



SCHOOL OF ECONOMICS AND MANAGEMENT

Is there a performance trade-off by choosing sustainable?

A quantitative study of funds tradable on OMX Stockholm

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ABSTRACT

This paper investigates the performance differences between sustainable and unsustainable funds, measured by ESG rating, over the time period of January 2006 to December 2020 on OMX Stockholm. It also sheds light on the performance differences between unsustainable funds and unsustainable funds claiming to be sustainable, i.e. greenwashers. The paper uses Fama and French five-factor model and time series data to extend previous research within fund performance and ESG screening, and furthermore exposes greenwashing problems in the fund investment industry. The paper finds evidence that there exists a performance trade-off by investing in sustainable funds and furthermore finds no evidence that greenwashing funds perform differently from their ESG-peers. The study, furthermore, generates indications of the advantages that greenwashing funds obtain, compared to unsustainable and sustainable funds, by marketing themselves as sustainable

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1. INTRODUCTION

The introduction provides information about sustainability trends, relative fund performance and the paper's research objectives. It, furthermore, gives a brief explanation of previous research and the findings of the study before outlining the remainder of the paper.

In the making of investment decisions, investors are traditionally concerned with the return of the investment, but in recent years the awareness of ethics and corporate social responsibility has increased throughout society and investors. During the dot-com crisis, analysts blamed many companies for being mismanaged which led to raised awareness of corporate behavior and the breakthrough of the ESG rating (Galbeath, 2013). The market of ESG investing is in an increasing state and had a development of 34 % between 2016-2019, with analysts estimating that the volumes going into ESG-related fund investments will total up to USD 400 billion in the coming decade (KPMG, 2019). This raises the incentives for fund managers to invest more sustainably and in a time where everyone has access to a vast amount of information through their smartphones, people are more informed about company-actions than ever before. The availability of information shrinks the knowledge asymmetry between corporations and consumers and with the social media of today, everyone has a platform to speak up which puts pressure on firms to act more ethically. The volume of people reporting wrongdoings of firms has increased substantially over the most recent years (Chiappetta et al., 2020) as a consequence of the sustainability awareness from people. The fund manager of Fondita Sustainable Europe, Marcus Björkstén, has even publicly criticised fund-managers for greenwashing their funds in order to catch some of the upgoing investment trends along with the ethical values that comes with it (Mooney, 2021). When corporations do not live up to their sustainable promises and do not deliver on said advertisement it is called “greenwashing” in accordance with Dahl (2010) which is becoming an increasing problem.

The possibility to share both positive and negative experiences, or information in a simple way makes it easy for consumers’ to compare both the quality of products and how they are made. Due to raised awareness amongst consumers on humans' effect on the environment, inequalities

between gender and ethnicities and how corruption affects societies, higher demands on companies are set to create their products in a sustainable way. It is not unusual that companies who do not reach these demands get blacklisted on the internet. One recent example of this cancellation of a brand is the boycotting of Oatly. A company who got accused of ‘selling its soul’, deceiving its customers of being a “green” company while at the same time having a big investor who supposedly were involved in the deforestation of the Amazonas (Spencer, 2020). Companies that have been convicted by the community of being unethical should therefore reasonably be having lower sales, but at the same time, sustainability work costs. After seeing this kind of cancellation behaviour amongst consumers, there must be a connection between the level of sustainability of a company and the financial performance.

This paper aims to extend previous research on ESG-related fund performance by analyzing the relationship between fund performance and their related ESG rating over three time periods. The paper also sheds light on the performance advantages that the greenwashing-funds obtain by marketing themselves as sustainable, even though they have a relatively poor ESG rating. Time series analyses are conducted on funds tradable on OMX Stockholm by creating ESG-screened portfolios to capture the relationships between the various funds.

Previous literature about the research objectives have not reached a consensus regarding the relationship between sustainability and performance. With the use of ESG ratings as a constraint in investment decisions, several studies have shown positive (Atz et al., 2020; Porter and van der Linde, 1995), negative (Correia-Domingues et al., 2019; Chang and Witte, 2010) and a null (Auer and Schuhmacher, 2016; Carafò et al., 2020) effect of ESG screening on financial performance.

The study finds evidence of a performance trade-off by choosing sustainable, depending on ESG ratings, when investing in funds tradable on OMX Stockholm. The paper further finds no evidence that the greenwashing-funds would perform differently from their ESG-peers, indicating that the greenwashing funds could deliver the best product out of the sustainable- and unsustainable-funds. Creating a *dark side* of sustainable investing, whereas greenwashers can

generate the return in relation to the unsustainable funds and at the same time falsley mediate that they are investing sustainable.

The remainder of the paper is organized in the following way: Section two introduces the problem discussion, purpose and the formulated hypotheses. Chapter three presents a thorough review of previous research as well as a critical review of the literature. Section four provides the data collection. The method is described in section five and the empirical results and discussion of the hypotheses are presented in section six. The final chapter, section seven, concludes the paper and provides suggestions for further research.

2. BACKGROUND

To get an understanding of the problem with the research objectives, this chapter presents a discussion of the different views of the objectives. The chapter also provides the purpose, the hypotheses and explanations of ESG and greenwashing.

2.1. Problem discussion

The former economic advisor to president Ronald Reagan and the Alfred Nobel-award winning scientist in economy (The Nobel Prize, 2021), Milton Friedman, published in 1970 an article in the New York Times Magazine claiming that the social responsibility of businesses is to increase profits for its shareholders. He, furthermore, describes the relationship between business and social responsibility in his own published book in the following way:

“The view has been gaining widespread acceptance that corporate officials and labor leaders have a “social responsibility” that goes beyond serving the interest of their stockholders or members. This view shows a fundamental misconception of the character of the nature of a free economy. In such economy, there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase profits so long as it stays within the rules of the game...” (Friedman, 1967)

Milton continues, describing that practices of social responsibility and environmental engagements which are not directly linked with creating value for the business is value destroying. If these practices would have been value-creating they would already have been implemented within the strategies of the firms (Friedman, 1970). Furthermore, recent studies have shown that socially responsible funds have experienced lower returns over a 10-15-year time frame, even though sustainable funds have had a relative advantage compared to conventional mutual funds in terms of lower tax costs and lower turnover rate costs (Chang and Witte, 2010).

While the concerns over the relationship between performance and sustainability has been questioned, there are several researches which claim that if sustainability is applied in the right way it could be used as a competitive advantage even in terms of performance. Porter and van der Linde (1995) argue that sustainability enhances the urge for new innovation which in the long term will lead to relative advantages compared to firms which do not succeed to engage with new technologies and trends within the society. The relationship is because of this, argued to be positive and businesses that pursue their operations at the expense of the society which it operates in will eventually find themselves temporary in comparison to sustainable businesses (Kramer and Porter, 2006). They also claim that firms' sustainability approach in many cases have been cosmetic and not been incorporated naturally in the firms' businesses. This leads to window dressing and value destruction that results in a trade-off rather than a gain from sustainable practices which Kramer and Porter means is the reason why criticism against the relationship between sustainable funds and performance is being raised.

During this controversy between choosing sustainable or not in terms of return performance, the manager of one of Europe's best performing sustainable funds made an interview with Financial Times. Marcus Björkstén, Fondita Sustainable Europe, claims that one factor to the growth of sustainable investing during the recent decade is the marketing of the ESG label. He means that many popular ESG funds are not as green as they appear and that greenwashing is a severe problem, finishing the article with the fraise:

“Nowadays, every second fund is claiming it is in some way sustainable” - (Mooney, 2021)

Meaning that several funds today claim to be sustainable when in reality they are not and their ESG-label is used as a marketing tool for their fund rather than a receipt of their sustainability implementation which is problematic (Mooney, 2021). Furthermore, while sustainability investment volumes have increased with 34 % during 2016-2019 and analysts estimates that the volumes going into ESG-related fund investments will total up to USD 400 billion in the coming decade (KPMG, 2019), there is no question whether there are incentives for fund managers to greenwash their mutual funds.

2.2. Purpose and hypotheses

The purpose of the report is to investigate if there is a performance trade-off by choosing a sustainable fund in comparison to a conventional fund and to see if there is any correlation between the two. Furthermore, this report aims to shine a light on greenwashing among unsustainable funds which claim to be sustainable and to investigate if they experience any performance advantages as a consequence. To examine the purpose of this paper the following hypotheses are to be tested:

Hypothesis one

H_0 : ESG-screening has a negative effect on the performance of conventional mutual funds.

H_1 : ESG-screening does not have a negative effect on the performance of conventional mutual funds.

Hypothesis two

H_0 : Greenwashing-funds do not perform differently compared to funds with similar ESG-ratings.

