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Performance comparison of a Socially Responsible Investment stocks portfolio and conventional indexes for French private investors

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Master in Finance

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Resumo

O Investimento Socialmente Responsável (ISR) tem vindo a ganhar uma força significativa, especialmente no mercado francês, mas o seu desempenho em comparação com os índices convencionais continua a ser um tema de debate. Este estudo tem como objetivo compreender se um investidor francês pode obter retornos superiores com uma carteira ISR, construída utilizando informações publicamente disponíveis e critérios ESG, em comparação com índices convencionais. Aplicando uma metodologia quantitativa, o estudo analisou o desempenho de uma carteira de ações ISR, selecionada a partir da classificação Global-100, em comparação com índices de referência convencionais ao longo de um período de 66 meses. Os resultados revelaram que a carteira de ações ISR, apesar de certas limitações, tem potencial para oferecer rendimentos competitivos, ultrapassando frequentemente os índices de referência tradicionais. Este facto sublinha a importância crescente das estratégias de ISR no panorama de investimento francês.

Palavras-chave: Investimento socialmente responsável, mercado francês, desempenho da carteira.

Classificação JEL: G11; G15

Abstract:

Socially Responsible Investing (SRI) has gained significant traction, especially within the French market, yet its performance in comparison to conventional indexes remains a topic of debate. This study aims to understand whether a French investor can achieve superior returns with an SRI portfolio, constructed using publicly available information and ESG criteria, compared to conventional indexes. Applying a quantitative methodology, the research examined the performance of an SRI stocks portfolio, selected from the Global-100 ranking, against conventional benchmarks over a 66-month period. The findings revealed that the SRI portfolio, despite certain limitations, has the potential to offer competitive returns, often surpassing traditional benchmarks. This underscores the growing significance of SRI strategies within the French investment landscape.

Keywords: Socially Responsible Investing, French Market, Portfolio Performance.

JEL Classification: G11; G15

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List of Abbreviations:

- **CAC40** : Cotation Assistée en Continu, a benchmark French stock market index
- **CAPM** : Capital Asset Pricing Model
- **COFRAC** : French Accreditation Committee
- **CSR** : Corporate Social Responsibility
- **ESG** : Environmental, Social, and Governance
- **FTSE** : Financial Times Stock Exchange
- **GSIA** : Global Sustainable Investment Alliance
- **HML** : High Minus Low
- **IFOP** : French Institute of Public Opinion
- **MOM** : Momentum
- **OLS** : Ordinary Least Squares
- **SMB** : Small Minus Big
- **SRC** : Socially Responsible Company
- **SRI** : Socially Responsible Investing
- **TEEC** : Energy and Ecological Transition for Climate Label (now recognized as GREENFIN)
- **WEF** : World Economic Forum

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1. Introduction

Socially responsible investing (SRI) is an investment strategy that is growing at a remarkable pace, among both institutional and private investors. In its latest 2020 report, the Global Sustainable Investment Alliance, reported that sustainable investment in the five major markets reached an astounding 35.3 trillion $, which represents a 15% increase over the previous two years and a significant 55% growth over the past four years. This highlights the growing importance and relevance of SRI in today's financial world.

Socially responsible investing, which integrates financial and extra-financial factors, including environmental, social, and governance (ESG) criteria in investment decisions (Arjaliès, 2010), has gained notoriety following recent financial crises that underscored the demand for ethical investment considerations. The 2008 subprime crisis particularly raised both public and academic concerns, enhancing investors towards aligning financial and social objectives through SRI principles (Puaschunder, 2016). Europe is the one that experienced a remarkable shift towards sustainable investing due to regulatory, industry, and collaborative initiatives. However, even if the United States and Europe held over 80% of global sustainable investing assets from 2018 to 2020, Europe saw a 13% decline in sustainable investment asset growth during this period, due to a changed measurement methodology and updated sustainable investment definitions that are now integrated into European Union legislation through the European Sustainable Finance Action Plan (GSIA 2020).

From a scientific point of view, research into socially responsible investment (SRI) focuses mainly on the search for financial profitability, as highlighted by Revelli and Sentis (2012). The "doing well by doing good" perspective states that effective ESG risk management in SRI enhances performance, while the "whatever is better is worth a premium" view argues that nonfinancial screens may diminish diversification and harm performance (Crifo & Mottis, 2016). Although consensus is vague regarding SRI's financial performance superiority, Fride et al. (2015) found that nearly 90% of over 2,000 empirical studies since 1970 discovered no negative impact of ESG criteria on financial performance, with the majority indicating a rather positive correlation and suggesting a consistent, positive, and enduring impact of ESG factors on financial performance.

While comparative national varieties of SRI have gathered significant attention in the literature, there is a gap about the French SRI market in the existing research (Louche & Lydenberg, 2006; Arjaliès, 2010; Déjean et al., 2013; Crifo & Mottis., 2016), especially for the

private investor in this growing and demanding SRI context. This study aims to raise awareness and bridge this gap among other contributions. On one hand, it develops a comprehension of national SRI variations by examining the French market structure and legislation. On the other hand, by using the French case as an example, it contributes to the discussion on region-specific socially responsible investing, especially within the context of "SRI mainstreaming".

The research objective is to understand whether a French private investor can outperform conventional indexes with a portfolio constituted of SRI stocks selected with openly available information and ESG criteria.

In order to fully answer this objective, this research employs a quantitative methodology analysing the performance of a portfolio derived from the Global-100 ranking and benchmarked against conventional French indexes over 66 months. Moreover, the data should be openly available and is therefore retrieved from databases like Yahoo Finance, and Kenneth and French library. This paper will firstly be reviewing the existing literature about SRI, from its historical development and definition to the current accepted models of performance assessment. Then, the results will be examined before discussing about the findings and contributions. Finally, the paper will be concluded with the suggestion that SRI portfolios, when created with careful consideration of ESG criteria, can offer competitive, if not superior, returns compared to traditional investment strategies.

2. Literature review

2.1 Historical development

Throughout history, various religious and philosophical traditions have influenced ethical considerations in trade and investment practices. In ancient Rome, wise individuals aimed to excel in all aspects of their lives, including commerce. Early religious texts such as the *Bible* and *Torah* laid down the foundational rules for ethical investment. In the 7th century, the *Quran* and *Hadith*, central to *Islam*, extended this ethical philosophy, offering clear guidance for commercial life through *Sharia* or Islamic jurisprudence *Al-Fiqh*.

 For example, during medieval times in the 16th century Jewish law has specified first rules for ethical investments. In the 18th century, the Methodist Church followed those principles and introduced similar rules (Schueth, 2003). As a matter of fact, by 1948, the Methodist Church and the Church of England in the United Kingdom even established investment portfolios incorporating ethical constraints (Bengtsson, 2008).

However, the first, true SRI fund was the Pioneer Fund of Boston, founded by a church group in the United States in 1928. This marked the foundation of the first genuine SRI fund (Kirchhoff, 2008). Its purpose was to reflect and enhance a movement that refused to invest and enrich itself by investing in certain sectors of activity, such as armaments and slavery, known at the time as "sin stocks".

Subsequently, in the 1900s, the equity market increasingly considered the religious requirements of the Islamic community, and excluded certain sectors from investment portfolios, including alcohol, tobacco, sex-related industries, pork, usury, and gambling (Ariff & Iqbal, 2011; Alim, 2014). Consequently, concerns regarding environmental issues gained prominence as the political dimension also started to arise at the same time (Fung et al., 2010). Therefore, in the mid-20th century, ethical investing began to extend beyond religious principles to include a broader range of considerations, including social issues like civil rights and women's rights, political factors, and the complexities of corporate management and its relationships among stakeholders. As a result, in 1971, two Methodist Church ministers created the "Pax World Funds", with the goal of starting an investment fund that did not to use church funds to finance the weapon business, since they did not support the Vietnam war. This marked the beginning of the first socially responsible mutual fund in the United States, with a simple goal of investing according to specific values and integrating criteria related to environmental, social, and governance concerns.

As a reflection of ethical concerns, some investment funds opted not to invest in South Africa during the Apartheid era. Additionally, major environmental disasters like Chernobyl, Fukushima, and the Exxon Valdez spill have underlined the need to consider environmental factors into investment choices, which affected how people invest their money (Renneboog et al., 2008).

Until recently, investment choices were guided by a basic framework focused on three key factors: liquidity, risk, and return. However, current investors seem to be increasingly adopting a more comprehensive approach known as the "magic square," which includes sustainability as a fourth essential element along with liquidity, risk, and return. This shift represents an improvement compared to the traditional neoclassical homo-economicus model, which was solely motivated by economics principles (Duttweiler, 2011; Bernstein, 2020). The following figure illustrates this development from a "magical" triangle to a "magical" square (Cengiz et al., 2010):

Figure 1: Trade-off Relationship in the Magical Square for Investment Decision

2.2   SRI definition and terminology

The current academic literature shows a large diversity in the terminology used to describe the type of investment discussed in this study. Chatzitheodorou et al. (2019) conducted a literature review specifically examining this issue, its findings were that most of the research mainly focuses on comparing the performance of Socially Responsible Investment (SRI) with conventional investment strategies. The author argued that terms like "sustainable," "ethical," "environmental," and "social" have been invented to explain the motivation behind SRI. However, despite this diversity, these terms essentially revolve around a common definition, underlying the need to recognize the fundamental principles in the field of SRI research.

