theoretical frameworks. Generally, such frameworks suggest that incorporating ESG criteria may negatively impact financial performance, primarily due to increased constraints on portfolio diversification and higher associated management costs. For instance, MPT emphasises the importance of diversification in maximising risk-adjusted returns (Lintner, 1965; Markowitz, 1952; Sharpe, 1964, 1966). Diversification allows the idiosyncratic risks of individual securities to offset one another without affecting expected performance (Rubinstein, 2002, p. 1042). However, applying responsible criteria may restrict the investment universe and hinder optimal diversification, a key requirement for portfolio efficiency under MPT. Similarly, according to Friedman's neoclassical reasoning, including social or environmental considerations typically leads companies—and consequently investment portfolios—to financial underperformance. Thus, both MPT and Friedman suggest that portfolios are most likely to match market benchmarks when they invest primarily in firms focused on financial return maximisation.

Yet, recent empirical work challenges these assumptions. Several meta-analyses (Friede et al., 2015; Kim, 2019; Revelli & Viviani, 2015) find no significant difference between the

performance of responsible and conventional investments. However, these results vary depending on factors such as the social filters applied, the study period, and the geographical context (Badía et al., 2020). Responsible portfolios may exhibit lower risk levels, particularly during economic crises (Omura et al., 2021). This resilience may stem from their lower sensitivity to market fluctuations, as a results of ESG strategies and socio-environmental filters that help mitigate volatility and play a stabilising role (Ghoul & Karoui, 2022; Lean et al., 2015; Lee et al., 2010; Syed, 2017)[7]. Interestingly, the most responsible funds may outperform their less responsible peers (Ghoul & Karoui, 2022). ESG filters appear to enhance performance beyond a certain threshold, suggesting a curvilinear relationship between the number of filters applied and financial performance (Barnett & Salomon, 2006; Capelle-Blancard & Monjon, 2014). This curvilinear relationship between sustainability intensity and performance raises important questions, particularly in relation to funds that apply the most comprehensive sets of ESG filters or go beyond standard screening practices.

In light of these theoretical insights, and given the high sustainability constraints faced by solidarity-based funds—such as their responsible and solidarity-based composition, extra-financial labels, and SFDR compliance—their strategy may place downward pressure on financial performance. However, this effect could be offset, particularly during periods of market instability, by responsible assets that help reduce exposure to volatility and by solidarity-based assets that offer an alternative source of diversification. Thus, we propose the following hypothesis:

Hypothesis 1: Solidarity-based funds exhibit performance similar to conventional funds.

In contrast to neoclassical theory, stakeholder theory (Freeman, 1994; Freeman & Reed, 1983) posits that a firm's success depends on its ability to manage relationships with its stakeholders (employees, customers, suppliers, and society at large). Rather than viewing the firm as a nexus of contracts serving only its shareholders, this perspective conceives it as a coalition of interests whose sustainability relies on balanced, cooperative relationships among all parties involved. Stakeholder theory contends that addressing stakeholder needs not only fulfils ethical or normative obligations but also enhances corporate resilience and competitiveness—particularly in environments where social legitimacy, reputational capital, and stakeholder trust influence financial outcomes. This perspective provides an alternative to purely instrumental approaches,

[7] However, beyond a certain threshold, the increase in SRI filters can compromise risk-adjusted performance, particularly for highly filtered funds (Lee et al., 2010).

suggesting that responsible corporate behaviour can serve both ethical and performance-oriented objectives (Donaldson & Preston, 1995).

In this framework, CSR understood as the alignment of corporate behaviour with societal expectations (Carroll, 1979, p. 498), is not seen as an obstacle to corporate financial performance (CFP), but as a lever for creating long-term value for both the company and society (Linde & Porter, 1995; Porter, 1991).

Early empirical studies quickly revealed a positive correlation between CSR and CFP (Stanwick & Stanwick, 1998; Waddock & Graves, 1997), showing that companies with higher CSR levels tended to pollute less, invest more, and perform better financially. These findings were reinforced by later studies suggesting a bidirectional causality: high CSR can enhance financial performance, while strong financial results enable firms to invest in more ambitious CSR strategies (Margolis et al., 2009; van Beurden & Gössling, 2008).

Subsequent empirical work has reinforced this positive relationship, particularly in times of crisis. ESG strategies appear to act as a form of "insurance", offering downside protection during turbulent periods (Atz et al., 2023). Financial performance improves as companies pay greater attention to key stakeholders and enhance their ESG scores; this effect is amplified when responsible practices are clearly and transparently communicated (Coelho et al., 2023).

Highly sustainable companies are also more likely to adopt long-term strategic planning and rely on external verification mechanisms to reinforce the credibility of their non-financial disclosures. Over the long run, they exhibit significantly better performance—both in stock market and accounting terms—while also displaying lower risk and volatility (Eccles et al., 2014). CSR may also facilitate access to capital by reducing informational asymmetries and agency costs, notably through stakeholder engagement and enhanced disclosure. Firms with high CSR performance are therefore less financially constrained and more capable of pursuing profitable investments that may otherwise be out of reach (Cheng et al., 2014).

This growing recognition of CSR's financial value is reflected in capital market dynamics. Over time, analysts have shifted from perceiving CSR as a cost under agency logic to viewing it as a value-generating element aligned with stakeholder-oriented frameworks (Ioannou & Serafeim, 2015).

Yet challenges remain, particularly regarding the comparability of ESG data. Inconsistencies in data reporting, peer benchmarking, imputation of missing data, and divergent scoring methodologies all contribute to significant variation across ESG ratings (Kotsantonis & Serafeim, 2019). These issues call for the development of more transparent, harmonised, and context-specific sustainability measures, especially in highly regulated environments.

Taken together, this body of evidence supports the view that investment vehicles composed of highly responsible firms—such as solidarity-based funds—are well positioned to outperform conventional funds by capturing the long-term financial benefits associated with corporate sustainability:

Hypothesis 2: Solidarity-based funds outperform conventional funds.

3. Data and descriptive statistics

3.1 Sample construction

This study examines an original sample of 49 French solidarity-based investment funds, selected based on two criteria: holding the Finansol label during the period and including solidarity assets in their portfolios. Initially, the sample comprised 56 funds, but seven Professional Specialized Funds (FPS – Fonds Professionnels Spécialisés) were excluded due to their significantly different characteristics, to ensure greater homogeneity (these are not '90-10' funds). This homogeneity was preserved by maintaining the same 49 funds throughout the period. The final sample represents 49% of the total assets under management in French solidarity-based funds in 2020 and 34% in 2023. It also accounts for 87% of the Finansol-labelled solidarity-based funds in 2020 and 66% in 2023[8].

This original database was constructed using data provided by FAIR, a French association dedicated to promoting solidarity finance and impact investing. FAIR grants the "Finansol" label to financial products, including savings accounts, solidarity-based investment funds, and securities issued by solidarity enterprises. Each year, FAIR organises data collection and conducts audits on labelled products in collaboration with their distributors and managers. The database was compiled from documents submitted annually by fund managers between 2020 and 2023. Data prior to 2020 could not be included, as systematic archiving and audit processes only began that year.

Despite the direct access to FAIR's data, constructing a coherent and usable dataset required substantial effort to reconcile and standardize the variety of fund documents—management reports, extra-financial reports, inventories[9], key investor information documents (KIID), fund

[8] The representativeness of the sample decreases over time for two reasons: (a) Funds labelled after 2021 are not included in the sample because information would have been unavailable for the earlier period. Consequently, the number of funds in the sample remains constant while the market continues to grow in subsequent years. (b) A significant portion of solidarity-based funds are not Finansol-labelled and thus fall outside the scope of this study, although their share in the market is steadily increasing.

[9] The fund inventory is a document detailing the assets comprising the investment fund. It is presented as a table listing the asset name, price, quantity, etc. The document is provided to the association in Excel or PDF format

regulations, and transparency codes. This heterogeneity in format, timing, and categorisation made cross-fund comparisons particularly challenging. As a result, an extensive data-cleaning and harmonisation process was undertaken to consolidate key variables (e.g., fund structure, types of solidarity assets, investment strategies) into a uniform framework.

This work not only supports the findings of this study but also breaks new ground by providing a structured dataset not previously available for these specific '90-10' solidarity-based funds. To our knowledge, this is the first empirical analysis of FAIR data on these funds, and the first to offer such a detailed view of their composition and investment strategies. Consequently, this study makes a valuable contribution to the responsible finance literature by addressing an overlooked yet important segment of socially oriented investment products in France.

The sample could not be expanded using publicly available external sources, as certain information—particularly for employee savings funds—remains inaccessible online. By focusing on comprehensive, primary data from FAIR's audits, this study offers an unprecedented level of detail on the actual composition and investment strategies of solidarity-based funds in France.

3.2 Descriptive statistics

Asset allocations and characteristics of solidarity-based funds

Among the 49 investment funds in our sample—each classified as a "90-10" fund—27 are employee savings vehicles, known in France as Employee Investment Funds (*Fonds Communs de Placement d'Entreprise, or FCPE*). These funds have been offered through employee savings schemes since 2001. The remaining 22 are open-ended funds, structured either as Mutual Investment Funds (*Fonds Communs de Placement, FCP*) or as Open-Ended Investment Companies (*Société d'Investissement à Capital Variable, SICAV*). Investors can subscribe to these open-ended funds freely through their banks, outside of employee savings schemes.
These 49 funds encompass various asset types: 17 are predominantly equity-focused (more than 70% invested in equities and equity funds), 20 are predominantly fixed-income-focused (bonds and bond funds), and 12 are classified as mixed funds (see Table 1).

and varies in structure depending on the fund managers. Standardising these documents proved to be the most laborious task. They enabled the precise categorisation of all assets within the funds, allowing for an accurate breakdown by asset class.

