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Are sustainable funds sustainable in terms of return?

- A study on the Swedish fund market

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Are sustainable funds sustainable in terms of return? - A study on the Swedish fund market

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Abstract

Sustainable investments have become a highly popular choice amongst private investors over the last decades and the number of alternatives has increased on the Swedish market. Sustainable funds have become one of the more popular options for Swedish investors that looks for sustainable investment options. Sustainable funds should however not be able to compete with conventional funds, according to the modern portfolio theory. The theory state that sustainable funds should perform a lower return than conventional funds due to placement restrictions. Previous studies about sustainable funds are inconclusive on how sustainable funds have performed compared to conventional ones.

This research aims to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted return on the Swedish market. Through a matched pair approach, 13 sustainable and 13 conventional funds were analyzed during a 6-year period between 2013 and 2018. The performance of the two fund categories were evaluated with Sharpe ratio, Treynor ratio and Jensen's alpha to measure their risk-adjusted return. The performance of these funds was tested over time as well as during sub-periods of 2 years each. The results of this study indicate that the conventional funds performed a higher risk-adjusted return during the full sample period. The sustainable funds however performed a higher risk-adjusted return during the last sub-period between 2017 and 2018. However, there was no significant difference between sustainable and conventional funds during the full sample period or the sub-periods. Therefore, private investors can expect sustainable and conventional funds to yield the same risk-adjusted return over time.

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1 Introduction

One of the more popular topics in today's society is climate change and there is no doubt that mankind wants to live in a world that is sustainable in social, economic and environmental terms. Unfortunately, the world is far from sustainable and this is partly due to the large effect of economic growth in the last two centuries (Bureau of Economic Analysis, 2018). To cope with the challenges towards a more sustainable world the United Nations (UN) has developed 17 goals and a target to achieve each goal by 2030 (UN, 2019). The goals presented by the UN are a blueprint of how to reach a more sustainable future for everyone. UN's Sustainable Development Goals (SDG) address challenges towards a more sustainable future that involves environment degradation, climate and inequality all around the world (ibid.).

Consumption is one of the factors for rising temperatures that affect our ecosystems and also leads to more waste, polluted land, air and water that has a negative impact on our climate (UNEP Finance, 2019). Climate change is of high importance and a threat to mankind and climate change has led to rising temperatures which has a negative impact on our environment (ibid.). In order to fight climate change and the problem with rising temperatures, our society needs more sustainable businesses (ibid.). Studies use the concept of Overshoot Day to show how much we actually consume and how it has developed over the years (WWF, 2019). Overshoot Day illustrates and represents the day that humanity has exhausted the budget of natural resources for one year (ibid.). In 1970 this day was on the 29th of December when looking at our global footprint on a global level (ibid.). In 2019, Overshoot Day has already passed, July 29th was the day when we overshoot our budget globally and in Sweden, we reached our limit for consumption on the 3rd of April. Consumption is often synonymous with economic growth, but studies clearly show that our behavior is not sustainable and that we have to use other ways to reach sustainable economic growth (Nordea Markets, 2018).

The economic growth that characterized the world during the past century has also contributed to a better standard of living for most of us. The development has also led to negative impacts such as the depletion of environmental resources and pollution (Chapin et al., 2010). Negative impacts on the environment have been a hot topic during recent years and this has forced companies to take more responsibilities towards the environment (Carroll, 1999). Corporate Social Responsibility, or CSR, is a term developed in the 1950s and has gained plenty of attention during recent years (ibid.). CSR has become increasingly important with focus areas such as local development, human rights and sustainable environmental actions that are of significant importance for a company's marketing and image (ibid.). The development of CSR has shown that a long-term relationship towards sustainable questions is of high importance and that companies have to consider the resource needs for future generations (Eccles, Ioannou & Serafeim, 2014)

In order to shift our economic development and to reach a sustainable future, huge investments will be needed, and our society cannot wait (IPCC, 2018). According to the Intergovernmental Panel on Climate Change or IPCC, investments of 2 400 billion U.S. dollars a year until 2035 will be needed for us to reach the goal of a maximum increase of 1.5 degrees in global warming (ibid.). That is seven times more than the invested money that was used for renewable energy in 2017 (Bloomberg, 2018). In 2018, global funding for renewable energy decreased with 8 percent in total while an increase of 27 percent could be seen in Europe. (Bloomberg, 2019). One might ask where we can find the money needed in order to reach the goal of IPCC with calculations for sustainable future and investments in clean energy. IPCC (2018) suggests that one way would be to charge companies and customers for their actual depletion of resources and carbon footprint with taxes added to the service or product. Furthermore, the report from

IPCC (2018) states that the taxes have to be significantly higher than today's taxes and that implementing these will not be easy for politicians. Another suggestion is to shift money from unsustainable investments to more sustainable investments with help from policymakers and the financial industry (ibid.).

Since the pressure regarding CSR from consumers has increased, companies on the financial markets have followed and developed ethical investment options that have become popular among investors (Riedl & Smeets, 2017). In addition to the driving force from CSR, which probably has been the main driver in the business sector, parts of our society have pushed for ethical and responsible investments since the 1960s (Sandberg & Nilsson, 2017). Today almost all bigger companies in Sweden work with CSR and use a lot of energy to show this to their customers (ibid.). In the financial sector, the more common term for social responsibility work is defined as Social Responsible Investments (SRI), investments with social responsibility in mind (ibid.). SRI has increased significantly during the past years from 17 trillion U.S. dollars in 2014 to almost 31 trillion U.S. dollars in 2018 and stands for over 25 percent of all global invested capital (GSIA, 2018). Within the category of SRI, there are several underlying categories such as ethical, sustainable and green investments that are available for the customer (Sandberg et al, 2009).

In recent years, sustainable investments have increased in Sweden and Scandinavia is seen as frontrunners when it comes to sustainable investments (McCallin & Webb, 2004). Investors today also focus more on long-term regarding their overall investments and this has shifted their strategy towards more sustainable investments that will favor our society in the future (ibid.). Sustainability has become a popular topic among us and because of the UN's SDG politicians have shifted more focus on sustainable investments (Sandberg & Nilsson, 2017). The popularity of sustainable investments has forced banks and other financial institutions to follow the trend (McCallin & Webb, 2004).

In 2018, a new law was introduced in Sweden which forces every fund on the Swedish financial market to provide information regarding their sustainable declaration (Fondbolagens förening, 2017). With this information, it is much easier for investors to choose an alternative that suits his/her sustainability preferences and to compare different sustainability options (ibid.). Changes in the financial sector have also been brought up by the European Union (EU) that legislated a package in 2018 that will contribute towards more sustainable and responsible investments to fight climate change (European Commission, 2018). The EU states that the current investments in sustainable development are not enough and that more money is needed to change the system and that investments from private investors are necessary (ibid.).

1.1 Problem background

In the financial market, there are plenty of ways to invest money with the purpose of economic return in the long run. To invest in a fund is a way for private investors to gain value creation from the stock market and also diversify the risk. Funds allow private investors and financial institutes to invest money in their portfolio with several stocks in companies that are listed on the stock exchange. (Fondbolagens förening, 2018)

Funds are not a new phenomenon, it dates back to the early 18th century and was first introduced in the Netherlands. Funds were around for almost 220 years before they got popular and in 1920, the American fund market exploded as a result of the stock market boom. Equity funds as we know them today have been developed during more recent years and got popular in the 1950s in America. In Sweden, funds started to increase during the 1970s due to lower taxes that made it more profitable to save and invest in funds. The first funds in Sweden were

only investing money into companies that were active on the Stockholm Stock Exchange and have since then developed through the years. Today there are several different kinds of funds to invest in, interest funds, equity funds, hedge funds and hybrid funds that all allow investment in companies all over the world. (Fondbolagens förening, 2018) This study will only focus on equity funds on the Swedish market.

Since the 1970s funds have not only seen a rapid increase in Sweden but also the rest of the world (Fondbolagens förening, 2018). Since 1979, when the Swedish Investment Fund Association has founded the total savings in funds have increased from 1 billion to 4423 billion Swedish Krona in March 2019 (Fondbolagens förening, 2019a). Many factors have been helpful to achieve this level of wealth in funds and one of them has been the average increase of 15,8 percent per year on the Stockholm Stock Exchange (ibid.). Another big factor in the high increase of net assets of funds in Sweden has been the high rate of new savings which have been an average of 41 billion a year during the same time, around 40 percent of the total increase in net assets (ibid.).

Net assets of funds in America stands for almost 50 percent of the total fund assets in the world, Europe comes in second place with around 33 percent (Fondbolagens förening, 2018). When focusing on the Swedish Fund Market, Sweden is quite unique with a large range of different funds and a large proportion of savings in funds. Eight out of ten people have invested money in funds and if we include savings through the Swedish pension system almost everyone in Sweden has savings in funds (Fondbolagens förening, 2019a).

On the Stockholm Stock Exchange, there has also been more and more popular to invest in ethical, sustainable and responsible funds. Sustainable or responsible funds are an umbrella term for funds that invest in companies that work with environmental and societal challenges. Sustainable funds can be divided into three subcategories when selecting companies, to include, to exclude and to impact. To include companies in the fund can be called a first step to becoming a more sustainable fund, i.e. companies with specific criteria for environmental, social or ethical challenges. The next step is to exclude certain sectors or companies with unsustainable businesses from the fund, for example, companies that work within industries like tobacco, arms or pornography. The last step is to use the influence of the fund to invest and make an impact on companies that work towards sustainability, to make the production more eco-friendly or better working conditions for the employees. (Fondbolagens förening, 2019b)

The purpose of sustainable funds is to invest and interact with companies that will benefit our society in a positive manner (Kreander et al., 2005). In doing so, funds will have restrictions on which companies they can invest in and not (ibid.). The guidelines for investing in sustainable companies and pick them to be a part of a sustainable fund portfolio makes sustainable funds less able to diversify the fund since there will be fewer options (ibid.). Sustainable funds should therefore not be able to compete in risk-adjusted returns with conventional funds with no diversification restrictions according to Markowitz (1952). Markowitz (1952) states that investors and fund managers should always seek to diversify in order to reach the best possible yield on the investment.