H_1 : Greenwashing-funds perform differently than funds with similar ESG-ratings.

2.3. Definitions

With a large variety of definitions regarding sustainability in previous studies, there is a need for explanation of our view on the term and what measures are used to quantify an otherwise abstract label.

2.3.1. ESG

The ESG is a rating with the purpose of informing investors on funds' level of sustainability, measuring the risk of three variables; environmental, social, and governance (Nordea, 2021). Whereas the environmental factor rates how companies contribute to climate change, a good environmental rating can be reached by minimizing waste, pollution and resource depletion, to name a few. The social variable rate companies' way of taking care of their employees as well as

the society they operate in. Terms for working conditions and diversification are ways corporations can affect their social rating. Corporate governance rating is a sort of control mechanism to monitor bribery, tax evasion and corruption that might occur in companies (Henisz, Koller and Nuttall, 2019). Transparency and open contact with shareholders are connected with a low governance risk rating (Nordea, 2021).

There are different ESG ratings issued by banks, financial institutes and corporations accessible on the market. One of these ratings is provided by Morningstar which is a reliable, independent financial service company that delivers objective investment analyses. As a trustworthy source of information, this paper will use Morningstar's ESG rating as a measurement of sustainability. Introduced in August 2016, this ESG rating goes on a scale from 0-50, where lower ratings equals less ESG-related risk. For a fund to get an ESG rating at least 67 % of the owned assets have to have a sustainability rating. The portfolio sustainability is calculated using the weights of the owned assets using the formula below:

$$Portfolio\ Sustainability = \sum_{i=1}^n ESG\ Risk_i * Weights\ adjusted \quad (1)$$

The result is then rescaled to 100 % of the funds value before the fund is given a portfolio sustainability rating. Since different industries don't work under the same conditions, these ratings are all relative to the portfolio's peer group (Morningstar, 2019).

2.3.2. Greenwashing

With an increasing public environmental awareness, mandatory recycling and climate change legislation companies see value in advertising the amount of “green work” they are achieving. When corporations do not live up to their green promises and do not deliver on said advertisement it is called “greenwashing” (Dahl, 2010). Even though the phenomenon has increased substantially in recent years to try to match consumers' demands on recycled and climate neutral products, the term has been around since the mid 80's. Costly television and print ads by the oil company Chevron claiming their sustainability resulted in the new term greenwashing being brought to life by environmentalists. A Nielsen poll in 2015 showed that 66

% of consumers are willing to pay more for sustainable products which makes it economically important for companies to be associated as a “green brand”. The positive sustainability development and higher climate awareness has made the greenwashing more complex, whereas companies promote onsite recycling of old products or products solely made on recycled materials, at the same time they are selling environmentally dangerous products (Watson, 2016).

A newer ESG-problem that has been rising is the so-called “social washing”. Closely related to greenwashing named above, social washing refers to a company’s exaggerations or falsely advertising their labour rights or human rights (Marsh, 2020). Capitalizing on human rights movements like “Black Lives Matter” or “MeToo” giving out false information creates difficulties for ESG investors (Dowell and Jackson, 2020).

“Empty company statements can seem to say that black lives only matter to big business when there’s profit to be made.” - (Dowell and Jackson, 2020)

Note that in this paper we will not differ between different types of “washing” but use the term greenwashing for all funds exaggerating their sustainability work in comparison to their ESG rating. Since greenwashing is a rather abstract term, it is hard to quantify when a firm or fund is a greenwasher or not. For clarification, our definition of a greenwashing fund, that will be used in this research, is derived from the fund's internal documentation provided by Morningstar. Funds will be divided using a dummy-variable. If the fund claims to be sustainable, the fund will be given a value of 1 on the dummy. If not, the fund will be given the value of 0. The greenwashers in this research will be the worst performing 40 % in terms of ESG rating, with the self-claim of being sustainable.

3. PREVIOUS RESEARCH

This chapter will briefly present and discuss previous research on the subject of sustainable fund management and ESG-investing. These reports will be the framework in terms of methodology in this paper when examining the relationship between financial performance and sustainability.

Previous studies about sustainability in relation to fund performance have been conducted throughout the years, with ESG as a measure of sustainability being increasingly adopted during more recent years. But, the previous research has not come to conclusion whether there actually is a performance trade-off by choosing to invest in sustainable funds.

3.1. Review of previous research

In a meta-study covering over 1000 published articles, Atz et al. (2020) found a positive relationship between financial performance and ESG. The purpose of the study was to examine in a broader picture if sustainable companies outperform non-sustainable peers. By collecting articles published between 2015-2020 and compiling their results the authors got a better understanding of the impact of sustainable investing in the most recent years. Since many of the studies used different statistical methods and terminology, Atz et al. choose to divide the studies into those focused on corporate financial performance (eg. ROA, ROE, Stock price) and those focused on investment performance (sharpe ratio, alpha value).

In line with Porter and van der Linde (1995), findings in the report showed that 58 % of the studies focusing on corporate performance had results of a positive relationship between ESG and financial performance. 13 % of the studies showed a neutral connection and 23 % a mixed result. Only 8% of the studies had results of negative impact between ESG and performance. For the articles with an investment focus, 59 % showed results of similar or better performance to conventional companies. Only 14 % had results of a negative correlation. The authors suggested that a similar meta-study should be conducted in the year 2025, covering articles between 2020-2025 to see if the relationship between ESG and performance changes over time.

In the paper “Is there a relationship between Morningstar’s ESG ratings and mutual fund performance?”, Gjolberg et al. (2019) researched the relationship between ESG ratings and financial performance of 146 funds registered on the Norwegian market. The funds were divided into quintiles depending on their ESG rating. The top and bottom quintiles were adjusted for standard risk factors using Fama-French three-factor-model. Gjolberg et al. (2019) found no significant results of different mean returns or volatility between the high and low rated portfolios. However, when dividing the sample on geographical investment areas, solely researching “European” investing, the authors found that the top sustainable quintile outperformed the bottom quintile by 0.3 % alpha in monthly return on a 1 % significant level. Furthermore, when looking at the data for the past twelve months, they found proof that an ESG-effect momentum on the market exists.

Durán-Santomil et al. (2019), published an article studying the effects of Socially Responsible Investing (SRI) on funds performance in Europe using the period 2016-2018. The authors found proof of a negative relationship between sustainability level and value at risk. Meaning that funds with a better ESG rating have better protection against large losses. Further the study examined the effect sustainability has on flows, where results told the importance of being sustainable when attracting investors (Durán-Santomil et al. 2019)

Auer and Schuhmacher (2016) consider the connection between ESG rating and financial performance, both globally and on industry level. The time frame of the research paper was between September 2004 and December 2012. The authors created an equally weighted portfolio containing the top 5 % ESG rated stocks in their sample. A benchmark portfolio was created in the same way, containing conventional stocks as well as a portfolio with bad ESG rated companies. Findings of the article showed proof that the results of SRI had different effects depending on geographical location. In the Asia-Pacific area and in the United States, there was no significant relationship between ESG rating and financial performance. However, in Europe in some industries investors pay an additional price for choosing sustainable.

In an article examining whether or not ESG ratings have an effect on financial performance written by La Torre, Mango, Cafaro and Leo in 2020, no evidence of a relationship between ESG and performance was found. The article looked at Eurostoxx50 companies over the time period of 2010-2018. They found that investing in ESG only had a positive effect on return amongst a few companies, mostly operating in specific sectors, like energy and utilities. The authors believe that other factors have a larger impact on returns, leading to insignificant results when looking at ESG rating.

Even though the results vary in different studies, depending on the geographical area, time frame or financial metrics being observed, there seems to be a correlation between SRI and fund performance.

This paper contributes to previous research with an updated time frame in the investigation of performance differences between sustainable and unsustainable funds, and covers the Swedish fund market. The paper is also investigating greenwashing among funds which has not been thoroughly explored yet, since the field of research within mutual funds is relatively new. To get insight into the advantages and disadvantages of greenwashing funds, the paper aims to reveal severe problems with funds greenwashing their reputation in order to gain investment volumes.

