


Performance and development of Norwegian green funds

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FRONT PAGE

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Abstract

Incorporating environmental criteria in investment decisions is becoming increasingly important to a growing number of investors. The thesis evaluates the risk-adjusted performance of 23 Norwegian green funds. Describing the emergence of green finance in Norway is also an important part of the thesis.

The green funds are compared to two benchmarks as well as a sin fund with low ethical standards. To analyze the funds, Sharpe ratio, Treynor ratio, and Jensen's alpha were applied. In contrast with recognized research, the results show that green funds over perform compared to the market. The analysis is based on a limited data sample.

Preface

This thesis is written as a closing part of my master degree in business administration at the University of Stavanger. My major is finance, with a minor in economic analysis. This master thesis is written in the field of finance.

The topic of the thesis is chosen based on personal interest and curiosity for the green trend in finance. Writing this thesis has been challenging, rewarding, and especially strange in these times of a global pandemic. Self discipline really was put to the test.

I would like to thank my supervisor Bernt Arne Ødegaard for thorough and constructive feedback. I would also like to thank HHUiS for five exciting and educational years.

Sofie Quesada Gjessen

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1 Problem

In my thesis I aim to describe and evaluate the performance of Norwegian green funds.

2 Introduction

Climate change is one of the greatest threats of our time. There are many actions that can be taken to mitigate pollution, such as recycling, less traveling, greener energy production, carbon offsets, and so on. The Danish bank Nordea, which is the largest Nordic financial institution, argues that investing your savings in green funds can be the most effective way to reduce your emission footprints [Nordea, 2018].

Green funds are a part of the ESG trend, where Environmental, Social and Governance considerations are the basis for all investment decisions. In 2018 Nordea presented a paper where they concluded that moving your savings from a fossil investment fund to a green investment fund is 27 times as effective as other mitigation to reduce climate change, as for instance reducing meat consumption [Nordea, 2018].

The Nordea calculations have been the subject of some criticism, especially from NHH professor Thore Johnsen. The criticism is mainly based on the fact that moving savings from fossil funds to green funds will not increase mitigation. Johnsen argues that the only consequence of moving your savings from fossil to green funds is that shares will change ownership, without further benefits for the environment [Rommetveit, 2018].

In this thesis I take a first look at green funds in Norway. I describe their development and look at their risk adjusted performance. The green funds are compared to some benchmarks to see how they perform relative to the market and other funds. I also describe these funds both numerically and by characteristics.

Evaluating green funds is important as the ESG market is a fast growing market for financial institutions. I am hoping to provide insight that can be used by

Norwegian investors to determine whether investing in green funds is a good investment strategy. It is interesting to investigate how funds committing to a green investment strategy compares to the Norwegian market, as well as other benchmarks.

3 Literature Background

Conscious investing includes terms such as ESG, SRI, green funds and green investing. The terms all represent a part of finance that is affected by ethics and other concerns that are not directly connected with financial performance.

3.1 Socially responsible investing

The literature on conscious investing separates sustainable investing from socially responsible investing (SRI). SRI focuses on making investment decisions based on ethical or moral considerations, such as choosing to not invest in weapons, tobacco, gambling, or so called "sin stocks". Sustainable investment however, is defined by Joseph F. Keefe as "the full integration of environmental, social, and governance (ESG) factors into financial analysis and decision-making" [Keefe, 2007]. SRI and ESG investing includes putting constraints, or screens, on the investment possibilities.

Stocks included in green funds could still be excluded from SRI funds. This is because a green fund could invest in companies that do not meet the social standard of SRI investment funds. Hence, green funds have less constraints. Keef (2007) argues that green investing is better defined than social responsible investing. However, it is not clear to what degree SRI funds and green funds overlap, as they have a lot of similar characterizations.

There is a lot of research investigating SRI and how the constraints on the investment possibilities affect funds performance. When SRI was starting to gain popularity in the late 70's and 80's, the general perception was that the screens would have negative effect on performance. Rudd stated in 1981 that the investment implications of SRI largely had been ignored, and that intuition suggested that investment performance would be adversely affected. He argued that each time a portfolio is constrained, performance suffers [Rudd, 1981]. In support of Rudd, Grossman and Sharpe found that the exclusion of South African

stocks hurt portfolio performance [Grossman and Sharpe, 1986]. The exclusion of South African stocks was a reaction to the apartheid policies, and can be seen as a SRI constraint.

Rudd's intuition however proved to be incorrect. As more research was conducted on this subject, the general consensus developed to being that there is little difference in the performance of conventional active managed funds and social responsible funds. Bello summarized many of the findings from 90's research on risk-adjusted performance of socially responsible funds. He looked at four different studies: [Hamilton et al., 1993], [Statman, 2000], [Sauer, 1997] and [Goldreyer and Diltz, 1999], and found that "the application of social screens does not have a significant effect on investment performance" [Bello, 2005]. However, the literature support under-performance of SRI funds compared to index funds [Mallett and Michelson, 2010].

3.2 History of ESG

3.2.1 Kofi Annan's letter

SRI has been a known concept in the world of finance since the 70's. ESG on the other hand was first introduced in 2004, in a letter written by the then Secretary-General of the UN, Kofi Annan. The letter was addressed to 55 CEO's of major financial institutions and invited them to take part in an initiative to incorporate ESG factors into capital markets [Knoepfel, 2004].

Following Annan's letter, the concept of ESG investing was more thoroughly discussed the following year in the UN report "Who Cares Wins". The report is a

joint initiative of financial institutions which were invited by United Nations Secretary-General Kofi Annan to develop guidelines and recommendations on how to better integrate environmental, social and

corporate governance issues in asset management [Knoepfel, 2004]

Ivo Knoepfel authored the report, with the contribution of 20 financial institutions that manage assets worth over \$6 trillion. The report mainly focuses on companies to include ESG-considerations in their decision-making process, and the benefits this could entail for the companies, as for instance strengthen competitiveness and improved public perception.

The UNEP Finance Initiative is introduced in the report, which is an initiative with a mission to incorporate ESG considerations into financial sector operations and services. The report states that "emerging environmental and social trends [...] presents a new set of challenges with far-reaching financial consequences for corporations. This is true both at the level of companies and at the level of investment portfolios" [Knoepfel, 2004].

The report is written as a guideline to the financial industry as a consequence of "more analysts and fund managers have begun to experiment with the integration of these issues", and "Investors have also become more vocal in their demand for products and services incorporating such aspects" [Knoepfel, 2004]. Hence, the report is written as a reaction to increased focus on ESG concerns by both providers and consumers of financial services. The report states that financial markets only factor in ESG issues if they are seen as short-term risk, and that markets cannot fully recognize the importance of new emerging trends, such as the increasing pressure for companies to factor in reputation risk related to ESG issues.