Previous studies show that sustainable investments and funds, in particular, will generate a lower average return on your investment than if you would have invested in conventional funds (Chang, Nelson & Witte, 2012). In Do green mutual funds perform well? Chang, Nelson and Witte (2012) compared the financial performance of 131 green funds with conventional funds. Their findings were that sustainable funds generated an average lower return than conventional funds with similar risk (ibid.). According to Markowitz (1952), an investor will make fully

rational investment decisions and always invest in the asset that will give the largest return on invested capital. Even fifty years later, Rubenstein (2002) agrees that a fully rational investor would follow Markowitz portfolio theory and only consider profit when choosing funds. In contrast to this, only 13 percent of the participants in a European survey answered that they invested in sustainable funds because they thought it will give a higher return than conventional funds (Eurosif, 2018). According to this survey, a larger part of investors, therefore, goes against Markowitz (1952) and will choose a sustainable fund of other reasons than the expected rate of return.

As mentioned earlier Chang, Nelson and Witte (2012) found that sustainable funds in America produced a lower rate of return than conventional options. The study presents one explanation to this being that the sustainable funds have a higher management fee than a conventional fund, which will affect the investor's return (ibid.). Hong and Kacperczyk (2009) state that sustainable funds will not receive the same rate of return as conventional funds since those options invest in unethical industries that generates a higher return. Furthermore, the authors explain that the lower rate of return is due to the limited options for the fund managers to invest in (ibid.). The findings in their study get backed up by Markowitz's portfolio theory that states that diversification will lower the risk of the fund and help it achieve maximized return (Markowitz, 1952). When the option is limited by an investor, only choosing sustainable funds in their portfolio, the fund will not be as diversified as a conventional fund which can lower the risk to a larger extent and therefore get a higher return as a result (ibid.).

Some of the previous studies in this area have not been able to prove that sustainable funds performed worse than conventional funds in terms of return (Utz et al., 2014; Bauer, Koedijk & Otten, 2005). The same result is found on the European market by Cortez, Silva and Areal (2012) when they compare sustainable funds to conventional funds, the study shows no evidence of underperformance. A study made by Kreander et al. (2005) in the British, Swedish, Dutch and German fund market, also came to the conclusion that there is no statistical significance of differences in regard to performance when evaluation conventional and sustainable funds.

Contradictory to Chang, Nelson and Witte (2012) and Hong and Kacperczyk (2009), a study on the Swedish market finds that investors can go with a sustainable fund and also get a higher return (Morningstar, 2015). A study made by Mallin et al. (1995) did also find proof for a better return on sustainable funds than in conventional funds on the market in the United Kingdom. Also, more recent studies on the American and European fund market find proof for better returns from investors choosing sustainable funds over conventional ones (Ito, Managi & Matsudas, 2013).

As mentioned above, several different studies have found differences in the result when looking at sustainable funds and their performance in terms of return. Given that no previous research has taken a deep dive into the sustainable options on the Swedish fund market makes it interesting to study this issue. What further makes Sweden interesting is that McCallin and Webb (2004) consider the Swedish capital market to be a frontrunner when it comes to sustainable investment, something that might have an effect on the performance of the funds.

1.2 Aim and delimitations

The aim of the study is to contribute to previous findings regarding sustainable funds and to analyze the performance of sustainable funds on the Swedish fund market. This research aims to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted return. The author will analyze if placement restrictions for sustainable funds will have an effect on the return when compared to conventional funds without restrictions.

This thesis will have the following research questions:

- Is there any difference in risk-adjusted return between sustainable and conventional funds?
- Do restrictions for sustainable funds have a negative impact on the fund's risk-adjusted return?

The stated research questions will be answered by comparing the empirical data about funds on the Swedish market with the theoretical framework. The empirical data that is used in the research comes from an objective secondary source.

This study aims to investigate sustainable funds on the Swedish market. The research is excluding foreign funds and contains only Swedish equity funds with placements of at least 70 percent in Swedish companies. The reason for a limit at 70 percent is that a higher level of Swedish companies in the funds will affect the possible selection of funds and the sample will be too small. With the focus on the Swedish market, this study aims to fill a gap in the field of sustainable investments since there has been little to no studies about how diversification restrictions effect returns for sustainable funds. The funds analyzed in this study have a rating from Morningstar Sustainability Rating that is based on sustainalytics ESG-score. The study is limited to analyzing fund performance during a research period between 2013-01-01 to 2018-12-31. Furthermore, the study contains 13 sustainable funds which will be compared to 13 of their conventional peers, funds that are matched in a matched pair approach.

2 Theoretical background and literature review

When managing funds, a fund manager puts money into a portfolio of assets that create a fund (Elton & Gruber, 1997). Gathered stocks or financial assets in a portfolio are supposed to give a return on the invested capital (ibid.). Fund managers normally invest the capital in several different assets and stocks which makes the portfolio diversified and lowers the risk compared to investing in one single asset (ibid.). Markowitz (1952) explains the relationship between risk and diversification with his modern portfolio theory which has become of high importance when evaluating financial investments. Miller and Modigliani (1961) further developed the theory that Markowitz developed, labeling it their theory of the rational investor. In their theory, they assume that all investors have perfect information and know exactly how to get the maximized return on invested capital. A couple of years later the CAPM, Capital Asset Pricing Model was developed by Sharpe (1964) who was highly influenced by earlier theories developed by Markowitz (1952) and Miller and Modigliani (1961). Sharp focused on the underlying assets and connected the value to the capital market with CAPM. The CAPM model, rational investor theory and the model portfolio theory all arrive at the same conclusion, that diversification is preferred when trying to reach as high a return as possible. When investing in different asset the investor can lower the overall risk and reach maximum profit given a certain risk (Markowitz, 1952).

2.1 Modern portfolio theory

Modern portfolio theory was founded by Harry Markowitz in his article on Portfolio Selection that The Journal of Finance published in 1952. The article has gained a lot of attention since its publication it is still relevant today, almost seventy years later. Markowitz's article is mainly built on his idea that an investor can use diversification to their advantage when choosing assets for a portfolio and therefore get a higher risk-adjusted return on assets (Markowitz, 1952). By having several different assets in different kinds of branches the total risk in the portfolio will be reduced through risk diversification. A private investor or a portfolio manager can use the relationship between risk and return to optimize their investments and maximize the return given a certain level of risk. Markowitz describes that it is of high importance to analyze how the selected assets correlate to each other and how their relationship or connection will affect the return and risk of the whole portfolio. Furthermore, Markowitz states that by investing in assets of different kinds with no direct covariance the result will be optimized risk-adjusted return for the investor. With the modern portfolio theory and by using the strategy developed by Markowitz (1952), anyone can reach a maximized profit given a certain risk in a portfolio. This theory will also be possible to use for private investors and portfolio managers interested to invest in funds since the range of selection in funds will create an almost infinite number of combinations with funds in the portfolio. The possible outcome for a private fund investor should, therefore, be that one might actively select different funds, diversify their portfolio to lower the risk and to maximize the profit of the invested capital.

In the theory presented by Markowitz (1952), there are two main assumptions that have an impact on the whole theory. Markowitz (1952) states that every investor wants to achieve as high a return as possible with as low risk as possible. The second assumption made in the theory is that every investor will act fully rational and act as the economic man in their investment decisions (ibid.). With these two assumptions, the investor will always choose investment options that have a lower risk, given that the two options have the same return. According to Markowitz (1952), there are no reasons for an investor to choose an option with a higher risk. With higher risk comes a higher expectancy of return, the two measurements relate to each other and investors want to get paid for the risk they take (Markowitz, 1952).

The author will use risk as a measurement throughout this thesis and will measure the risk with the help of standard deviation. Standard deviation will show how much variation in return the funds or portfolios are expected to have. With a low standard deviation, the variation is expected to be low and with a high standard deviation, the variation in return is expected to be high. Markowitz describes that there are two types of risks when investing, systematic risk and unsystematic risk. The systematic risk or portfolio risk cannot be eliminated or diversified away and will always be there due to certain macroeconomic aspects. The unsystematic risk or also known as diversifiable risk is the risk one can lower with help from diversification of different assets. The risk-adjusted return is the measurement that will show how much risk is taken to reach a certain level of return in the portfolio. When an investor has different options with the same return it will be the level of standard deviation that will decide which one to go with. A portfolio with the lowest standard deviation is the portfolio that is expected to have the highest risk-adjusted return.

2.2 Definitions of Corporate Social Responsibility (CSR)

CSR is a management concept that has been developed since the 1950s and stands for a company's work towards more responsible and sustainable business (Carroll, 1999). In the beginning, the concept was often referred to as just social responsibility (SR) instead of CSR and Bowen (1953) argued for the importance of companies' decisions and the consequences of their actions in society. Throughout the years the concept has been developed and it is today known as CSR but there is still no unified definition of the concept (Rahman, 2011). When referring to CSR in research, Carroll's pyramid has become a standard model to use when evaluating companies work in the area of CSR (Borglund et al., 2017) The wide concept of CSR includes internal and external actions and are often connected to the triple bottom line that takes economic, social and environmental aspects into consideration (ibid.). In 2001 the Commission of the European Communities stated that CSR is "a concept by which companies decide voluntarily to contribute to a better society and a cleaner environment by going beyond compliance and investing more into human capital, the environment and the relations with stakeholders" (European Commission, 2001, p. 4). Depending on the industry, the work with CSR can differ between companies but the end goals are the same, to do good for society and create valuable branding for the company (Borglund et al., 2017).

2.3 Definition of Sustainability

Sustainability is today a hot topic in both societies and in business practices around the whole world (Chouinard, Ellison & Ridgeway, 2011). It is uncommon that people deny the need for more sustainable developments to meet the needs of our environment (ibid.). Even those who do not recognize the need for sustainability in order to protect our planet sees the need for sustainability in their business practices (ibid.). Business today depends on healthy ecosystems that can provide productive land, freshwater and clean air (ibid.).

Sustainability aspects have seen a large increase in popularity in recent years but the definition of it has been around since the 1980s (Brown et al., 1987). The term sustainability can be used in a wide variety of contexts and ranges from maximized yield in business processes to a vision of sustainable and stable societies in relation to their economy (ibid.). The meaning of sustainability is highly dependent on which area or context it is related to and may differ if it is seen from an ecological, economic or societal perspective (ibid.). Definitions of sustainability may be narrow or broad but in order to be useful, it needs to have the context specified in relation to the definition (ibid.). Even though societies and sustainability definitions might differ, the basic fundamentals of sustainability are built on a healthy relationship between the environment, economic growth and stable population development in the world (ibid.).

In *Our Common Future*, a report provided for the UN by the Brundtland Commission in 1987, sustainability is defined as follows: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland et al., 1987, p. 41). In the economic context, sustainability refers to business practices that aim to produce economic growth in the long term and without a negative impact on the environment and society (ibid.).