In the literature, authors agree that there are variations in their use, however, SRI definitions are consistent to the extent that they refer to the integration of non-financial

concerns, such as environmental, social or governance, into investments decisions (Guay et al., 2004; Arjaliès, 2010; Bilbao-Terol et al., 2016).

In the absence of a scientific community consensus regarding the definition of SRI, the broad definition proposed by Renneboog et al. (2008: 1723) will be used in this thesis. It states: "Unlike conventional types of investments, SRI apply a set of investment screens to select or exclude assets based on ecological, social, corporate governance or ethical criteria, and often engages in the local communities and in shareholder activism to further corporate strategies towards the above aims."

2.3   SRI and Theoretical Arguments

Socially responsible investments performance can be explained by a range of factors, whether positive or negative. However, it is essential to distinguish a Socially Responsible Company' (SRC) financial performance from SRI itself.

Indeed, a strong economic performance by an SRC does not necessarily guarantee positive results for SRI investments since its effectiveness is also influenced by management constraints linked to market dynamics (Lucas-Leclin, 2006). SRI typically takes the form of fund-type investments, which may include SRC among their holdings. These different sources of performance underline the need to make a clear distinction between them, as it impacts the conceptual framework this research could adopt.

2.3.1   Accounting-based: Theoretical foundations of socially responsible company's financial performance

Certain principles can explain the positive performance of SRCs. This is particularly true for the stakeholder theory developed by Freeman (1984). According to Igalens and Point (2009), "the stakeholder approach creates value". This argument can be verified in the case of shareholder activism. Indeed, through shareholders' pressure exerted on companies, change is possible to the latter's behaviour by orienting them towards the values they defend (Ryan & Schneider, 2002).

According to Yahchouchi (2007), the shareholder's direct engagement with the corporate governance structure, the influence they exercise in decision-making and their demand for prompt responsiveness, enable their preferences to be rapidly considered, thereby enhancing the company's economic performance.

According to Porter (1991), improving a company's environmental performance will also ultimately improve its economic performance through the development of better productivity. Thus, the more environmental regulations are introduced, the more they will generate additional costs, but the latter will be largely offset by improvements in production processes resulting from innovation efforts, ultimately improving productivity and therefore profitability.

As of Kurtz (2002) argues in his theory of "information effect", extra-financial rating can be interpreted as reflecting some control of risks facing the company. Therefore, companies that manage the most their socio-environmental stakes limit risks of labour or industrial unrests, liable to harm their image, and are so called ultimately to outperform their competitors. Conversely, companies neglecting shareholders' interests face an important risk of financial instability and investor capital withdrawal.

In contrast, some theories claim that taking Corporate Social Responsibility (CSR) into account in corporate strategy is damaging performance. According to Friedman in his book *Capitalism and Freedom* (1962) or in the article published in the *New York Times Magazine* (1970), its theories criticize corporate social responsibility advocates. In his view, there is no compatibility between SRI and profitability. He argues that the most sustainable form of social responsibility is one that aligns with increasing corporate profits. Taking social and environmental factors into account within a company's policies is believed to create extra external costs that need to be absorbed internally. Consequently, this is likely to lead to a decrease in the company's overall value and the value of its stocks. In this perspective, managers and shareholders find themselves in an agency relationship. Shareholders own the company's capital and assume the role of principals, while managing directors serve as agents with the responsibility of safeguarding the interests of the principals. If shareholders aim to pursue social objectives, it is suggested that they do so by using their own funds rather than relying on corporate social responsibility initiatives.

2.3.2 Market-based: Theoretical foundations of SRI financial performance

Critics of SRI base their arguments in modern portfolio theory introduced by Markowitz in 1952. They argue that SRI, due to its restrictions on investment selection and exclusion, reduces the available investment options and therefore limits diversification potential. According to this theory, a well-diversified portfolio is key to efficiency, however SRI often falls short in this regard. Thus, SRI is expected to yield lower returns compared to traditional investments, with SRI efficient frontier residing below Markowitz's frontier (Le Maux & Le Saout, 2004).

Clow's theory from 1999 aligns with this view, suggesting that SRI's selective approach tends to converge investments in fewer sectors, resulting in elevating risk while potentially diminishing profitability. Additionally, Rudd (1981) contends that introducing constraints to investment portfolios, such as social and environmental factors, may negatively impact their performance.

Furthermore, the "cost" theory is also associated with SRI into explaining its underperformance compared to conventional investments (Revelli & Viviani, 2013). According to Rudd (1981), every transaction carries costs, such as brokerage commissions or expenses tied to selecting or excluding specific blocks of shares. These costs are defined as "monitoring costs" (Luther et al.,1992). In simpler terms, SRI's filtering criteria tend to reduce the overall assets' liquidity in the long run. This means that each future transaction in the market can have a more significant impact. Furthermore, SRI often requires more complex and costly asset management due to the need for extensive research to determine if a asset aligns with SRI criteria. All these associated costs can ultimately diminish overall investment performance, as supported by several academics (Bauer et al., 2005; Barnett & Salomon, 2006; Luther et al., 1992; Tippet, 2001).

In contrast, SRI also benefits from theoretical contributions suggesting this type of investment can generate value and performance. According to the "learning effect", SRI initially underperforms conventional investments in the short term, but gradually narrows this gap in the medium term and ultimately surpasses it in the long term (Bauer et al., 2005, 2006). Thus, a longer investment horizon appears as a performance-enhancing factor for SRI (Cummings, 2000).

In addition, Dupré et al. (2009) introduced a framework that explores how SRI impact the financial performance of ethical stocks. The authors state that legislation and label emergence will enhance socially responsible investors to enter the market and drive the demand

and prices up for ethical stocks. This results in lower expected returns for those investors who prioritize ethics over profitability.

While socially responsible investors are willing to accept this trade-off, favouring ethics over profits, ethical companies benefit from reduced capital-raising costs thanks to higher stock prices. Therefore, it encourages them to implement "social compliance" programs.

Over time, the cost savings from lower capital expenses are balanced out by the expenses incurred in implementing social compliance efforts. This equilibrium ensures that SRI and conventional investments perform at a similar level, maintaining competitiveness in the market (Dupré et al., 2009).

2.4   SRI in France: Legislation and Market Size

The evolution of the French market provides interesting insights for this discussion. To better understand the characteristics of the French SRI market and evaluate the idea of SRI becoming more common in this context, this section presents a brief overview of the legislation and market size in France.

The French SRI market is among the most active on a worldwide scale (Arjaliès et al., 2022). As elaborated in the previous sections, SRI markets began to gain traction in the late 1990s and gradually became more popular. This shift was influenced by specific laws introduced by politicians and supported by trade unions. Furthermore, it is the involvement of three key players in the market that played a significant role in making SRI more mainstream: institutional investors (public pension funds), regulatory bodies, and market intermediaries (social rating agencies) (Arjaliès 2010; Crifo et al., 2019).

In 2016, the French introduced two public labels with the aim of certifying the quality of mutual funds available to retail consumers, particularly those falling under the category of Socially Responsible Investment (SRI). One of these labels, known as the *Energy and Ecological Transition for Climate Label*, formerly referred to as *TEEC*, is now recognized as *GREENFIN*, and is overseen by the French Ministry of Ecological and Solidarity Transition. This label is specifically dedicated to financial products with demonstrable environmental advantages, typically invested in sectors such as renewable energy and waste management. However, it is important to note that this research note does not explore into *Greenfin*-labeled funds. Instead, the focus is directed towards the second label introduced in 2016, the *SRI label*. It is overseen by the French Ministry of the Economy and Finance, it includes a broader range of ESG criteria managed and was initially launched to increase SRI products' visibility among

savers and private investors in France and Europe (Arjaliès et al., 2022). In order to earn this label, mutual funds have two options. They can either exclude 20% of their initial investment options based on specific ESG criteria, or they need to maintain an average portfolio's ESG rating that surpasses the benchmark index's rating used for assessing their financial performance (cf Arjaliès & Durand, 2019). The *SRI label* is granted for three years and undergoes regular certification audits by two independent organizations: Afnor Certification and Ernt and Young France, both accredited by COFRAC (a semi-public body that ensures the quality of labelling organizations across all sectors). They review applications from asset management companies, assess compliance with label criteria, and recommend any necessary technical changes. Promotion of the label is delegated to an organization led by the *Association Française de la Gestion Financière* (French Asset Management Association) and the *Forum pour l'Investissement Responsable* (Forum for Responsible Investment), responsible for fee collection from asset managers for label use (Arjaliès et al., 2022).

The *SRI label* imposes strict criteria for funds seeking its validation, they revolve around six pillars: (1) Fund's ESG objectives; (2) The methodology used by the management company to analyse and rate issuers; (3) Integration of ESG criteria in portfolio construction and management; (4) ESG engagement policy encompassing dialogue and voting with issuers; (5) Transparency; (6) Highlighting the positive contributions to sustainable economic development. Given the lack of standardization, it is difficult to precisely quantify the assets under SRI management. However, according to Novethic (2021), the French SRI Label is currently leading the European market both in terms of number of labelled funds and assets under management. Indeed, the French market is stronger than ever as it expanded from 309 billion € under management across 486 funds at the end of 2020 to 693 billion € across 749 funds at the end of 2021.