Knoepfel provides examples of ESG factors that could affect both companies and investors. Some of these are:

Environmental issues:

- Climate change and related risks
- The need to reduce toxic releases and waste
- Emerging markets for environmental services and environment-friendly products

Social issues:

- Workplace health and safety
- Community relations
- Increasing pressure by civil society to improve performance, transparency and accountability, leading to reputational risks if not managed properly

Corporate governance issues:

- Board structure and accountability
- Audit committee structure and independence of auditors
- Management of corruption and bribery issues [Knoepfel, 2004].

There is made a clear distinction between SRI and ESG by stating that they will refrain from using the term sustainable, and focus on environmental, social and government issues, which is the topic of the report [Knoepfel, 2004].

3.2.2 A different kind of letter

Larry Fink, the CEO and founder of the world's largest asset manager, BlackRock, sends an annual letter to CEOs worldwide. New York Times journalist Michael Barbaro claims Fink's letter has "biblical quality in the world of business" [Barbaro, 2020]. The title of the 2020 letter was "A Fundamental Reshaping of Finance", and the letter addresses the financial risk related to climate change which Fink states is "a risk that markets to date have been slower to reflect" [Fink, 2020a].

In his letter Fink encourages all businesses, not just energy companies, to review their carbon footprint. He writes: "The evidence on climate risk is compelling investors to reassess core assumptions about modern finance" [Fink, 2020a]. As a consequence of this, Fink gives some concrete examples of steps taken in a letter to their clients. This includes the introduction of new funds that refrain from investing in fossil fuel-related stocks, divesting in thermal coal producers, and voting more aggressively against managers that do not make sufficient progress with regards to sustainability [Fink, 2020b].

New York Times journalist Andrew Sorkin states that this letter for the first time puts real pressure on "Corporate America" [Barbaro, 2020]. These issues have been popular to address for some time, but with this letter Fink puts pressure on businesses to take concrete measures. He states that if they fail to do so, investors will, more likely than before, either vote against the board, or pull their money from the firm.

When the letter was sent to the CEO's, headlines quickly raised about some of the worlds biggest companies taking action to be more sustainable. Some of these pledges may have some real impact, many of them do not. Sorkin for instance problematises the practise of making any sort of production "carbon neutral", as this could be done in many different ways, and potentially have little to none real effect on emissions [Barbaro, 2020]. This relates to the issue of greenwashing, which will be discussed later in this thesis.

Green funds can be seen as a byproduct of both SRI and ESG investing. Green finance is a part of the ESG trend, but separates itself from SRI.

3.3 Development of green funds

Mallett and Michaelson (2010) states that as evidence arise of global warming being caused by human behavior, there has been a large increase in green in-

vestment funds. The Green Transition Scoreboard has tracked private green investing in the US since 2009. In the table below there are some information on the development of green investments:

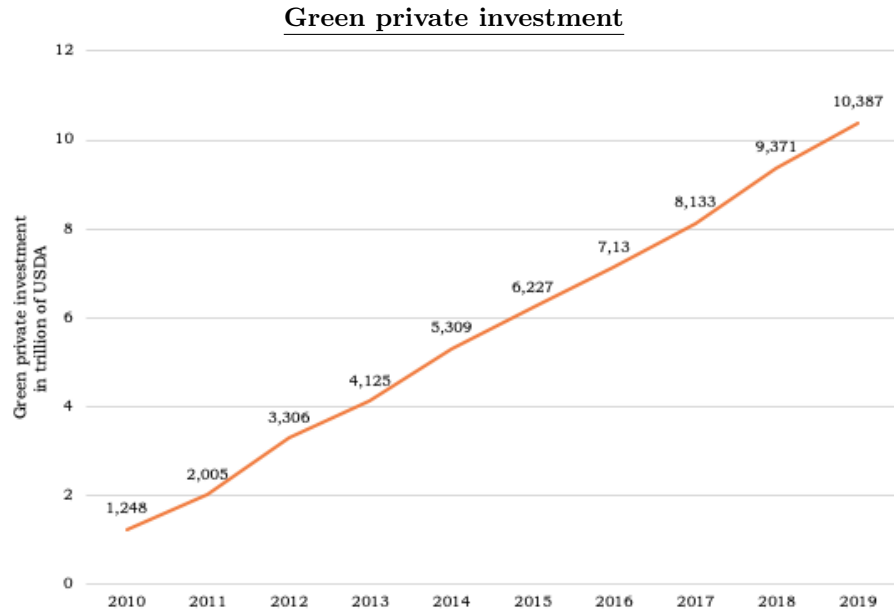


Figure 3.1: Green private investment in the U.S.

Data gathered from ethicalmarkets.com [ethicalmarkets.com, 2019]

Even though these numbers represent US investors, the trend is however clear: green investing is becoming increasingly popular. According to the U.S. Forum for Sustainable and Responsible Investments, USSIF, SRI assets accounted for 25% of total assets under professional management in the US in 2018 [Murray, 2018].

There are at least two factors that contribute to making green investing increasingly popular. First, individual investors want their investment decisions to reflect their sense of ethics and personal beliefs. This is especially true for women [Hansson, 2019]. Second, for fund managers it can be a strategic choice to invest in companies that account for ESG concerns. This is important re-

lated to long-term investing, as these companies have reduced risk with regards to climate risk and risk connected with the transition into a greener economy.

3.4 Climate risk

The emergence of green finance can be seen in context with increasing climate risk, which can be divided into two categories. One being the physical risk related to extreme weather, including droughts, floods and heat waves. The second category of climate risk involves the transition to a low-carbon economy. This risk includes technical innovation, regulatory changes and changes in consumer preferences. The risk faced by investors differs from the risk faced by consumers and companies. However, climate related risk will affect most sectors on multiple levels [Bloomberg, 2017]. Even though the transition to a low-carbon economy comes with a significant risk, it also creates opportunities for organizations focused on mitigating pollution.

The degree to which the price of an asset reflects climate risk will affect the financial risk for an investor [NBIM, 2020]. However, a challenge related to accounting for climate risk is absence of high quality data. Some initiatives have been started to provide investor access to data and to increase company disclosure regarding climate risk.

3.5 Existing research on green funds

There is some research on green funds globally, but little on Norwegian green funds.

3.5.1 Globally

In 2011, Climent and Soriano published an article evaluating the performance of mutual green funds. They concluded that for the period 1987-2009 green funds under performed compared to conventional funds with similar characteristics. However, when looking at a more recent period (2001-2009), they do not find a

significant difference between green and conventional funds [Climent and Soriano, 2011]. The following year Chang et al. looked at the performance of green funds in the USA. They concluded that green funds had under performed compared to conventional funds on a risk-adjusted basis [Chang et al., 2012].