Table 1:Asset allocations and characteristics of solidarity-based funds (2020-2023)

	Mean	S. D	Median	Q25%	Q75%
Performance	2.26%	10.22%	1.99%	-5.45%	8.44%
Equities	27.32%	33.68%	0.00%	0.00%	48.79%
Bonds	14.16%	29.41%	0.00%	0.00%	0.00%
Cash & Monetary Funds	6.65%	8.55%	3.05%	0.68%	9.86%
Funds	45.90%	41.45%	34.80%	0.26%	91.28%
Equity Funds	10.61%	22.10%	0.00%	0.00%	6.14%
Bond Funds	15.57%	21.79%	0.00%	0.00%	27.17%
Feeder Funds	18.78%	38.60%	0.00%	0.00%	2.98%
Other	0.94%	4.46%	0.00%	0.00%	0.00%
Solidarity	5.93%	3.02%	6.90%	5.44%	7.95%
Size	€161 M	€252 M	€55 M	€17 M	€190 M
Fees	0.93%	0.59%	0.90%	0.50%	1.20%
Sustainability Score	3.8	1.8	3.5	2.9	5.1

Source: Author's calculations

Table 1 details the characteristics of the funds over the 2020–2023 period. The average annual performance is 2.26% over four years but with significant variability (S.D. of 10.22%). The average equity share is 27.32% but is highly variable, as are bonds (14.16%). Liquidity averages 6.65% and includes both uninvested capital and allocations to money market instruments.

The "funds" category refers to all fund-of-funds allocations within the solidarity-based funds and has been divided into four subcategories. Equity and bond funds allocations represent 10.6% and 15.6% respectively, while feeder funds —which refer to holdings in other "90-10" solidarity-based funds—account for an average of 18.8% of fund assets. This structure allows a solidarity fund to hold shares in another solidarity fund.

The "solidarity" variable represents the share of unlisted solidarity assets, to which the portion of solidarity FPS funds is added. FPS funds, which concentrate investments in solidarity and social economy enterprises, consist solely of solidarity enterprises and liquidity (Devin, 2025). On average, the solidarity share amounts to 5.93%, with a standard deviation of 3.02%, indicating relatively low dispersion. The broader distribution of asset allocations (Table 1) shows that some components have a median of 0%, suggesting that many funds do not invest in certain asset classes. This highlights the need to conduct a category-based analysis (equity, mixed, and fixed-income funds) to better understand allocation patterns. The average fund size is €161 million, though the median and standard deviation indicate that most funds remain relatively small. Management fees average 0.93%.

The sustainability score

To assess the sustainability commitment of solidarity-based funds, we developed an original indicator called the "Sustainability Score", based on five criteria: four French extra-financial labels (ISR, Finansol, Greenfin, CIES[10]) and the SFDR classification (Articles 8 and 9). These criteria were selected for their complementarity, high ESG standards, transparent methodologies, and broad recognition among French investors. This indicator is used to approximate the level of ESG screening, positive selection and overall sustainability commitment of the funds. It aims to capture both the degree of ESG integration (through selection and exclusion mechanisms) and the transparency of responsible practices.

- The ISR label evaluates funds on environmental, social, and governance (ESG) factors rather than purely financial metrics. This approach implies a more holistic view of sustainability, requiring that funds actively address issues like climate impact, human rights, and responsible governance. Certain high-emission and controversial sectors (e.g., coal, unconventional hydrocarbons, new fossil projects) are excluded to ensure tighter alignment with global climate objectives.
- The Finansol extra-financial label distinguishes solidarity finance products by ensuring that investments target significant social or environmental impact, such as social housing or job integration. Over time, it has become increasingly stringent, introducing strict sector exclusions (e.g., fossil fuels, arms) and requiring measurable impact reporting—particularly for the “90” portion of “90-10” funds. Awarded by an independent committee, Finansol is the only extra-financial label identifying solidarity savings products with robust social impact, mandating rigorous ESG and exclusion criteria. As a result, it serves as a reliable gauge of a fund’s commitment to sustainability, solidarity financing and transparency.
- The Greenfin label evaluates funds primarily on their contribution to the energy and ecological transition, rather than purely financial metrics. Over time, it has introduced ever-stricter exclusions—covering the entire fossil-fuel chain and certain controversial sectors—and aligned with demanding European frameworks (European Taxonomy, SFDR) to ensure measurable environmental impact. By mandating transparent reporting and positive performance indicators (e.g., reduced greenhouse gas emissions, alignment with Green Bond Principles), Greenfin label provides a gauge of a fund’s sustainability.

[10] CIES stands for “*Comité Intersyndicale de l'Epargne Salariale”* (Inter-union Employee Savings Committee), was established in 2002 by French trade unions, promotes socially responsible investment (SRI).

Its focus on rigorous environmental criteria and continuous improvement makes it a reference for investors seeking to finance ecological transition projects.

- Concerning the CIES label, it ensures that employee savings adhere to stringent ESG requirements. Over time, it has added stricter exclusions (e.g., fossil fuels, non-compliant weapons) and set clear shareholder engagement rules (voting in at least 90% of annual meetings). Funds must also provide measurable social and environmental impact, aligning with global labour conventions and climate objectives (Paris Agreement). Consequently, the CIES label offers an indication of a fund's commitment to transparency (of both the asset manager and supervisory boards of the funds), responsible investment and continuous ESG progress.
- Under the SFDR, Article 8 funds promote environmental or social characteristics but do not necessarily set specific sustainability targets, while Article 9 funds formally commit to achieving measurable sustainable investment objectives. These classifications requiring funds to disclose how they consider sustainability risks and the concrete steps they take to meet environmental or social goals. In doing so, Articles 8 and 9 serve as a marker of a fund's sustainability, aligning investment strategies with stricter European standards and transparent reporting obligations. However, its primary aim is transparency: it does not directly impose investment guidelines but requires financial players to clearly explain their choices. Even so, it has been shown that SFDR classifications further improve funds' ESG scores – as managers strive to improve their responsible strategies – and stimulate the reinvestment of capital in the most sustainable funds (Becker et al., 2022). 60% of article 9 funds have 'impact creation' strategies and higher SDG scores, while the remainder have broader ESG strategies (Scheitza & Busch, 2024). Finally, the SFDR classification often appears in fund promotional documents, and functions as an additional extra-financial labelling system (ibid.).

For each fund, one point is assigned to each criterion met. These points are then weighted by coefficients that reflect the evolution of ESG requirements between 2020 and 2023—the more demanding the criterion becomes, the higher its weight. For example, the coefficient assigned to the "Article 9" criterion increases from 0 in 2020 (non-application) to 2.5 in 2023. Similarly, the ISR label sees its weighting increase from 0.5 in 2020 to 1.5 in 2023, reflecting enhanced exclusion policies and transparency rules.

A bonus system awards additional points (+1 to +2) to funds meeting multiple criteria. Granting a bonus to a fund that combines multiple criteria (labels, SFDR classification) reflects the assumption that accumulating such requirements signals greater commitment and consistency

in its ESG approach. Moreover, it suggests that the fund aims to convey a stronger message of trust and credibility to investors. In a market where many products claim to be responsible, holding multiple labels can reinforce confidence in the fund's ESG strategy.

The final score, calculated annually for each fund, combines the criteria fulfilled, the weighting coefficients, and applicable bonuses. It ranges from 1.5 to 9.3, providing a synthetic measure of the diversity, intensity, and evolution of the funds' sustainability commitments over time[11]. This methodology enables us to analyse the link between sustainability and financial performance (see Appendix 1 for the detailed methodology).

3.3 Comparative analysis of the financial performance and risks of solidarity-based funds

Performance comparisons to market indices and respective benchmarks

This section compares the performance of solidarity-based funds against both conventional benchmark indices (Table 2) and each fund's own benchmarks (Table 3). It highlights performance differences across equity, fixed-income, and mixed fund categories and incorporates risk assessment through the information ratio and beta coefficient (Figure 1). The analysis emphasizes the stabilizing role of responsible strategies and solidarity assets during market downturns.

Table 2 presents annual performance data for the solidarity-based fund sample relative to standard market indices (over the 2020–2023 period). Specifically, the MSCI EMU serves as a comparator for equity funds, the Bloomberg Euro Aggregate for fixed-income funds, and the average of these two for mixed funds. These indices were selected for their representativeness of European market trends. Moreover, conventional indices remain common reference points for many SRI funds, making them suitable for comparison purposes (Joliet & Titova, 2018).

[11] The average score is 3.8, but it varies substantially, with the lowest score being 1.5 in 2020 and 2021, 2.0 in 2022 and 3.0 in 2023. The maximum score ranges from 5.0 in 2020 to 9.3 in 2023.