2.4 Definition of Sustainable funds

In 2016 Eurosif stated that the European definition for sustainable investments is: “Sustainable and responsible investment (“SRI”) is a long-term oriented investment approach that integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors in order to better capture long term returns for investors, and to benefit society by influencing the behavior of companies”. (Eurosif, 2018, p. 12)

Sustainable funds are a part of the Swedish fund market that takes economic, social and environmental aspects into consideration. Sustainable funds are an umbrella term for all funds that are investing in companies with the purpose to encourage sustainable development (Fondbolagens förening, 2019b). Environmental, Social and Governance (ESG), Ethical and CSR funds are some of the different kinds of sustainable funds that invest in companies with sustainability implemented in their work (Eurosif, 2018). These funds with companies and organizations aim to create positive effects on society and our environment together with an economic return to the investor (ibid.). ESG has become a common term in the area of sustainable funds and often used by fund analysts when evaluating if a company is sustainable or not (ibid.). In an ESG analysis, the fund manager looks at three main topics and how the company works with those topics: environmental, social and governance concerns (ibid.). Environmental concerns include climate change, carbon risk, usage of raw materials, land-use, water, and energy usage and waste generation (ibid.). Analysts further evaluate social concerns and look at human rights, health and safety, labor rights, consumer protection, and personal data safety (ibid.). The last aspect is corporate governance where analyst looks at transparency, bribery and corruption risk, tax planning and structure of committee (ibid.). All these aspects will generate an ESG score for the company which determines how sustainable the company is. (ibid.).

2.5 Sustainability rating

To further help investors to navigate and choose funds that align with their preferences when it comes to sustainability, several institutes have developed a sustainability rating for funds on the Swedish market. Sandberg and Nilsson (2017) point out that third-party rating systems are very useful for investors to help them analyze information about funds and make investment decisions. Furthermore, Sandberg and Nilsson (2017) state that Hållberhetsprofilen and Morningstar Sustainability Rating are two of the more commonly used sustainability rating systems. Both these rating systems are impartial, and their purpose is to deliver valuable information, knowledge, and statistics about sustainable funds (ibid.).

2.5.1 Morningstar Sustainability Rating (MSR)

In March 2016 Morningstar launched Morningstar Sustainability Rating (MSR) that is developed to deliver a sustainability rating for investors in order to help them evaluate the level of sustainability in the fund. MSR is based on information about funds ESG-score that is delivered to Morningstar from Sustainalytics which is a leading company in evaluating companies ESG-work (Sandberg & Nilsson, 2017). Sustainalytics provides ESG-scores on

individual companies and the information is added together with the other companies included in the fund and is summed up to a fund's total sustainability score. A total calculated ESG-score for the fund is calculated by MSR and is compared to other funds in the same category. From the calculated ESG-score each fund receives a sustainability grade on a scale from 1-5, with 1 being the worst and 5 being the best. (Morningstar, 2018)

2.5.2 Hållbarhetsprofilen

Hållbarhetsprofilen is a platform created by Swesif - Sweden's Forum for Sustainable Investments which is an independent organization provided for investors and organizations interested in sustainable investments. The organization's goal is to provide easily accessible information and to increase knowledge as well as provide useful statistics about sustainable funds in Sweden. Hållbarhetsprofilen is a tool with information about Swedish funds for investors, organizations, and consumers interested in knowing more about a funds work with sustainability questions. Contrary to MSR and other rankings, Hållbarhetsprofilen is not a ranking, certificate or quality stamp, it is a standardized information sheet provided by Swesif. With help from the information at Hållbarhetsprofilen, investors can more easily compare funds and categorize them with information on how sustainability is implemented in the fund portfolio. (Sandberg & Nilsson, 2017)

Important to know is that Hållbarhetsprofilen only provides information and that the platform does not evaluate any of the published information on its website. "Hållbarhetsprofilen is a self-declaration; the information in Hållbarhetsprofilen is filled in by the fund companies and has not been reviewed or approved by Swesif. Swesif is only responsible for the format and guidelines for Hållbarhetsprofilen." (Swesif, 2019, p. 1)

2.6 Literature review

Previous studies about sustainable funds are inconclusive on how sustainable funds have performed compared to conventional ones. Results from previous research can be divided into three different categories, neutral, positive and negative performance. Neutral performance means that the studies show no difference between sustainable and conventional funds in terms of return. A positive performance means that the sustainable funds outperform their conventional counterparts. Lastly, negative performance means that sustainable funds underperformed and had a lower return than conventional funds.

2.6.1 Neutral performance:

Gregory, Mataka and Luther (1997) studied 36 funds in the United Kingdom and compared 18 conventional funds to 18 ethical funds with a matched pair approach similar to Mallin et al. (1995). From the author's matched-pairs analysis they found no statistically significant difference in risk-adjusted return between conventional funds and ethical funds (Gregory, Mataka & Luther, 1997) The authors measured the risk-adjusted return with Sharpe ratio, Treynor ratio and Jensen's alpha (ibid.). Furthermore, the authors looked at other variables that may have affected the alpha of the fund and found that age was of high importance (ibid.).

Another study by Kreander et al. (2005) studied fund performance and compared ethical funds to conventional funds in four different countries, the United Kingdom, Germany, The Netherlands, and Sweden. The authors also used a matched pair approach like Mallin et al. (1995) with 60 European funds, 30 ethical funds and 30 conventional funds between January 1995 and December 2001 (Kreander et al., 2005). The authors also looked at the risk-adjusted return with Treynor ratio, Sharpe ratio, and Jensen's alpha to measure the collected data (ibid.). Kreander et al. (2005) found that the ethical funds performed the same risk-adjusted return as the conventional funds during January 1995 and December 2001. The result from their study

does not show any difference in risk-adjusted return between the two categories when using Treynor's ratio, Sharpe ratio, and Jensen's alpha.

A study by Bauer, Derwall and Otten (2007) on the Canadian capital market examined the performance of ethical funds vis-à-vis their conventional peers between January 1994 and January 2003. In their study, the authors state that the constraints that ethical funds have will result in higher management fees and decrease the possibility to diversify the portfolio (ibid.). Bauer, Derwall and Otten (2007) further state that previous studies show a higher profit in irresponsible investments and that the screening process for ethical funds will have a negative effect on return since it is expensive. The authors arrive at the conclusion that there are no significant differences in risk-adjusted returns between ethical funds and conventional funds (ibid.). The result goes against previous findings and states that the costly screening process and decreased diversification possibilities did not make ethical funds to perform worse than their conventional peers (ibid.). The authors also state that the ethical and conventional funds do not differ that much in investment strategy and that ethical funds correlate more to conventional market index than with ethical market index. Measurements used for the study are Jensen's alpha, Sharpe ratio, and multifactor performance evaluation models.

In a previous study made by Bauer, Koedijk and Otten (2005) studied ethical fund performance of 103 ethical funds from the German, UK, and American market were studied. Between 1990 and 2001 the authors compared the performance of 103 ethical funds to 4383 conventional funds. Bauer, Koedijk and Otten (2005) use CAPM, Carhart four-factor model, and Jensen's alpha to analyze the data in their study. The result of the study is that no statistical significance can be found between ethical and conventional funds when an evaluation of their risk-adjusted performance (ibid.). The authors also looked at three sub-periods in their study, 1990-1993, 1994-1997, 1997-2001 and found that ethical funds performed a better risk-adjusted return between 1998-2001 than at the beginning of the 1990s (ibid.). One explanation for this might be increased knowledge and interest according to the authors.

In contradictory to Markowitz's (1952) modern portfolio theory, all the previous stated studies above state that the limitations in diversity did not have any significant statistical effect on the risk-adjusted return.

2.6.2 Positive performance:

Mallin et al. (1995) analyze the financial performance of ethical and conventional funds on the capital market in the United Kingdom with data from 58 funds between 1986 and 1993. In their study, the authors used a matched pair approach to evaluate if there is any difference in performance between 29 ethical funds and 29 conventional funds (ibid.). To match ethical and conventional funds the authors paired the funds with similar size and age to eliminate unwanted characteristics that may affect the results in their study (ibid.). Mallin et al. (1995) analyzed the conventional and ethical funds with the Sharpe ratio, Treynor ratio, and Jensen's alpha to evaluate the portfolios. The authors also measure the performance of the two different fund categories to the market performance with the result of negative risk-adjusted return from both conventional and ethical funds in comparison to the market (ibid.). Furthermore, the authors found that ethical funds outperformed their conventional peers when evaluating the performance with all three measures, Sharpe, Treynor and Jensen's (ibid.). Lastly, the authors state that the outperformance of ethical funds was weak and might have been caused by increased interest and awareness in ethical investments that could have been temporarily (ibid.).

Ito, Managi and Matsuda (2013) studied the performance of socially responsible investments and environmentally friendly funds with the purpose to fill out the inconclusive research that

does not determine if SRI funds outperform or underperform conventional funds. The Empirical results from the study were that SRI funds outperformed their conventional peers in the European and American markets. Environmentally friendly funds (EF) did not perform as well as SRI funds but have a similar or better performance than the conventional funds (ibid.). The study collected data during a nine-year period between 2000 and 2009 (ibid.). The authors analyzed 1337 funds in the European market, out of those 1 337 funds, 80 were SRI funds and 27 were EF funds. In the American market, the study analyzed 1 156 funds, 29 SRI funds and 3 EF funds (ibid.). Like many previous studies, the authors used Jensen's alpha to measure the risk-adjusted return between SRI, EF and conventional funds (ibid.). The authors also used a dynamic mean-variance model for evaluating the funds return and risk orientation at the same time (ibid.).

Eccles, Ioannou and Serafeim (2014) studied 180 companies on the American market and did a comparison between companies that the authors ranked as low and high in terms of sustainability. The study contained 90 companies as high ranked and 90 as low ranked with superior performance from the high ranked sustainability companies (ibid.). The authors presented results that show outperformance from high sustainable companies in both market and accounting-based performance when studying both categories over a long period (ibid.).

Friede, Bush and Bassen (2015) published a study where the authors summarize results and findings from 2200 academic papers in the field of sustainable investments. The authors present secondary data and findings from the 1970s to add knowledge about sustainable investment performance. From the 2 200 evaluated studies the authors state that roughly 90 percent find a nonnegative relationship between ESG and corporate financial performance (ibid.). Friede, Bush and Bassen (2015) also find a positive relationship between ESG and financial performance in 62.6 percent of their meta-analyses studies that are made on both portfolio and nonportfolio assets.