Nevertheless, despite the SRI market size noticeable growth, private investors in France do not seem to fully embrace this trend. Indeed, French people expressed interest in environmental, social, and ethical aspects when making investment decisions. However, as presented on the figure 2 below, according to a survey conducted by IFOP in 2021, 63% of French adults had never heard of socially responsible investments. Only a small group, accounting for nine percent of the overall survey sample (and ten percent of those with savings), were familiar with SRI and could define it accurately. It paradoxically denotes the unawareness of the SRI topic, its broadness, and a lack of definition among the French population.
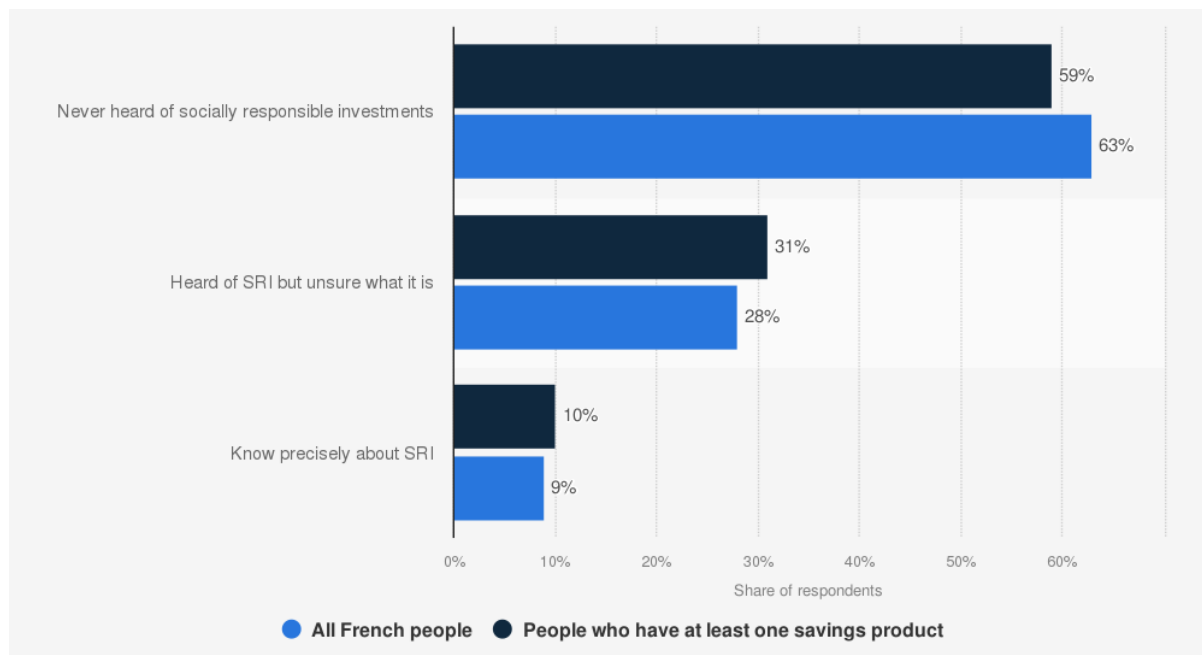
Figure 2: *Awareness of socially responsible investments among French respondents in 2021*

2.5   SRI Performance

Indeed, when examining the SRI financial performance in comparison to conventional funds, research results are mixed. The literature offers two main approaches for assessing SRI's financial performance. The first approach involves comparing SRI funds with conventional counterparts that share similar characteristics in terms of capitalization, time horizons, economic zones, and more. The second approach entails comparing the financial performance of SRI funds with the overall market using various models (AitElMekki, 2020).

In some studies, researchers employ regression analyses to identify factors influencing returns, including ethical concerns. These analyses often use one-, two-, or four-factor models, such as the Capital Asset Pricing Model (CAPM) proposed by Markowitz (1952). Fama and French (1993) expanded on CAPM by introducing two additional factors: size and book-to-market value. The Carhart model, building on the Fama-French model, adds a fourth factor capturing momentum, which measures the difference in returns between winning and losing investments over the past year (Carhart, 1997). To ensure a fair comparison between SRI and conventional funds, researchers must match them based on similar characteristics to minimize the impact of size or style differences when evaluating returns. Different methods exist for this purpose, changing in terms of performance measures and benchmark selection. Moreover, many studies employ multiple performance measures to assess SRI investments comprehensively.

Other researchers take a distinct approach but share the same goal. They employ metrics such as the Sharpe's ratio (1994), Jensen's alpha (1967).

Benchmark selection is a crucial aspect of performance assessment. In the world of market finance, it refers to sustainability indices, selection methodologies, and underlying benchmarks. Noticeable sustainability indices include the Dow Jones Sustainability Index (López et al., 2007), based in the United States, and the FTSE4Good Index in the United Kingdom (Collison et al., 2008, 2009; Brzeszczyński & McIntosh., 2020). The Domini 400 Social Index, also known as the KLD 400 Index, established by Kinder, Lydenberg & Domini, stands out as one of the most well-known social indices (Sauer, 1997). Introduced in 1990, this index holds the merit of being the first stock market index in the United States made to assess portfolio performance under the influence of several constraints such as religious and social criteria (Kurtz & di Bartolomeo, 2005).

3. Data

In this research, the aim is to analyse the performance of a portfolio consisting of socially responsible investment stocks listed on the French stock market, covering the period from early 2018 to mid-2023. The chosen French SRI companies have been have carefully selected from the renowned 'Global-100 Most Sustainable Corporations in the World' list, commonly referred to as the Global-100. This list has been launched in 2005 by Corporate Knights Inc., in collaboration with Innovest Strategic Value Advisors Inc. Its purpose is to offer a comprehensive classification of international socially responsible firms. Each year, the list is unveiled before the World Economic Forum (WEF) and is open to the public.

The companies featured on the Global-100 list are acknowledged for their commitment to sustainable practices, surpassing many peers and competitors in their industries, in effectively managing critical environmental, social, and governance factors.

According to the Global-100 list's official website its intended audience is very large, from investors seeking companies with enduring prospects, as well as community groups interested in establishing meaningful collaborations. But mostly importantly, it is also addressed to private investors to identify stocks to include in their SRI portfolios, making it a valuable resource for individual stock selection.

Below, Table 1 provides an annual breakdown of companies on the Global-100 rankings. The table highlights a declining trend in the presence of French stocks. For the portfolio construction in this study, only five French stocks have been selected: Schneider Electric SE, Dassault Systèmes SE, Kering, Sanofi, and BNP Paribas. These companies are distinctive in a way that they have successfully maintained their position on the Global-100 list since 2018, despite the decreasing representation of French stocks overall. This suggests that these companies have demonstrated a consistent ability to integrate environmental, social, and governance factors into their core values and management practices, and standout as the best SRI stocks within the studied period. As a matter of fact, Dassault Systemes was ranked as the world's most sustainable company in the 2018 Global-100, Schneider Electric SE also received this accomplishment in the 2021 Global-100 ranking. Moreover, Kering has been awarded the runner-up position in the 2019 Global-100 with its second position in the ranking.

The portfolio's chosen SRI stocks examined in this study come from various of industries. Although not every CAC40 industry sector is included in the portfolios, their distribution is relatively broad. Indeed, this is a relatively well sector-diversified portfolio with Schneider Electric SE representing the energy sector; Dassault Systemes SE representing the

aeronautics, aerospace, and defence sector; Kering representing the luxury sector; Sanofi representing the health & care sector; and BNP Paribas representing the financial & banking sector.

Table 1: *French companies figuring on the Global-100 ranking since 2018*

	2018	2019	2020	2021	2022	2023
Schneider Electric SE	X	X	X	X	X	X
Dassault Systèmes SE	X	X	X	X	X	X
Kering	X	X	X	X	X	X
Sanofi	X	X	X	X	X	X
BNP	X	X	X	X	X	X
Quadient					X	X
Société Générale						X
Alstom		X		X	X	
Legrand					X	
Rexel				X		
Valeo	X	X	X	X		
CNP Assurances				X		
bioMerieux	X	X	X			
L'Oreal	X	X	X			
Amundi	X	X	X			
Total		X				
Vivendi	X					
Television francaise 1	X					
Legrand	X					
AXA	X					
Renault	X					
Suez	X					
TOTAL	15	11	9	9	8	7

In this thesis, to compare the returns achieved by the SRI portfolio that has been created, two indexes will be used, the CAC40 and FTSE4GOOD, which are the commonly accepted benchmarks. In the first hand, the CAC 40, often referred to simply as the CAC, is a benchmark stock market index representing the top 40 companies listed on the Euronext Paris stock exchange. These companies are selected based on their market capitalization and liquidity. The CAC 40 provides valuable insights into the performance of the French stock market and is a widely tracked indicator for investors and financial analysts. It serves as a key reference point for assessing the overall health and trends of the French economy. On the other hand, the

FTSE4Good Index is a stock market index that evaluates and measures the performance of companies based on their ESG practices, making it an essential component of SRI. The index assesses how well these companies integrate ESG factors into their business operations and decision-making processes. Created by the Financial Times Stock Exchange (FTSE) Russell, the FTSE4Good Index is designed to provide investors, particularly those engaged in SRI, with a reference point for identifying and investing in companies that align with ethical and sustainability criteria. This index is recognized globally and serves as a valuable tool for socially responsible investors seeking to support businesses that prioritize ESG considerations in their strategies and practices.