Table 2: Annual performance trends of solidarity-based funds compared to market indices (2020-2023)

Name	2020	2021	2022	2023
Equity: MSCI EMU Price Index	-2.68%	19.96%	-14.80%	16.39%
Fixed income: Bloomberg Euro Aggregate	3.84%	-3.02%	-17.17%	7.25%
Mixed: 50% MSCI EMU + 50% Bloomberg Euro Aggregate	0.58%	8.47%	-15.98%	11.82%
Solidarity-based **Equity** Funds	2.18%	14.34%	-13.01%	11.75%
Solidarity-based **Bond** Funds	1.26%	1.88%	-8.62%	6.43%
Solidarity-based **Mixed** Funds	2.52%	7.53%	-10.81%	8.12%

Source: Eikon Refinitiv, Author

When compared to these indices, solidarity-based funds generally underperform during bullish phases but outperform certain benchmarks in bearish markets.

Table 3: Average annual performance of funds by category to their benchmarks (2020-2023)

	Average Fund Performance	Average Benchmark Performance	Average Relative Performance
Solidarity-based **equity** funds	4.89%	6.14%	-1.26%
Solidarity-based **bond** funds	0.07%	0.01%	0.05%
Solidarity-based **mixed** funds	2.19%	2.95%	-0.77%

Table 3 compares the performance of solidarity-based funds to their respective benchmarks. On average, equity solidarity-based funds show higher absolute returns than the other two categories yet remain below their equity benchmark (4.89% vs 6.14%). Bond funds exhibit the strongest relative performance, at 0.07% compared with 0.01%. Overall, during the 2020–2023 period, solidarity-based funds delivering overall absolute performance broadly in line with their respective benchmarks.

These solidarity-based funds benchmarks generally fall into three categories: equity-oriented indices (e.g., Euro Stoxx 50, MSCI EMU, MSCI World), fixed-income indices (e.g., Bloomberg Euro Aggregate), and blended indices that combine equity, bond, and sometimes money market components. Four references recur most often:

- Euro Stoxx 50 – A popular choice for equity exposure, sometimes combined with FTSE or MSCI indices.
- MSCI EMU – Another common equity benchmark for funds seeking broader Eurozone coverage.
- Bloomberg Euro Aggregate – A widely used fixed-income benchmark, often adjusted to specific maturities (3–5 years, 5–7 years, etc.).
- ESTR (Euro Short-Term Rate) – Often used to represent the "solidarity" or money market portion, occasionally replacing older references like EONIA.

In some cases, fund managers simulate the solidarity allocation by assigning a 10% weighting to a money market index such as the ESTR, thereby reducing the main benchmark to 90% of its original weight (e.g., shifting from 100% CAC 40 to 90% CAC 40 and 10% ESTR) to account for the presence of unlisted solidarity assets. For funds without an official benchmark, we constructed a composite index using data on each fund's holdings (inventory), recreating the relevant equity, bond, and monetary exposures in line with the actual portfolio composition[12]. This approach ensures the benchmark aligns with the same composition constraints applied by fund managers, as documented in their inventories and ensures that the benchmark used mirrors the same compositional constraints that the manager applies to the actual portfolio.

It is worth noting that a fund's relative performance depends greatly on how their benchmarks are constructed, particularly regarding whether the benchmark simulates the presence of solidarity assets. Among the 49 funds, 13 compare themselves to benchmarks that do not replicate the solidarity share, whereas 36 incorporate it—either *via* a money market component or by proportionally reducing the index to reflect unlisted holdings. Interestingly, most funds with weaker relative performance do factor the solidarity share into their benchmark. As this allocation is designed to neutralise the potential negative impact of solidarity assets, the underperformance likely stems from other factors, such as the management choices and responsible strategies (ESG selection, screening) applied to the "90" portion of these "90-10" funds.

Relative risk analysis: the information ratio and beta

Comparing fund performance without accounting for risk provides only a partial view of managerial effectiveness. To deepen the analysis, we calculated the information ratio (IR), which evaluates the relative performance of a fund compared to its benchmark, accounting for

[12] For those funds lacking an official benchmark, the author constructed a composite index that included a small money market component. This addition was designed to approximate the share of unlisted solidarity assets, thereby capturing the effect of the "solidarity portion" on overall fund performance.

the risk taken, a ratio that also serves as an indicator of managerial skill (Kiymaz, 2019). The IR is calculated by dividing the fund's average outperformance relative to its benchmark by the volatility of this outperformance (referred to as the "tracking error"). Low volatility indicates good stability relative to the benchmark, while high volatility reflects a loss of consistency and increased risk-taking. The IR helps assess whether the fund has been able to generate high returns per unit of risk taken compared to its benchmark.

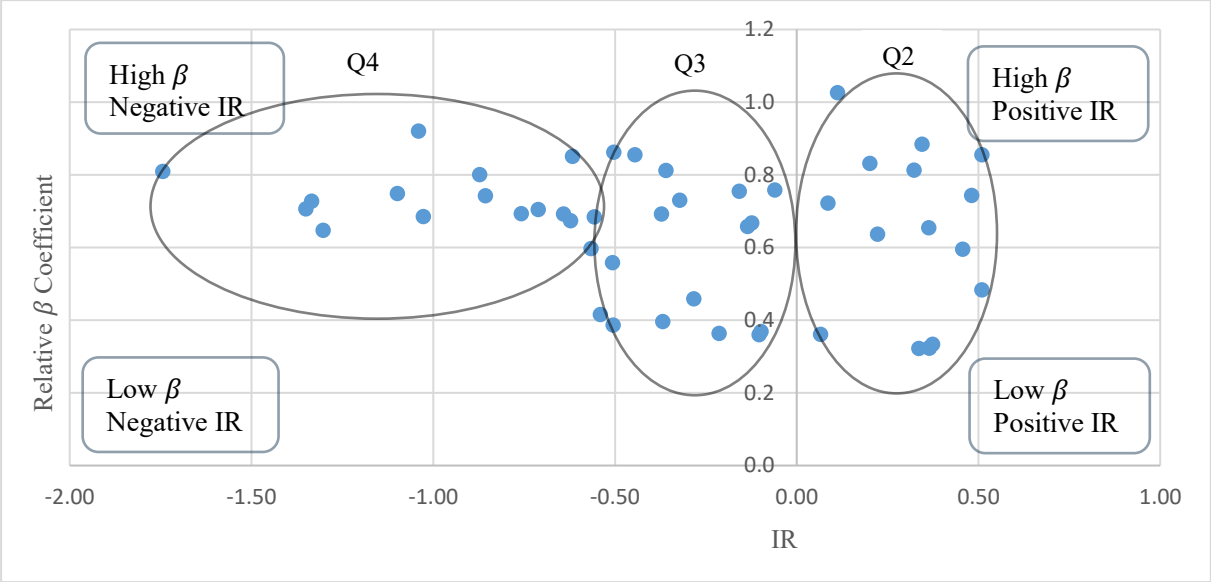
In Figure 1, each point represents a fund from the sample compared to its own benchmark, with the vertical axis showing the fund's beta coefficient (volatility relative to the market, see below) and the horizontal axis displaying its information ratio. Regarding the IR, represented on the horizontal axis, the following cases can be observed:

- High IR (≥ 0.5): Indicates significant outperformance and low risk, suggesting that the fund effectively tracks its benchmark.
- Moderate IR (≈ 0): Reflects minimal outperformance or underperformance, or higher risk, indicating that the fund takes on more risk to stay aligned with its benchmark.
- Negative IR: Signals underperformance relative to the benchmark. The IR becomes increasingly negative (≤ -0.5) as the fund underperforms or risk decreases.

The zones "Q2," "Q3," and "Q4" in Figure 1 correspond to the quartiles of a theoretical normal distribution of the information ratio[13]. The "Q2" zone includes funds with ratios between 0 and 0.5, "Q3" encompasses ratios between zero and -0.5, and "Q4" contains those below -0.5. These zones help position each fund relative to the distribution. The more positive the IR, the greater the outperformance and lower the relative risk. Conversely, a more negative IR indicates more pronounced underperformance and lower relative risk, highlighting an ineffective defensive approach suggesting that risk avoidance does not justify such negative performance.

[13] The IR follows a normal distribution curve (Grinold & Kahn, 2000, p. 114), where 0 represents the mean of the distribution. An IR > 0 places a fund in the top 50% of the population, an IR greater than 0.5 in the top 25%, and an IR of -0.5 in the bottom quartile. An IR of 1 is considered exceptional (Blatt, 2004).

Figure 1: Information Ratio (IR) and Beta coefficient of solidarity-based funds



Source: Author

The vertical axis represents the beta coefficient, which measures the sensitivity of funds to fluctuations in their benchmark, based on the Capital Asset Pricing Model (CAPM) approach. A beta close to one indicates that the fund closely tracks its benchmark. A beta between 0 and 1 suggests that the fund follows the benchmark in a subdued manner, with lower market sensitivity. Most funds in the sample have a beta below 1, reflecting lower systemic risk[14]. This aligns with observations by Lee et al. (2010) regarding SRI funds, where increased filtering intensity reduces beta, though excessive filtering can increase risk.

Funds with a high beta and a positive information ratio (IR) take greater risks to track their benchmark, but these risks are justified by better risk-adjusted performance. Conversely, funds with a high beta and a negative IR take unrewarded risks. Funds with a low beta and a positive IR limit their market exposure while achieving satisfactory risk-adjusted performance. However, those with a low beta and a negative IR take minor risk but fail to compensate with better risk-adjusted performance. These funds do not justify their defensive position, as they fail to manage risk effectively despite lower market exposure.