Authors	Time Period	Geographical Area	Research method	Findings
Atz, Clark, Van Holt and Whelan (2020)	2015-2020	United States	Meta-study	A majority of researched studies show a positive relationship between ESG and financial performance.
Gjolberg, Steen & Taghawi Moussawi (2019)	2014-2019	Norway	Empirical study, Fama-French H-L.	No relationship with mean returns or volatility. Positive Alpha when looking at "European" investing.
Correia-Domingues, Durán-Santomil, Ortero-González & Reboredo (2019)	2016-2018	Europe	Empirical study, portfolio returns	Negative correlation between ESG and VaR. Higher level of investing flow amongst high ESG rated funds
Auer & Schuhmacher (2016)	2004-2012	Global	Empirical study, portfolio returns	Null in Asia-Pacific and US. Additional price premium in Europe on SRI
Cafaro, La Torre, Leo & Mango (2020)	2010-2018	Europe	Empirical study, portfolio returns	No significant correlation between ESG rating and financial performance. A slightly positive effect on certain industries.
Chang & Witte (2010)	1995-2010	United States	Empirical study, portfolio returns	ESG has a negative impact on returns. SRI funds have a relative advantage in terms of tax reductions.
Porter & vad der Linde (1995)	-	-	Theoretical	Theory of sustainability works positive impact on returns.
Porter & Kramer (2006)	-	-	Theoretical	CSR leads to competitive advatages.

Table 1. Summary of previous literature

3.2. Critical review of previous research

The fact that many of the tests performed in previous studies aren't significant tells how complex the pricing of financial assets is, especially when researching different parts of the world. As found by Auer and Schuhmacher (2016), in Europe there is an additional price premium by choosing sustainable, which can be interpreted as a different mindset of the importance of sustainability depending on the continent investors are in. Additionally, the time frame examined plays a big part in the results of the paper. At the rate SRI-investing is increasing, results from studies quickly become obsolete. For this reason, even though ESG is a highly published topic, it is of high importance to keep the data updated for each geographical area.

A factor which affects performance studies when dealing with large samples of funds and performance measures is the issue regarding funds closing during the period of study. This measurement error is called survivorship bias which refers to logical errors that occur in samples of funds that focus on assets that have survived the time frame of the report, but overlooks the ones that do not (Carpenter and Lynch, 1998). The assets which have been shut down in the time horizon of study have been removed from the samples in the previous research of Chang and Witte (2010), Gjolberg et al. (2019) and Cafaro et al. (2020). To not treat survivorship bias could affect research results negatively in the case that these closed funds probably would have contributed to inferior performances. The results from previous literature should, therefore, be considered with some restriction.

4. DATA

This chapter describes how data have been collected, assessed and managed to construct the fund-portfolios.

To form the data for this report, certain criteria and screenings have been made to select the funds, the index benchmark and the risk-free rate. After the screening process, the total sample of useful funds collected totaled up to 258 funds (Appendix D) with over 30 000 data points.

4.1. Sample of funds

When collecting the funds which will be included in the final sample of funds, a number of restrictions have been applied. All data has been collected through Thomson Reuter DataStream. First of all, the data available for the selected funds all have monthly Net Asset Value-courses, i.e. NAV-courses, available for at least the past five years, 2016-2020. Furthermore, only all-equity funds are considered since the ESG rating is only applicable on actual firms. Finally, the funds investigated are tradable on OMX Stockholm to make the report applicable for Swedish investors.

4.2. Time frame

When studying performance-history for various funds it is interesting to oversee different time periods to evaluate which surrounding factors have made an impact on the funds' performance and during which circumstances certain funds perform better than others. The sustainability awareness among investors has not been as hot of a topic as it is today, with investing volumes breaking records five years in a row for ESG-related investing (Iacurci, 2021). Therefore, one could argue that sustainable funds, with that in mind, could have had an upswing in terms of performance in the most recent years. The report is therefore overseeing three time-periods, to evaluate if more recent trends have had any effects on the sustainable funds or not. These time periods are 2016-2020, 2011-2020 and 2006-2020, i.e. the last 5-, 10- and 15-years.

4.3. Index benchmark

The index benchmark chosen for the report is the OMXSGI index which represents the underlying return of all tradable stocks on OMX Stockholm. The index reflects current changes within the market and, in contrast to OMXSPI, with dividends reinvested in the index (Nasdaq, n.d.). An index with reinvested dividends reflects the market more sufficiently when it comes to fund performance measures, since investors in funds are not granted a part of the dividends but will experience market fluctuation because of it. The index is collected with monthly data points using Thomson Reuter DataStream.

4.4. Risk free rate

The risk free rate is the return the investor would receive if he or she invests in bonds issued by the government. The risk free rate used in the report is the Swedish one month bond, also known as STIBOR 1M, which is issued by Sveriges Riksbank (The Riksbank, n.d.). The monthly rate is chosen in line with the monthly data from the funds and the benchmark index. The historical return is collected through Thomson Reuter DataStream and used in the Fama and French five-factor model.

4.5. ESG screening

The funds' total ESG rating is provided by Morningstar which is an independent finance source of ESG ratings and fund performance analysis. Individual E, S and G ratings are not considered since the availability of ratings are far less than overall ESG ratings. Funds which do not have a rating or do not have over 67 % of their assets ESG rated are not a part of the total sample of funds. The ESG ratings are collected as of 2021-03-15.

The ESG rating collected for the study is updated as of 2021-03-15, meaning that companies and funds having another rating before this date is not taken into account. Previous ratings are not considered due to time consumption and having yearly updated ratings would urge the need for yearly updated portfolios and returns which would have been too time consuming. The shortfall of funds would also have been a greater issue, since less funds have received ESG ratings when going back in time and Morningstar's ESG ratings began in 2016. The effects on the results are

present because the returns can be affected by changes in investment strategies, meaning that funds that shift from unsustainable to sustainable investing, and vice versa, in the past are not taken into consideration in the study. A fund which today has low ESG risk (low rating), considered sustainable in this study, could in the past have had a high ESG risk (high rating) and by that having a greater return history, effecting the portfolios to have more equal cumulative returns.

4.6. Dropout analysis

Out of the total sample, five funds have closed during the period of study which could be due to poor results or low demand for the fund. Considering that these funds have been excluded from the study, the report suffers from a survivorship bias which will generate a negative skewness in the results (Carpenter and Lynch, 1998), since these funds probably would have contributed to more negative performances than their peers.

4.7. Portfolio construction

The construction of portfolios in the first hypothesis is based on the overall ESG-rating where all funds in the sample are divided into five equally large pools, with the first pool being the funds with the lowest (best) ESG-ratings and so on. The construction of the equally weighted sustainable and the non-sustainable portfolio are constructed as the two pools with lowest ESG-rating are in the sustainable portfolio (Appendix C, table 10) and the two pools with the highest ESG-rating are gathered in the unsustainable portfolio (Appendix C, table 12), leaving out the third pool (Appendix C, table 11). This to create a significant difference between the two constructed portfolios.

ESG rating	Sustainable portfolio	Unsustainable portfolio	No. of funds
Lowest 1-40 %*	YES	-	102
41-60 %	-	-	53
Highest 61-100 %	-	YES	103

*Percentage refers to the whole sample of funds, ranked by ESG-rating

Table 2. Portfolio construction, hypothesis one

In the second hypothesis, the construction of the portfolios is only based on the funds within the previous non-sustainable portfolio. Morningstar has provided the information, through the funds' own documentation, if the funds perceive themselves as sustainable or not. Using dummy variables, the previous non-sustainable fund is divided into two portfolios where one portfolio contains funds which claim that they are sustainable and one portfolio where funds do not claim that they are sustainable. Out of the previous unsustainable portfolio, 18 % claim to be sustainable and thus form the greenwashing portfolio.

	Greenwashing portfolio	Unsustainable portfolio
Claims to be sustainable*	YES	NO
Share**	82%	18%
No. of funds	84	19

*Sustainability documentation provided by Morningstar

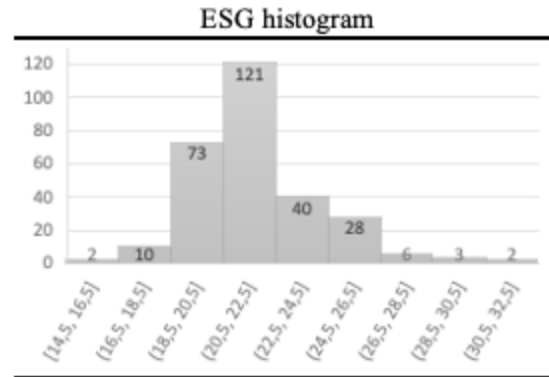
**Percentage refers to previous unsustainable portfolio in hypothesis one

Table 3. Portfolio construction, hypothesis two

4.8. Descriptive statistics

An overview of the collected data and associated descriptive statistics of the dataset is presented in the tables below. The median in the overall sample of funds is lower than the average which is an indication of a negative skewness. In the first hypothesis, the portfolios are clearly separated in terms of average and median ESG rating, with a one ESG point gap between the upper percentile of the sustainable funds and the lower percentile of the unsustainable funds. For the second hypothesis, portfolios are more similar as the greenwashing portfolio is integrated in the unsustainable portfolio with no clear difference in either average or median ESG rating.