2.6.3 Negative performance:

De Souza Cunha and Samanez (2012) studied the market for sustainable investments between 2005 and 2010 on the Brazilian stock market. The authors measured the performance on sustainable investments using the Sortino, Sharpe, Treynor and Omega measures. The study accounted for risk, liquidity and return in their performance comparison between sustainable and conventional investment options. In their study, the authors used the Brazilian Stock Exchange Index as a benchmark for the market index. De Souza Cunha and Samanez (2012) found that sustainable investments performed worse than the market index during the studied time period. Furthermore, the study stated that sustainable investment options had higher increased liquidity and lower diversifiable risk. De Souza Cunha and Samanez (2012) state that the underperformance can be explained by the lack of trust in sustainable investments in Brazil. The authors further state that the Brazilian capital market does not have any effective regulatory that influence sustainable investments in a positive way (ibid.).

A long-term study by Hong and Kacperczyk (2009) on the American market does also shows a negative performance from sustainable investments when comparing it to unsustainable options. The authors collected data about investments during the period 1962 to 2006 and stated that the best performance came from companies in unethical business areas such as alcohol, gaming, and tobacco (ibid.). Hong and Kacperczyk (2009) highlight the effect of social norms on markets and displays proof of higher risk-adjusted returns in unethical business areas.

A study on the Australian market by Tippet (2001) examined the performance of three ethical funds between June 1991 and June 1998. The Australian study used CAPM, Jensen's alpha and

Treynor ratio to analyze the performance of the ethical funds with a result of lower return from the ethical funds compared to conventional funds (ibid.). Their results even showed that the ethical funds performed worse than the risk-free rate in some parts of their study (ibid.). Findings in Tippet (2001) states that the screening process for ethical funds will increase the management fees and lower the diversification possibilities which has a negative impact on return.

Chang, Nelson and Witte (2012) compared the financial performance of sustainable and traditional funds in the USA with data from 1997 to 2012. In their study, 131 sustainable funds were compared to conventional funds in terms of risk-adjusted return (ibid.). Chang, Nelson and Witte (2012) measured the standard deviation with the Sharpe ratio to compare the risk-adjusted return between the two fund categories. The results presented from their study was that sustainable funds underperformed when compared with conventional funds on the American market (ibid.). The sustainable funds had higher management fees and a lower risk-adjusted return in their study but the authors state that sustainable funds might be more competitive in the future (ibid.).

2.7 Hypothesis formulation

As stated above, a considerable number of previous studies conducted about sustainable funds show contradicting results. A negative impact of placement restrictions is found by Chang, Nelson and Witte (2012) in their study on the US market. The same results are found by Tippet (2001), Hong and Kacperczyk (2009) and De Souza Cunha and Samanez (2012) that all state that sustainable funds underperformed compared to conventional funds. Contradictory to the negative performance findings, Mallin et al. (1995), Ito, Managi and Matsuda (2013), Eccles, Ioannou and Serafeim (2014) and Friede, Bush and Bassen (2015) all found a positive relationship between sustainable funds and performance. Given this and the fact that Sweden is considered a mature market within sustainable investments and frontrunners by McCallin and Webb (2004), a first hypothesis was formulated.

H1: Sustainable funds will have a higher risk-adjusted return than their conventional peers.

Bauer, Koedijk and Otten (2005) suggest that the increased knowledge and interest in sustainability have had a positive effect on sustainable investments. The authors used sub-periods in their study and found that sustainable funds performed higher returns later in the research period. Also, Mallin et al. (1995) found that increased interest and awareness for sustainability might have had a positive effect on the ethical funds in their study. Since Sweden is considered to be frontrunners in implementing sustainability a second hypothesis was formulated.

H2: Sustainable funds will have a higher risk-adjusted return than their conventional peers in the last sub-period between 2016-2018.

3 Method

3.1 Research design

The selection of research methodology should be formed and fitted to the problem statement and aim of the study. In research, there are two main methods to choose, namely a quantitative approach or a qualitative approach. A quantitative approach mainly focuses on numbers instead of words and quantitative methodology has a deductive approach towards the relationship between theory and empirics. A quantitative approach focuses on the testing of theories with a general opinion that an objective reality exists and that it can be studied. In a quantitative methodology, the gathered data are transformed into numbers and quantified to be able to analyze it with the help of tables and diagrams. A qualitative method, on the other hand, focuses on the collection of words often provided through interviews with respondents and an inductive approach to the relationship between theory and empirics. Furthermore, a qualitative approach aims to understand rather than describe reality. (Bryman & Bell, 2015)

All the previous research that has been used for this study have used a quantitative method with numbers and secondary data. Previous studies have analyzed data and compared it to theories to answer their purposes and research questions. This research aims to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted return. With the purpose of this study and to measure the risk-adjusted return of funds this study also finds it to be best suited to use a quantitative method instead of a qualitative method. A quantitative method is best suited since the aim is to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted returns. The suitable way for a study of risk-adjusted return is to look at historical returns from sustainable and conventional funds. A qualitative method with interviews and surveys will not be necessary since all data that is needed can be found in historical returns from the funds. This study will use a deductive approach when analyzing the relationship between theory and empirical findings. The foundation for this study will be scientific research, articles and published papers together with theories. From the gathered information in previous studies research, this study will test the research questions with the empirics. Information and numerical data about the funds will be collected from secondary sources. The advantage of secondary sources is that the access and collection of quantitative data will be fewer resources demanding and more efficient then to collect the data on your own. (Bryman & Bell, 2015)

3.2 Literature Review

The foundation of this study is built on a literature review of funds and specifically sustainable funds and their performance. The literature review is a base for the study and was made continuously during the research process with the aim to understand the subject and research field. Through the review of previous research, it became also possible to analyze a research gap. Bryman and Bell (2015) highlight the importance of a literature review in order to find a gap in previous literature and build a foundation of understanding for theoretical background and conceptual framework. The literature review further helps a researcher to understand existing theories that are commonly used and that will be necessary to use for research in the specific area of study (ibid.). In this study, the literature review built a wide understanding of previous findings and helped the author to evaluate and select the theories that are used in the result section when analyzing the empirical findings.

In order to perform a study on sustainable funds and their performance on the Swedish market, it is important to understand sustainable funds with help from theories and definitions in the selected field of study. To study sustainable funds the authors have to understand CSR, ESG,

sustainability and sustainable funds, concepts that many previous studies have tried to define, investigate and analyze.

Bryman and Bell (2015) state that there are varying methods to use when searching for previous studies and setting up a literature review. When searching for and reviewing previous literature one can use a narrative review or a systematic review (ibid.). With a systematic review, the search will be more focused and often preferred when a researcher knows what he or she is looking for (ibid.). A narrative review, on the other hand, is less focused and has a broader search spectrum (ibid.). The selected subject and its related theories and concept will require a broad literature review, therefore, this study will use a narrative method which suits the purpose.

In the literature review, when searching for previous studies about sustainable funds it was clear that many of the previous research had been focused on the American and UK market. It became clear that Sweden was seen as a frontrunner in the field of sustainable investments but no extensive studies on the Swedish market existed. In the search for research about sustainable fund performance, it became clear that Modern Portfolio Theory and ESG were commonly used. From the literature review, a decision was made concerning which theories and concepts this study will be using to evaluate and analyze findings from the collected data about sustainable fund performance on the Swedish market.

The literature review was completed with help from the academic database Primo, i.e., Uppsala University's database and Google Scholar. Sources of high reliability have been selected and used to the greatest possible extent. In addition to the findings from academic databases, literature about research methodology and search engines such as Google were used to gather information about related subjects to sustainable finance.

3.3 Data collection

In this study of sustainable funds and their performance in comparison to their conventional peers on the Swedish market, the author collected secondary data from Morningstar. Data about the funds rolling day yield are used to measure the performance. Morningstar is an independent third-party company that provides data and information about funds on the Swedish and international markets (Sandberg & Nilsson, 2017). Morningstar is a provider of all kinds of useful independent information about funds and stocks for private investors and organizations all around the world (ibid.). On the Swedish market, Morningstar is specialized in funds and their performance (ibid.). Morningstar also rates the fund's sustainability on a scale from 1-5 which helps this study to separate sustainable funds from conventional funds (ibid.). Morningstar is considered to be a source with a high level of reliability and one of the most commonly used resources for gathering information about funds and stocks in the global market (Blake & Morey, 2000). Additional data about funds, their performance, and sustainability information will be gathered from Hållbarhetsprofilen, which is an initiative from Swesif with the purpose to provide useful information about funds sustainability work (Sandberg & Nilsson, 2017).

During the collection of data, it was discovered that some dates occasionally were missing in a few funds during the full sample period between 2013-01-01 and 2018-12-31. The collected data was screened, and the missing dates were adjusted so that all funds had the same dates and amount of observations. In total, each fund consisted of 1480 observations during the full sample period.

3.4 Selection of sustainable and conventional funds

This study aims to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted return. The selection of funds aims at reflecting all available funds on the market to the greatest possible extent. The study has selected a research period between 2013-01-01 and 2018-12-31. Furthermore, the study aims to analyze the six-year period between 2013 and 2018 with three sub-periods of 2013-01-01 to 2014-12-31, 2015-01-01 to 2016-12-31 and 2017-01-01 to 2018-12-31. The sub-periods will further be mentioned as the first sub-period, between 2013-01-01 and 2014-12-31, the second sub-period, between 2015-01-01 and 2016-12-31 and the last sub-period, between 2017-01-01 and 2018-12-31. The purpose of the sub-periods is to analyze if the increasing awareness of sustainability in society has any effect on the sustainable funds performance. Sub-periods were also used by Bauer, Koedijk and Otten (2005) with the result that increased knowledge about sustainability might have an effect since the last time period showed the best result in sustainable fund performance.

The selected time period between 2013-01-01 and 2018-12-31 was chosen due to the preferences of the study and that the range of measurable sustainable funds is limited in comparison to conventional funds. The selected time period should not be any problem since previous studies have used the same time period or shorter ones (Kreander et al., 2005; De Souza Cunha & Samanez, 2012). The chosen time period has been restricted by the lifespan of sustainable funds in Sweden, there are limitations in data for sustainable funds further back. Similar to Kreander et al. (2005) this study suffers from survivorship bias and only funds that were active and survived the whole sample period will be analyzed. Survivorship bias will, however, affect both conventional and sustainable funds and should therefore not have a noticeable influence on the study, something that Kreander et al. (2005) also stated. Furthermore, this study also aims at analyzing sustainable fund performance on the Swedish market and therefore funds with at least 70 percent of Swedish companies will be selected for the study. The reason for a limit at 70 percent is that a higher level of Swedish companies in the funds will affect the possible selection of funds and the sample will be too small.