A particular case concerns funds with a low beta and an IR close to zero. These funds adopt a defensive approach (low beta) while taking significant risks to try to track their benchmark (IR ≈ 0). This inconsistency, or tension, may result from constraints such as ESG exclusions, which limit alignment with benchmark composition.

[14] Thirteen funds do not replicate the solidarity share in their benchmark, resulting in a beta lower than 1 by construction. For the other funds, the beta being below 1 is therefore not attributable to the presence of solidarity assets in the funds.

In conclusion, the performance of solidarity-based funds varies depending on the relative importance of their asset classes (equity, fixed income, mixed). Equity funds exhibit the best absolute performance but show negative relative performance. In contrast, fixed income funds, despite their low absolute performance, achieve positive relative performance on average. This relative underperformance or slight outperformance of solidarity-based funds persists regardless of whether their benchmarks replicate the solidarity share.

However, by incorporating risk into the analysis through the information ratio and beta, the results become more nuanced. Equity, fixed income, and mixed funds can exhibit both positive and negative IRs[15] (-0.29 in average), combined with either low or medium-high betas. Nonetheless, most funds in the sample are characterized by a low beta (0.64 in average), indicating low market sensitivity, and a negative IR[16], reflecting either unrewarded risk-taking or ineffective defensive positions. The weak performance of solidarity-based funds can partly be attributed to the constraints associated with sustainable investing and/or the presence of solidarity assets (but cannot be generalised to the whole sample). However, there is no evidence that solidarity assets are the primary factor weighing on financial performance. In fact, they may offer a different type of diversification, with low but stable returns, which is valuable in a bearish environment and thus helps protect investors.

Nevertheless, the reasons why some funds exhibit negative information ratios—reflecting relative underperformance—while others achieve positive results remain unclear. The tables and figure above suggest that adopting a responsible investment strategy is not inherently detrimental to financial performance. On the contrary, the presence of socially responsible assets, selection on the basis of ESG criteria, sector exclusions, can provide beneficial advantages from a financial point of view. These strategies may enhance risk mitigation, improve long-term resilience, and, in some cases, support performance levels comparable or even better to those of conventional funds. In the next section, we will use econometric models to assess the effects of solidarity assets, as well as the sustainability score and management fees, on financial performance.

[15] In a sample with numerous relative underperformances, modified information ratios can be used to obtain more realistic values (Blatt, 2004; Israelsen, 2005), but this does not significantly alter the conclusions presented above.

[16] This is not particularly unusual. Depending on the fund management strategies, a sample of funds composed of large companies may have an information ratio distribution similar to what was found here, with a majority of negative IRs and some IRs ranging between 0 and 0.5 (Goodwin, 1998, p. 41). For instance, Kiymaz (2019) finds, on a large sample of SRI funds, an average negative information ratios.

4. Methodology

4.1 Explanatory variables

This section identifies the variables influencing the financial performance of solidarity funds, focusing on the impact of the solidarity component. The dependent variable chosen is financial performance, defined as the annual calendar performance (as of 31/12 of year n), reported in management reports and sourced from the Refinitiv database.

Table 4 presents the main explanatory variables of our model, commonly referenced in the literature. These variables encompass the portfolio composition, management fees, and sustainability criteria represented by the sustainability score, thereby reflecting both financial and extra-financial dimensions of portfolio management. Fund size is included as a control variable, as it may potentially influence financial performance.

Table 4: Explanatory variables used in the following models

Independent or Control Variables	Description	Source	Expected Effects on the dependent variable & references
Asset Classes (Independent)	Assets in the sample funds.	FAIR database	Equities: Positive relationship Bonds: Negative relationship
Fees (Independent)	Ongoing management fees charged to subscribers.	Fund documentation	Negative relationship (Carhart, 1997; Galagedera et al., 2020)
Sustainability Score (Independent)	Distinctive elements implying selection based on stricter ESG criteria. Includes reduced diversification and stricter selection/exclusion methodologies (e.g., extra-financial labels, SFDR classifications).	Fund documentation	Negative relationship (Renneboog et al., 2008)
			Mixed effect of extra-financial indicators: (Darpeix & Mosson, 2021; Fox et al., 2023)
			Curvilinear relationship (positive and negative effects of extra-financial filters): (Barnett & Salomon, 2006; Capelle-Blancard & Monjon, 2014)
			Neutral effect of SRI : (Kim, 2019; Revelli & Viviani, 2015)
Fund Size (Control)	Several characteristics, including costs, are linked to fund size.	FAIR database	Negative relationship: (Chen et al., 2004; Pastor et al., 2015)
			Negligible relationship : (Darpeix & Mosson, 2021; Reuter & Zitzewitz, 2021)

Source: Author

4.2 Model construction

The empirical analysis relies on a linear regression on panel data to examine the relationship between the financial performance of funds and their determinants[17]. Four models are distinguished: models (1) and (2) seek to assess the impact of solidarity assets on financial performance while controlling for other asset classes (equities, equity funds, bonds...). As for models (3) and (4), they follow a similar approach but integrate additional explanatory variables such as management fees and the sustainability score. These four models aim to identify the main drivers of financial performance, with particular attention to the role of solidarity assets, management fees, and sustainability intensity.

Given its strong correlation with other explanatory variables (Appendix 3), the liquidity share (cash and money market funds) is excluded from the models.

Model (1) is formulated as follows:

$$y_{it} = \beta_0 + \alpha_i + \alpha_t + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_3 T_{it} + \varepsilon_{it}$$

Where y_{it} represents the dependent variable, here the performance of investment funds, (X_{it}) represents the equity share in the fund, (Z_{it}) the share of solidarity assets, and (T_{it}) the equity fund share. Index (i) represents the fund, index (t) represents the year, (β_0) represents the model constant, (ε) the error term, (α_i) represents individual effects (fixed or random), and (α_t), time effects.

Model (2) includes fund share noted (W_{it}), bond share (V_{it}), and the solidarity share (Z_{it}) as follow:

$$y_{it} = \beta_0 + \alpha_i + \alpha_t + \beta_4 W_{it} + \beta_5 V_{it} + \beta_2 Z_{it} + \varepsilon_{it}$$

Model (3) explains performance by the equity share (X_{it}), solidarity share (Z_{it}), the level of ongoing fees (F_{it}) and sustainability score (S_{it}).

$$y_{it} = \beta_0 + \alpha_i + \alpha_t + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_6 F_{it} + \beta_7 S_{it} + \varepsilon_{it}$$

Finally, Model (4) replaces the equity share with the fund share (W_{it}), while retaining the other explanatory variables.

$$y_{it} = \beta_0 + \alpha_i + \alpha_t + \beta_4 W_{it} + \beta_2 Z_{it} + \beta_6 F_{it} + \beta_7 S_{it} + \varepsilon_{it}$$

The inclusion of individual effects (α_i) helps control for heterogeneity specific to each fund, while time effects (α_t) capture aggregate shocks affecting all funds at a given date. This method

[17] The regressions were performed using the R software.

helps control for the particularities of each fund and each period, thereby reducing potential bias due to unobserved characteristics that may affect performance.

To determine the most appropriate approach, we conducted a Hausman test. This test verifies whether individual and time-specific effects are correlated with the explanatory variables. If this is the case, a fixed-effects model is preferable. In our case, the Hausman test revealed that fund and time-specific effects were independent of the explanatory variables, justifying the use of the random effects approach. Consequently, the test allowed us to reject fixed-effects models in favour of random-effects models (Appendix 4).

Additionally, a Breusch-Pagan test was conducted to check for heteroscedasticity in the model residuals. Heteroscedasticity can render the Student's t-test unreliable for assessing coefficient significance. To correct this, we used White's (1980) method[18], ensuring robust and reliable standard errors for significance tests.

5. Results

5.1 Results of linear regressions

The results of the linear regressions assess the impact of asset composition, management fees, and the sustainability score on the financial performance of French solidarity-based funds. Across all models, the share of solidarity assets exhibits a negative and statistically significant effect on performance.

Table 5: Results of Models 1 and 2 analysing the effect of asset classes and solidarity on performance

	Model 1			Model 2	
(Intercept)	0.028	.	(Intercept)	0.103	***
	(1.95)			(4.26)	
% Equity	0.071	***	% Funds	-0.068	***
	(5.83)			(-3.50)	
% Equity Funds	0.063	**	% Bonds	-0.076	***
	(2.95)			(-5.05)	
% Solidarity	-0.539	***	% Solidarity	-0.655	**
	(-3.95)			(-2.74)	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 // Note: t-statistics in parentheses (standard errors are heteroskedasticity-robust) – random-effects models*

[18] We used the "coeftest()" function with the "vcovHC" option (heteroskedasticity-consistent variance-covariance matrix) in R.

Model (1) examines the effect of the variables "equity", "equity funds", and "solidarity" to explain financial performance. In both models, the share of solidarity assets exerts a negative and significant effect on financial performance. An increase of 1% in the share of solidarity assets results in a performance decrease of 0.539% (Model 1) to 0.655% (Model 2).
Equities and equity funds contribute positively, while bonds and other fund components exert a negative influence. These findings reflect the market context during the 2020–2023 period, where equity markets outperformed fixed-income assets (see Appendix 2).

Table 6 introduces Models (3) and (4), which include management fees and the sustainability score alongside asset classes. Model (3) examines the effect of the variables "equity," "solidarity," "fees," and "sustainability" on financial performance. Model (4) analyses the effect of the variables "funds," "solidarity," "fees," and "sustainability score".