Overall statistics	
Start date	2006-01-02
End date	2020-12-31
Total number of funds	258
Total number of observations	32 508
Average number of obs. per fund	127
Average ESG rating	21.8
Median ESG rating	21.3
Lowest ESG rating	14.5
Highest ESG rating	31.8



Hypothesis one	
Sustainable portfolio	
Total number of funds	102
Average ESG rating	19.8
Median ESG rating	20.0
Unsustainable portfolio	
Total number of funds	103
Average ESG rating	23.7
Median ESG rating	23.3

Hypothesis two	
Greenwashing portfolio	
Total number of funds	19
Average ESG rating	23.8
Median ESG rating	23.2
Unsustainable portfolio	
Total number of funds	84
Average ESG rating	24.2
Median ESG rating	23.4

Table 4. Descriptive statistics

5. METHOD

This chapter gives an overview of how the study is being performed and which statistical approaches are being used to test the hypotheses.

5.1. Scientific approach

We have chosen to perform this quantitative study using previous research and acknowledged theories regarding fund measures, which creates a deductive approach. Furthermore are hypotheses formulated to highlight the purpose of the study. The report uses quantitative data, mostly monthly historical returns collected from Thomson Reuters DataStream. The numerical data is used to create different portfolios with various ESG-related characteristics. The Fama and French five-factor model are then used, in line with previous research, to evaluate the performances and differences of the fund-portfolios, using Eviews. The difference between the portfolio's alpha-values reported in the Fama and French five-factor model are tested using a t-test, to see if there is a statistically significant difference between the values. Thereby, the results of this study are based on these tests which are being performed and then compared to the results of previous research. This report's results and discussion aims to fulfill the purpose, answer the hypotheses and contribute to a broader perspective within this financial field.

5.2. Statistical approach

To test the formulated hypotheses and fulfill the purpose of the study, statistical models and tests are implemented and applied in line with previous research.

5.2.1. Return on the asset

What mainly measures fund performance is the return which measures the change in value from one period to another (Körner and Wahlgren, 2006). The return is calculated using NAV-courses for the individual funds according to the following formula:

$$R_{it} = \left(\frac{P_{it} - P_{it-1}}{P_{it-1}} \right) \quad (2)$$

R_{it} = Return on the asset

P_{it} = NAV course at time t

P_{it-1} = NAV course at time t-1

5.2.2. Fama and French five-factor model

The Fama and French five-factor model estimates the relationship between return and risk and quantifies the observed risk into estimates of expected return. Other models to estimate expected return in relation to risk have been used over time, such as the Capital Asset Pricing Model (CAPM) and Fama and French three-factor model. Previous research has found empirical evidence that these models are deficient, suggesting that additional variables should be added to the Fama and French three-factor model to completely capture estimations of asset pricing and expected returns (Titman, 2004). Motivated by recent studies, the Fama and French five-factor model is implemented in this study and is formulated as follows (Fama and French, 2015):

$$R_{it} - R_{Ft} = \alpha_i + \beta_i(R_{mt} - R_{Ft}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{it} \quad (3)$$

R_{it} = Expected asset return

R_{Ft} = Risk free return

β_i = Market risk

R_{mt} = Return market portfolio

s_i = Factor exposure, size effect

SMB_t = Size premium

h_i = Factor exposure, value effect

HML_t = Value premium

r_i = Factor exposure, profitability effect

RMW_t = Profitability premium

c_i = Factor exposure, investment effect

CMA_t = Investment premium

e_{it} = Zero mean residuals

The size factor (SMB: Small Minus Big) is constructed using market capitalization of individual stocks and the value factor (HML: High Minus Low) is created using book-to-market ratio. Furthermore, the profitability factor (RMW: Robust Minus Weak) is constructed using the return of firms sorted by robustness in operating profitability and the investment factor (CMA: Conservative Minus Aggressive) is created measuring the returns of firms sorted by their investment strategies.

5.2.3. Two sample t-test

A two sample t-test is conducted to test whether alpha-values are significantly different from each other. To do this a two sample t-test is conducted. The null hypothesis in the t-test states that there is no difference in the mean and variance in the two samples (JMP, 2021).

The following formula is used in the two sample t-test:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \quad (4)$$

t = The test statistic

\bar{x}_i = Mean of sample i

σ_i^2 = Variance of sample i

n_i = Number of observations i

6. EMPIRICAL RESULTS & DISCUSSION

This chapter reports test results and analysis regarding hypothesis one and hypothesis two and furthermore provides a discussion of the study. The chapter ends with suggestions on future research.

6.1. Hypothesis one

To answer hypothesis one whether there is a performance trade-off by choosing sustainable funds, we will use the time series data of the sustainable and unsustainable portfolios. Starting with a two sample t-test followed by graphs of the cumulative return of the two portfolios. Further, a Fama and French five-factor model will be presented to show the results of the portfolios alpha and beta values. The cumulative returns and Fama and French five-factor test will be repeated for the different time frames.

6.1.1. Results

When looking at the cumulative return of the 15 year period between 2006-2020, there are many similarities between the two equally weighted portfolios. A high correlation between them is highly reasonable. A covariance analysis, found in Appendix B table 5, of the two portfolios show a result between 0.943 and 0.959 depending on the time frame, meaning that the sustainable and unsustainable portfolio will to large extent correlate in their ups and downs. As seen in graph 1. ‘Cumulative return Sustainable vs. Unsustainable 2006-2020’, the return in both portfolios was mostly negative until 2013, and there are not much differences in the returns until 2016 when the unsustainable portfolio gets higher returns. This difference can be more easily seen in the 10- and 5 years time horizon, and can be found in Appendix A, graph 2 and graph 3. Contrary to the results of the meta-analysis conducted by Atz et al. (2020) where a clear majority of researched papers had found a positive correlation between sustainability level and financial performance, in our sample, the sustainable funds had worse returns compared to the unsustainable funds.



Graph 1. Cumulative return Sustainable vs. Unsustainable 2006-2020

The results from the Fama and French five-factor model can be found in table 6. ‘Fama and French five-factor model sustainable vs. unsustainable’ which represents values on a monthly basis. The model reports high R^2 in all time periods, showing proof of the test's good fit. In the table, one can see that the sustainable portfolio has a positive alpha value, whilst the unsustainable portfolio has a negative alpha in the 15 year period. However, the alpha values in the period between 2006-2020 are not significant. This tells us that both portfolios performance is not significantly different from the market's return. In line with the findings of Gjolberg et al. (2019), the sustainable portfolios in the 10 year and 5 year time frame have positive and significant alpha values on the 10 % and 5 % level respectively. Meaning that a sustainable investment strategy is to prefer. Although the coefficients are very small at roughly 0.2 % and 0.3 %. None of the alpha values of the unsustainable models are significant and can therefore not with certainty be considered higher than 0. The beta value is significant on the 1 % level for all models, whereas all the sustainable portfolios have a higher beta value. The higher the beta value, a larger proportion of the portfolio return can be explained by the market return. A roughly 10 % difference between the sustainable and unsustainable portfolios is quite substantial. The lower beta value for the unsustainable portfolios indicates that the portfolios with a higher ESG value are exposed to a smaller systematic risk compared to the sustainable portfolios.