Friede, Busch and Bassen (2015) conducted a meta study looking at 2200 individual studies on ESG criteria and financial performance. They concluded that an overwhelming majority of the papers examined find a non-negative relation between ESG and financial performance [Friede et al., 2015]. However it is important to note that this study looks at ESG generally, and not green funds specifically.

3.5.2 Norway

In 2018, a master thesis was written by two students at NMBU looking at Nordic green funds. All Nordic managed funds with an 'environmental focus' label from Morningstar.com was included in their sample. This label no longer exists. The students find no evidence of green funds to under perform. However, they find evidence to support that non-Nordic managed green funds under perform compared to Nordic managed green funds [Rønningen and Endresen, 2018].

3.6 Green finance in Norway

ESG concerns have become increasingly important for both providers and consumers of financial services in Norway. The insurance and banking company Storebrand's last ad campaign has a clear green focus. They call their campaign "good money", and state that they refuse to invest their clients money in companies contributing to destroying the world [Storebrand, 2019]. Many large Norwegian banks now offer green funds to their clients. The screenshot below is from DNB.no, and shows how DNB not only offers green funds, but also uses them as a part of their marketing strategy.



Figure 3.2: Screenshot from DNB.no [DNB.no, 2020d]

In December 2017, government owned Nysnø Klimainvesteringer was founded. The investment strategy of the fund is to "invest in companies that provide profitable and smart solutions to the challenges of climate change" [Nysnø.no, 2020a]. The founding of this fund, and the publicity it has generated, speaks to a growing conscience regarding green investing in the Norwegian society.

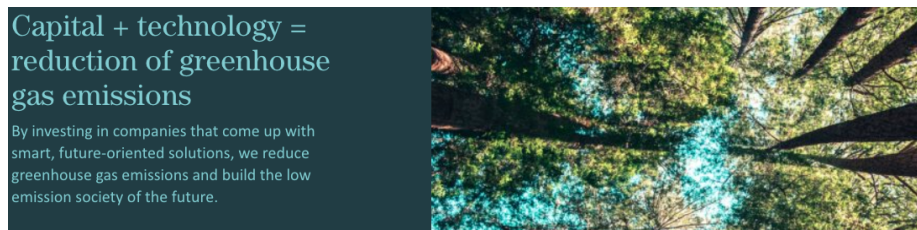


Figure 3.3: Screenshot from Nysnøinvest.no [Nysnø.no, 2020b]

Recently DNB announced that they will consider levels of emission and sustainability when deciding whether or not to give loans to businesses [Haugan, 2019]. ESG concerns will also influence the interest rate given. DNB's CEO Kjersti Braathen states that DNB now includes climate risk in their credit process [Haugan, 2019]. Firms that want financing in the future, will have to present measures for reducing their climate risk to potential lenders.

Customers on the private marked could also face various rates depending on how climate-friendly their housing is. Lenders have for some time offered loans

on better terms for clients buying electric cars compared to conventional cars. Recently multiple banks started offering better terms on mortgages if the house is energy effective, with an energy ranking of A or B.

3.6.1 Government Pension Fund Global

The Norwegian Government Pension Fund Global (GPFG), popularly referred to as the 'oil fund', has since 2014 annually published a rapport on responsible investment in addition to the annual rapport. In 2019 the fund had 79,4 billion NOK invested in environmental equity, with a return of 35,8% on these investments. The previous year the return on these investments was -8,3%, and the invested amount was 56,7 billion [NBIM, 2019] [NBIM, 2020]. Owning 1,5% of the worlds listed companies, investors world wide are paying attention as the fund develops. Increased green focus in the GPFG will not go unnoticed.

Norges Bank Investment Management (NBIM), which manages the GPFG, practice dialogue with companies to encourage good business practice. Using their voting rights is the preferred way of NBIM to support effective boards. In 2019 NBIM voted at 97,8% of shareholder meetings [NBIM, 2020]. Divestment is also used as a measure of moving the fund in a more responsible direction, and in 2019 NBIM divested from 42 companies.

With regards to calculating the fund's carbon footprint, NBIM follows the recommendations from the Task Force on Climatedrelated Financial Disclosures (TCFD). The TCFD has developed four widely adaptable recommendations for large asset owners and asset managers. The recommendations are divided into governance, strategy, risk management and metrics and targets. The recommendations generally revolves around describing the organizations risk and oversight regarding questions surrounding climate change [Bloomberg, 2017].

3.7 Green stock's weakness

One of the main weaknesses of green equity is that in time of uncertainty, investors are not willing to pay for future earnings. Nordea analyst Robert Næss states that when markets are optimistic, investors are willing to pay for earnings far into the future. Investors affected by uncertainty, however, looks for moderately priced companies with good earnings today [Kvale, 2020]. This makes green stocks vulnerable in times of uncertainty, as for instance in these times of a global pandemic.

Another weakness regarding green assets is that there is no universal applied standard separating green assets from SRI, ESG, or conventional assets. This can make it difficult for investors, managers and analysts navigating in the field of green finance.

3.8 Greenwashing

The term "greenwashing" was introduced by the American environmentalist Jay Westerveld in 1986. Westerveld was in Fiji when he noticed a hotel encouraging clients to reuse towels for environmental reasons. Westerveld claimed the practice only was a measure of reducing cost, and stated that the hotel was engaged in greenwashing [Rust, 2019]. Today, greenwashing is discussed in a number of industries.

Greenwashing reflects the practise where some firms creatively manage their public reputation with regards to hiding deviance, specially related to the environmental profile of the corporation [Laufer, 2003].

Equinor was accused for greenwashing in 2018 as a consequence of removing 'oil' from their name, changing it from "Statoil" to "Equinor". GreenPeace wrote about the name change: "a move which is nothing but greenwashing if they continue to explore for new climate change fuelling oil" [GreenPeace, 2018].

In January 2019, Equinor announced that they would cut their emissions from production to zero by 2050. This also made environmentalists accuse them of greenwashing, as emissions from the production of oil and gas only accounts for a small fraction compared to the emissions related to the use of the oil and gas [Milne, 2019].

In finance, the American asset manager BlackRock has been repeatedly accused of greenwashing. BlackRock has over the last years consequently voted against climate-related proposals from shareholders. Al Gore rhetorically asked in December 2019: "Do they want to continue to finance the destruction of human civilization, or not?" [Tett, 2019]. The public outcries have forced BlackRock to take action with regards to this, and in January 2020 they signed a petition together with 370 fund managers encouraging the heaviest emitters of greenhouse gases to reduce their environmental impact [Henderson, 2019].