Table 6: Results of Models 3 and 4 analysing the effect of solidarity, sustainability score and fees on performance

Model 3			Model 4		
(Intercept)	0.043	*	(Intercept)	0.074	**
	(2.17)			(3.08)	
% Equity	0.050	***	% Funds	-0.031	*
	(4.59)			(-2.24)	
% Solidarity	-0.357	**	% Solidarity	-0.444	*
	(-2.99)			(-2.51)	
Fees	2.204	*	Fees	2.797	*
	(2.10)			(2.38)	
Sustainability Score	-0.009	*	Sustainability Score	-0.010	*
	(-2.44)			(-2.46)	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 // Note: t-statistics in parentheses (standard errors are heteroskedasticity-robust) – random-effects models*

Regarding the influence of the solidarity component, the negative effect of these assets remains consistent with previous models, leading to a performance decrease between -0.357% and -0.444% per additional percentage point.

Contrary to expectations from the literature (Carhart, 1997; Galagedera et al., 2020), management fees show a positive and significant effect on fund performance, which appears counterintuitive. This could reflect the impact of more expensive but potentially more rewarding risky management strategies. However, this effect might be biased by the specifics features of employee savings, where actual fees are sometimes compensated to minimize their impact on investors. We can assume that in our sample, the influence of management fees remains minimal.

The sustainability score has a negative and significant effect on performance, albeit with low amplitude (-0.009% to -0.010%). This suggests that, on average, funds with more stringent ESG criteria experience somewhat weaker returns. For instance, an increase in the sustainability score from 5.5 to 7.5 will result in a 0.32% decrease in performance. This result diverges from the findings of Kim (2019) and Revelli & Viviani (2015), who observe a neutral impact of ESG criteria on performance. It also contrasts with Darpeix and Mosson's study, which highlights that durable funds labelled in France do not particularly underperform (Darpeix & Mosson, 2021). In our case, the results indicate that the high level of sustainability in solidarity-based funds could modestly reduce their performance if it increases too much.

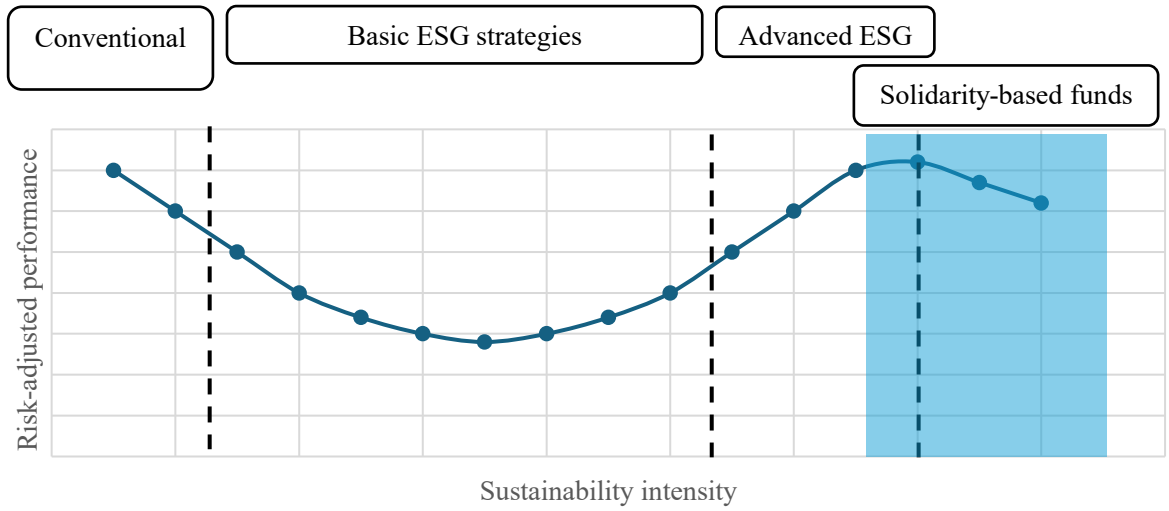
However, this average negative effect masks a more nuanced and theoretically grounded relationship. When introducing a quadratic specification of the sustainability score, the results reveal a curvilinear relationship[19]: while moderate increases in sustainability enhance performance, exceeding a threshold (between a score of 4.3 and 4.7) leads to diminishing returns. This inverted U-shaped curve is illustrated in Figure 2.

This finding extends the theoretical framework developed by previous studies (Barnett & Salomon, 2006; Capelle-Blancard & Monjon, 2014), who identified a U-shaped relationship—initial ESG screening harmed performance, followed by improvement beyond a certain level. In contrast, the funds in our sample operate at the upper end of the sustainability spectrum, suggesting that excessive ESG constraints may begin to impair returns. This inverted U-shape can therefore be seen as a natural continuation of the ESG–performance continuum, with solidarity-based funds occupying the right-hand segment.

Our contribution is twofold: first, we provide empirical validation of a non-linear sustainability–performance relationship using an original indicator; second, we identify a sustainability threshold, above which additional ESG layers may reduce financial returns. These insights are particularly relevant for fund managers seeking to balance ESG ambition with competitive performance.

[19] This result is based on additional specifications including the sustainability score and its squared term ($Score^2$) to test for non-linearity. The sustainability score was first introduced in a univariate regression (Score + $Score^2$), then in a multivariate context alongside solidarity assets (Score + $Score^2$ + control variables). In both cases, the quadratic term was statistically significant, and the turning point was consistently estimated between 4.3 and 4.7, confirming the presence of an inverted U-shaped relationship.

Figure 2: Conceptual visualisation of the curvilinear relationship between sustainability intensity and risk-adjusted financial performance



Source: Author

Broadly speaking, all four models confirm that the share of solidarity assets negatively affects performance, with a decrease ranging from -0.36% and -0.65% per additional percentage point. This challenges Hypothesis 2, which posits superior performance for solidarity-based funds. Meanwhile, Hypothesis 1, which suggests similar performance to conventional funds, is only partially supported: returns remain close to benchmarks, but the combined weight of solidarity holdings and high ESG intensity can constrain outcomes.

Yet these results also reveal hidden stabilising effects. Both responsible investment constraints and solidarity assets may dampen volatility and enhance resilience—particularly during periods of market turmoil (see Tables 2 & 3, Figure 1). Moreover, the observed curvilinear relationship indicates that solidarity-based funds are not inefficient by nature. On the contrary, performance depends on where they fall along the ESG intensity spectrum, which is consistent with the findings of previous studies (Barnett & Salomon, 2006; Capelle-Blancard & Monjon, 2014), and a sufficiently high—but not excessive—level of sustainability can offset the negative effects predicted by MPT.

In sum, performance is shaped by where funds fall along the ESG intensity spectrum. Solidarity-based funds may adopt strategies that enable them to achieve returns comparable to—or in some cases even exceeding—those of conventional funds. Yet beyond a certain point, an overly stringent responsible strategy may lead to underperformance. Recognising and managing this trade-off is therefore essential for fund managers seeking to align social ambition

with long-term financial sustainability. Recognising and managing this trade-off is essential for fund managers aiming to balance social ambition with long-term competitiveness.

5.2 Robustness of the models

To ensure the robustness of the results, we assess whether the key effects identified—particularly those related to management fees, the sustainability score, and the share of solidarity assets—may be driven by methodological issues such as multicollinearity, model over-specification, or variable-specific biases. We also test whether the exclusion of certain variables (e.g., fund size) or the inclusion of specific funds (e.g., solidarity FPS) materially affects the relationships observed.

First, the limited significance of the "fees" and "sustainability" variables does not appear to stem from multicollinearity or model saturation. The coefficients associated with these variables remain stable in simplified model specifications, suggesting that their explanatory power is intrinsically limited in this context.

Second, the "size" variable does not exhibit statistical significance in any of the models tested, and its inclusion does not alter the sign or magnitude of other coefficients. This confirms that fund size is not a direct determinant of performance within this sample, aligning with the findings of Reuter and Zitzewitz (2021).

Finally, the inclusion of FPS-type solidarity funds—characterised by near-zero performance and the absence of listed financial assets—dilutes the apparent effect of solidarity assets in certain models. The resulting loss of statistical significance does not reflect a structural change in the relationship between solidarity assets and performance, but rather a distortion introduced by the specific characteristics of FPS funds.

Conclusion

Considering the strong growth of the SRI fund market in France, solidarity-based funds stand out as distinctive vehicles. Their composition differs somewhat: they are required to invest 5% to 10% of their assets in unlisted holdings (typically low-yielding) and generally apply rigorous ESG filters to the remaining 90%. Despite competing with both conventional and SRI funds, solidarity-based funds have consistently attracted substantial investment from savers. Yet until now, no comprehensive study had analysed the financial performance of solidarity-based funds, leaving savers and industry professionals reliant on preconceived ideas. This study aims to assess the financial performance of French solidarity-based funds. The idea is to see whether these funds can balance competitive returns while supporting high-impact

social and solidarity economy enterprises and avoiding investments that exacerbate social and environmental crises. Based on a representative sample of 49 solidarity funds, the analysis offers new insights into the financial consequences of integrating non-financial considerations. Several key findings emerge from both statistical and econometric methods:

First, the statistical analysis shows that solidarity-based funds tend to underperform major indices during bullish markets but demonstrate greater resilience during downturns. Fixed-income funds outperform their benchmarks on average, whereas equity and mixed funds slightly underperform. Overall, these funds exhibit relative performances close to their benchmarks. When risk is considered using the information ratio, risk-adjusted returns are predominantly negative, though some funds exhibit strong risk-adjusted performance. Additionally, beta coefficients reveal that nearly all funds are less volatile than their respective benchmarks.