Previous research has used a matched pair approach to get the best possible measurable sample of sustainable and conventional funds (Mallin et al., 1995; Gregory, Matakoto & Luther, 1997; Kreander et al., 2005). With a matched pair approach the selection of funds for the study is actively done with the purpose of finding funds with similar traits. These traits are age, amount of assets under management, expressed as size and placement strategy. This study will also use a matched pair approach to eliminate unwanted characteristics that might have an effect on the result. In total, 26 funds were used for this empirical study, 13 sustainable funds, and 13 conventional funds.

In the selection of conventional funds, several screenings have been done in order to select funds that will fit the matched pair approach. The conventional funds selected for this study have an MSR rating of 1-3. Conventional funds have gone through a screening of size, age, and investment universe so that they match sustainable funds. The oldest of the conventional funds was 28 years and the youngest 7 years. The sample of conventional funds has an average age of 18 years. The size of conventional funds varied from 1450 million to 33600 million SEK with an average of 10080 million SEK in assets under management.

The Sustainable funds in the sample for the study have been selected with help from MSR which has a range from 1-5 in sustainability score. This study has decided to only define funds with a score of 5 as sustainable. By defining the funds with the highest possible MSR rating as sustainable and compare it with funds that are rated 1-3 this study has separated the two categories. In addition to separate the two fund categories, the selection also gives the study

credibility by examining the most sustainable funds. The age of sustainable funds varies between the youngest of 8 years and the oldest sustainable funds were 30 years, the sample of sustainable funds has an average age of 19 years. The size of sustainable funds varied from 1504 million to 32905 million SEK with an average of 11040 million SEK in assets under management.

From the gathered data for the analysis of fund return, it is possible to measure the return on a daily, weekly, monthly and yearly basis. Previous studies that have been reviewed during the literature research has varied in the selection of return that has been measured. This study will analyze the daily return of funds which will take most of the variation in performance into account. The selection of daily return has been made to make this study more credible and measurable to previous and future studies.

3.5 Evaluations models

In this segment the used evaluation models or measurements will be described and how the different model theories are going to be applied. To analyze the performance of funds from both the sustainable and conventional category this study uses several implementations of model theory that was found in the literature review. The chapter will describe how data about the funds are computed to analyze the funds risk-adjusted return and standard deviation. The purpose of this chapter is to bring a clear view for the reader on how the study has arrived at the results.

The most common models that are used to evaluate and analyze a portfolio or a fund's risk-adjusted return are the Sharpe ratio, Treynor ratio and Jensen's alpha (Brealey, Myers & Allen, 2019). In addition to the most commonly used measurements, this study will also include standard deviation to further analyze the performance of sustainable and conventional funds.

3.5.1 Standard deviation

Standard deviation is a statistical measurement of dispersion that will show the variation in a data sample in relation to the mean value (Chang, Nelson & Witte, 2012). For this study, it will show how wide the variation is between the analyzed funds when looking at their returns over time. According to Chang, Nelson and Witte (2012) standard deviation is a commonly used measurement for investors when trying to predict the future performance of funds with help from historical data. Funds that show a low level of standard deviation will have a small range of differences in their predicted performance and funds with high standard deviation are more volatile and their predicted range of performance is wide (ibid.). Investors often use standard deviation when evaluating the risk and the fund's performance compared to the average return on the market (ibid.). In this study, the standard deviation is used for measuring the variation in return on average return from sustainable and conventional funds. With the calculation of each fund's standard deviation, it is possible to compare the risk of sustainable and conventional funds (ibid.).

In order to calculate a fund's standard deviation, you have to measure the variance in return for each fund (Brealey, Myers & Allen, 2019). To compute the standard deviation this study will use the following formula:

$$S = \sqrt{\sum(x - \bar{x})^2 \div (n - 1)}$$

Where:

S = Standard deviation

x = Return

\bar{x} = Mean value of return

n = Number of observation

3.5.2 Sharpe ratio

Standard deviation is also used in measuring the risk-adjusted return with the Sharpe ratio, a measurement that William Sharpe developed in 1966 (Chang, Nelson & Witte, 2012). With standard deviation and excess return, it is possible to determine the return per unit of risk (Sharpe, 1966). When comparing the historical performance of two funds with the Sharpe ratio, the fund with the highest Sharpe ratio is the one with the highest risk-adjusted return (ibid.). The measurement is one of the most commonly used measurements in order to determine the performance of a fund (Brealey, Myers & Allen, 2019). This study will, therefore, use the Sharpe ratio to analyze the risk-adjusted return on each fund in the data sample, similar to Mallin et al. (1995), Kreander et al. (2005), De Souza Cunha and Samanez (2012) and Chang, Nelson and Witte (2012). By doing so, the funds will be possible to compare with each other even though they might differ in risk and performance goals. The Sharpe ratio evaluates the diversification of a fund and looks at both systematic and unsystematic risk (Sharpe, 1966). Kreander et al. (2005) and Mallin et al. (1995) also use the Treynor ratio to compare the results from measurements with the Sharpe ratio which will differ when funds have different levels of diversification in the fund. Sharpe (1966) states that the Sharpe ratio and the Treynor Ratio might show similar results in funds with well-diversified assets in the portfolio.

To compute the Sharpe ratio for funds this study will use the following formula:

$$S_i = \frac{r_i - r_f}{\sigma_i}$$

Where:

S_i = Sharpe ratio of asset

r_i = Return of asset

r_f = Risk-free rate

σ_i = Standard deviation of asset

3.5.3 Treynor ratio

Similar to the Sharpe ratio the Treynor ratio computes the difference in return of the fund compared to the risk-free rate (Brealey, Myers & Allen, 2019). The measurement is also known as the reward to volatility ratio was founded by Jack Treynor in 1965 (Treynor, 1965). The Treynor ratio measures the excess return given each unit of risk that a fund has taken. To measure the risk the Treynor ratio uses a fund's beta and as stated above, Treynor ratio only takes the systematic risk into account (ibid.). Beta measures how changes in the market will affect a fund's return (ibid.). Previous studies from Mallin et al. (1995), Tippet (2001), Kreander et al. (2005) and De Souza Cunha and Samanez (2012) used the Treynor ratio to measure fund performance when studying sustainable funds. This study will also use Treynor ratio to analyze the relationship between systematic risk and return. When comparing sustainable and

conventional funds with Treynor ratio the result is that the one with the highest Treynor ratio is the fund that has the highest return in relation to the risk (Treynor, 1965).

To compute the Treynor ratio for funds this study will use the following formula:

$$T_i = \frac{r_i - r_f}{\beta_i}$$

Where:

T_i = Treynor ratio of asset

r_i = Return of asset

r_f = Risk-free rate

β_i = Market exposure of asset

3.5.4 Capital Asset Pricing Model (CAPM)

CAPM is a shortening for Capital Asset Pricing Model, a model founded by William Sharpe in 1964 and is used by investors to predict the return of an asset (Sharpe, 1964). The model is a development of the Modern portfolio theory by Markowitz and computes the predicted return given the systematic risk in a fund during a set time period (ibid.). To compute CAPM investors use the market return, the risk-free rate and beta to get their value (Brealey, Myers & Allen, 2019). Beta shows the volatility of a fund in relation to the volatility of the market (ibid.). A fund with a beta greater than one is riskier than the market and should therefore have a higher return than the average return on the market (ibid.). If a fund has a beta of less than one the return is predicted to be less than the average return on the market (ibid.). The purpose of investors using the CAPM measurement is to determine if a specific fund is valued properly given the risk of the fund and what the predicted return will be (ibid.). Previous studies from Bauer, Koedijk and Otten (2005) and Tippet (2001) used CAPM to study the performance of sustainable funds. This study will also use CAPM in order to compute Jensen's alpha for the two fund categories.

To compute CAPM for funds this study will use the following formula:

$$E(r_i) = r_f + \beta_i * (E(r_m) - r_f)$$

Where:

$E(r_i)$ = Expected return of security

r_f = Risk-free rate

β_i = Market exposure of asset

$E(r_m)$ = Expected return of the market

3.5.5 Jensen's alpha

To further measure the performance of sustainable and conventional funds previous studies like Kreander et al. (2005), Bauer, Derwall and Otten (2007), Mallin et al. (1995) and Tippet (2001) have used Jensen's alpha in their studies. Jensen's alpha is similar to the Sharpe and Treynor measures a risk-adjusted performance measurement that is used for measuring the actual return to the predicted return of an asset or portfolio (Brealey, Myers & Allen, 2019). Jensen's alpha was developed by Michael Jensen in 1967 to evaluate the performance of funds compared to the market (Jensen, 1968). A positive alpha means that the fund has outperformed the prediction and a negative alpha means that the fund has a lower return in relation to the prediction (ibid.). To compute the alpha value the predicted return and the actual return of a fund is compared (ibid). Jensen's measurement is based on CAPM which is used for predicting the return of a fund (ibid.). This study will also use Jensen's alpha to measure how the return from both sustainable and conventional funds will be in comparison to their predicted returns. The results from Jensen's alpha will show if the funds have performed better or worse than the predicted return given the risk a fund has taken. The values from Jensen's alpha will also show potential differences between conventional and sustainable funds.

To compute the Jensen's alpha for funds this study will use the following formula:

$$a_i = r_i - [r_f + \beta_i * (E(r_m - r_f))] = r_i - E(r_i)$$

Where:

a_i = Jensen's Alpha of asset

r_i = Return of asset

r_f = Risk-free rate

β_i = Market exposure of asset

$E(r_m)$ = Expected return of the market

$E(r_i)$ = Expected return of asset

3.6 Selection of benchmark

To further measure and evaluate the performance of funds previous studies have used a benchmark to do this (Mallin et al., 1995; Kreander et al., 2005). To clarify the performance of funds on a specific market, researchers often use an index as a proxy for the market that is being studied. Swedish Investment Fund Association states that "Comparing a fund's performance with an index enables an understanding of how well the fund has performed over a given period of time" (Fondbolagens förening, 2019c, p. 1). Mallin et al. (1995) used the Financial Times All Share Actuaries Index as a proxy for the market return in their study of sustainable funds in the UK market. The study on the European market by Kreander et al (2005) used Financial Times Work Index as a proxy for the international funds and funds investing only in one country like the UK funds was compared to a domestic index as a proxy for the market. Since this study has a selection of funds with a minimum placement of 70 percent in Swedish companies to represent the Swedish market it will make sense to use an index that represents the market return of the Stockholm Stock Exchange. The selected index is OMX Stockholm PI (OMXSPI) and will be used as a proxy for the Stockholm Stock Exchange. OMXSPI-index contains the weighted value of all the listed stocks and is therefore considered to represent the development

of the Stockholm Stock Exchange. Historical data of OMXSPI were collected from the Nasdaq OMX Nordics website (Nasdaq, 2019).