Model						
	(1) Sustainable 15 years	(2) Unsustainable 15 years	(3) Sustainable 10 years	(4) Unsustainable 10 years	(5) Sustainable 5 years	(6) Unsustainable 5 years
Variables	Coefficients	Coefficients	Coefficients	Coefficients	Coefficients	Coefficients
Alpha	0,0002631 (0,00109)	-0,001573 (0,00135)	0,00173* (0,00101)	0,00132 (0,00147)	0,00309** (0,00141)	0,00336 (0,00217)
Rm - Rf	0,8651*** (0,02008)	0,7511*** (0,02484)	0,8659*** (0,02248)	0,77232*** (0,03286)	0,8814*** (0,03039)	0,79133*** (0,04703)
SMB	0,04467 (0,04697)	0,07608 (0,05811)	0,10135 (0,04612)	0,08565 (0,06741)	0,10827* (0,05561)	0,11472 (0,08605)
HML	0,05472 (0,04508)	-0,01990 (0,05576)	0,00510 (0,04718)	0,01792 (0,06897)	0,01924 (0,05285)	0,03442 (0,08177)
RMW	-0,01912 (0,07278)	-0,05259 (0,09003)	0,09921 (0,06936)	0,10305 (0,10139)	0,03469 (0,09246)	0,01383 (0,14306)
CMA	-0,06569 (0,08369)	0,02332 (0,10352)	0,00774 (0,08187)	0,00933 (0,11966)	0,04301 (0,09563)	0,04807 (0,14797)
R-square	0,922	0,852	0,932	0,836	0,946	0,856
Observations	180	180	120	120	60	60

Note: Robust standard error in paranthesis. *** $p < 0,01$ ** $p < 0,05$ * $p < 0,1$

Table 6. Fama and French five-factor model Sustainable vs. Unsustainable

To see if there exists a significant difference between the alpha-values a t-test has been conducted. None of the differences can with statistical assurance be differentiated from one another. The results can be found below in table 7.

	t-test 15-years	t-test 10-years	t-test 5-years
t-value	1,058	0,230	-0,104
p-value	0,241	0,428	0,467

Table 7. t-test statistics comparing alpha values Sustainable vs. Unsustainable

By just looking at the cumulative return, with the sustainable portfolio having 141 % raw return and the unsustainable portfolio having 232 % over the period 2006-2020, it should be quite clear that the null hypothesis of hypothesis one can not be rejected. Without further tests on the data, it seems likely that there is a tradeoff by choosing sustainable which is in contrast to previous findings of Atz et al. (2020). However, the Fama and French 5-factor model reports a higher alpha value amongst the sustainable portfolio for the 15 years and 10 years period. Even though

the alpha value of model (6) is higher than model (5), the value is not significant. This result complicates the answer of hypothesis one. The cumulative returns are higher amongst the unsustainable funds, but the sustainable funds have a significant alpha value in model (3) and (5). Although the t-test proved that there is not a significant difference between the values, a significant and positive alpha-value is proof of a better risk-adjusted return, and that an investment in sustainable funds outperform expected returns after adjusting for the risk the investment is exposed to.

To answer hypothesis one whether or not there exists a trade-off by investing sustainable, it depends on how risk averse the investor is. The unsustainable funds have a substantially bigger cumulative return than the sustainable funds. But at the same time does the sustainable funds outperform the unsustainable funds when looking at the risk-adjusted returns in the alpha values of the Fama and French five-factor model (if the insignificant alpha value of model (6) is not looked upon). The tests made do not give enough evidence to reject the null hypothesis, and therefore is it reasonable to assume that it in fact exists a trade-off on returns of investment when investing sustainable compared to investing in conventional mutual funds.

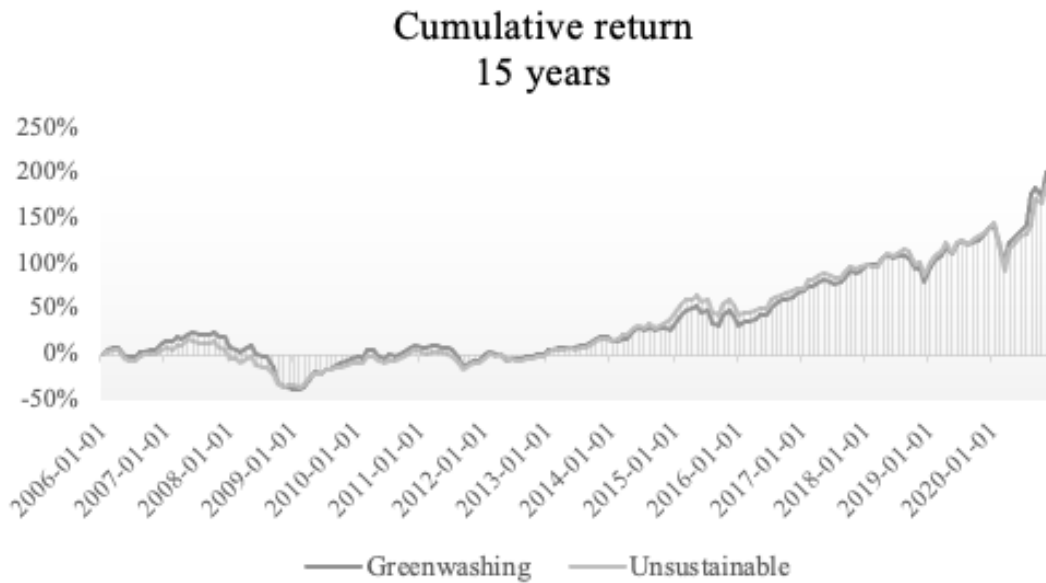
6.2. Hypothesis two

The tests performed to answer hypothesis two, whether the greenwashing funds perform better than their ESG-peers, are the Fama and French five-factor model to see the generated alphas of the unsustainable and the greenwashing portfolios. Cumulative returns are calculated to give a clear view of the performance history. The tests have been performed for the three time periods.

6.2.1. Results

Over the time period of 2006-2020 there are small differences in cumulative return between the equally weighted portfolios, with the portfolios almost replicating each other's return movements according to graph 4. Screening into a shorter time frame of 10- (graph 5) and 5-years (graph 6), found in Appendix A, there are a larger variety of return movements as the time frame becomes more recent. In 2016-2020 the portfolios observed a 20 % return difference in favor of the greenwashing-portfolio, indicating that recent trends regarding sustainability-related investments

reported by KMPG (2019) could have an impact on the greenwashing-returns since investors might believe that the greenwashers are a sustainable alternative.



Graph 4. Cumulative return Greenwashing vs Unsustainable, 2006-2020

Regarding the results of the Fama and French five-factor model (table 8), the study finds that both portfolios observe significant betas at the 1 % level over all time periods with differences in betas increasing substantially in the most recent 5-year period with a 9 % difference. Furthermore, observed abnormal returns or alphas become significant at 5 % level only in the 5-year period, with the unsustainable portfolio generating a 10 % significance level in the 10-year time period. Monthly abnormal returns are, however, small ranging from -0.074-0.735 %. Considering the other variables, the model finds only one significant variable in (SMB) market capitalization for unsustainable funds between 2016-2020 with a value of 19 %, all other variables for all other portfolios and time frames show no significance. The model shows high R^2 for all variables indicating that the model is a good fit.

Variables	Model					
	(1)	(2)	(3)	(4)	(5)	(6)
	Greenwashing 15 years	Unsustainable 15 years	Greenwashing 10 years	Unsustainable 10 years	Greenwashing 5 years	Unsustainable 5 years
	<i>Coefficients</i>	<i>Coefficients</i>	<i>Coefficients</i>	<i>Coefficients</i>	<i>Coefficients</i>	<i>Coefficients</i>
Alpha	0,00034 (0,00190)	-0,00074 (0,00156)	0,00233 (0,00202)	0,00267* (0,00158)	0,00735** (0,00291)	0,00545** (0,00228)
Rm - Rf	0,79429*** (0,03492)	0,76170*** (0,02870)	0,80016*** (0,04508)	0,81649*** (0,03520)	0,75971*** (0,06292)	0,84622*** (0,04935)
SMB	0,07900 (0,08167)	0,10851 (0,06714)	0,12735 (0,09247)	0,15464 (0,07221)	0,15021 (0,11513)	0,18687** (0,09030)
HML	0,03927 (0,07837)	-0,00757 (0,06443)	-0,02774 (0,09461)	0,05878 (0,07388)	0,02829 (0,10941)	0,10828 (0,08580)
RMW	-0,14532 (0,12653)	-0,07728 (0,10402)	0,04691 (0,13909)	0,08563 (0,10861)	-0,10459 (0,19142)	-0,09472 (0,15013)
CMA	-0,12270 (0,14549)	0,00515 (0,11961)	-0,02173 (0,16416)	-0,02161 (0,12818)	-0,13115 (0,19798)	-0,02172 (0,15527)
R-square	0,772	0,818	0,747	0,835	0,768	0,865
Observations	180	180	120	120	60	60

Note: Robust standard error in paranthesis. *** $p < 0,01$ ** $p < 0,05$ * $p < 0,1$

Table 8. Fama and French five-factor model Greenwashing vs Unsustainable

The alpha-values in the Fama and French five-factor model are somewhat close to each other. The t-test conducted on the values shows that there is no significant difference between the values. Statistics from the test can be found below in table 9.

	t-test 15-years	t-test 10-years	t-test 5-years
t-value	0,4393	-0,1326	0,5140
p-value	0,736	0,915	0,698

Table 9. t-test statistics comparing alpha values Greenwashing vs. Unsustainable

Results from the cumulative return of the portfolios and the Fama and French five-factor model do not show evidence enough to reject the null hypothesis and therefore the study can not prove that the greenwashing funds perform differently from their ESG-peers over a 15 year time period.