Second, the econometric analysis confirms and complements the statistical results presented above, highlighting three key findings: (1) A negative relationship between performance and the share of solidarity assets (-0.36% to -0.65% per additional percentage point), likely due to the social mission of SSE enterprises, which prioritise social impact over profitability; (2) a modest negative influence of the sustainability score on performance, potentially reflecting portfolio constraints from ESG exclusions, thematic strategies, regulatory burdens, or transparency requirements; (3) An absence of a significant effect of fund size, while the effect of management fees remains ambiguous. This suggests that costs associated with responsible and solidarity-based management are offset by long-term advantages or borne elsewhere.

These results allow us to re-examine the two initial hypotheses. Hypothesis 1, suggesting that solidarity-based funds perform comparably to conventional funds, is only partially supported. Hypothesis 2, which posited that solidarity-based funds outperform conventional funds, is clearly challenged: the observed returns do not support a consistent outperformance. Although their average returns remain close to their benchmarks, the data reveal that certain structural features—particularly high ESG intensity and solidarity holdings—can impose a financial cost in some cases. However, the presence of solidarity assets alone does not fully explain the underperformance observed across the sample. While these assets may weigh on returns, they also contribute to portfolio stability. The same can be said for responsible investment constraints: although they may restrict diversification and increase operational complexity, they appear to reduce volatility and enhance resilience during market downturns. This dual effect illustrates a fundamental trade-off between financial optimisation and extra-financial commitment.

Beyond average effects, this study reveals an important non-linear dynamic. By introducing a quadratic specification of the sustainability score, we uncover a curvilinear relationship between ESG intensity and performance: returns improve up to a certain point (between scores of 4.3 and 4.7), after which additional ESG constraints correlate with diminishing performance. This inverted U-shaped pattern extends the theoretical continuum initiated by Barnett and Salomon (2006), who found the opposite (a U-shape). Together, these patterns suggest that responsible investing follows a trajectory of increasing returns up to a threshold—after which "too much" responsibility may hinder financial performance. In this continuum, solidarity-based funds are located at the upper end of the ESG spectrum.

Nonetheless, this study is not without limitations. The analysis is shaped by a period of high market volatility (COVID-19, rate hikes, geopolitical crises), which may have influenced fund behaviour and investor preferences. Future research should test these findings over longer time horizons and under more stable conditions.

The results of this study highlight the challenges faced by solidarity-based funds in reconciling social impact and financial returns. The negative relationship between solidarity and sustainability criteria, on the one hand, and returns and risk, on the other, reflects the cost of pursuing social impact. Moreover, the moderately negative effect of sustainability criteria underscores that a well-executed sustainable strategy can remain competitive. Indeed, although not widely recognized, the funds analysed in this study may be among the most sustainable in France. This raises important questions about the ability of asset managers to assess and report the socio-environmental impact of their solidarity-based and responsible investments. Beyond fostering greater transparency, such efforts could provide investors with concrete and informative metrics about the trade-offs they make between financial returns and social impact.

Furthermore, some funds feel the need to accumulate extra-financial labels, particularly in France where several coexists, and where the SFDR seems to be one more. The reliance on a sustainability score as a proxy to assess fund sustainability—in the absence of standardised ratings—underscores the need for further research on this topic, particularly to assess the real level of sustainability and what it is implying in terms of practices and investments. In fact, different types of funds, each reflecting varying degrees of commitment to sustainability, coexist yet often exhibit similar guarantees or characteristics, creating challenges in differentiating their genuine levels of engagement. This coexistence complicates investors' ability to clearly distinguish among funds based solely on their declared sustainability approaches. Finally, the absence of a harmonised methodology for impact assessment presents a significant obstacle, hindering accurate comparisons across funds. Future research could

beneficially enhance the sustainability score developed in this article, refining its capacity to capture and accurately represent funds' true levels of sustainability commitment—for instance, by explicitly integrating and appropriately weighting various indicators reflective of funds' sustainability and impact strategies.

Appendix 1: Methodology for constructing the sustainability score

To assess the sustainability commitment of the funds in our sample, we developed a composite sustainability indicator based on several specific criteria, weighted according to their evolution over time. This indicator is designed to reflect, in a weighted and differentiated manner, the sustainability efforts of the funds, considering the certifications and labels associated with each fund as well as their combination.

Identification of Sustainability Criteria

Six sustainability criteria were identified in the sample of solidarity-based funds:

- Articles 8 and 9 of the SFDR (Sustainable Finance Disclosure Regulation): These classifications are defined by the SFDR, which imposes transparency requirements on financial products regarding sustainability.
    - Article 8: Applies to funds that promote environmental or social characteristics without making them the primary objective.
    - Article 9: Targets funds explicitly aiming for a measurable sustainability objective, with stricter compliance and sustainability requirements than Article 8 funds.
- ISR Label: Created in 2016 by the French Ministry of Economy and Finance, certifying funds that incorporate ESG criteria into their management. Widely used in France, it identifies responsible funds.
- Finansol Label: Created in 1997 by the Finansol association, this label distinguishes solidarity finance products, ensuring that investments finance projects with strong social or environmental impact, such as social housing or job integration. It is the only extra-financial label identifying solidarity-based savings products with a significant social impact.
- Greenfin Label: Created in 2017 by French Ministry of Ecological and Solidarity Transition, awarded to funds financing ecological transition projects, excluding sectors related to fossil fuels and nuclear energy.
- CIES Label (for *Comité Intersyndicale de l'Epargne Salariale* - Inter-union Employee Savings Committee), established in 2002 by trade unions, promotes socially responsible investment (SRI) through stringent ESG criteria, exclusion of controversial industries, and active shareholder engagement. Developed in collaboration with employee unions, this label is granted to employee savings funds integrating ESG criteria and adhering to governance standards favouring employee rights.

Assignment of Points for Presence

Each fund receives one point for each sustainability criterion met, with a maximum of five points per fund based on the number of certifications and sustainability labels it holds. In our sample, funds accumulate up to four sustainability criteria.

Annual Weighting of Criteria

To reflect the evolving recognition and importance of different sustainability criteria over time, each criterion is weighted differently for each year from 2020 to 2023. For example:

- In 2023, Article 9 of the SFDR is assigned a coefficient of 2.5, emphasizing its prominent role as an impact investment criterion. In 2021, when the technical regulation governing these articles had not yet been published, funds could assign themselves the sustainability criterion without fully understanding its implications, resulting in a coefficient of 1. In 2020, this coefficient is 0, reflecting the regulation's non-application at that time.
- The Greenfin Label is assigned a coefficient of 1.8 in 2023 and 1.5 in 2020. The Greenfin label has progressively strengthened its criteria from 2021 to 2024-2025, including enhanced transparency, partial exclusions for controversial activities, integration of the European Taxonomy, stricter performance thresholds, and advanced environmental indicators.
- The ISR Label has a coefficient of 0.5 in 2020 and 0.7 in 2021 due to increased transparency requirements starting in July 2020. With strengthened reporting and exclusion criteria, the coefficient increases to 1 in 2022 and 1.5 in 2023. We hypothesize that stakeholders anticipated the enhanced sustainability requirements outlined in the 2024 ISR label regulations.
- A similar approach was applied to the Finansol Label, which gradually increased its reporting and impact requirements from 2020, integrating impact measurement in 2023 and new sectoral exclusion criteria in 2024. The coefficient rises from 1.5 in 2020–2021 to 2 in 2023–2024.
- The CIES label emphasises transparency, impact measurement aligned with the SDGs and Paris Agreement, and continuous evolution towards stricter environmental and social standards. The coefficient rises from 1 in 2020 to 1.5 in 2022-2023.

This annual weighting accounts for the growing importance of certain labels and classifications over time.

Bonus for Combining Sustainability Criteria

A bonus system was introduced to reward funds meeting multiple sustainability criteria, reflecting a higher level of commitment. Bonuses are applied as follows:

- 2 criteria: +1 additional point

- 3 criteria: +1.5 additional points
- 4 or more criteria: +2 additional points

This bonus differentiates funds with a single certification from those engaging on multiple fronts, thus enhancing their overall sustainability score. We hypothesize that meeting multiple sustainability criteria is challenging and signifies a heightened commitment to responsible strategies.

Final Sustainability Score Calculation

The final score for each fund is calculated by summing:

- The points assigned for each criterion met, multiplied by the coefficient for the year.
- The bonus earned for meeting multiple criteria.

The score is calculated annually for the 2020–2023 period, allowing the evolution of investment fund sustainability commitments to be tracked over time.

Conclusion

This sustainability indicator is designed to provide a nuanced and dynamic view of the sustainability efforts of French solidarity-based funds. It captures the diversity and intensity of commitment based on the labels and certifications acquired by each fund while accounting for the normative and regulatory evolution shaping sustainable finance.