3.7 Risk-free interest rate

The risk-free interest rate is the return an investor can get without taking any risk in their investments. In previous studies, the risk-free interest rate is often used as a benchmark to measure and to further help the analysis of a specific fund's performance. Kreander et al. (2005) used a one-month Treasury bill as a proxy for the risk-free interest rate in the UK and Sweden. On the Dutch and German fund market, the authors compared funds to a local one-month interbank rates. The result of this makes the study less comparable between funds from different countries but more accurate on the individual market (ibid.).

Previous research stated in the literature review varies between usage of proxy for the risk-free rate, often between Treasury bills and government bonds. Mallin et al. (1995) explain that the selection of a proxy for the risk-free rate might be problematic and states that previous studies have had problems with incorrect selections and affected results. Furthermore, the authors chose a three months treasury bill as a proxy for the risk-free rate, one explanation for this was to avoid problems that previous studies have had with short treasury bills.

In line with Mallin et al. (1995) and Kreander et al. (2005) this study has also chosen to use a treasury bill as a proxy for the risk-free interest rate in Sweden. To avoid problems stated by Mallin et al. (1995) the selection will be a three-month treasury bill instead of a one month like Kreander et al. (2005). The average return of the three-month treasury bill is gathered from Svenska Riksbanken between 2013-01-01 and 2018-12-31 (Sveriges riksbank, 2019).

3.8 Data analysis

All the gathered data for the study has been summarized in Microsoft Excel. Microsoft Excel was also used for the calculation with mentioned evaluation models such as Jensen's alpha, Treynor Ratio, Sharpe ratio. With the collected data about the funds performance in Microsoft Excel formulas were applied to receive the user results in the study. Summary of data and formation of tables used to describe the results in the study were also done in Excel. The return from each sustainable and conventional funds will be added together in their individual category to state the average performance of sustainable and conventional funds. With the summary of data in Excel, the average return from each fund category will be measured to easily analyze performance differences or similarities of the two fund categories. In addition to the average return between 2013-01-01 and 2018-12-31 sustainable funds and conventional funds will also be measured with an average return during the two-year sub-periods and on individual years. These average returns will be used as the foundation for analysis when applying the models and t-test.

3.9 Statistical significance

Previous studies like Mallin et al. (1995), Kreander et al. (2005) and Bauer, Derwall and Otten (2007) also investigates the statistical significance from the performance measures when analyzing risk-adjusted return from sustainable compared to conventional funds. Similar to previous research, this study will also analyze the performance from sustainable and conventional funds with a t-test to investigate if the results are of statistical significance. A t-test will point out eventual differences in the study's result and if they can be generalized as significant for the whole population that they are supposed to reflect. The t-tests will be done on all the collected data in Microsoft Excel. From the t-test results, there will be a p-value that describes if the results are of statistical significance or if the result might be caused by random

factors. Similar to Mallin et al. (1995) and Kreander et al. (2005) this study will test the results with a statistical significance of 5 percent.

3.10 Reliability and validity

Reliability and validity are often evaluated differently when using qualitative or quantitative methods in studies. In a quantitative study, it is important that used research is reliable. The author of the study also needs to be able to guarantee that the used approach is reliable. Reliability is about the used literature in a study and the methods that are used to get the results. In order to show reliability a study should aim for stability over time, it should be possible to replicate and that the results are independent and objectively found by the author. Since this study has previous literature as a foundation was recognized theories and collected data comes from secondary sources with a high level of credibility, this study can also be considered to have a high level of reliability. Data about funds return and sustainability is collected from websites that are commonly used in the field of sustainable investments which also are known as trustworthy. The used performance measurements such as Jensen's alpha, Treynor ratio, and the Sharpe ratio are also commonly used in previous research and thoroughly described in this study. This makes the study easy to replicate and more reliable. Even though a study can be reliable it does not make the study valid. (Bryman & Bell, 2015)

Validity in research is determined if the study actually measures the aim and purpose of the study. The aim of this study is to measure if there are any differences in risk-adjusted returns between sustainable and conventional funds. Bryman and Bell (205) describe validity as the relationship between theory and operationalization and that a valid study also can be considered as reliable. The methods and theories used in this study have been influenced by previous research in order to create the most suitable for a study of sustainable funds. This study is also using recognized measurements and formulas for fund return which is of high importance for research validity (ibid.).

3.11 Reflection of the study

In this study the chosen methodology is quantitative research analysis with data collected from secondary sources and calculations have been done with relevant measurement formulas. Common critique towards studies using a quantitative methodology are often that the findings are descriptive, conclusions can be drawn but an explanation of the results is missing (Brealey, Myers & Allen, 2019). General critique regarding performance measurements using return, beta or other variables concerning the market is that they are abstract theoretical variables that are hard to estimate in reality (ibid.). The critique can be applied to this study as well since the measurements used in the study are from the market and tough to estimate in reality. In order to cope with the challenges, this study aims to use measurements that are commonly used in performance measurements between sustainable and conventional funds.

Further critique could also be addressed to the chosen time period for the research which is relatively short and makes it more difficult to draw conclusions for the general population. A longer time period would benefit this study's conclusion and give a more generalized result. Previous studies like Kreander et al. (2005) and De Souza Cunha and Samanez (2012) have used a similar or shorter time period which makes this study and the results more credible. Something that would have added more credibility is the number of funds that are being analyzed. If there were a higher number of sustainable funds available on the Swedish market it would make this study more credible and generalizable for the whole market.

4 Analysis and results

In this chapter, the results of the study based on the research questions will be analyzed. The analysis is based on the literature review and the theoretical framework with the aim to be as descriptive as possible. This chapter begins with the research questions and will continue with the analysis. After the analysis, the results from the study will be presented and lastly, discussions about the findings will be presented.

Research questions:

- Is there any difference in risk-adjusted return between sustainable and conventional funds?
- Do restrictions for sustainable funds have a negative impact on the funds risk-adjusted return?

These research questions aim to answer if sustainable funds can perform similar or better than their conventional peers.

4.1 Empirical findings and analysis

This passage will display the empirical results from the study when comparing the performance of Swedish sustainable and conventional funds. The different funds were separated into two categories, Sustainable funds versus conventional funds. The performance of sustainable and conventional funds, as well as the performance of the market, is illustrated through their returns over the whole time period as well as in the sub-periods. In addition to return, the fund categories will also be analyzed through the results from the different performance measurements.

4.1.2 Performance during the full sample period

The study has a full sample period that extends over 6 years, from 2013-01-01 to 2018-12-31. During the whole sample period, the market had an average daily return of 0,031567 percent. In comparison to the performance of the market, the two different categories had an average daily return of 0,0450 percent by the sustainable funds and 0,0512 percent by the conventional funds. The empirical findings state that the conventional funds outperformed their sustainable peers in terms of average daily return during the full sample period. Both of the fund categories performed a better return during the full sample period than the market at the same time.

Table 1. Average return and performance measures for the full sample period.

	Sustainable funds	Conventional funds
Return	0,045027%	0,051226%
Standard deviation	0,923481%	0,921470%
Sharpe ratio	0,216958	0,231765
Treynor ratio	0,002293	0,002427
Jensen's alpha	0,029176%	0,034644%

4.1.3 Standard deviation

The standard deviation measures the variance in a funds return, and a high variance indicated high risk versus a low variance that indicates low risk and less spread in the return. In table 1 the standard deviation of the full sample period is shown. The empirical findings of this study show that the conventional funds have an average standard deviation of 0,921470 percent in their daily return. The sustainable funds have 0,923481 percent in standard deviation which is higher than the conventional funds. The different values in standard deviation imply that the sustainable funds have a higher risk than their conventional peers during the full sample period.

4.1.4 Sharpe ratio

The Sharpe ratio shows the excess return of an asset per unit of total risk. In this study, the Sharpe ratio was calculated for both the full sample period and the sub-periods. As shown in table 1 that displays the full sample period, the Sharpe ratio for sustainable funds was 0,216958 and 0,231765 for the conventional funds. The results when using the evaluation measurement shows a slight difference in favor of the conventional funds that has a higher Sharpe ratio. The slightly higher Sharpe ratio by the conventional funds implies that their average return is higher given the total risk of the fund compared to their sustainable peers. The sustainable funds had a higher standard deviation during the full sample period and therefore a higher risk which can explain the Sharpe ratio results. The conventional funds also had a higher average daily return during the full sample period, something that further explains the result from Sharpe calculations.

4.1.5 Treynor ratio

The Treynor Ratio shows how the funds perform in relation to the systematic risk and give a value of the funds risk-adjusted return per unit of systematic risk. The results from the calculations made with the Treynor ratio state that the conventional funds had an average value of 0,002427 and the sustainable funds have an average Treynor ratio of 0,002293. The empirical findings imply that the conventional funds have a higher risk-adjusted return than their sustainable peers. The conventional funds showed a slightly better performance in terms of risk-adjusted return than the sustainable funds during the full sample period. The results from the calculation with the Treynor ratio might be explained with the beta value that stands for the systematic risk of the fund portfolio. Since the beta value is similar to both of the fund categories the value of the Treynor ratio is higher in the fund category that had the highest actual return.

4.1.6 Jensen's alpha

With Jensen's alpha, the collected data about funds actual return is compared to the expected return that was computed with CAPM measurement. The empirical findings from calculations with Jensen's alpha exhibit the average daily value of both of the fund categories. The sustainable funds had a value of 0,029176 compared to the conventional funds that had a value of 0,034644. The value that is shown with Jensen's alpha measurement states the actual return of the two fund categories compared to the expected return. A negative value means that the fund category had a lower actual return than the expected return computed with CAPM. A positive value means a higher actual return. The value from Jensen's alpha implies that both of the fund categories performed better than expected. The conventional funds outperformed the sustainable funds during the full sample period.