4. Methodology

4.1 Context

As previously said, the Global-100 list has been used to construct the portfolio of SRI French stocks over the period from February 1St, 2018, to June 30th, 2023. Its return is compared with the returns of the indexes. The annual release of the Global-100 list takes place towards the end of January, just before the WEF conference. Considering this research, the first week of February 2018 has been retained as the starting date of the portfolio construction.

Given that the Global-100 is a list that does not rank its components like an index, an equal weighting for each stock in the portfolio has been applied. This study focuses on evaluating the performance of a portfolio that private investors could construct using openly accessible information from the Global-100 list. Considering that most individual investors may not engage in detailed assessments of stock sizes, market capitalization, and other complex factors, it is assumed that they would typically choose a straightforward, equally weighted portfolios.

Moreover, the date of stocks and indexes prices have been gathered through Yahoo Finance. It is important to note that the dividend data were also collected, and the dividend payments were included in the analysis of the SRI portfolios' performance. This means that only the adjusted close from the data collection will be used since it is assimilated to closing price after adjustments for all applicable splits and dividend distributions. Hence, data is adjusted using appropriate split and dividend multipliers. It is important to include this metric as SRI portfolios include dividend payments, and this is what investors holding them would experience and receive in reality, as an income from investing in these stocks.

4.2   Asset pricing models

Overall, this study applies linear regression models to compare the performance of a portfolio made of SRI stocks and different indexes. The used statistics models are well-established tools for performance measurement. In all models, the factor time, represented as T, will play an important role. In this research T=66 as the observed time period is from February 1st of 2018 until June 30th of 2023, being 66 months to examine.

Firstly, the Capital Asset Pricing Model (CAPM) will be used. This model is fundamental for evaluating the risk-return relationship. Introduced by Sharpe (1964), Lintner (1965), and Mossin (1966), it is based on Markowitz's Portfolio Theory (1952). CAPM links asset returns to their riskiness, with β measuring systematic risk compared to the market. The risk premium is β times the market risk premium. The CAPM equation is:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_i \left(R_{M,t} - R_{f,t} \right) + \varepsilon_{i,t}$$
$$t = 1,2,\dots,T$$

(1)

Here, R_i is the return over the risk-free rate R_f αi represents alpha (risk-adjusted abnormal return), and εi is the idiosyncratic return factor. Moreover, βi is being interpreted as the systematic (market) risk that cannot be eliminated through any diversification, R_M reflects the related market return, R_f is the risk-free rate. $(R_M - R_f)$ as a subtraction term can be interpreted as the excess market return of the risk-free rate.

While CAPM is widely used in the academic world, it has limitations: it assumes uniform investment periods and mean-variance optimal portfolios. It fails to integrate transaction costs, taxes, and assumes risk-free borrowing and lending, hence the need to use other models. Still, CAPM is valuable for investment decisions and evaluating expected returns (Bodie, et al., 2011).

Secondly, it will be the Fama-French three-factor model. This model is an extension of the relatively simple CAPM, aiming to capture additional factors, especially firm-specific ones, affecting systematic risk sensitivity (Fama & French, 1993). This model retains CAPM's core assumptions while introducing two more factors, which have significant explanatory power for stock returns and risk premium estimates.

In the Fama-French three-factor model, the single-factor CAPM is expanded by including additional variables and can be described in the following formula:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1 \left(R_{M,t} - R_{f,t} \right) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$$
$$t = 1,2, \dots, T$$

(2)

Here, the model incorporates three key factors being firm size, book-to-market values, and market return in excess of the risk-free rate. These factors are represented as Small Minus Big (SMB), High Minus Low (HML), and the portfolio's return minus the risk-free rate $(R_{M,t} - R_{f,t})$. SMB captures excess returns of small-cap portfolios versus large-cap portfolios, reflecting small stocks' impact. While HML, represents the excess return of a value stock portfolio compared to a growth-stock portfolio, based on book-to-market ratios. Moreover, β_2 and β_3 represent factor-mimicking portfolios (SMB) and (HML) respectively.

The Fama-French model incorporates these additional factors alongside the CAPM's systematic risk factor. While the first factor accounts for systematic risk from macroeconomic conditions, SMB and HML offer approximations for further variations in the model. While SMB and HML are not pure risk factors, they can be useful proxies for macroeconomic risk sensitivity within the model.

Lastly, the Carhart (1997) four-factor model will be used. This model is an expansion of the Fama-French three-factor model, since it adds the one-year momentum effect as a fourth factor. Momentum, discovered by Jegadeesh and Titman (1993), reveals that recent stock returns (3 to 12 months) tend to continue for the months. Thus, high returns follow high returns, especially in the short term. This factor is not explained by the CAPM or the three-factor model. The equation for the Carhart model is:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1 \left(R_{M,t} - R_{f,t} \right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{i,t}$$
$$t = 1,2, \dots, T$$

(3)

Here, its components are the same as before except for β_4 that represents the one-year momentum anomaly and MOM being the Monthly Momentum factor. It accounts for the tendency of higher returns to follow higher returns and vice versa for lower returns over 12

months. It is calculated as the average return on high prior return portfolios minus low prior return portfolios.

Carhart (1997) finds that momentum sensitivity is key in explaining funds' risk-adjusted abnormal returns and is widely used in empirical research on return performance (Bodie, et al., 2011).

For additional analysis purposes, three additional performance indicators will be used. The first one will be Jensen's alpha, to assess performance. This metric calculates an investment's risk-adjusted abnormal return, measuring how it exceeds the model-predicted return. It was initially introduced by Jensen (1967) for mutual fund performance analysis, it shows an investment's success when its return surpasses the model's prediction, resulting in a positive alpha. It was originally designed for portfolio manager evaluation, however it ss still widely used as a general performance indicator for portfolio investments (Bodie, et al., 2011). The formula of Jensen Alpha is as follows:

$$\alpha_p = R_p - [R_f + \beta_p(R_m - R_f)]$$ (4)

The second indicator is another commonly used measure called the Sharpe ratio. It offers an alternative approach to risk-adjusted performance evaluation. Unlike Jensen alpha, the Sharpe ratio measures excess return compared to the total risk through quantified return standard deviation. In other words, it reflects the reward-to-risk ratio (Sharpe, 1994). The Sharpe ratio can be mathematically expressed as follows:

$$SRp = \frac{(R_p - R_f)}{\sigma_p}$$ (5)

Another crucial metric incorporated in the analysis is the Treynor's ratio. Similar to the previously mentioned indicators, this ratio's purpose is also to measure the performance of a portfolio. However, its distinction lies in its approach.

Indeed, it focuses on measuring the excess returns derived for each unit of systematic risk, as opposed to the total risk of the Sharpe ratio. Jack Treynor was the first to introduce this metric as a tool for evaluating the performance of portfolio managers in the context of the risk they undertake (Treynor, 1965).

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It offers insights into the reward an investment provides for its beta risk, making it especially relevant for diversified portfolios. The Treynor's ratio can be mathematically expressed as follows:

$$T_p = \frac{(R_p - R_f)}{\beta_p} \qquad (6)$$

Here, Tp stands for the Treynor's ratio of the portfolio; Rp is the portfolio's return; Rf represents the risk-free rate; βp is the beta coefficient of the portfolio, representing its sensitivity to market movements. By deploying the Treynor's ratio alongside Jensen's alpha and the Sharpe ratio, this research ensures a comprehensive and multi-dimensional view into portfolio performance. This will allow us to better answer to the research question as since not just the returns will be explained but also the various risks associated with them.

4.3 Variables

Now that the pricing models have been introduced, it is important to detail the variables used in these models. To begin with, the dependent variables are examined, followed by a closer look at the explanatory or independent variables. This step is crucial since the variables mentioned previously have been incorporated into the econometric models, but their construction has not been explained yet.

Firstly, the dependent variable in the models represents the SRI stocks portfolio return, denoted as $R_{i,t}$. This variable is based on the excess return over the risk-free return, $R_{f,t}$, obtained from the Fama-French database, that is the main source of data for the variables. The risk-free return relies on weekly U.S. Treasury bill yields and is widely accepted as a suitable proxy thanks to its coverage of the largest and most significant financial market by market capitalization. As mentioned in the previous chapter, the adjusted closing prices is used to calculate returns, ensuring the consideration of dividend payments.

Secondly, various explanatory variables are used across the various models. The market premium, represented as R_M, is a common element in all models, and is used to indicate the excess market return over the risk-free rate (R_M -$R_{f,t}$). Additionally, multiple risk factors have been included to better understand returns' sensitivity to specific market parameters in the models. In the three-factor model, size and value factors are introduced. The four-factor model

incorporates a momentum factor. These factors are weekly-based in US Dollars and have also been extracted from the Fama-French database, that resulted from the research conducted by Fama and French (1993) and Carhart (1997).