Table 7: Annual weighting of criteria for the sustainability score

Year	SFDR Article 9	SFDR Article 8	ISR Label	Finansol Label	Greenfin Label	CIES Label
2020	0	0	0.5	1.5	1.5	1
2021	1	0.8	0.7	1.5	1.5	1
2022	2	1	1	2	1.8	1.5
2023	2.5	1	1.5	2	1.8	1.5

Source: Author

Appendix 2: Average funds' performance by category

Figure 3: Average performance of funds by category – Equity funds, mixed funds, fixed-income funds (2020-2023)

Source: Author

Appendix 3: Correlation coefficients of explanatory variables

Table 8: Correlation coefficients and significance of correlations (2020-2023)

		1.	2.	3.	4.	4.1	4.2	5.	6.	7.	8.	9.
1.	Performance	1										
2.	Equity	0.145 (0.043)	1									
3.	Bonds	-0.084 (0.240)	-0.202 (0.004)	1								
4.	Funds	-0.03 (0.680)	-0.686 (0.000)	-0.533 (0.000)	1							
4.1	Equity Funds	0.036 (0.620)	-0.331 (0.000)	-0.228 (0.001)	0.428 (0.000)	1						
4.2	Bond Funds	-0.084 (0.245)	-0.253 (0.000)	-0.346 (0.000)	0.342 (0.000)	0.204 (0.004)	1					
5.	Cash & Monetary Funds	-0.1 (0.164)	-0.03 (0.679)	-0.135 (0.059)	-0.111 (0.120)	-0.077 (0.283)	0.423 (0.000)	1				
6.	Solidarity	-0.089 (0.216)	0.321 (0.000)	0.208 (0.003)	-0.554 (0.000)	0.252 (0.000)	0.296 (0.000)	0.35 (0.000)	1			
7.	Size	0.048 (0.519)	0.057 (0.471)	0.079 (0.031)	-0.096 (0.039)	0.095 (0.013)	0.028 (0.232)	-0.106 (0.045)	0.2 (0.000)	1		
8.	Fees	0.115 (0.109)	0.285 (0.000)	-0.252 (0.000)	-0.063 (0.378)	0.345 (0.000)	-0.031 (0.668)	-0.02 (0.783)	0.201 (0.005)	0.125 (0.006)	1	
9.	Sustainability Score	-0.047 (0.510)	0.162 (0.023)	-0.049 (0.495)	-0.074 (0.300)	0.066 (0.361)	-0.003 (0.970)	-0.149 (0.037)	0.095 (0.187)	0.301 (0.000)	0.463 (0.000)	1

Correlation coefficient / p-value in parentheses
Source: Author

Appendix 4: Tests results

Hausman Test: Comparison of Fixed and Random Effects

To determine the most appropriate approach, a Hausman test was conducted to compare fixed-effects and random-effects models.

Table 9: Hausman tests results

Model	Chi²	p-value
Model 1	1.91	0.592
Model 2	2.48	0.479
Model 3	5.44	0.245
Model 4	6.04	0.196

Source: Author's calculations

None of the p-values are below the 5% threshold, indicating that for all models, individual and time effects are independent of the explanatory variables. Therefore, the random-effects approach was deemed the most appropriate.

Heteroscedasticity Test: Breusch-Pagan Test

A Breusch-Pagan test was performed for each model to check for heteroscedasticity in the residuals. The p-values of the tests, ranging between 3.49×10^{-4} and 1.35×10^{-5}, are all below 0.05. This allows us to reject the hypothesis of constant residual variance in each case.

Multicollinearity Tests

To check for multicollinearity in the models, Variance Inflation Factors (VIF) were calculated for the explanatory variables. The VIF values obtained range between 1.11 and 1.67, indicating low multicollinearity. These results confirm that multicollinearity does not significantly impact the coefficient estimates in our models.

Appendix 5: Model results – 56 solidarity funds (Including FPS)

Table 10: Results of Models (1) & (2) – 56 funds (Including FPS)

Model 1			Model 2		
(Intercept)	0.005		(Intercept)	0.053	***
	(0.25)			(4.11)	
% Equity	0.051	***	% Funds	-0.038	**
	(5.26)			(-3.20)	
% Equity Funds	0.039	*	% Bonds	-0.061	***
	(2.07)			(-5.92)	
% Solidarity	-0.010		% Solidarity	-0.071	***
	(-1.21)			(-4.94)	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 // Note: t-statistics in parentheses (standard errors are heteroskedasticity-robust) – random-effects models*

Table 11: Results of Models (3) & (4) – 56 funds (Including FPS)

Model 3			Model 4		
(Intercept)	0.014		(Intercept)	0.032	
	(0.75)			(1.61)	
% Equity	0.039	***	% Funds	-0.013	
	(4.03)			(-1.37)	
% Solidarity	-0.004		% Solidarity	-0.021	
	(-0.22)			(-0.95)	
Fees	1.380	*	Fees	1.934	*
	(2.12)			(2.50)	
Sustainability Score	-0.004		Sustainability Score	-0.005	
	(-1.36)			(-1.57)	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 // Note: t-statistics in parentheses (standard errors are heteroskedasticity-robust) – random-effects models*

In the above models, the inclusion of seven FPS-type funds in the sample significantly alters the correlations between performance and other variables, leading to different results. These FPS funds contain no listed equities, bonds, or other investment funds and exhibit near-zero performance. Their presence in the sample affects the correlation levels between explanatory variables and performance.

While the relationship between the share of solidarity assets and performance remains generally negative, its apparent influence diminishes or disappears. This is due to the low returns of FPS funds, which distort results without reflecting real changes in the interaction between solidarity assets and performance. In other words, the loss of significance is not due to a genuine change in the relationship between performance and solidarity assets but is an artifact arising from FPS characteristics that bias correlations.

This phenomenon is reflected in the loss of significance of the solidarity variable in three out of four models. This is not caused by increased multicollinearity but rather by the absence of a real effect of this variable in this expanded sample.

Appendix 6: The inverted U-shaped curvilinear relationship between sustainability and financial performance

Table 12: Results of models testing the curvilinearity of the sustainability score

	Model 5			Model 6	
(Intercept)	-0.031		(Intercept)	-0.038	
	(-0.93)			(-1.05)	
% Equity	0.053	***	-		
	(4.98)				
% Solidarity	-0.273	*	-		
	(-2.53)				
Sustainability Score	0.031	*	Sustainability Score	0.031	*
	(2.24)			(2.38)	
(Sustainability Score) ²	-0.004	*	(Sustainability Score) ²	-0.003	*
	(-2.46)			(-2.51)	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 // Note: t-statistics in parentheses (standard errors are heteroskedasticity-robust) – random-effects models*

Model (5) explains performance by the equity share (X_{it}), solidarity share (Z_{it}), sustainability score (S_{it}), and squared sustainability score (${S^2}_{it}$) :

$$y_{it} = \beta_0 + \alpha_i + \alpha_t + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_7 S_{it} + \beta_8 {S^2}_{it} + \varepsilon_{it}$$

The turning point of this quadratic relationship, representing the level of the sustainability score at which performance reaches its maximum before starting to decline, is calculated using this standard formula:

$$Turning\ point = -\frac{\beta_7}{2\beta_8} = -\frac{0.031}{2 * (-0.004)} = 4.36$$

Based on the coefficients $\beta_7$and β_8 , the turning point is approximately 4.36. This result suggests that the positive effect of sustainability practices on fund performance holds up to a sustainability score of about 4.4, beyond which the marginal contribution of additional sustainability becomes negative.

In simplified model (6), which includes only the sustainability score (S_{it}) and its squared term (${S^2}_{it}$), the turning point is estimated at approximately 4.68. These results suggest that the actual threshold likely lies somewhere between 4.3 and 4.7.

References

AFG. (2024). *Etude Investissement responsable—Données d'enquête 2023*. https://www.afg.asso.fr/afg-document/etude-afg-2024-investissement-responsable/

AitElMekki, O. (2020). Is Socially Responsible Investment Outperforming Conventional Investment or Not? A Meta—Analysis. *American Journal of Industrial and Business Management*, *10*(11), Article 11. https://doi.org/10.4236/ajibm.2020.1011110

Atz, U., Van Holt, T., Liu, Z. Z., & Bruno, C. C. (2023). Does sustainability generate better financial performance? Review, meta-analysis, and propositions. *Journal of Sustainable Finance & Investment*, *13*(1), 802–825. https://doi.org/10.1080/20430795.2022.2106934

Badía, G., Cortez, M. C., & Ferruz, L. (2020). Socially responsible investing worldwide: Do markets value corporate social responsibility? *Corporate Social Responsibility and Environmental Management*, *27*(6), 2751–2764. https://doi.org/10.1002/csr.1999

Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, *27*(11), 1101–1122. https://doi.org/10.1002/smj.557

Barroso, J. S. S., & Araújo, E. A. (2020). Socially responsible investments (SRIs) – mapping the research field. *Social Responsibility Journal*, *17*(4), 508–523. https://doi.org/10.1108/SRJ-06-2019-0204

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*(PB). https://ideas.repec.org//a/eee/finlet/v47y2022ipbs1544612322000332.html

Blatt, S. (2004). *An In-Depth Look at the Information Ratio* [Master Thesis, Worcester Polytechnic Institute]. https://www.semanticscholar.org/paper/An-In-Depth-Look-at-the-Information-Ratio-Blatt/e4161f1297bc2b9ea6259e201cd655fbe8022311

Brière, M., & Ramelli, S. (2021). *Responsible Investing and Stock Allocation* (SSRN Scholarly Paper 3853256). Social Science Research Network. https://doi.org/10.2139/ssrn.3853256