4.2 Performance during the different sub-periods.

This study used three different sub-periods in order to see if the increasing awareness of sustainability had an impact on the sustainable funds performance on the Swedish market. The performance of the sustainable and conventional funds is presented in the table below and are also compared to the market performance during the same time.

Table 2. Average return and performance measures for the sub-periods.

	Sustainable funds	Conventional funds
Return		
2013-2014	0,080075%	0,080747%
2015-2016	0,043290%	0,060785%
2017-2018	0,009619%	0,008849%
Standard deviation		
2013-2014	0,773475%	0,781909%
2015-2016	1,171574%	1,160255%
2017-2018	0,757075%	0,766308%
Sharpe ratio		
2013-2014	-0,764787	-0,756627
2015-2016	0,500842	0,466136
2017-2018	0,918273	0,916412
Treynor ratio		
2013-2014	-0,007109	-0,006934
2015-2016	0,006535	0,006132
2017-2018	0,007905	0,007742
Jensen's alpha		
2013-2014	-0,068973%	-0,055438%
2015-2016	0,063161%	0,083775%
2017-2018	0,083883%	0,073088%

As seen in table 2 above, the conventional funds had a higher level of average return during the first sub-period. The average daily return for the conventional funds was 0,080747 percent and 0,080075 percent for the sustainable funds. The conventional funds, therefore, performed a higher average return during the first sub-period. During the second sub-period, the conventional funds once again performed a higher average return. The conventional funds had an average daily return of 0,060785 percent compared to 0,043290 percent by the sustainable funds. During the last sub-period, the sustainable funds outperformed their conventional counterparts. The sustainable funds had an average daily return of 0,009619 percent and the conventional 0,008849 percent. This finding was interesting since the conventional funds otherwise outperformed their sustainable counterparts when analyzing the full sample period. During the sub-periods, the market performed an average daily return of 0,064300 percent in the first sub-period. In the second sub-period, the average return of the market was 0,030836 percent and -0,002235 percent during the last sub-period. During all three sub-periods, both of the fund categories performed a higher average daily return than the market. The findings from the empirical data also state that the sustainable funds performed best of the two fund categories during the last sub-period when the market had a negative average daily return.

4.2.1 Standard deviation

During the different sub-periods variations in standard deviation between the two fund categories can be found. In the first sub-period, the standard deviation was 0,781909 percent for the conventional funds and 0,773475 percent for the sustainable funds. The conventional funds have the highest average standard deviation in their daily returns and therefore a higher variance and risk than the sustainable funds in the first sub-period. In the second sub-period, it can be observed that the sustainable funds had the highest standard deviation at 1,171574 percent and a higher risk than their conventional peers. The conventional funds had a standard deviation of 1,160255 percent during the same time period. During the last sub-period, the conventional funds had the highest standard deviation and highest risk with 0,766308 percent in variance. In comparison, the sustainable funds had a standard deviation at 0,757075 percent and a lower variance in the average daily return.

4.2.2 Sharpe ratio

As seen in table 2 above, the average Sharpe ratio during the first sub-period implies that the conventional funds had the highest Sharpe ratio at -0,756627. The sustainable peers had a lower Sharpe ratio with a value of -0,764787 which implies a lower return given the total risk of the fund. In the second sub-period, the sustainable funds had the highest Sharpe ratio at 0,500842 and outperformed the conventional funds in terms of return and total risk. The conventional funds had a Sharpe ratio of 0,466136 during the same time period. In the last sub-period, the sustainable funds once again performed the highest Sharpe ratio. The sustainable funds had a Sharpe ratio value of 0,918273 compared to the slightly lower Sharpe ratio of 0,916412 by the conventional funds.

4.2.3 Treynor ratio

As seen in table 2 above, during the sub-periods, the sustainable funds outperformed their conventional counterparts during the last two sub-periods. The values from the Treynor ratio during the first sub-period was -0,006934 for the conventional funds and -0,007109 for the sustainable funds. The results imply that the conventional funds outperformed the sustainable funds in the first period in terms of risk-adjusted return per unit of systematic risk. During the second period, the values were 0,006132 for the conventional funds and 0,006535 for the sustainable funds. The sustainable funds also had the highest Treynor ratio during the last sub-period with 0,007905 compared to 0,007742 by the conventional funds. Furthermore, it can be stated that the sustainable funds had the highest risk-adjusted return per unit of systematic risk during the second and last sub-period.

4.2.4 Jensen's alpha

During the first of the sub-periods, it can be observed that the sustainable funds had a lower Jensen's alpha than the conventional funds, -0,068973 percent and -0,055438 for the conventional funds. Both of the two fund categories had a negative value, implying that they underperformed compared to the expected return calculated with CAPM. In the second sub-period the same results were found, 0,06361 percent by the sustainable funds versus 0,083775 by the conventional funds. Interesting was that once again it can be observed that the sustainable funds outperformed the conventional funds during the last sub-period. The sustainable funds had a Jensen's alpha at 0,083883 percent compared to the conventional funds that had 0,073088 percent.

4.3 T-test for the full sample period

In order to answer the research questions, whether there is any difference in risk-adjusted return between sustainable and conventional funds, the average values from the three different risk-adjusted measurements for the two fund categories were analyzed for the full sample period. The results during the full sample period state that the conventional funds outperformed their sustainable peers in all three performance measurements. The findings state that the conventional funds performed a higher risk-adjusted return between 2013-01-01 and 2018-12-31.

Table 3. T-test for the full sample period.

Eveluation model	P-value
Sharpe ratio	0,673
Treynor ratio	0,682
Jensen's alpha	0,631

The outperformance from the conventional funds was then tested through a t-test which generated high p-values, implying that the differences between the two fund categories were not statistically significant. The non-statistically significant findings at 5 percent significance level imply that the null hypothesis for hypothesis 1 was not rejected. While the conventional funds achieved higher average risk-adjusted values than their sustainable counterparts, these results could not be statistically significant compared to the sustainable funds. The non-statistically significant results imply that these findings cannot be applied to the whole population and concludes that both fund categories expect to have the same performance over time. The results from the empirical data are in line with previous studies by Kreander et al. (2005), Bauer, Derwall and Otten (2007), Gregory, Matakoto and Luther (1997) and Bauer, Koedijk and Otten (2005) that found no statistically significant difference between the two fund categories.

4.4 T-test for the sub-periods

To answer the research questions during the sub-periods, whether there are any differences in risk-adjusted return between sustainable and conventional funds, the average values from the three different risk-adjusted measurements for the two fund categories were analyzed for the sub-periods. The obtained results from the sub-periods state that the sustainable funds had a higher Sharpe ratio and Treynor ratio during the second and last sub-period. The sustainable funds also performed a higher Jensen's alpha during the last sub-period than the conventional funds. In the first sub-period, the conventional funds outperformed their sustainable peers in all the evaluation models.

Table 4. T-test for the sub-periods.

Eveluation model	P-value
Sharpe ratio	
2013-2014	0,741
2015-2016	0,723
2017-2019	0,627
Treynor ratio	
2013-2014	0,862
2015-2016	0,834
2017-2019	0,752
Jensen's alpha	
2013-2014	0,629
2015-2016	0,621
2017-2019	0,589

The performance during the sub-periods was also tested through a t-test which once again showed high p-values. None of the values from the evaluation models showed statistical significance during the three sub-periods. Since the findings from the risk-adjusted return models were non statistically significant at the 5 percent level the null hypothesis for hypothesis 2 was not rejected. While the values state that the sustainable funds outperformed their conventional peers during the last sub-period in terms of risk-adjusted return, the result is not statistically significant. Bauer, Koedijk and Otten (2005) found similar results in their study when evaluating the performance from sustainable funds in sub-periods. The sustainable funds outperformed their conventional counterparts but with no statistical significance.

4.5 Modern portfolio theory

Markowitz (1952) and the modern portfolio theory states that investors should always aim for diversification in order to minimize risk in relation to the return when investing. As stated in the theory chapter, the more placement restrictions investors have, the less possibility to diversify and the fund will, therefore, have a lower chance to maximize the risk-adjusted return (ibid.). Sustainable funds have a lower possibility to diversify than their conventional peers since they have restrictions on which companies to invest in. Previous studies such as Markowitz (1952) states that placement restrictions will have a negative effect on a funds risk-adjusted return. The empirical findings of this study show that conventional funds perform a higher risk-adjusted than their sustainable counterparts during the full sample period. The conventional funds did not only perform better in risk-adjusted returns but also in actual return. The same results were found during the first sub-period, conventional funds had a higher value in all of the three evaluation models. The results in the first sub-period and the full sample

period supports the modern portfolio theory by Markowitz (1952) since the placement restrictions for sustainable funds seems to affect the funds risk-adjusted return and actual return.

Interestingly, the sustainable funds outperformed their conventional peers in risk-adjusted return during the last sub-period. The sustainable funds had a higher risk-adjusted return value in all three of the evaluation models between 2017-01-01 and 2018-12-31. The observed higher performance measures were ultimately not statistically significant compared to the conventional funds but the disadvantage for sustainable funds was arguably not big enough. The results go against the modern portfolio theory which implies that the conventional funds with more placement options should have a higher risk-adjusted return. The modern portfolio theory assumes that all investors are fully rational and that investors only will choose funds with the highest return and lowest risk. The theory goes against the findings of this empirical study and previous research on the Swedish market that states that an increase in investments in sustainable funds can be seen (Sandberg & Nilsson, 2017). The empirical findings of this study state that conventional funds perform a higher return and the results can, therefore, question if investors have other preferences than the highest possible return when choosing funds.

The results of this study imply that the conventional funds outperformed their sustainable peers when comparing the two during the full sample period. Even though the conventional funds obtained higher averages in all of the risk-adjusted performance measurements and in actual return, the results were not statistically significant. Interestingly, the sustainable funds outperformed their conventional counterparts during the last sub-period, results which are in line with previous studies by Mallin et al. (1995) and Bauer, Koedijk and Otten (2005). The sustainable funds obtained higher average values in all three risk-adjusted performance measurements and in actual return. The findings were however once again not statistically significant.

5 Discussion

This study's aim was to contribute to previous findings regarding sustainable funds and to analyze the performance of sustainable funds on the Swedish fund market. The research aim was to examine if there are any differences between sustainable and conventional funds in terms of risk-adjusted return. The two fund categories were analyzed during a 6-year sample period and sub-periods of 2 years each in order to answer the aim of the study. To fulfill the aim of the study, the following hypotheses were specified:

H1: Sustainable funds will have a higher risk-adjusted return than their conventional peers.