In all regressions, autocorrelation and heteroscedasticity of the error term have been tested. Heteroscedasticity was never detected, so estimated parameters of the Fama–French and Carhart models are estimated using the ordinary least squares (OLS) method. In cases when there was autocorrelation in any of the models, relevant AR and/or MA terms has been used to fix it.

5. Results

To determine how the SRI stocks portfolio performs in comparison to traditional market benchmarks like the CAC40 and the FTSE4Good, this section details the findings. Three analytical models have been applied: the classic CAPM, the Fama-French three-factor, and the Carhart four-factor. Moreover, to also measure performance, Sharpe and Treynor ratios are used, which highlight the average returns and volatility. By examining these results, the purpose is to give French private investors a clearer picture of whether the SRI portfolio is a considerable option in their investment choices.

5.1 CAPM regression results

Table 2 presents an interesting look into the risk and return dynamics of the SRI portfolio through the prism of the CAPM. The table breaks down beta coefficients and other essential statistics, giving a detailed view of how the portfolio has performed when compared to the European and French market.

Table 2: Results of the Capital Asset Pricing Model (CAPM) regressions

Research Object	Alpha	$R_m\text{-}R_f$	R^2
Panel A: European market portfolio as R_m			
SRI portfolio	0.7658%**	0.9075***	0.7537
FTSE4Good	0.0599%	0.6313***	0.7206
CAC40	0.1530%	0.9041***	0.8221
Panel B: CAC40 as R_m			
SRI Portfolio	0.6319%**	0.9680***	0.8518
FTSE4Good	- 0.0287%	0.6651***	0.6651

Notes: **, and *** denote the significance at the 5%, and 1% levels, respectively

As detailed in the previous section of this research, the CAPM regression model primarily focuses on the relationship between a portfolio's excess returns and the excess returns of the market. Here, the alpha, commonly referred as the Jensen's alpha, represents the extra return over the risk-free rate, after accounting for the market risk, while the beta Rm−Rf gives an idea of the portfolio's sensitivity to overall market movements.

Results under the European market proxy are first examined. Regarding the SRI Portfolio, a significant alpha of 0.7658% at the 5% level is observed. This implies that the SRI portfolio has been able to achieve a return that surpasses what would be expected given its market risk exposure. With a market beta of 0.9075 (significant at the 1% level), the SRI portfolio appears to be closely correlated with the broader European market and moves quite closely to it. The adjusted R^2 of 0.7537 indicates that around 75.37% of the portfolio's return variance is explained by the model.

Now regarding the FTSE4Good portfolio, the alpha stands at 0.0599%, but it isn't statistically significant. This suggests that the FTSE4Good's returns align more closely with its inherent market risk. A significant market beta of 0.6313 suggests a less aggressive stance towards market movements compared to the SRI portfolio. Moreover, with an adjusted R^2 of 0.7206, around 72.06% of its performance variation can be attributed to market movements.

Finally, when looking at the CAC40, it presents a positive alpha of 0.1530%, but is not statistically significant. This portfolio also exhibits strong sensitivity to the broader market with a beta of 0.9041, significant at the 1% level. The adjusted R^2 here is 0.8221, suggesting that the model captures approximately 82.21% of the variance in CAC40's returns.

Results under the CAC40 index market proxy will be now examined. Regarding the SRI portfolio, it presents a significant alpha of 0.6319% at the 5% level. This suggests that it continues to offer superior returns for its level of market risk. With a market beta of 0.9680, it remains highly sensitive to market dynamics. An adjusted R^2 of 0.8518 denotes that the model explains a larger portion of the portfolio's return variations (85.18%).

Moving on to the FTSE4Good portfolio. Here, a slight negative alpha of -0.0287% is observed, which is not significant. Its market beta is 0.6651, and interestingly, the adjusted R^2 also matches this value, suggesting that about 66.51% of its variance is accounted for by market moves, which is less than for the SRI portfolio.

According to the performed CAPM regressions and its results, the SRI portfolio distinctly stands out in terms of performance. Its consistently positive and significant alpha, under both market proxies, indicates an ability to deliver returns that surpass what has been anticipated from its market risk alone and the models' predictions. As evidenced by the market beta values, the strong association with market movements indicates that the SRI portfolio's performance aligns well with broader market variations. Moreover, when comparing the portfolios, especially in relation to the European market portfolio, the SRI portfolio is the most performant, followed closely by the CAC40, with FTSE4Good being relatively more

conservative in its market movements. In order to deepen the analysis, Fama–French three-factor regressions have been performed, which the results are displayed below in table 3.

5.2   Fama – French regression results

Table 3 reveals the results of the Fama-French three-factor model, it includes the size and value factors allowing for a deeper and more explanatory analysis. The table shows how these additional components, when combined with the market premium, have an impact on the portfolios' returns.

Table 3: Results of the Fama–French three-factor regressions.

Research Object	Alpha	R_m-R_f	SMB	HML	R^2
Panel A: European market portfolio as R_m					
SRI portfolio	0.6158%	0.9662***	-0.5358***	-0.1307	0.7745
FTSE4Good	0.1459%	0.5847***	0.2020	0.2820***	0.7732
CAC40	0.0846%	0.9123***	-0.3950***	0.2373***	0.8680
Panel B: CAC40 as R_m					
SRI Portfolio	0.5304%**	1.0529***	-0.1148	-0.3787***	0.8983
FTSE4Good	0.1033%	0.6238***	0.4622***	0.1390**	0.8351

*Notes: **, and *** denote the significance at the 5%, and 1% levels, respectively*

As mentioned in the previous section of this research, the Fama-French three-factor model measure a portfolio's exposure not only to the general market risk but also to the size and value factors. Here are the results.

Results under the European market proxy are first examined. Regarding the SRI portfolio, it displays an alpha of 0.6158%, suggesting a clear outperformance, however it is not statistically significant. Its market beta value stands at 0.9662, which reveals its high sensitivity to the European market's movements and is significant at the 1% level. The portfolio displays a notable preference for larger companies as reflected by its negative and statistically significant SMB factor of -0.5358. Although the HML factor is -0.1307, indicating a potential growth stock preference, is not statistically significant. Moreover, as evident from its adjusted R^2, the model comprehensively explains around 77.45% of the portfolio's returns, indicating a slightly better model fit with the introduction of the size and value factors.

Now regarding the FTSE4Good portfolio, its alpha of 0.1459%, showing a good outperformance, is not statistically significant. With a statistically significant (1%) beta value

of 0.5847, the portfolio seems to be less influenced by the broader European market than the SRI portfolio. The positive SMB value of 0.2020, although not significant, indicates a potential preference towards smaller companies. However, the portfolio's positive HML factor of 0.2820, significant at 1%, clearly underscores its preference for value stocks. Moreover, the model explains approximately 77.32% of the portfolio's returns, also indicating a slightly better model fit.

Finally, when looking at the CAC40, it displays an alpha of 0.0846% that is also not significant. Its strong beta of 0.9123, significant at the 1% level, indicates its alignment with the European market. The negative and significant SMB factor of -0.3950 suggests a preference for larger companies. Moreover, with its positive and significant HML value of 0.2373, it suggests a clear preference for value stocks, and the model explains around 86.80% of its variability in returns.

Results under the CAC40 index market proxy will be now examined. Regarding the SRI portfolio, it displays a significant alpha of 0.5304%, highlighting its potential to outperform the market after adjusting for risk factors. It has a beta of 1.0529, suggesting it' is rather more volatile when compared to the CAC40. The SMB factor stands at a not significant -0.1148, making it unclear about its size preference. On the other hand, the significant negative HML factor of -0.3787 indicates a distinct growth stock preference. Moreover, the model strongly explains about 89.83% of its returns, indicating the best model fit yet.

Moving on to the FTSE4Good portfolio. It registers a non-significant alpha of 0.1033%. With its beta at 0.6238, it relatively aligns with the CAC40's movements. Through its significant positive SMB factor of 0.4622, it has a clear preference for smaller companies. On the other hand, its positive and significant HML factor of 0.1390 demonstrates a value stock preference. Moreover, this model depicts around 83.51% of the portfolio's return variability, indicating a very strong model fit.

This analysis under the Fama-French three-factor model adds more depth compared to the CAPM. This new model unveiled the SRI portfolio's preference for bigger firms and its preference towards growth stocks. From the European market perspective, the SRI portfolio shows interesting traits, indeed, it displays the highest alpha even though it is not significant, it also shows the strongest correlation with the highest market beta. Under the CAC40, the SRI portfolio's performance looked even more compelling, especially with its strong statistically significant alpha. Between the two regression models, the three-factor model provides a clearer image, capturing aspects the CAPM might miss. As a result, the SRI portfolio's significant alpha

and the highest adjusted R^2 justify for its superior risk-adjusted performance and remain the best portfolio.

In order to deepen even more this research, the analysis is repeated using the Carhart four-factor model to evaluate the explanation power of the momentum factor to returns. The results are presented in table 4 below.

5.3   Carhart regression results

Table 4 reveals the results of the Carhart four-factor model, it includes the momentum factor allowing for an even deeper and more explanatory analysis. The table shows how this additional component, when combined with the market premium, size and value factors have an impact on the portfolios' returns.

Table 4: Results of the Carhart four-factor regressions.