6.3. Discussion

Between the years 2006-2020 the financial market has gone through two financial crises, the great recession between 2007-2009 and the market crash during the early phase of the covid-19 pandemic. According to previous research conducted by Correira-Domingues et al. (2019), this abnormality in the market can affect the two portfolios differently. Whereas the sustainable funds having a lesser VaR during more volatile times on the financial market. However, when looking at the cumulative return from the portfolios, we can not distinguish any difference between the two portfolios during the early crisis. Both portfolios return following the same pattern, which works as a weak proof that the two portfolios are strongly correlated with the market. The Fama and French tests have a significant and relatively high beta in all time periods, which further prove that the portfolio's follow the market to a large extent. In 2016 a positive shift in the unsustainable portfolio as well a better recovery after the recent market crash has led to a substantially higher cumulative return amongst the unsustainable portfolio. Considering that SRI-investing has increased greatly in recent years it is surprising that the difference between the two portfolios occurs in the last five years.

With a correlation between the sustainable- and the unsustainable portfolio at roughly 0.95, there are many similarities between the funds. Considering that the pricing on the financial market is affected by many variables, one should not only look at the ESG value to assume a certain level of return. Even though not significant, there are indications in the Fama and French five-factor model which point out several factors affecting the returns of the funds. However, through the tests the level of sustainability work within companies or funds seems to have an effect on the financial performance and should be one of the reasons that the two portfolios perform differently.

Since the study can not reject the null in any of the two hypotheses there is evidence which show that the greenwashing-funds have benefitted in ethical values and returns over the researched time period. As there is evidence that the unsustainable funds perform better than sustainable funds in terms of returns and that there is no evidence that the greenwashing funds perform differently from their unsustainable ESG-peers. The conclusion can be drawn that the fund managers of the greenwashing-funds will benefit from the increased sustainability

investment-volumes. The incentives for the funds with poor ESG rating to greenwash their funds are, therefore, obvious in order to collect a piece of the upgoing sustainability trend. As can be seen in graph 6, cumulative returns 2016-2020, there is a 30 % difference in returns in favor of the greenwashing portfolio. This indicates that recent trends might have had an effect on the returns of the greenwashing funds in relation to their ESG-peers, as they have been able to collect fundings from investors thinking they had invested in sustainable funds which they in fact have not. In this way, the greenwashing funds seem to deliver the best product out of the sustainable and the unsustainable portfolios; generating the return equal to the unsustainable funds and at the same time convey the perception of investing sustainable and increasing the ethical values of investing according to the sustainable funds. This problem, which Markus Björkstén (Mooney, 2020) brought up in the discussion of greenwashing is therefore an issue which should be taken more seriously in times where sustainability is more important than ever.

6.3.1. The ESG effect

The effects of the ESG rating on the study are immense, in terms of screening funds into portfolios. Since the ESG rating is industry-relative, there are notes to be considered when ranking individual funds and companies. When a rating is industry-relative, it means that the ESG rating is not solely based on the objective ESG of a company, it is also weighted against the company's industry to make the ESG rating more comparable over industries. For example, the fuel industry which is considered one of the least sustainable industries could compete in terms of ESG rating with an industry such as the real estate industry that is considered to have low ESG risk. This causes the screening to generate better diversified portfolios, with various industries and companies in each of the portfolios. If the ESG rating was not relative, meaning that the rating was solely based on the companies actual impact on the environment and society, then there would not be diverseable portfolios. Since certain industries would have been over represented in the portfolios, with for example real estate-funds being present only in the sustainable fund and funds investing in fuel being over represented in the unsustainable portfolio. This issue generates both positive and negative outcomes. In terms of diversity and global coverage, the ESG rating provides a general screening with the companies being ranked according to their industry-peers. On the other hand, companies with an objective worse climate impact could be considered sustainable when being relatively compared over industries. For

example, the fuel company with least ESG risk could be screened into the sustainable portfolio while the real estate company with highest ESG risk could be screened into the unsustainable portfolio, even though the real estate company may have objectively less environmental-, social- and governance-risk. The results of the study are therefore dependent on these screenings and because the ESG rating is globally accepted and implemented in previous research, this rating is chosen in the study.

7. CONCLUSION

This chapter concludes the paper with final thoughts on what the paper's contributions are for the field of sustainability and greenwashing. The section ends with suggestions for future research.

This paper's contribution to, first of all, the field of sustainability investing is the ESG screening in relation to the overall performance of funds tradable on the OMX Stockholm. The study finds that sustainable funds are more prone to market risk but also display a higher alpha, especially in more recent years. However, the two sample t-tests show proof of the difference of alpha values being too small to be significant. The unsustainable funds, in cumulative returns, experience a better performance than the sustainable funds, indicating that there is a performance trade-off by choosing sustainable. We believe that our findings are up to date with the recent trends regarding ESG-related fund investments and contribute to signs indicating that these trends have a larger impact on fund investments as the application of sustainability grows. As the industry develops and sustainability trends become more of a necessary investment strategy, we believe that the performance trade-off in the near future will be no more and the market will reward investing which has lesser ESG risk.

Secondly, this paper contributes to indications that bring up severe concerns regarding sustainability and credibility in the fund investment industry. The findings show no evidence that greenwashers perform differently from their truly unsustainable peers, but in terms of alpha they seem to perform slightly better. There should not be a case where fund managers benefit from marketing their funds as green, while they are in fact not in regard to their ESG rating. Today, out of this study, 18 % of the unsustainable funds perceive themselves as sustainable, even though their ESG rating tells us otherwise. For an investor, this is a severe problem of not knowing whether a fund is green or just greenwashed. The credibility for all the funds participating on OMX Stockholm becomes less trustworthy when studies like these report the wrongdoings from certain fund managers, generating uncertainty regarding the fund's marketing of sustainable investing.

7.1. Further research

We recommend a similar research to be conducted in a few years to see how the market is reacting to the increasing SRI. This to keep the results of greenwashing and ESG-screening up to date since it is a fast changing topic. Further we would like to see how the results are affected when looking at individual stocks and companies ESG ratings. Since fund prices have less volatility than individual stocks, and many funds own parts of the same companies, the results may vary when looking at the relationship between companies ESG rating and financial performance.

To enhance the results from this paper, using alternative ESG scores provided by another company than morningstar would strengthen the credibility. Also, the time period used can have an affect on the results. Considering that the financial market during the covid-19 pandemic has had some abnormal returns, it would be interesting to see if the results would be different during more stable times on the market.