The threat of being accused of greenwashing could push corporations to participate or initiate actual green projects. On the other hand, the fear of being accused for greenwashing could lead to managers refraining from promoting their good environmental choices [Lyon and Maxwell, 2011].

4 Data

4.1 Identifying the funds

For the analysis I want Norwegian green funds that describe themselves with words as green, environmental and ESG. As long as any of these words are mentioned in the investment strategy of the fund, the fund is included in the sample. The word 'sustainable' is in itself not enough to be included. Excerpts from the funds investment strategies can be seen in appendix A.

To determine which providers can be categorized as Norwegian I use Finansportalen's list of Norwegian funds. This list contains foreign financial institutions with offices in Norway (such as DanskeBank). It also contains institutions without Norwegian offices, but with funds easily accessible for Norwegian consumers (such as JP Morgan). The list excludes delisted funds, but this will not likely affect the results in a appreciable degree. I look through each financial institutions funds, and select the ones that match the criteria.

Surprisingly many established capital managers do not provide any funds with an environmental profile. For instance, Sparebank 1 SR-Bank is one of the asset managers that do not offer green funds to their customers.

4.2 The funds

I identify 33 funds describing themselves with words mentioned above. Of these 33, I am able to find price history for 23 of them. These 23 include:

Table 4.1: The green funds

Financial institution	Fund	Managed capital in	
		mNOK per	Fund identifier
		30.04.2020	
Alfred Berg	Humanfond	116	1
C WorldWide	Globale Aksjer Etisk	776	2
DNB	Miljøinvest	2231	3
DNB	Low carbon credit	2310	4
DNB	Barnefond	868	5
Fidelity Funds	Sustainable Global	11687	6
	Equity Fund		
Fidelity Funds	Sustainable Water	15299	7
	& Waste Fund		
Handelsbanken	Barekraftig Energi	5852	8
Handelsbanken	Global Selektiv	2901	9
Handelsbanken	Europa Selektiv	3053	10
Handelsbanken	Norden Selektiv	9202	11
JP Morgan	Europe Sustainable Equity Fund	2022	12
JP Morgan	Global Socially Responsible	719	13
KLP	AksjeGlobal Mer	1799	14
	Samfunnsansvar		
KLP	AksjeGlobal Mer	1762	15
	Samfunnsansvar II		
KLP	AksjeNorden Mer	672	16
	Samfunnsansvar		
Nordea	Klima og Miljø	29197	17
Parvest	Climate Impact	12523	18
PLUSS	Utland Etisk	23	19
Storebrand	Global Solutions	3937	20
Storebrand	Global ESG Plus	4217	21
Storebrand	Global ESG	2568	22
Storebrand	Norge Fossilfri	1148	23
Sum		114882	

Across these funds, there are different shades of (self described) green. The Fidelity Sustainable Water & Waste Fund for instance, has relatively weaker environmental screens. The investment objective of the fund states:

The fund adopts a Sustainable Thematic strategy which actively seeks to select companies involved in the design, manufacture, or sale of products and services used for or in connection with water and waste management sectors [...]. Sustainable characteristics may include but are not limited to effective governance and superior management of environmental and social issues ('ESG') [Fidelity.com, 2019]

This investment objective can be seen in comparison to Handelsbankens Bærekraftig Eneregi which has very clear environmental screens. Their objective states that the fund "invests globally in companies that contribute to reducing greenhouse gas emissions and energy efficiency" [Handelsbanken.no, 2020a]. We clearly see that the main objective here is to participate in lowering GHG emissions, while the Fidelity fund is more of a sector specific fund. Hence, the data set contains funds with different levels of environmental focus, but they all include it somehow in their investment objective.

4.2.1 Number of observations

The number of price observations varies a lot between the funds, from three to 205 observations. These limitations will greatly affect the results in a negative way. Numbers of observations per fund can be seen in table 7.3.

4.3 Development of the funds

The graph below describes the development in numbers of the Norwegian green funds included in the sample:

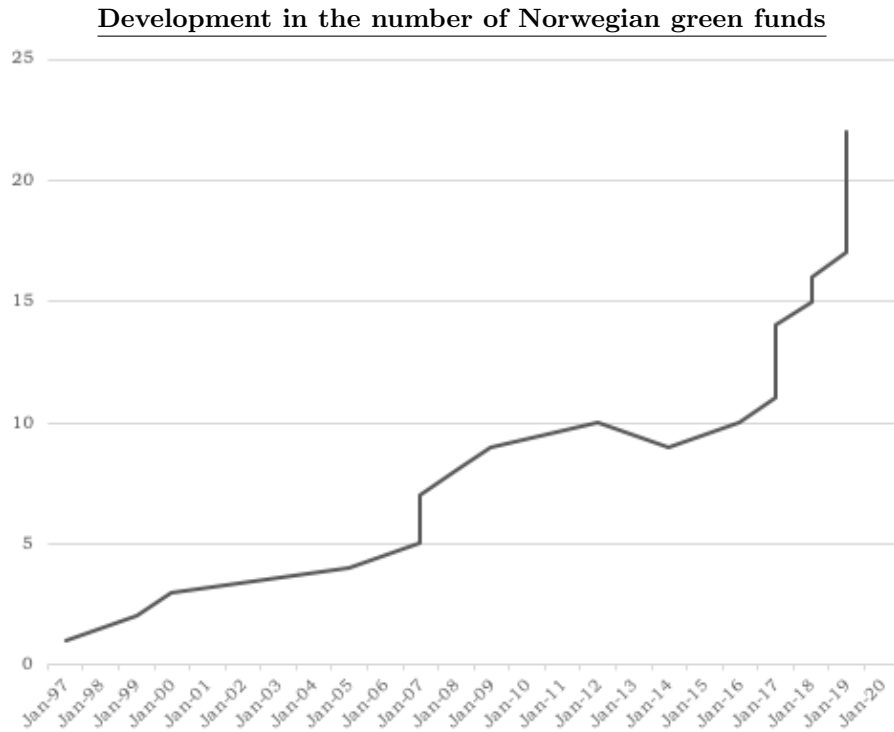


Figure 4.1: Number of Norwegian green funds

From the graph we clearly see that the number of Norwegian green funds have had a steady development from the late 90's and the following 10 years. There is a bump during the financial crisis. The last years the growth has been steeper than previously, showing a strong increase in the number of Norwegian green funds. We also see one fund liquidated in 2014. This is the only one in the sample that is not still active.

4.3.1 Managed capital

I calculate the managed capital of the funds per 06.05.2020. Some values are quoted in currencies other than NOK, and I use the exchange rate per 06.05.2020 to convert all values to Norwegian Krone. Exchange rates are gathered from the Norwegian Central Bank. The value of the assets managed by these funds is

per 06.05.2020 114,9 billion NOK. This is approximately 1% of the Norwegian Pension Fund Global.