Research Object	Alpha	R_m-R_f	SMB	HML	MOM	R^2
Panel A: European market portfolio as R_m						
SRI portfolio	0.8029%**	0.8679***	-0.4446**	-0.2408**	-0.2635**	0.7855
FTSE4Good	0.2181%	0.5467***	0.2372	0.2395***	-0.1017	0.7737
CAC40	0.2281%	0.8369***	-0.3251**	0.1529*	-0.2020**	0.8754
Panel B: CAC40 as R_m						
SRI Portfolio	0.5777%**	1.0272***	-0.1032	-0.3995***	-0.0640	0.8974
FTSE4Good	0.1030%	0.6240***	0.4621***	0.1391**	0.0005	0.8323

*Notes: *, **, and *** denote the significance at the 10%, 5%, and 1% levels, respectively*

Diving deeper into the analysis of the portfolios' performance, the Carhart four-factor model is used as an extension of the earlier Fama-French three-factor model. As introduced previously in this research, by incorporating momentum, represented by the MOM factor, this model seeks to capture the persistence in stock performance, both in terms of outperforming and underperforming stocks. This additional layer of analysis aims to provide a more comprehensive understanding of the factors driving the returns of the selected portfolios. Through this lens, not only the portfolios' sensitivities to market movements, size, and value-growth dimensions are assessed but also their alignment with prevailing momentum trends in the market.

Results under the European market proxy are first examined. Regarding the SRI portfolio, a strong alpha of 0.8029% is observed, statistically significant at the 5% level, meaning that after accounting for market risks, the portfolio consistently delivers an extra monthly return of 0.8029% above the expected model. Its market beta of 0.8679, significant at the 1% level, denotes the portfolio's strong sensitivity to the European market. As indicated by the negative coefficients for both SMB (-0.4446) and HML (-0.2408), both significant at the 5% level, it suggests that the portfolio leans towards larger and more growth-oriented stocks. Additionally, the negative MOM value of -0.2635, also significant the 5% level, implies the portfolio might not heavily focus on stocks that recently performed well. Moreover, the adjusted R^2 of 0.7855 emphasizes that a considerable portion of the portfolio's variance is explained by the model, indicating its best model fit for the European market proxy yet.

Now regarding the FTSE4Good portfolio, it displays a positive alpha of 0.2181%, but it is not statistically significant. Its market beta of 0.5467, statistically significant at the 1% level, confirms its alignment with broader market movements. The positive HML value of 0.2395 indicates an inclination towards value stocks, whereas the SMB and MOM factors do not seem to have a major impact on its returns since there are statistically unsignificant. Moreover, the adjusted R^2 of 0.7855 also emphasizes that a considerable portion of the portfolio's variance is explained by the model.

Finally, when looking at the CAC40, it displays an alpha of 0.2281%, but it is not significant. Its market beta stands at 0.8369, significant at the 1% level, revealing a close tie with broader market swings. Its SMB coefficient is negative with a value of -0.3251, denoting a preference for larger firms and is significant the 5% level. The positive HML coefficient with a value of 0.1529, indicates a slight inclination towards value stocks but is significant at the 10% significance level. The negative momentum coefficient with a value of -0.2020, significant at the 5% level, suggests that the portfolio does not benefit from prevailing momentum trends. Moreover, the adjusted R^2 of 0.8754 is strong, indicating the model effectively captures the portfolio's return variations.

Results under the CAC40 index market proxy will be now examined. Regarding the SRI portfolio, it shows a significant alpha of 0.5777%, at the 5% level, confirming its capacity to outperform the model on a risk-adjusted basis. With a market beta of 1.0272, significant at the 1% level, this portfolio is very reactive to CAC40 movements, even more than when compared to the European market proxy. While the SMB factor is not statistically significant, meaning no clear small or large firm preference, the portfolio clearly leans towards growth stocks with a significant negative HML coefficient of -0.3995 at the 1% level. Momentum doesn't appear

to play a significant role. The adjusted R^2 of 0.8974 indicates a strong explanatory power of the model for the portfolio's returns when the CAC40 is the market proxy.

Moving on to the FTSE4Good portfolio. It shows a non-significant Jensen's alpha of 0.1030%. It demonstrates a notable market sensitivity, with a beta of 0.6240 that is significant at the 1% level. Given the strong SMB coefficient of 0.4621, significant at the 1% level, a preference towards smaller firms is distinguished. The HML coefficient of 0.1390, is significant at the 5% level and suggests a slight value stock preference. The momentum factor is practically zero with a value of 0.0005, and is not statistically significant, indicating no clear momentum trend orientation. The adjusted R^2 of 0.8323, denotes that a significant portion of the portfolio's return variance being explained by the model.

This final Carhart four-factor model regression analysis confirms what has been previously observed. When comparing the portfolios, the SRI portfolio consistently stands out in terms of performance. It showcases a positive and significant alpha under both market proxies, emphasizing its ability to outperform expectations even when accounting for typical market risks. The strong correlation with broader market trends, combined with its preferences towards larger and growth-oriented stocks, play an essential role in its performance. Indeed, whether the European market portfolio or the CAC40 as a market proxy is used, its performance remains strong. This highlights the SRI portfolio as the most performant among the three, especially when evaluated against the European market portfolio.

This marks the end of the regressions' analysis. The portfolios' performance using three regression models has been explored, through the CAPM, the Fama-French three-factor model, and the Carhart four-factor. Each of them provided more and more insights into the dynamics of the portfolios. To begin with, under the CAPM analysis, the SRI portfolio displayed a strong and significant positive alpha when compared to the European market proxy as well as under the CAC40 market proxy. This suggests a strong potential for superior risk-adjusted returns. Moving on to the Fama-French three-Factor model. This model added the size and value factors, hence deepening this research. Once again, the SRI portfolio continued to stand out, especially with its preference for larger firms and growth-oriented stocks. Moreover, when using the CAC40 as market proxy, the SRI portfolio's alpha became even more compelling, reinforcing the CAPM's findings. Finally, this analysis has been completed with the Carhart four-Factor model, which introduced momentum as an additional factor, the SRI portfolio again took the spotlight. It consistently demonstrated the highest and strongest ability to generate excess returns over the predictive models while maintaining a solid correlation with the market

proxy. It also displayed a slight avoidance of small cap stocks and expressed a clear growth preference.

When it comes to know what the best market proxy is in order to examine the SRI portfolio's performance, a closer look at the adjusted R^2 is needed. The SRI portfolio showed higher explanatory power when the CAC40 was used as the market proxy, especially in the Fama-French and Carhart models. Thus, for the analysis, the CAC40 appears to be a slightly more fitting market proxy than the European market portfolio. In conclusion, across all regression models, the SRI portfolio consistently appears as the most performant, especially when paired with the CAC40 as the market proxy. Its ability to deliver superior risk-adjusted returns and its distinct behaviours, like growth stock preference, set it apart. In order to deepen this and confirm these findings, the results of the Sharpe and Treynor ratios are presented in the table 5 below.

5.4   Returns, Risks, Sharpe and Treynor ratios.

Table 5 provides a comparative performance analysis of the SRI portfolio against the benchmarks of the CAC40 and FTSE4Good indexes, listing key measures such as average yearly returns, standard deviations, Sharpe ratios, and Treynor ratios.

Table 5: Average Annual returns, average standard deviations, Sharpe ratios and Treynor ratios of CAC40, SRI portfolio and FTSE4Good using monthly returns.

Research Object	Avg. Annual Return	Avg. Standard Deviation	Sharpe Ratio	Treynor Ratio
CAC40	8.43%	19.00%	0.404	0.077
SRI Portfolio	16.64%	19.89%	0.799	0.164
FTSE4Good	5.70%	14.13%	0.351	0.075

Considering the decision to focus on the French market and utilize the CAC40 as the optimal market proxy, it was essential to adopt an appropriate risk-free rate that aligns with this context. Hence, the French 10-year treasury bonds served as the most suitable reference, being widely regarded as a standard for risk-free returns in the country. Over the period of examination, the average yield of these bonds was computed to be 0.749%. This rate reflects the prevailing economic conditions in France and offers a pertinent benchmark against which the portfolios' performances can be measured.

The results obtained will be now analysed. Starting with the CAC40, being the French market benchmark and the market proxy, has displayed an average annual return of 8.43%. This return, considering an annual standard deviation of 19.00%, also reveals a certain level of volatility. The Sharpe Ratio of 0.404 suggests that for every unit of total taken, the CAC40 generated a risk-adjusted excess return of 0.404 units over the risk-free rate. Moreover, when observing the Treynor Ratio, which stood at 0.077, it highlights the CAC40's ability to deliver return per unit of systematic risk. Given its beta of 1, this suggests that the market risk is well priced into the CAC40's return.

Moving on to the SRI portfolio, it appeared to be a remarkable rival with an average annual return of 16.64%. This return becomes more significant when compared to its annual standard deviation of 19.89%, only slightly higher than the CAC40. With a Sharpe Ratio of 0.799, the SRI portfolio not only outperforms the CAC40, but it also implies that for each unit of total risk, the portfolio achieved nearly double the risk-adjusted excess return over the risk-free rate than the CAC40. Its Treynor Ratio at 0.164 confirms its superior performance, displaying its ability to reward investors with higher returns for each unit of systematic risk, as compared to both the CAC40 and the FTSE4Good.