Capelle-Blancard, G., & Monjon, S. (2012). Trends in the literature on socially responsible investment: Looking for the keys under the lamppost. *Business Ethics: A European Review*, *21*(3), 239–250. https://doi.org/10.1111/j.1467-8608.2012.01658.x

Capelle-Blancard, G., & Monjon, S. (2014). The Performance of Socially Responsible Funds: Does the Screening Process Matter? *European Financial Management*, *20*(3), 494–520. https://doi.org/10.1111/j.1468-036X.2012.00643.x

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance*, *52*(1), 57–82. https://doi.org/10.2307/2329556

Carroll, A. B. (1979). A Three-Dimensional Conceptual Model of Corporate Performance. *The Academy of Management Review*, *4*(4), 497–505. https://doi.org/10.2307/257850

Charreaux, G., & Albouy, M. (2017). La construction de la théorie financière moderne: De la finance néoclassique à la finance néoinstitutionnelle et comportementale. Une introduction aux grands auteurs en finance. In *Les Grands Auteurs en Finance* (Vol. 2, pp. 4–54). EMS Éditions. https://doi.org/10.3917/ems.albou.2017.01.0004

Chen, J., Hong, H., Huang, M., & Kubik, J. D. (2004). Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization. *American Economic Review*, *94*(5), 1276–1302. https://doi.org/10.1257/0002828043052277

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal*, *35*(1), 1–23. https://doi.org/10.1002/smj.2131

Coelho, R., Jayantilal, S., & Ferreira, J. J. (2023). The impact of social responsibility on corporate financial performance: A systematic literature review. *Corporate Social Responsibility and Environmental Management*, *30*(4), 1535–1560. https://doi.org/10.1002/csr.2446

Darpeix, P.-E., & Mosson, N. (2021). *Frais et performances des fonds commercialisés en France et intégrant une approche extra-financière entre 2012 et 2018*. AMF.

Devin, P. (2025). La finance à impact: Éclairage sur les pratiques d'une société française de gestion d'actifs solidaires. *Entreprise & Société 2024 – 1, N° 15*.

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *The Academy of Management Review*, *20*(1), 65–91. https://doi.org/10.2307/258887

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, *60*(11), 2835–2857.

ESS France. (2017). *Le financement des entreprises de l'Economie Sociale et Solidaire—Rapport de la commission présidée par Frédéric Tiberghien*. https://www.ess-france.org/rapport-sur-le-financement-des-entreprises-de-l-economie-sociale-et-solidaire

ESS France. (2020). *Atlas commenté de l'économie sociale et solidaire 2020: Observatoire national de l'ESS - CNCRESS Ed. 4*. Dalloz.

Finansol. (2014). *Les épargnants solidaires* (p. 100).

Fox, M., Nguyen, A., & Dumas, C. (2023). Efficacité des labels à but non lucratif et des notations commerciales pour orienter les flux financiers vers des fonds durables. *Management & Prospective*, *40*(3–4), 126–140. Cairn.info. https://doi.org/10.3917/g2000.403.0126

Freeman, R. E. (1994). The Politics of Stakeholder Theory: Some Future Directions. *Business Ethics Quarterly*, *4*(4), 409–421. https://doi.org/10.2307/3857340

Freeman, R. E., & Reed, D. L. (1983). Stockholders and Stakeholders: A New Perspective on Corporate Governance. *California Management Review*, *25*(3), 88–106. https://doi.org/10.2307/41165018

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210–233. https://doi.org/10.1080/20430795.2015.1118917

Friedman, M. (1970, September 13). A Friedman Doctrine: The Social Responsibility of Business Is to Increase Its Profits. *The New York Times*. https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

Galagedera, D. U. A., Fukuyama, H., Watson, J., & Tan, E. K. M. (2020). Do mutual fund managers earn their fees? New measures for performance appraisal. *European Journal of Operational Research*, *287*(2), 653–667. https://doi.org/10.1016/j.ejor.2020.04.009

Ghoul, S. E., & Karoui, A. (2022). Fund performance and social responsibility: New evidence using social active share and social tracking error. *Journal of Banking & Finance*, *143*, 106598. https://doi.org/10.1016/j.jbankfin.2022.106598

Goodwin, T. H. (1998). The Information Ratio. *Financial Analysts Journal*, *54*(4), 34–43.

Grinold, R. C., & Kahn, R. N. (2000). *Active Portfolio Management* (McCraw-Hill).

Ioannou, I., & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal*, *36*(7), 1053–1081. https://doi.org/10.1002/smj.2268

Israelsen, C. (2005). A refinement to the Sharpe ratio and information ratio. *Journal of Asset Management*, *5*(6), 423–427.

Joliet, R., & Titova, Y. (2018). Equity SRI funds vacillate between ethics and money: An analysis of the funds' stock holding decisions. *Journal of Banking & Finance*, *97*, 70–86. https://doi.org/10.1016/j.jbankfin.2018.09.011

Kim, C.-S. (2019). Can Socially Responsible Investments Be Compatible with Financial Performance? A Meta-analysis. *Asia-Pacific Journal of Financial Studies*, *48*(1), 30–64. https://doi.org/10.1111/ajfs.12244

Kiymaz, H. (2019). Factors influencing SRI fund performance. *Journal of Capital Markets Studies*, *3*(1), 68–81. https://doi.org/10.1108/JCMS-04-2019-0016

Kotsantonis, S., & Serafeim, G. (2019). Four Things No One Will Tell You About ESG Data. *Journal of Applied Corporate Finance*, *31*(2), 50–58. https://doi.org/10.1111/jacf.12346

Lean, H. H., Ang, W. R., & Smyth, R. (2015). Performance and performance persistence of socially responsible investment funds in Europe and North America. *The North American Journal of Economics and Finance*, *34*, 254–266. https://doi.org/10.1016/j.najef.2015.09.011

Lee, D. D., Humphrey, J. E., Benson, K. L., & Ahn, J. Y. K. (2010). Socially responsible investment fund performance: The impact of screening intensity. *Accounting & Finance*, *50*(2), 351–370. https://doi.org/10.1111/j.1467-629X.2009.00336.x

Linde, C. van der, & Porter, M. E. (1995). Green and Competitive: Ending the Stalemate. *Harvard Business Review*, *73*(5).

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *The Review of Economics and Statistics*, *47*(1), 13–37. https://doi.org/10.2307/1924119

Margolis, J., Elfenbein, H., & Walsh, J. (2009). Does it Pay to Be Good...And Does it Matter? A Meta-Analysis of the Relationship between Corporate Social and Financial Performance. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1866371

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, *7*(1), 77–91. https://doi.org/10.2307/2975974

Omura, A., Roca, E., & Nakai, M. (2021). Does responsible investing pay during economic downturns: Evidence from the COVID-19 pandemic. *Finance Research Letters*, *42*, 101914. https://doi.org/10.1016/j.frl.2020.101914

Pastor, L., Stambaugh, R., & Taylor, L. A. (2015). Scale and skill in active management. *Journal of Financial Economics*, *116*(1), 23–45.

Porter, M. E. (1991). America' Green Strategy. *Scientific American*, *264*(4), 168.

Renneboog, L., Ter Horst, J., & Zhang, C. (2008). The price of ethics and stakeholder governance: The performance of socially responsible mutual funds. *Journal of Corporate Finance*, *14*(3), 302–322. https://doi.org/10.1016/j.jcorpfin.2008.03.009

Reuter, J., & Zitzewitz, E. (2021). How Much Does Size Erode Mutual Fund Performance? A Regression Discontinuity Approach. *Review of Finance*, *25*(5), 1395–1432. https://doi.org/10.1093/rof/rfab016

Revelli, C., & Viviani, J.-L. (2015). Financial performance of socially responsible investing (SRI): What have we learned? A meta-analysis. *Business Ethics: A European Review*, *24*(2), 158–185. https://doi.org/10.1111/beer.12076

Rubinstein, M. (2002). Markowitz's 'Portfolio Selection': A Fifty-Year Retrospective. *The Journal of Finance*, *57*(3), 1041–1045.

Scheitza, L., & Busch, T. (2024). SFDR Article 9: Is it all about impact? *Finance Research Letters*, *62*, 105179. https://doi.org/10.1016/j.frl.2024.105179

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. *The Journal of Finance*, *19*(3), 425–442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x

Sharpe, W. F. (1966). Mutual Fund Performance. *The Journal of Business*, *39*(1), 119–138.

Stanwick, P. A., & Stanwick, S. D. (1998). The Relationship Between Corporate Social Performance, and Organizational Size, Financial Performance, and Environmental Performance: An Empirical Examination. *Journal of Business Ethics*, *17*(2), 195–204. https://doi.org/10.1023/A:1005784421547

Syed, A. M. (2017). Socially responsible: Are they profitable? *Research in International Business and Finance*, *42*, 1504–1515. https://doi.org/10.1016/j.ribaf.2017.07.090

van Beurden, P., & Gössling, T. (2008). The Worth of Values: A Literature Review on the Relation between Corporate Social and Financial Performance. *Journal of Business Ethics*, *82*(2), 407–424.

Waddock, S. A., & Graves, S. B. (1997). The Corporate Social Performance-Financial Performance Link. *Strategic Management Journal*, *18*(4), 303–319.

White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica*, *48*(4), 817–838. https://doi.org/10.2307/1912934