5 Theory

To be able to compare the performance of green funds to different benchmarks I will use theory for evaluating mutual fund performance.

5.1 Treynor ratio

In 1966, the field of economics had experienced progress within three related topics - portfolio selection theory, capital asset pricing, and the behavior of stock-market prices. William Sharpe wanted to use this knowledge to further develop Treynor's predictor of mutual fund performance, the Treynor ratio [Sharpe, 1966] [Treynor, 1965].

The Treynor ratio was developed by Jack. L Treynor and was presented in the 1965 paper *How to rate mutual fund performance?* [Treynor, 1965]. The ratio is a measure of reward-to-volatility. More specifically, the ratio measures how much excess return is generated per unit of risk taken. In investment textbooks [Laopodis and Laopodis, 2012], the Treynor ratio is written:

$$\text{Treynor Ratio} = \frac{r_p - r_f}{\beta_p}$$

where

r_p = Portfolio return

r_f = Risk-free rate

β_p = Beta of the portfolio

5.2 Sharpe ratio

In Sharpe's 1966 paper he tries to extend Treynor's model from the previous year to "make explicit the relationships between recent developments in capital theory and alternative models of mutual fund performance and to subject these alternative models to empirical test" [Sharpe, 1966]. Sharpe received the Nobel Memorial Prize for Economic Sciences in 1990 for his work with risk adjusted

return. The Sharpe ratio is, as the Treynor ratio, a measure of reward-to-volatility. In investment textbooks [Laopodis and Laopodis, 2012], the Sharpe is written:

$$\text{Sharpe Ratio} = \frac{r_p - r_f}{\sigma_p}$$

where

$$\sigma_p = \text{Standard deviation of portfolio's excess return}$$

The Treynor ratio and the Sharpe ratio are similar in that they provide a measure for risk-adjusted return. The difference between them is that the Treynor ratio use systematic risk as the measure for risk, while the Sharpe ratio use the portfolio's standard deviation.

5.3 Jensen's alpha

Jensen's alpha provides a measure on the investment return compared to its required return, given market performance and risk [Damodaran, 2012]. An assets required return is calculated from the Capital Asset Pricing Model (CAPM). Jensen's alpha can be written:

$$\text{Jensen's alpha} = r_i - [r_f + \beta(r_m - r_f)]$$

where

$$r_m - r_f = \text{Market risk premium}$$

The model used for calculating the alphas:

$$r_p - r_f = \alpha + \beta[r_m - r_f] + e_i$$

where

$$e_i = \text{error term}$$

5.4 Risk-free rate

When calculating Jensen's alpha, Sharpe- and Treynor ratio, the risk-free rate is used to decide the excess return of the portfolio. Isolating the excess return

allows investors to account for profit generated from risk-taking activities.

The risk free rates used for the calculations are gathered from Bernt Arne Ødegaard's data base. The rates are forward looking monthly estimates based on government securities and NIBOR [Ødegaard, 2020].

5.5 Betas

The betas of the funds are collected from the Thomas Reuters Eikon tool.

5.6 Market risk premium

The market risk premium used when calculating Jensen's alpha is the excess monthly return from the Oslo stock exchange index, OBX. Monthly price observations for OBX are gathered from Investing.com [Investing.com, 2020].

6 Methodology

6.1 Benchmarks

I use two benchmarks, S&P500 and OBX, the Oslo stock exchange index. This is because these benchmarks are repeatedly used as benchmarks for the green funds. The data representing the benchmarks is gathered for the time period January 2003 until January 2020.

6.1.1 VICEX - curiosity benchmark

I also use VICEX, USA Mutuals Vitium Global Fund, as a trivial measure of comparison to the green funds. VICEX looks for "companies that derive a significant portion of their revenues from products often considered socially irresponsible" [MarketWatch.com, 2020], and "will invest at least 80% of its net assets [...] in equity securities of companies that derive a significant portion of their revenues from a group of vice industries that includes alcoholic beverages, defense/aerospace, gaming and tobacco industries" [YahooFinance.com, 2020].

6.2 Calculations

Below are some values representing fund number 1 that I will use to show my approach with regards to the calculations:

Figure 6.1: Example fund 1

<u>Fund</u>	<u>$r_{p1} - r_f$</u>	<u>σ_{p1}</u>	<u>β_{p1}</u>
1	0,84%	5,5%	0,85

Figure 6.2: Calculations example fund 1

$$\begin{array}{l|l} \text{SR} & \frac{r_p - r_f}{\sigma_p} = \frac{0,84\%}{5,5\%} = 0,15 \\ \text{TR} & \frac{r_p - r_f}{\beta} = \frac{0,84\%}{0,85} = 0,01 \end{array}$$

The alpha's are calculated by carrying out simple regressions where the fund's excess return is the regressand and the market premium is the regressor.

The estimated equation is:

$$\text{Portfolio excess return} = \alpha + \beta_1(\text{mkt risk premium})$$

7 Results

In this section I will report my findings. When calculating averages, funds with less than 12 monthly observations are excluded. This is due to the uncertainty associated with few data observations. Benchmarks refer to S&P500 and OBX, and excludes VICEX.