Lastly, the FTSE4Good displayed a lower average annual return of 5.70%. Its lower volatility, signified by the annual standard deviation of 14.13%, positions it as the least risky among the three. However, its Sharpe Ratio of 0.351 implies a lower risk-adjusted excess return over the risk-free rate per unit of total risk compared to the SRI portfolio and closely mirroring the CAC40. The Treynor Ratio of 0.075 explains that despite its lower market risk, its ability to provide returns for that market risk is relatively the same when compared with the CAC40.

When interpreting the Sharpe and Treynor ratios, the SRI portfolio, once again, stands out as the best choice for a private French investor, presenting unmatched risk-adjusted returns. In contrast to both the CAC40 and the FTSE4Good, the SRI portfolio consistently illustrates a superior ability to offer its investors optimal returns for the risk taken, whether total or systematic.

6. Discussion

The research question sought to understand whether a French investor can outperform conventional indexes with a portfolio constituted of SRI stocks selected with openly available information and ESG criteria. These findings, as detailed in the results section, indicate that the SRI portfolio, constructed from the best French companies figured in Global-100 ranking since 2018, revealed an outperformance when compared to traditional market benchmarks like the CAC40 and the FTSE4Good. This has been achieved through using various analytical models, including the standard CAPM, the Fama-French three-factor, and the Carhart four-factor. Moreover, performance was also measured using the Sharpe and Treynor ratios.

When it comes to theoretical relevance, historically, ethical considerations in investment practices have been influenced by various religious and philosophical traditions, from ancient Rome to the foundational rules laid down in religious texts. The modern interpretation of SRI has evolved to incorporate ESG factors, with definitions consistently referring to the integration of non-financial concerns into investment decisions (Guay et al., 2004; Arjaliès, 2010; Bilbao-Terol et al., 2016). As a matter of fact, this study contributes to the ongoing debate in the literature regarding the financial profitability of SRI. The "doing well by doing good" perspective suggests that robust ESG risk management in SRI can positively influence performance. These findings support this theory, meaning that the integration of ESG criteria in portfolio construction not only preserves but can enhance returns. This view challenges the "whatever is better is worth a premium" theory, which posits that non-financial screens might reduce diversification and negatively impact performance.

To go deeper into the theoretical relevance, the "information effect" theory proposed by Kurtz (2002) is underlined. Indeed, it suggests that companies effectively managing their socio-environmental stakes can outperform their competitors. These findings support this theory, suggesting that the integration of ESG criteria can generate outperformance. This view challenges the critics of Friedman (1962, 1970), who argue against the compatibility of SRI and profitability. Indeed, some critics of SRI, base their arguments on the Markowitz's modern portfolio theory, arguing that because of its restrictions on investment selection, it reduces the diversification potential. They argue that a well-diversified portfolio is key to efficiency, but SRI often falls short in this regard (Le Maux & Le Saout, 2004). This research counters this view, demonstrating that SRI portfolios can achieve diversification without compromising on returns.

Moreover, these findings support the theory of Dupré et al. (2009), which explored the influence of ethical ratings on the evolution of stock prices. Their work underscores the potential impact of ethical considerations on financial performance. This research builds upon this foundation by examining the performance of an SRI portfolio in the French context. Once again, evidence has been found that the integration of ESG criteria in portfolio construction can increase the performance, hence supporting the findings of Dupré et al. and adding empirical evidence to the theory. Finally, this study contributes to the understanding of national SRI variations by examining the French market structure and legislation. This study adds a regional dimension to the global field of research on SRI, underlining the importance of understanding region-specific nuances in socially responsible investing.

The findings' contribution to practice will now be elaborated. Firstly, among the complex world of investment, this research shines a light on the potential of SRI. Historically, investors have struggled with the balance between ethics and returns. These findings prove that investors, more specifically private French investors, no longer have to face this balance. It has been observed that SRI portfolios can not only challenge but outperform conventional benchmarks, offering investors a pathway to align financial goals with ethical beliefs.

Secondly, financial institutions can gain valuable insights from these findings. As the demand for ethical investment options rises, institutions armed with knowledge about the performance's capability of SRI portfolios are at a turning point. They can tailor their offerings and advisory services to attract a broader clientele and gain advantage in this growing segment.

Lastly, policymakers and regulators can't ignore the rising popularity of SRI. This research underscores the potential of SRI not just as an ethical choice but also as a financially and performant one. This could support the actual policies and encourage the integration of ESG factors into mainstream investment practices.

In conclusion, this research not only answers to the research question but also offers significant contributions to both theory and practice. By linking the findings to the existing literature, a comprehensive understanding of the performance of SRI portfolios is provided, thereby enriching the academic literature, and offering practical insights for many stakeholders just as private investor, financial institutions, and policymakers.

7. Conclusion

Throughout this study, the analytical research aimed at understanding the complicated nature of socially responsible investments within the French market, with a specific focus on private investors. The investigation began with the historical evolution of SRI, tracing its roots from religious and philosophical traditions to its modern-day significance. This study's primary objective was to discern whether a French investor could outperform conventional indexes with an SRI stocks portfolio created with publicly available information and ESG criteria.

The importance of this study is reinforced by the rapid expansion of socially responsible investing (SRI) on a worldwide scale. This research offers valuable insights into the complex relationship between ethical concerns and financial decisions, particularly within the French market. Despite the expansive literature on SRI, a clear gap exists, particularly about the French private investor. This study aims to bridge that gap by providing a comprehensive focus to the French investment landscape.

It is important to underline that the findings affirmatively suggest that it is indeed possible for private French investors to achieve superior performance compared to traditional indexes with publicly available information and ESG criteria. This insight brings several implications and contributes both theoretically and practically. On a theoretical hand, the research improves the existing body of SRI literature, offering fresh perspectives on the SRI performance dynamics within the French context. On the Practical hand, the findings serve as a valuable resource for private investors, financial institutions, and policymakers. This study underscores the potential of SRI portfolios to offer competitive returns, paving the way for its broader acceptance in mainstream investment practices.

While this research offers a deep analysis into the dynamics of SRI within the French market, it is limited by certain constraints. Indeed, the SRI portfolio, is constructed from a select five stocks from the Global-100 ranking, however, it may not include the full spectrum of SRI's potential. Moreover, the geographical lens of this study, focused on the French market and benchmarked against the CAC40 and FTSE4Good, provides a very specific context. This focus might limit the generalization of the findings on a more global scale. Additionally, the time frame of this study, spanning 66 months, offers a glimpse of SRI's performance. This period, though considerable, might not reflect potential long-term trends or the impact of cyclical dynamics intrinsic to the investment world.

Following these limitations, the world of SRI presents great potential for future research. Indeed, investigating the performance dynamics of a more diversified SRI portfolio could reveal other risk and return configurations, offering a more complete understanding of SRI's potential. Moreover, comparative research across different global markets could reveal regional SRI nuances, providing a more comprehensive perspective on its challenges and opportunities. Additionally, longitudinal studies that would extend this study's time frame, could research into the long-term viability of SRI, especially in a context of major economic or regulatory changes. Lastly, the interplay between emerging technologies, like artificial intelligence and data analytics, and their hypothetical role in optimizing portfolios in the financial world, presents a promising perspective for future research.

In conclusion, this study provides evidence of the SRI's upside potential within the French market. As the lines between ethics and investment continue to blur, research like this become crucial as it guides investors towards a future where financial returns harmoniously coexists with ethical considerations.

References

AitElMekki, O. (2020). Is socially responsible investment outperforming conventional investment or not? A meta-analysis. *American Journal of Industrial and Business Management, 10*(11), 1760-1784. https://doi.org/10.4236/ajibm.2020.1011110

Alim, E. A. (2014). Global Leaders in Islamic Finance: Industry Milestones and Reflections. *Hoboken, NJ: John Wiley & Sons*.

Ariff, M., & Iqbal, M. (2011). The Foundations of Islamic Banking: Theory, Practice and Education. *Cheltenham: Edward Elgar Publishing*. https://doi.org/10.4337/9781849807937

Arjaliès, D. L., & Durand, R. (2019). Product categories as judgment devices: The moral awakening of the investment industry. *Organization Science*, *30*(5), 885-911.

Arjaliès, D. L., Chollet, P., Crifo, P., & Mottis, N. (2023). The motivations and practices of impact assessment in socially responsible investing: the French case and its implications for the accounting and impact investing communities. *Social and Environmental Accountability Journal*, *43*(1), 1-29.

Arjaliès, D.-L. (2010). A social movement perspective on finance: How sociallresponsible investment mattered. *Journal of Business Ethics, 92*, 57-78. https://doi.org/10.1007/s10551-010-0634-7

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.

Bauer, R., Koedijk, K., & Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. *Journal of Banking and Finance, 29*, 1751-1767.

Bauer, R., Otten, R., & Tourani-Rad, A. (2006). Ethical investing in Australia: Is there a financial penalty? *Pacific Basin Finance Journal, 14*, 33-48.
Bengtsson, E. (2008). A history of Scandinavian socially responsible investing. *Journal of Business Ethics, 82*(4), 969-983.