H2: Sustainable funds will have a higher risk-adjusted return than their conventional peers in the last sub-period between 2016-2018.

The results from the empirical findings do not show any statistical significance and therefore the null hypothesis for hypothesis 1 cannot be rejected. The non-statistically significant results from the full sample period lead to that it is not possible to draw any conclusions for the whole population.

The results obtained from this study state that the conventional funds performed a higher risk-adjusted return than their sustainable peers, without any statistical significance. The results of outperformance from the conventional funds can be seen during both the full sample period and also during the last sub-period. The superior performance from the conventional funds goes in line with findings from Markowitz (1952) and previous studies by De Souza Cunha and Samanez (2012), Hong and Kacperczyk (2009), Chang, Nelson and Witte (2012) and Tippet (2001). The previous studies all found that reduced diversification ability had a negative impact on the sustainable funds return. The placement restrictions can possibly also be an explanation for the higher risk-adjusted return and actual return from conventional funds in this study during the full sample period and the last sub-period.

The negative performance findings during the full sample period and last sub-period in this study go against the previous studies made by Mallin et al. (1995), Ito, Managi and Matsuda (2013), Eccles, Ioannou and Serafeim (2014) and Friede, Bush and Bassen (2015). The previous studies all found a positive performance relationship between sustainable funds and return. Mallin et al. (1995) found that ethical funds outperformed conventional funds with a small margin. One of the explanations was that increased awareness for sustainability affected the results which were not found in this study. Even though Sweden is seen as frontrunners in the field of sustainable investment there were no indications in this study that it had a positive effect on the sustainable funds return during the full sample period. Ito, Managi and Matsuda (2013) found that SRI funds outperformed conventional funds, both on the European and American markets. The authors analyzed 80 SRI funds during a nine-year period which is a larger sample than this study, something that could have had an effect on the results. Eccles, Ioannou and Serafeim (2014) studied 180 companies on the American market and found that high-ranked sustainability companies outperformed low-ranked companies. This study aimed to analyze the most sustainable funds on the Swedish market when only classifying funds with a 5 in MSR ranking as sustainable funds. The results from the empirical findings go against the findings from Eccles, Ioannou and Serafeim (2014) since the conventional funds outperformed their sustainable peers during the full sample period.

Furthermore, the results found during the full sample period in this study are in line with previous research by Bauer, Derwall and Otten (2007), Bauer, Koedijk and Otten (2005) and

Kreander et al. (2005). Similar to the findings of this study, all of them found no statistical significance in the difference between conventional and sustainable funds. Likewise, the findings in this study show higher risk-adjusted performance by the conventional funds while not enough to be statistically significant. These previous research listed in the literature all analyzed the performance of sustainable funds compared to conventional funds. The studies were all made during different sample periods, with different evaluation models and used different methods. The studies also covered different markets such as the American, UK, Germany, and Sweden with seemingly the same results. Even though the Swedish market is seen as frontrunners in sustainability, the results from this study show similar results as the other markets. The knowledge and awareness about sustainability do not seem to have had an effect on the performance during the full sample period.

The results during the sub-periods are also not statistically significant and therefore the null hypothesis for hypothesis 2 cannot be rejected. The non-statistically significant results from the sub-periods lead to that it is not possible to draw any conclusions for the whole population.

In contrast to the findings during the full sample period, the sustainable funds outperformed the conventional funds during the last sub-period. The results from the three different measurements imply that the sustainable funds performed a higher average daily risk-adjusted return. The sustainable funds also had a higher Treynor ratio and Sharpe ratio during the second sub-period between 2015-01-01 and 2016-12-31. The superior performance from the sustainable funds is in line with previous research from Mallin et al. (1995), Ito, Managi and Matsuda (2013), Eccles, Ioannou and Serafeim (2014) and Friede, Bush and Bassen (2015), that all found superior performance from sustainable funds. Mallin et al. (1995) stated that both conventional and ethical funds underperformed in their study compared to the market. Furthermore, the authors stated that a slightly superior performance by the ethical might have been caused by increased knowledge and interest in sustainability and ethical investments. The authors studied the market in the United Kingdom for 8 years with the same evaluation models as this study, Sharpe ratio, Treynor ratio, and Jensen's alpha to measure the risk-adjusted return. Ito, Managi and Matsuda (2013) further state that the differences between sustainable and conventional funds are not as clear anymore. This might also explain the small differences in this study, both during the full sample period but also in the sub-periods. Furthermore, the Swedish companies are seen as frontrunners in terms of sustainability, something that also could have affected the analyzed funds in this study. The findings in the last sub-period also go against the modern portfolio theory and previous findings in studies by De Souza Cunha and Samanez (2012), Hong and Kacperczyk (2009), Tippet (2001) and Chang, Nelson and Witte (2012). The authors all states that sustainable funds will not be able to perform the same return due to the reduced diversification ability. The disadvantage of not being able to fully diversify cannot be seen in the last sub-period since the sustainable funds outperformed their conventional peers.

The results found in this study derives from the two fund categories that were based on the sustainability classification and MSR ranking. If the fund had a 5 in MSR ranking, they were considered as sustainable. If the fund had a 3 or below in MSR ranking, they were considered as sustainable. In addition to this, all of the funds went through a matching pair approach to be as similar as possible to their counterparts. Furthermore, Sweden is seen as frontrunners in the field of sustainability which may imply that the companies within both of the two fund categories may be involved in sustainability work in one form or another. Since this study aimed to analyze the Swedish market and the fund had to contain at least 70 percent of their in Swedish companies, the conventional funds might contain a considerable amount of sustainable companies. With all of this in mind, the two different fund categories might not differ as much in investment strategy as their sustainability ranking may suggest.

Arguably, it can be stated that the sustainable funds perform better than their conventional peers during a period when the market has a negative return. The sustainable funds outperformed their conventional counterparts during the last sub-period when the market performed - 0,002235 in average daily return. The superior performance found in the study was however not enough to show statistical significance. One of the reasons for the nonstatistical significant results in the study can be explained by the selection of funds in the two fund categories. The relatively low number of funds and similarity in investment strategy can also be reasons for the small differences in the results that lead to nonstatistical significance of this study. Furthermore, the sample period is also relatively short, and a longer time period might have resulted in statistical significance for the results.

6 Conclusions

As the interest in CSR, sustainability and sustainable investments has grown during the last decades, the debate about its advantages has been widely discussed. The purpose of sustainable funds is that investors should get a return on their invested capital while also benefit the sustainable development in the world. Previously mentioned theories and studies explain the advantages and disadvantages of sustainable funds with inconclusive results about their performance. Previous research about sustainable funds has primarily been focusing on the US, UK and European markets with little to no research done on the Swedish market. The aim of this study was, therefore, to fill the gap in previous research and analyze the performance of sustainable funds compared to conventional funds on the Swedish market. To answer the aim of the study the following research questions were formed:

- Is there any difference in risk-adjusted return between sustainable and conventional funds?
- Do restrictions for sustainable funds have a negative impact on the funds risk-adjusted return?

To answer the research questions for this study, Swedish funds were separated into two different fund categories. One category with 13 sustainable funds and one category of 13 conventional funds were created. The used funds for this thesis were matched through a matched pair approach based on size, investment strategy, and age. The two fund categories were then compared with three evaluation models in order to analyze their risk-adjusted return between 2013-01-01 and 2018-12-31.

The results of this study found no statistical significance difference between the sustainable fund and the conventional funds, both during the full sample period and the sub-periods. It can therefore not be stated that placement restrictions for sustainable funds have an impact on their risk-adjusted return. The results, however, indicate that the conventional funds outperformed their sustainable peers when analyzing their risk-adjusted performance during the full sample period. When analyzing the findings of the sub-periods the conventional funds had a superior performance during the first sub-period. The sustainable funds, however, performed a higher average daily risk-adjusted return during the second sub-period in two out of three evaluation models. In the last sub-period, the sustainable funds outperformed their conventional peers and had higher values in all of the three evaluation models, once again, with no statistical significance. With these results in mind, the conclusion of this study is that private investors can choose to invest in conventional or sustainable funds and expect equal performance over time.

6.1 Future research

While several studies have been done to evaluate the performance of sustainable funds this study has created several interesting thoughts about sustainable funds and their performance. This thesis analyses funds on the Swedish market with at least 70 percent of their placements in Swedish companies. For future research, it would be interesting to study if the share of placements in Swedish companies has an effect on the funds return. Since Swedish companies are seen as frontrunners in implementing sustainability it would, therefore, be interesting to study if a high percentage of Swedish investments generate a higher return for sustainable funds.

Furthermore, it would be interesting to study how sustainable funds on the Swedish market perform compared to other Nordic countries like Finland, Denmark, Norway, and Iceland. This would further analyze if companies on the Swedish market perform better due to their high level of sustainable awareness. It would also be interesting to compare sustainable funds in Sweden to sustainable funds in the US, UK, and other European countries to test if there is any difference between these markets.

Future research about how sustainable funds perform during different market states would also be interesting. To study if there is any difference between sustainable and conventional funds during market crises such as the financial crisis in 2008. Finally, an interesting topic for future studies would be to research how the interest for sustainable funds can be increased. The interest and demand for sustainable funds are already here, but it would be interesting to study how regulation and transparency can increase the interest even more.

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Appendix 1

<u>Sustainable funds</u>	<u>Conventional funds</u>
Akte-Ansvar Sverige A	AMF Aktiefond Småbolag
Aktiespararna Topp Sverige (index)	Cliens Sverige A
AMF Aktiefond Sverige	Cliens Sverige Fokus A
Carnegie Sverigefond A	Didner & Gerge Aktiefond
Lannebo Sverige	Enter Sverige A
Länsförsäkringar Sverige Aktiv A	Norron Active RC SEK
Länsförsäkringar Sverige Indexnära	PriorNilsson Sverige Aktiv A
Nordea Swedish Stars icke-utd	SEB Sverige Indexfond
Spiltan Aktiefond Investmentbolag	Skandia Småbolag Sverige
Spiltan Aktiefond Stabil	Swedbank Robur Exportfond
SPP Aktiefond Sverige A	Swedbank Robur Sverigefond
Swedbank Robur Sweden High Dividend	Swedbank Robur Sverigefond Mega
XACT OMXS30	Öhman Småbolagsfond A

Appendix 1. Fund used in this study.