7.1 Return

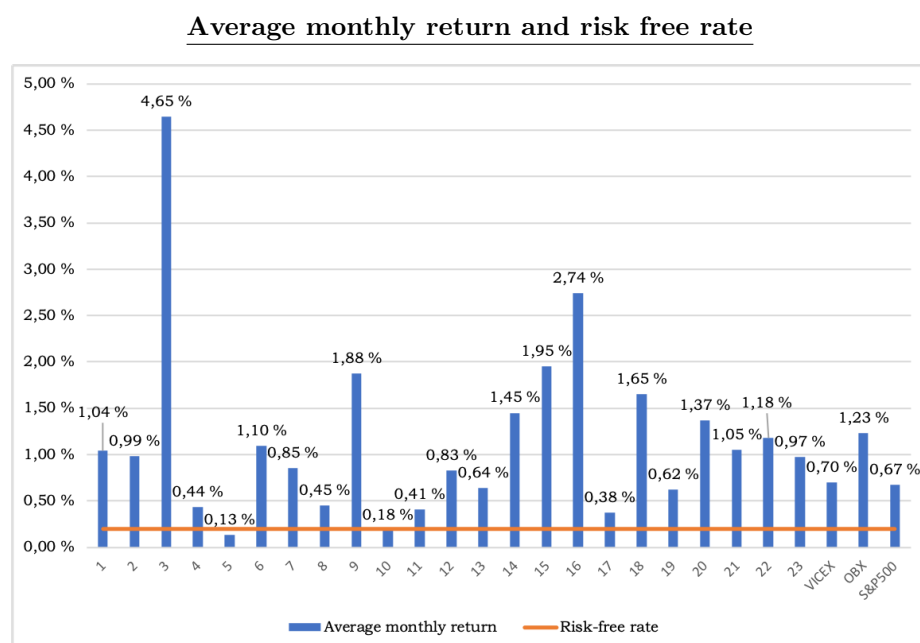


Figure 7.1: Average monthly return for the individual funds

Average rate of return for green funds and benchmarks

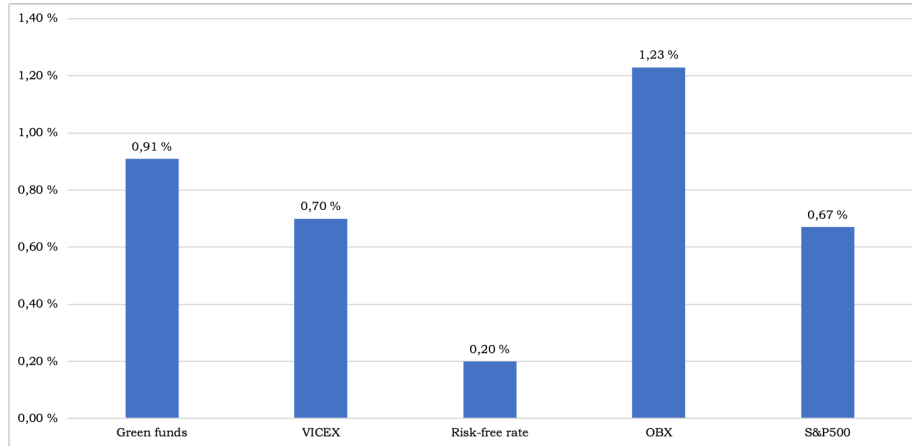


Figure 7.2: Average monthly rate of return for green funds and benchmarks

The average monthly return for the green funds is 0,91%, and 0,95% for the benchmarks. Hence, the return for the green funds is lower than for the benchmarks. The standard deviation is slightly lower for the benchmarks compared to the green funds. The average standard deviation for the green funds is 0,038, and 0,037 for the benchmarks. The green funds has a higher average monthly return than VICEX.

7.2 Sharpe ratio, Treynor ratio and Jensen's alpha

The Sharpe ratio (SR) are calculated for all green funds, both benchmarks and the VICEX fund. The Treynor ratio (TR) is calculated for the green funds that have available beta value in the Eikon data base, the benchmarks, and VICEX. Benchmarks have a beta of 1. Jensen's alpha is calculated for all green fund as well as the VICEX fund. In table 7.3, * = 10% level of significance, ** = 5% level of significance, and *** = 1% level of significance.

Figure 7.3: Results

<u>Fund</u>	<u>SR</u>	<u>TR</u>	<u>Alpha</u>	<u>Beta</u>	<u>First date</u>	<u>Last date</u>	<u># obs</u>
Alfred Berg Humanfond	0,1521	0,0099	-0,0020***	0,85	1/31/2003	12/31/2019	204
C Globale Aksjer Etisk	0,2030	0,0083	0,0041*	0,95	1/31/2003	12/31/2019	204
DNB Miljøinvest	0,8370	-3,0377	0,0756	-0,01	11/29/2019	12/31/2019	2
DNB Low carbon credit	0,4541	-	0,0042	-	6/28/2019	12/31/2019	7
DNB Barnefond	-0,1211	-0,0008	0,0029	0,79	6/28/2019	12/31/2019	7
FF Sustainable Global Equity	0,1823	0,0099	0,0003	0,91	1/31/2003	12/31/2019	204
FF Sust Water&Waste	0,2118	0,0067	0,0031	0,99	7/31/2017	12/31/2019	30
Handelsbanken Barekraftig Energi	0,7216	-	-0,0018	-	3/31/2008	9/30/2014	79
Handelsbanken Europa Selektiv	0,4714	0,0150	0,0073	1,12	1/31/2019	12/31/2019	12
Handelsbanken Global Selektiv	-0,0034	-0,0001	-0,0024	1,01	3/30/2007	12/31/2019	154
Handelsbanken Norden Selektiv	0,0439	0,0018	-0,0011	1,17	3/30/2007	12/31/2019	154
JPM Europe Sustainable Equity	0,2128	0,0062	0,0036	1,02	1/31/2017	12/31/2019	36
JPM Global Socially Responsible	0,1167	0,0038	0,0016	1,17	4/29/2005	12/31/2019	177
KLP Mer Samfunnsansvar	0,3444	0,0125	0,0125*	1,00	7/31/2018	12/31/2019	18
KLP Mer Samfunnsansvar II	1,5382	-	0,0177	-	9/30/2019	12/31/2019	4
KLP Mer Samfunnsansvar Norden	1,1486	-	0,0023	-	9/30/2019	12/31/2019	4
Nordea Klima og Miljø	0,0356	0,0017	-0,0024	1,07	12/31/2009	12/31/2019	121
Parvest Climate Impact	0,4488	-	0,0086	-	4/30/2019	12/31/2019	9
PLUSS Utland Etisk	0,1035	0,0042	0,0021	1,03	2/28/2007	12/31/2019	155
Storebrand Global Solutions	0,3768	0,0157	0,0094***	0,75	11/30/2012	12/31/2019	86
Storebrand Global ESG Plus	0,2559	0,0089	0,0054	0,96	5/31/2017	12/31/2019	32
Storebrand Global ESG	0,2911	0,0100	0,0072	0,98	10/31/2017	12/31/2019	27
Storebrand Norge Fossilfri	0,3802	0,0123	0,0044*	0,63	5/31/2017	12/31/2019	32
VICEX	0,1147	0,0047	0,0041	1,07	1/31/2003	12/31/2019	204
OBX	0,1821	0,0103	-	1,00	1/31/2003	12/31/2019	204
S&500	0,1224	0,0048	-	1,00	1/31/2003	12/31/2019	204
Average benchmarks	0,1523	0,0076					
Average green funds	0,2412	0,0079					

8 Discussion

In this section, when referring to benchmarks, this includes S&P500 and OBX, and does not include VICEX.

8.1 Weaknesses

A significant factor that inhibits the value of these results is that the price history observations for the funds are quoted for various time periods. For instance, the calculations for some funds are based on 204 observations, while others are based on five or less observations. This speaks to the general lack of data regarding green funds, but especially with regards to Norwegian green funds. The absence of existing research on Norwegian green funds can be seen in the context of insufficient data.

There is no exact standard for what a green fund is. It is up to managers and investors whether a fund is green or not. This makes it difficult to navigate when identifying green funds to analyze. I chose to include funds marketing themselves as green. However, there are numerous ways that this could be done, and that would in all likelihood have affected the results.