Bernstein, C. (2020). Performance comparison of sustainable and conventional exchange traded funds for German private investors.

Bilbao-Terol, A., Arenas-Parra, M., Cañal-Fernández, V., & Bilbao-Terol, C. (2016). Multi-criteria decision making for choosing socially responsible investment within a behavioral portfolio theory framework: A new way of investing into a crisis environment. *Annals of Operations Research, 247*, 549-580.

Bodie, Z., Kane, A. & Marcus, A. J. (2011). *Investments and Portfolio Management*. New York: McGraw-Hill.

Brzeszczyński, J., & McIntosh, G. (2014). Performance of portfolios composed of British SRI stocks. *Journal of Business Ethics, 120*, 335–362. https://doi.org/10.1007/s10551-012-1541-x

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance, 52*(1), 57-82.

Cengiz, C.-B., Braun, D. & Nitzsch, R. v. (2010). Alpha-Vehikel oder Preis für das gute Gewissen? Eine Performanceanalyse ethischer Investments. *Corporate Finance Biz, 1*(1), 263-271.

Chatzitheodorou, K., Skouloudis, A., Evangelinos, K., & Nikolaou, I. (2019). Exploring socially responsible investment perspectives: A literature mapping and an investor classification. *Sustainable Production and Consumption, 19*, 117-129. https://doi.org/10.1016/j.spc.2019.03.006

Clow, R. (1999). Money that grows on trees. *Institutional Investor, 33*(10), 212-215.

Collison, D. J., Cobb, G., Power, D. M., & Stevenson, L. A. (2008). The financial performance of the FTSE4Good Indices. *Corporate Social Responsibility and Environmental Management, 15*(1), 14-28. https://doi.org/10.1002/csr.144

Collison, D., Cobb, G., Power, D., & Stevenson, L. (2009). FTSE4Good: Exploring its implications for corporate conduct. *Accounting, Auditing & Accountability Journal, 22*(1), 35-58. https://doi.org/10.1108/09513570910923006

Crifo, P., & Mottis, N. (2016). Socially responsible investment in France. *Business & Society, 55*(4), 576-593.

Crifo, P., Durand, R., & Gond, J. P. (2019). Encouraging investors to enable corporate sustainability transitions: The case of responsible investment in France. *Organization & Environment*, *32*(2), 125-144.

Cummings, L. S. (2000). The financial performance of ethical investment trusts: An Australian perspective. *Journal of Business Ethics, 25*(1), 79-92.

Déjean, F., Giamporcaro, S., Gond, J.-P., Leca, B., & Penalva-Icher, E. (2013). Mistaking an emerging market for a social movement? A comment on Arjaliès' social-movement perspective on socially responsible investment in France. *Journal of Business Ethics, 112*, 205-212.

Dupré, D., Girerd-Potin, I., Jimenez-Garces, S., & Louvet, P. (2009). Influence de la notation éthique sur l'évolution du prix des actions. *Revue Économique, 60*, janvier.

Duttweiler, R. (2011). Managing Liquidity in Banks: A Top down Approach.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, *33*(1), 3-56.

Fama, E. F., & French, K. R. (1993). *Multifactor Explanations of Asset Pricing Anomalies*. *The Journal of Finance, 51*(1), 55-84.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach* (1st ed.). Boston: Pitman.

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.

Friedman, M. (1962). *Capitalism and Freedom*. University of Chicago Press, Chicago.

Friedman, M. (1970). *«The Social Responsibility of Business is to Increase Its Profits», The New York Times Magazine*, 13th September.

Fung, H. G., Law, S. A., & Yau, J. (2010). *Socially responsible investment in a global environment*. Edward Elgar Publishing.

Global-100 resources. (2023). https://www.corporateknights.com/resources/global-100/

Guay, T., Doh, J. P., & Sinclair, G. (2004). Non-Governmental Organizations, Shareholder Activism, and Socially Responsible Investments: Ethical, Strategic, and Governance Implications. *Journal of Business Ethics*, 52, 125-139. https://doi.org/10.1002/9781119206415

IFOP. (September 28, 2021). Awareness of socially responsible investments (SRI) among French respondents in 2021 [Graph]. In *Statista*. Retrieved August 16, 2023, from https://www-statista com.kedge.idm.oclc.org/statistics/415659/awareness-socially-responsible-investments-france/

Igalens, J., Point S., *Vers une nouvelle gouvernance des entreprises : l'entreprise face à ses parties prenantes*. Dunod, Paris, 2009, 211 pages.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of finance*, *48*(1), 65-91.

Jensen, M. C. (1967). The Performance of Mutual Funds in the Period 1945-1964. *Journal of Finance, 23*(2), 389-416.

Kirchhoff, K. R. (2008). *Investor Relations*. In A. Habisch, M. Neureiter, & R. Schmidpeter (Eds.), *Handbuch Corporate Citizenship: Corporate Social Responsibility für Manager* (pp. 109-116). Berlin: Springer. https://doi.org/10.1007/978-3-540-36358-3_7

Kurtz, L. (2002). *Studies in the Field of SRI Investing. Working Paper sristudies.org*.

Kurtz, L., & diBartolomeo, D. (2005). The KLD Catholic Values 400 Index. *The Journal of Investing, 14*, 101-104. https://doi.org/10.3905/joi.2005.580556

Le Maux, J., & Le Saout, E. (2004). La performance des indices socialement responsables: mirage ou réalité?. *Revue Sciences de Gestion, 44*, 51-79.

Lintner, J. (1965). Security prices, risk, and maximal gains from diversification. *The journal of finance*, *20*(4), 587-615.

López, M. V., Garcia, A., & Rodriguez, L. (2007). Sustainable development and corporate performance: A study based on the Dow Jones Sustainability Index. *Journal of Business Ethics, 75*, 285-300. https://doi.org/10.1007/s10551-006-9253-8

Louche, C., & Lydenberg, S. (2006). Socially responsible investment: Differences between Europe and United States. *Vlerick Leuven Gent Working Paper Series, 22*, 1-37.

Lucas-Leclin, V. (2006). Qu'apporte l'analyse ISR à l'analyse financière. *Revue d'Économie Financière*, n° 85, avril.

Luther, R. G., Matatko, J., & Corner, D. C. (1992). The investment performance of UK ethical unit trusts. *Accounting, Auditing and Accountability Journal, 5*(4), 57-70.

Luther, R. G., Matatko, J., & Corner, D. C. (1992). The Investment Performance of UK Ethical Unit Trusts. *Accounting, Auditing and Accountability Journal*, 5(4), 57-70.

Markowitz, H. (1952). *Portfolio Selection*. *Journal of Finance, 7*(1), 77-99.

Mossin, J. (1966). *Equilibrium in a Capital Asset Market*. *Econometrica, 34*(4), 768-783.

Novethic. (2021). Market data labels durables Europe. Retrieved from https://www.novethic.fr/fileadmin/user_upload/tx_ausynovethicetudes/pdf_complets/Novethic_MarketData_LabelsDurablesEurope_2021-09-30.pdf

Porter, Michael E. (1991). *American's Green Strategy*. *Scientific American, 264*(4), avril.

Puaschunder, J. M. (2016). *Socially Responsible Investment as emergent risk prevention and means to imbue trust in the post-2008/2009 world financial crisis economy*. In Routledge handbook of social and sustainable finance (pp. 222-238). Routledge.

Renneboog, L., Ter Horst, J., & Zhang, C. (2008). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking & Finance, 32*(9), 1723-1742. https://doi.org/10.1016/j.jbankfin.2007.12.039

Revelli, C., & Sentis, P. (2012). L'investissement socialement responsable diffère-t-il vraiment de l'investissement conventionnel? *La Revue des Sciences de Gestion, 255-256*, 85-95. https://doi.org/10.3917/rsg.255.0085

Revelli, C., & Viviani, J.-L. (2013). The Link Between SRI and Financial Performance: Effects and Moderators. *Management international / International Management / Gestiòn Internacional, 17*(2), 105–122. https://doi.org/10.7202/1015403ar

Rudd, A. (1981). Social responsibility and portfolio performance. *California Management Review, 23*(3), 55-61.

Ryan, L., V., & Schneider, M., (2002). The Antecedents of Institutional Investor Activism. *Academy of Management Review, 27*(4), 554-573.

Sauer, D. A. (1997). The impact of social-responsibility screens on investment performance: Evidence from the Domini 400 Social Index and Domini Equity Mutual Fund. *Review of Financial Economics, 6*, 137-149. https://doi.org/10.1016/S1058-3300(97)90002-1

Schueth, S. (2003). Socially Responsible Investing in the United States. *Journal of Business Ethics, 43*(3), 189-194.

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance, 19*(3), pp. 425-442.

Sharpe, W. F. (1994). The Sharpe Ratio. *The Journal of Portfolio Management, 21*(1), p. 49–58.

Tippet, J. (2001). Performance of Australia's ethical funds. *The Australian Economic Review, 34*(2), 170-178.

Treynor, J. L. (1965). How to rate management of investment funds. *Harvard Business Review*, 43(1), 63-75.

Yahchouchi G. (2007) Valeur ajoutée par les parties prenantes et création de valeur et création de valeur de l'entreprise. *La Revue des Sciences de Gestion, 2007*, n° 224-225, p. 85-92.