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APPENDIX

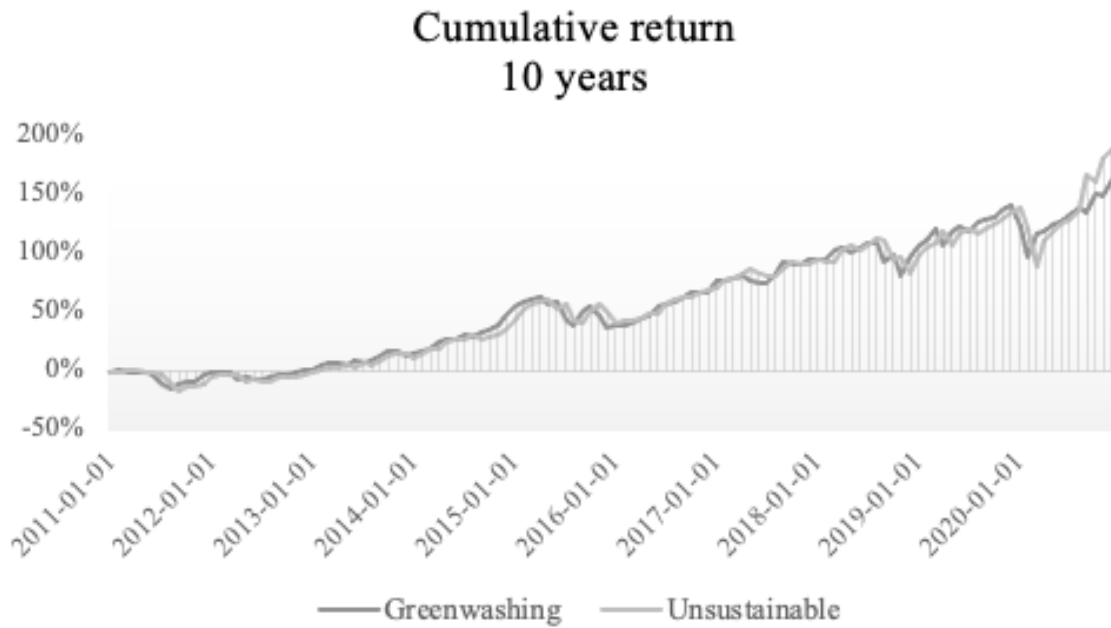
APPENDIX A



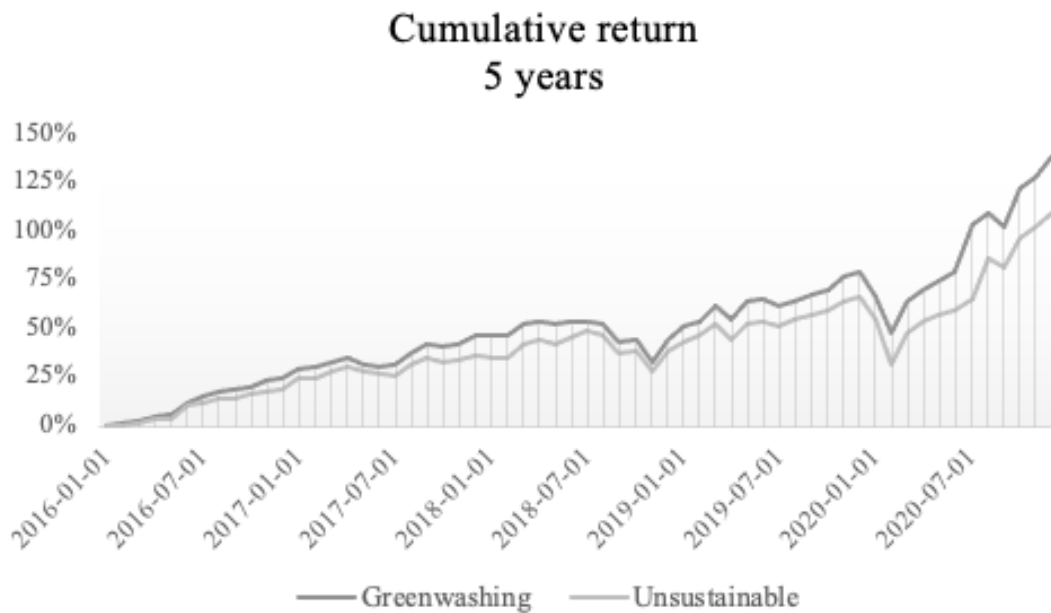
Graph 2. Cumulative return Sustainable vs Unsustainable, 2011-2020



Graph 3. Cumulative return Sustainable vs Unsustainable, 2006-2020



Graph 5. Cumulative return Greenwashing vs Unsustainable, 2011-2020



Graph 6. Cumulative return Greenwashing vs Unsustainable, 2016-2020

APPENDIX B

Table 5. Covariance matrices

Covariance analysis: Ordinary		
Date: 05/05/21 Time: 13:22		
Sample: 2006M01 2020M12		
Included observations: 180		
Correlation	Sustainable	Unsustainable
Sustainable	1.000000	
Unsustainable	0.943347	1.000000

Covariance analysis: Ordinary		
Date: 05/05/21 Time: 13:35		
Sample: 2011M01 2020M12		
Included observations: 120		
Correlation	Sustainable	Unsustainable
Sustainable	1.000000	
Unsustainable	0.954577	1.000000

Covariance analysis: Ordinary		
Date: 05/05/21 Time: 13:48		
Sample: 2016M01 2020M12		
Included observations: 60		
Correlation	Sustainable	Unsustainable
Sustainable	1.000000	
Unsustainable	0.958987	1.000000

APPENDIX C

Table 10. Sustainable portfolio

Fund	ESG	Fund	ESG
Agenta Svenska Aktier	19,8	Ohman Etisk Index Sverige A	20,0
Aktiehuset Fond	20,2	Ohman Etisk Index USA A	19,2
Aktiespararna Topp Sverige	20,7	Ohman Global Marknad Hallbar A	17,6
Alfred Berg NSC ESG A	20,6	Ohman Sverige Fokus D	20,6
AMF Aktiefond Europa	19,4	Ohman Sverige Hallbar A	20,5
AMF Aktiefond Global	20,1	Ohman Sverige Marknad Hallbar A	20,0
AMF Aktiefond Nordamerika	20,4	OPM Global Quality Companies A	20,0
AMF Aktiefond Sverige	19,6	PriorNilsson Realinvest A-klass	19,7
AMF Aktiefond Varlden	19,8	Quesada Global	20,0
Avanza Europa	18,4	SEB Europafond	20,7
Avanza USA	19,9	SEB Hallbar Faktor Global	19,2
Avanza Zero	20,7	SEB Hallbar Sverige Indexnara	20,8

Captor Scilla Nordic Equity B	19,9	SEB Hallbarhetsfond Global utd	20,0
Carnegie Fastighetsfond Norden A	17,5	SEB Hallbarhetsfond Sverige Index utd	20,7
Carnegie Global A	19,1	SEB Stiftelsefond Utland	20,2
Carnegie Sverigefond A	20,0	She Invest Sweden	18,6
Carneige Spin-Off A	20,7	Simplicity Norden	20,2
Case All Star	18,3	Simplicity Sverige	20,6
Catella Sverige Aktiv Hallbarhet	20,1	Skandia Cancerfonden	20,3
Catella Sverige Hallbarhet Beta A	20,6	Skandia Sverige Hallbar	20,3
Cliens Mixfond A	20,8	Skandia Time Global	19,4
Cliens Sverige A	20,7	Skandia USA	19,4
Cliens Sverige Fokus A	20,4	Skandia Varlden	19,0
Folksam LO Varlden	19,4	Skandia Varlden Sverige	19,2
GodFond Sverige & Varlden	20,0	Skandia Varldsnaturfonden	20,3
Handelsbanken Amerika Tema (A1 SEK)	20,7	Spiltan Aktiefond Investmentbolag	14,5
Handelsbanken Europa Index Criteria (A1 SEK)	20,6	Spiltan Aktiefond Stabil	19,0
Handelsbanken Europa Selektiv (A1 SEK)	18,6	SPP Aktiefond Europa A SEK	20,4
Handelsbanken Finland Smabolag (A1 SEK)	20,3	SPP Aktiefond Stabil A	20,3
Handelsbanken Global Selektiv (A1 EUR)	18,2	SPP Aktiefond Sverige A	20,5
Handelsbanken Global Tema (A1 SEK)	20,7	SPP Europa Plus A	20,7
Handelsbanken Norden Selektiv (A1 SEK)	20,4	SPP Global Plus A	20,1
Handelsbanken Sverige 100 Index Criteria	20,5	Swedbank Humanfond	20,7
Handelsbanken Sverige Index Criteria	20,8	Swedbank Robur Access Edge Europe A	19,7
Handelsbanken Sverige Selektiv (A1)	20,1	Swedbank Robur Access Edge Global A	19,5
Handelsbanken Sverige Tema (A1 SEK)	20,4	Swedbank Robur Access Edge USA A	19,6
Humle Sverigefond	19,8	Swedbank Robur Access Europa	20,1
IKC Fastighetsfond A	20,2	Swedbank Robur Access Sverige	20,2
Indecap Guide Q30 A	20,6	Swedbank Robur Aktiefond Pension	19,8
KPA Etisk Aktiefond	19,3	Swedbank Robur Allemansfond Komplet	20,7
Lannebo Teknik	18,5	Swedbank Robur Bas 100 A	20,8
Lansforsakringar Fastighet Europa	15,4	Swedbank Robur Europafond A	19,7
Lansforsakringar Global Hallbar A	20,3	Swedbank Robur Fastighet A SEK	16,7
Lansforsakringar Sverige Aktiv A	19,7	Swedbank Robur Global High Dividend	20,0
Lansforsakringar Sverige Indexnara	20,6	Swedbank Robur Global Impact	20,6
Lansforsakringar USA Aktiv A	20,2	Swedbank Robur Globalfond A	19,6
Nordea Alfa	20,3	Swedbank Robur Nordenfond	19,8
Nordea Inst Aktief Sverige utd	20,7	Swedbank Robur Sverigefond	20,0
Nordea Inst Aktiefonden Stabil utd	20,2	Swedbank Robur Sverigefond MEGA	19,3
Nordea Olympiafond	20,5	Swedbank Robur Talenten Aktiefond Mega	19,3
Nordea Sverige Passiv utd	20,8	Swedbank Robur Technology	18,4
Nordea Swedish Stars utd	20,1	Swedbank Robur Transition Global	18,1

Nordic Cross Bull	20,7	Swedbank Robur Transition Global MEGA	18,1
Nordnet Indeksfond Danmark A	20,6	Swedbank Robur Transition Sweden	20,7
Nordnet Indeksirahasto Suomi	19,8	Swedbank Robur Transition Sweden MEGA	20,7
Ohman Etisk Index Europa	18,7	Swedbank Robur USA	19,5
Ohman Etisk Index Pacific	19,5	Tellus Investmentbolag	19,6