8.2 Interpretation

8.2.1 Sharpe ratio

The Sharpe ratio for the different green funds varies from -0,12 to 1,5. Negative Sharpe ratios occur when the portfolio return is below the risk free rate. Only two of the green funds have negative Sharpe ratios. The average Sharpe ratio of the benchmarks is 0,15, which is somewhat smaller than the average Sharpe ratio of the green funds, at 0,24.

8.2.2 Treynor ratio

The Treynor ratio is calculated for 18 of the 23 green funds in the data set. This is because of absence of beta values for 5 of the green funds. The average Treynor ratio of the green funds is 0,0079. Treynor ratio for VICEX is 0,005, and 0,0076 for the benchmarks.

We see that the green funds slightly over perform compared to the benchmarks and VICEX. This means that when the systematic risk is used as the risk-measure when measuring risk-adjusted performance, green funds are preferred to the benchmarks.

8.2.3 Beta

What is more interesting with regards to Treynor's ratio than the actual number is the betas of the funds.

The average beta of the green funds and the beta of the VICEX is close to one. The green funds have an average beta of 0,91, and VICEX has a beta of 1,07. Hence, they differ from 1 with respectively 0,09 and 0,07. The green funds have a beta slightly below 1, which means that the prices of the green funds are a bit steadier than most stocks. VICEX, however, has a beta slightly higher than 1 which indicates that the price swings a bit wider compared to most stocks. A low beta does not necessarily mean that a fund has low volatility. A smaller than 1 beta for the green funds suggests that green funds has a low market-related risk.

Only one of the green funds has a negative beta value. This suggests that green funds generally are positively correlated with the market. The beta for fund three is -0.01, suggesting that the fund slightly moves in the opposite direction of the market. However, the beta is very close to zero.

8.2.4 Jensen's alpha

The average Jensen's alpha of the green funds is 0,003. This suggests that on average, monthly return of the green funds are 0,3% higher than that predicted by the CAPM. Jensen's alpha for VICEX is 0,004, this is higher than the average for the green funds. Five of the green funds have negative alpha values, and all of these includes more than 12 observations.

The green funds slightly over perform compared to the benchmarks with regards to Sharpe ratio, Treynor ratio and Jensen's alpha. With regards to the ethical attributes of the green funds, in addition to the performance, one could easily argue that these are preferred to index funds, given certain ethical standards for an investor.

9 Summary

The question whether imposing environmental screens to funds investment strategy is beneficial with regards to performance is debatable. Whether social screens affect financial performance has important implications for investors as demand for green funds is increasing. This thesis evaluates the risk-adjusted performance of Norwegian green funds, mainly using Sharpe ratio, Treynor ratio and Jensen's alpha. The analysis suffers from limited data on these types of funds. Lack of available data underlines the fact that Norwegian green funds are a relatively new phenomenon. There is no doubt that research on this topic will be increasing in the future.

The results show, almost unambiguously, evidence of Norwegian green funds to outperform the market, as well as the trivial measure of comparison, VICEX. Some researchers, like Climent and Soriano (2011) finds evidence that environmental screens are of little significance with regards to performance. However, the results of this thesis are in contrast with most existing research on green funds. In that sense, the results from this thesis are interesting. But, due to the scarcity of numbers of funds, as well as the big difference in the amount of data for the 23 green Norwegian funds, the results cannot be ascribed much significance.

In sum, considering the ethical attributions of green funds, I find no evidence to refrain from investing in Norwegian green funds, especially given certain ethical standards for the investor.

There is no doubt investment choices are becoming increasingly affected by the environmental profile of both individual companies as well as mutual funds. For investors with a long horizon it is becoming impossible to overlook how assets adapt to the transition to a greener economy.

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A Appendix - Description of the funds

Banco Humanfond Open Fund - Fund #1

- Launch date 23.12.1999
- ”Banco Humanfond er et ideelt aksjefond med etisk investeringsprofil. Fondet investerer ikke i selskaper som produserer våpen, alkohol og tobakk og selskaper som bryter vesentlige etiske kriterier som omfatter menneskerettigheter, barnearbeid, arbeidsmiljø og miljø” [Skagenfondene.no, 2020a].

C WorldWide Globale Aksjer Etisk - Fund #2

- Launch date 01.09.2012
- ”C WorldWide Globale Aksjer Etisk vil spesifikt unngå investeringer i selskaper som har hovedaktiviteter knyttet til utforskning, produksjon, utvinning, raffinering, transport, lagring og generering av kraft fra termisk kull, olje og gass” [CWorldWide.com, 2020].

DNB Miljøinvest - Fund #3

- Launch date 06.11.1989
- ”DNB Miljøinvest er et aktivt forvaltet aksjefond som hovedsakelig investerer i selskaper som bidrar til å redusere energirelaterte klimautslipp, notert på børser og regulerte markeder over hele verden” [DNB.no, 2020c].

DNB Low carbon credit - Fund #4

- Launch date 02.05.2019
- ”Fondet har en miljøprofil og vil blant annet søke å holde karbonintensiteten lav i forhold til referanseindeksen ved å inkludere analyser av selskapers klimagassutslipp i porteføljekonstruksjonen” [DNB.no, 2020b].

DNB Barnefond - Fund #5

- Launch date 17.02.1997

- ”Fondet investerer ikke i selskaper med direkte eksponering til fossilt brensel eller i selskaper med høy grad av klimagassutslipp” [DNB.no, 2020a].

Fidelity Funds - Sustainable Global Equity Fund - Fund #6

- Launch date 22.07.2017
- ”The fund invests in companies with sustainable returns, strong ESG characteristics and attractive valuations” [Fidelity.lu, 2020a].

Fidelity Funds - Sustainable Water&Waste - Fund #7

- Launch date 07.11.2018
- ”The fund seeks to integrate environmental, social, and governance (ESG) issues in its investment and risk monitoring process which leads to superior sustainable characteristics of the overall portfolio” [Fidelity.lu, 2020b].

Handelsbanken Bærekraftig Energi - Fund #8

- Launch date 08.10.2014
- ”Bærekraftig Energi er et aktivt forvaltet fond med et entydig fokus på bærekraft. Fondet investerer i aksjer utstedt av selskaper over hele verden som utvikler eller benytter teknologi og metoder med formål å begrense den globale oppvarmingen” [Handelsbanken.no, 2020b].

Handelsbanken Europa Selektiv - Fund #9

- Launch date 17.10.2014
- ”Fondet plasserer i forhold til spesielle bærekraftskriterier der blant annet internasjonale standarder og normer for miljø, samfunnsansvar og eierskapsstyring tas i betraktning” [Handelsbanken.no, 2020c].