Table 11. Reference portfolio

Fund	ESG	Fund	ESG
Aktie-Ansvar Europa	21,7	Nordea Aktieallokering	21,3
Aktie-Ansvar Sverige A	21,5	Nordea Inst Aktiefonden Varlden utd	21,1
Aktiespararna Direktavkastn A	21,3	Nordnet Indexfond Sverige	20,8
AMF Aktiefond Smabolag	21,7	Ohman Etisk Index Japan	21,1
Avanza Smabolag By Skoglund	21,2	Ohman Global Hallbar A	21,4
Avanza World Tech by TIN	21,2	Penser Sustainable Impact B	21,3
Captor Scilla Global Equity B	21,5	Quesada Sverige	20,9
Carnegie Smabolagsfond A	21,7	SEB Aktiesparfond	21,5
Didner & Gerge Global	20,8	SEB Dynamisk Aktiefond	21,5
Enter Select	21,2	SEB Nordamerikafond	21,7
Enter Select Pro	21,1	SEB Stiftelsefond Sverige	21,4
Enter Smabolagsfond A	21,2	SEB Sverige Expanderad	21,1
Folksam LO Sverige	21,2	SEB Swedish Value Fund	21,6
Folksam LO Vastfonden	21,0	SEB WWF Nordenfond	21,6
Handelsbanken Brasilien Tema (B1 SEK)	21,3	Simplicity Smabolag Sverige A	21,5
Handelsbanken Norden (A1 SEK)	21,3	Skandia Europa Exponering	21,0
Handelsbanken Norden Index Criteria (A1 SEK)	21,0	Skandia Global Exponering A	21,5
Handelsbanken USA Index Crit (A1 SEK)	21,2	Skandia Nordamerika Exponering	21,4
Indecap Guide Sverige A	21,3	Skandia Sverige Exponering	21,0
Lancelot Camelot A	21,4	Spiltan Aktiefond Smaland	21,5
Lannebo Norden Hallbar A	21,7	Spiltan Smabolagsfond	21,6
Lannebo Sverige Hallbar B	21,5	SPP Aktiefond USA A SEK	21,2
Lansforsakringar Bekvam Fond Potential A	21,7	SPP Global Solutions A	21,7
Lansforsakringar Europa Aktiv A	21,7	SPP Mix 100	21,6
Lansforsakringar Europa Indexnara	21,2	SPP Sverige Plus A	20,8
Lansforsakringar Global Klimatindex	21,0	Swedbank Robur Access Global	20,9
Lararfond 21-44 ar	20,9	Swedbank Robur Access USA	20,9
Naventi Offensiv Flex	21,2	Swedbank Robur Kapitalinvest	20,8
Navigera Global Change	21,4		

Table 12. Unsustainable portfolio

Fund	ESG	Fund	ESG
Agenta Globala Aktier	22,3	Lundmark Climate Impact Fund	25,3
Agenta Tillvaxtmarknader	24,5	Navigera Aktie 1	22,2
AMF Aktiefond Asien Stilla havet	22,0	Navigera Tillvaxt 1	23,7
AMF Aktiefond Tillvaxtmarknader	23,5	Nordea Smabolagsfond Sverige	23,5
Avanza Emerging Markets A	26,6	Nordiska Fonden	27,3
Carnegie Asia A	24,4	Nordnet Indeksfond Norge	24,6
Carnegie Indienfond A	26,0	ODIN Small Cap A (SEK)	22,2
Carnegie Micro Cap	22,8	Ohman Etisk Emerging Markets A	23,7
Carnegie Rysslandsfond A	30,4	Ohman Global Growth	21,8
Catella Smabolagsfond	23,9	Ohman Global Smabolag Hallbar A	25,4
Cicero Sverige A	21,9	Ohman Smabolagsfond A	23,2
Didner & Gerge Aktiefond	21,9	Ohman Sweden Micro Cap A	22,7
Didner & Gerge Small and Microcap	22,4	OPM Listed Private Equity	24,8
Didner & Gerge US Small and Microcap	24,7	PLUS Mikrobolag Sverige Index	28,1
East Capital Nya Europa	23,1	PLUS Smbolag Sverige Index	22,5
East Capital Osteuropafonden	29,9	PriorNilsson Evolve A	24,8
East Capital Rysslandsfonden	31,2	PriorNilsson Smart Global	22,9
Enter Sverige A	22,0	PriorNilsson Sverige Aktiv A	23,5
Ethos Aktiefond	22,0	SEB Asienfond ex Japan	25,7
Fronteer Harvest A	23,1	SEB Emerging Marketsfond	25,8
GlobeCap 100 A	22,7	SEB Europafond Smabolag	24,9
Handelsbanken Amerika Smabolag Tema (A1 EUR)	25,7	SEB Hallbar Faktor Emerging Markets Utd	25,2
Handelsbanken Asien Tema (A1 SEK)	22,5	SEB Japanfond	25,3
Handelsbanken AstraZeneca Allemansfond	22,9	SEB Nordamerikafond Sma och Medelstora Bolag	26,3
Handelsbanken EMEA Tema (A1 SEK)	27,1	SEB Nordamerikafond Smabolag	26,9
Handelsbanken Europa Smabolag (A1 SEK)	22,8	SEB Nordenfond	21,9
Handelsbanken Gl Smabolag Index Crit(A1 SEK)	24,6	SEB Sverigefond Smabolag	22,1
Handelsbanken Global Index Criteria (A1 SEK)	21,8	SEB Sverigefond Smabolag Chans/Risk utd	22,3
Handelsbanken Hallbar Energi (A1 SEK)	26,1	SEB Teknologifond	21,8
Handelsbanken Halsovard Tema(A1 SEK)	26,5	Simplicity Smabolag Global	22,6
Handelsbanken Japan Tema	22,9	Skandia Asien	24,7
Handelsbanken Kina Tema (A1 SEK)	23,1	Skandia Japan Exponering	23,7
Handelsbanken Multi Asset 100 (A1 SEK)	21,9	Skandia Norden	23,2
Handelsbanken Nordiska Smabolag (A1 SEK)	23,8	Skandia Smabolag Sverige	22,7
Handelsbanken Nordiska Smabolagsfond (A1 EUR)	23,8	Skandia Tillvaxtmarknadsfond	25,4

Handelsbanken Norge (A1 SEK)	25,5	Spiltan Globalfond Investmentbolag	23,3
Handelsbanken Svenska Smabolag (A1 SEK)	22,4	SPP Aktiefond Global A SEK	22,0
HealthInvest Small & MicroCap Fund C	31,8	SPP Aktiefond Japan A SEK	24,0
Humle Smabolagsfond	22,6	SPP Emerging Markets Plus A	24,2
IKC Global Infrastructure A	23,5	SPP Emerging Markets SRI A SEK	25,4
IKC Global Trend A	22,4	SPP Global Multifactor Plus A	22,0
Indecap Guide Global A	22,5	SPP Sverige Smabolag Plus A	22,1
Indecap Guide Tillvaxtmarknadsfond A	23,1	Swedbank Robur Acces Edge Em. Markets	23,0
Lancelot Avalon A	29,4	Swedbank Robur Access Asien	24,0
Lannebo Europa Smabolag A SEK	26,2	Swedbank Robur Exportfond	22,5
Lannebo Smabolag SEK	22,1	Swedbank Robur Japanfond	22,1
Lannebo Smabolag Select	23,6	Swedbank Robur Kinafond	23,3
Lannebo Sverige	21,9	Swedbank Robur Medica	25,9
Lannebo Sverige Plus	21,9	Swedbank Robur Ny Teknik A	22,1
Lannebo Teknik Smabolag	22,7	Swedbank Robur Osteuropafond	26,1
Lansforsakringar Asienfond A	25,6	Swedbank Robur Rysslandsfond A	27,5
Lansforsakringar Global Indexnara	22,0	Swedbank Robur Smabolagsfond Europa	23,2
Lansforsakringar Japan Indexnara A	23,8	Swedbank Robur Smabolagsfond Norden	22,8
Lansforsakringar Smabolag Sverige A	22,2	Swedbank Robur Smabolagsfond Sverige A	22,1
Lansforsakringar Tillvaxtmarknad Aktiv A	26,0	Swedbank Robur Small Cap USA	25,9
Lansforsakringar Tillvaxtmarknad Indexnara A	26,5	Swedbank Robur Transition Energy	22,1
Lansforsakringar USA Indexnara	21,8	Tellus Bank & Finansfond	23,0