Handelsbanken Global Selektiv - Fund #10

- Launch date 14.12.2018

- ”Fondet bruker en utelukkelsesstrategi til selskaper som opererer innen fossilt brensel, militærutstyr, tobakk, cannabis, alkohol, kommersiell gambling og pornografi. Fondet kan imidlertid investere i selskaper som er involvert i kraftproduksjon, distribusjon eller tjenester knyttet til fossilt brensel i de tilfellene hvor selskapene anses å forandre sin virksomhet til mer fornybar energi” [Handelsbanken.no, 2020d].

Handelsbanken Norden Selektiv - Fund #11

- Launch date 08.10.2014
- Same investment strategy as Handelsbanken Global Selektiv and Handelsbanken Europa Selektiv [Handelsbanken.no, 2020e].

JPM Europe Sustainable Equity - Fund #12

- Launch date 15.12.2016
- ”To provide long-term capital growth by investing primarily in European Sustainable Companies or companies that demonstrate improving sustainable characteristics. Sustainable Companies are those that the Investment Manager believes to have effective governance and superior management of environmental and social issues (sustainable characteristics)” [jpmorgan.com, 2020a].

JPM Global Socially Responsible - Fund #13

- Launch date 31.03.2005
- ”To provide long-term capital growth by investing primarily in companies globally that the Investment Manager believes to be socially responsible. Uses negative screening to exclude specific companies. Companies from remaining sectors are assessed for certain corporate, social and environmental attributes prior to inclusion” [jpmorgan.com, 2020b].

KLP AksjeGlobal Mer Samfunnsansvar - Fund #14

- Launch date 12.06.2018
- ”KLP AksjeGlobal Mer Samfunnsansvar investerer bredt globalt i aksjer som blir rangert høyt på kriterier innen miljø, sosial ansvarlighet, eierstyring og selskapsledelse. Fondet skal unngå investeringer i fossil energi” [klp.no, 2020a].

KLP AksjeGlobal Mer Samfunnsansvar II - Fund #15

- Launch date 27.09.2019
- Same investment strategy as KLP AksjeGlobal Mer Samfunnsansvar [klp.no, 2020b].

KLP AksjeNorden Mer Samfunnsansvar - Fund #16

- Launch date 24.09.2019
- Same investment strategy as KLP AksjeGlobal Mer Samfunnsansvar [klp.no, 2020c].

Nordea Invest Klima og Miljø - Fund #17

- Launch date 13.03.2008
- ”investerer globalt i selskaber, der direkte eller indirekte er beskæftiget med aktiviteter til forbedring af klima og miljø. Der investeres især i selskaber indenfor alternativ energi, ressourceoptimering og miljøbeskyttelse [nordeainvest.dk, 2020].

PARVEST Climate Impact - Fund #18

- Launch date 11.12.2009
- ”The Fund seeks to increase the value of its assets over the medium term by investing in shares issued by companies with business in activities focused on enabling the adaptation to, or mitigation of, climate change” [bnpparibas am.lu, 2020].

PLUSS Utland Etisk - Fund #19

- Launch date 17.10.2006

- ”Fondet investerer i internasjonale aksjer i henhold til anerkjente etiske retningslinjer” [fondsforvaltning.no, 2020].

Storebrand Global Solutions - Fund #20

- Launch date 01.10.2012
- ”Storebrand Global Solutions er et fossilfritt aksjefond som har som mål å oppnå langsiktig meravkastning ved å investere i globale aksjemarkeder, inkludert fremvoksende markeder. Fondet investerer i bærekraftige selskaper som vi mener er godt posisjonert for å løse utfordringene knyttet til FNs bærekraftsmål” [Storebrand.no, 2020b].

Storebrand Global ESG Plus - Fund #21

- Launch date 27.04.2017
- ”et fossilfritt indekxnært aksjefond som hovedsakelig investerer i aksjer notert i utviklede aksjemarkeder i Nord-Amerika, Europa og Asia. Fondet følger Storebrands standard for bærekraftige investeringer, som innebærer at en rekke selskaper utelukkes fra investeringsuniverset” [Storebrand.no, 2020a].

Storebrand Global ESG - Fund #22

- Launch date 13.09.2017
- ”Et utvidet bærekraftsfokus oppnås ved å investere i selskaper med høy bærekraftsrating, og unngå de med lav rating” [Skagenfondene.no, 2020b].

Storebrand Norge Fossilfri - Fund #23

- Launch date 27.04.2017
- ”Fondet avstår [...] fra å investere i selskaper som har sin hovedvirksomhet knyttet til olje- og gassutvinning og annen relatert virksomhet” [Morningstar.no, 2020].

B Appendix - Standard deviation of the funds

Table B.1: Standard deviation (SD) of the funds

<u>Fund</u>	<u>SD</u>
1	0,0558
2	0,0394
3	0,0533
4	0,0057
5	0,0496
6	0,0316
7	0,0228
8	0,0632
9	0,0343
10	0,0411
11	0,0494
12	0,0294
13	0,0391
14	0,0362
15	0,0113
16	0,0220
17	0,0503
18	0,0318
19	0,0418
20	0,0312
21	0,0335
22	0,0335
23	0,0201
VICEX	0,0359

C Appendix - Regression parameters

Table C.1: Regression parameters

<u>Fund</u>	<u>Alpha</u>	<u>Beta</u>	<u>p-value</u>	<u>R²</u>
1	-0,0020	1,0042	0,0000	0,9996
2	0,0041	0,3641	0,0820	0,2807
3	0,0756	-3,0163	-	1,0000
4	0,0042	-0,1229	0,1554	0,1177
5	0,0029	-0,1255	0,3021	0,1186
6	0,0003	0,8440	0,7494	0,9382
7	0,0031	0,4699	0,5550	0,2461
8	-0,0018	0,7595	0,6504	0,6808
9	0,0073	1,0222	0,4399	0,4221
10	-0,0024	0,3413	0,4648	0,4165
11	-0,0011	0,6437	0,6845	0,5550
12	0,0036	0,4609	0,4363	0,2244
13	0,0016	0,3911	0,5095	0,3256
14	0,0125	0,6503	0,1032	0,3317
15	0,0177	0,0262	0,2555	0,0011
16	0,0023	0,6355	1,5267	0,9632
17	-0,0024	0,6366	0,5593	0,2532
18	0,0086	1,1663	0,3236	0,5519
19	0,0021	0,4715	0,4163	0,4160
20	0,0094	0,4177	0,0039	0,1732
21	0,0054	0,4714	0,3432	0,2050
22	0,0072	0,6375	0,1965	0,3535
23	0,0044	0,4869	0,0803	0,5907
VICEX	0,0041	0,0853	0,1856	0,0122

