Performance of Active vs. Passive Investments in the Nordic countries during COVID-19

Rosangela Limachi Tapia

Haaga-Helia University of Applied Sciences

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Abstract

Author(s)
Rosangela Limachi Tapia

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For many years, active vs. passive investing has been studied to determine which strategy generates the best returns for investors. Both strategies have their advocates and opponents. Meanwhile, active managers intend to outperform the market, passive investors adopt a “buy and hold” strategy.

During the recent COVID-19 pandemic, the stock market experienced high volatility and changes that could test if the buy and hold strategy could produce better results than the active investment strategy. Alternatively, on the other side, if actively managed, investments can take advantage of their flexibility and adapt to the changes and succeed by outperforming the market.

This thesis report aims to study the performance of active vs. passive investments in the Nordic countries during the Covid-19 pandemic two-year period. For this study, a sample of 40 actively managed open-end funds from the nordic countries was taken and compared against the highest trading index by countries, the OMX Indexes. The S&P Country BMI was used as well as an additional index benchmark for analysis. The best and worst actively managed portfolio funds by country during the two-year period were analyzed in closer detail, taking a look into the performance of each mutual fund against the OMX country Index.

The study was performed as quantitative research with secondary data extracted from investment databases, and for its analysis, it was used descriptive statistics, regression analysis, and different performance ratios to reach comprehensive results and further conclusions.

The analysis relied on the theoretical framework studied, understanding the described investment theories, performance ratios measurement significance, and lastly, the effect of COVID-19 on investments. It was found that only two actively managed portfolios were able to outperform the market during the pandemic of the four Nordic countries. In Sweden and Norway, the selected sample's active mutual funds outperformed both selected indexes. In, the opposite the Danish OMXC20 and Finnish OMHEX25, shown to be a better decision to invest during the two year period than the actively managed funds portfolio.

Keywords DONE
Active investment, passive investment, mutual funds, COVID-19, index benchmark

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1 Introduction

This chapter will serve as a presentation of the preliminary information related to the subject of the thesis, and it will outline the general structure of the report. The introduction has been divided into five subchapters to give the reader a clear understanding of the object of this chapter and the thesis report.

In the background subchapter, it will be described the general context and scope of the research problem, and it will aim to give a reader a good understanding of this. Then, the thesis objective subchapter will explain the primary goal of the thesis and the importance of the study. In subsequent, the research question will be presented, followed by the benefits that the author considers this study will bring, and lastly, demarcations and thesis structure will be presented.

1.1 Background

Active Investment vs. passive Investment has been analyzed for years and studied to determine which strategy is better and results in the best returns for investors. (Sanchez, 2022) While active managers try to outperform, the stock market average returns, passively managed investments track an index and take a “buy and hold” strategy approach. (Chen, 2021). As Sanchez, 2020 mentions, passively managed investments tend to outperform the majority of actively managed funds, according to SPIVA (S&P Indices versus Active) scorecard. For many authors, SPIVA Scorecard is the best measurement of the percentage of actively managed funds that outperformed their index benchmark. (Employee Fiduciary 2022).

Hunt, 2022 suggests that a favorable result for an investor may come from a blended strategy by combining both active and passive investment strategies. This could be done by trusting in active management in areas that have profitable results when performing a historical analysis and relying on passive investing in stocks of US large companies, for example. This has been discussed, and there are different opinions on this blended strategy; however, in the end, it will depend on the individual investors' choice.

However, if market conditions are volatile and affected by global economics, such as the financial crisis seen in the past and, most lately COVID-19 pandemic, active investors might have the advantage of adjusting their strategies to outperform the market and reducing risks. On the other hand, passively managed investments do not have this opportunity as they lack flexibility. (Chen, 2022)

1.2 Thesis objective

The aim of this report is to analyze the performance of Active vs. Passive Investments in the Nordic countries during COVID-19 with the objective to study if actively managed investments can outperform passively managed investments in times of high volatile and changes as the latest COVID-19 pandemic and see if investment managers are adding value to their portfolios.

For this, it was decided to analyze the performance of actively managed open-ended mutual funds with origin in the Nordic countries against each country's most important index and S&P Country subindex. Additionally, it will be analyzed the best and worst countries mutual funds' performance in detail against the country's respective OMX benchmarks. The selection was based on results on the relative Annualized Returns of active Portfolios against indexes benchmarks.

Investment managers can sell and buy different funds in their investment portfolio with the aim of maximizing returns and reducing risk; the opposite, passive investments, do not have this possibility as they account for a "buy and hold" strategy (Field 2021) the author found it interesting to analyze if actively managed mutual funds outperformed the market during COVID-19 and see if active investors are able to take advantage of market volatility and adapt to this changes and most importantly, succeed by outperforming the market.

1.3 Research question

The author aims to understand how actively investments performed against a determined index in the Nordic countries. The research question and consequent investigative questions that help to understand and answer this question can be defined as follows:

RQ: Have actively managed investments outperformed the Nordic countries' market during COVID-19?

IQ1: Can a single investment spread across the top 10 active open-end funds in each Nordic Country outperform a single investment spread evenly across the four countries' benchmark indexes?

IQ2: Have active managed open-end funds investments outperformed the Finish market during COVID-19?

IQ3: Have active managed open-end funds investments outperformed the Swedish market during COVID-19?

IQ4: Have active managed open-end funds investments outperformed the Norwegian market during COVID-19?

IQ5: Have active managed open-end funds investments outperformed the Danish market during COVID-19?

An overlay matrix has been composed where it displays how investigative questions are answered in the theoretical framework, empirical part, and results chapters. Consequently, information that is not necessary or directly relates to the research study was not added to this report. The main goal of the overlay matrix presented is to ensure that the thesis structure forms a logical whole that supports the research study and that each chapter and section has a clear relation with the subject of study.

Table 1. Overlay Matrix

Investigative Questions	**Theoretical Framework**	**Empirical Part**	**Results**
IQ1: Can a single investment spread across the top 10 active open-end funds in each Nordic Country outperform a single investment spread evenly across the four countries' benchmark indexes?	3.1.1, 3.1.2 3.1.5, 3.2.1 3.2.2, 3.2.3 3.2.4	4.2.1, 4.2.2 4.3.1, 4.3.2	3.4, 5.1 5.3, 6.1
IQ2: Have active managed open end funds investments outperformed the Finish market during COVID-19?	3.1.1, 3.1.2 3.1.5, 3.2.1 3.2.2, 3.2.3 3.2.4, 3.3, 3.4	4.2.1, 4.2.2 4.3.1, 4.3.2	3.4, 5.1 5.3, 6.1
IQ3: Have active managed open end funds investments outperformed the Swedish market during COVID-19?	3.1.1, 3.1.2 3.1.5, 3.2.1 3.2.2, 3.2.3 3.2.4, 3.3, 3.4 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6	4.2.1, 4.2.2 4.3.1, 4.3.2 4.4.1	3.4, 5.1 5.3, 6.1
IQ4: Have active managed open end funds investments outperformed the Norwegian market during COVID-19?	3.1.1, 3.1.2 3.1.5, 3.2.1 3.2.2, 3.2.3 3.2.4, 3.3, 3.4	4.2.1, 4.2.2 4.3.1, 4.3.2	3.4, 5.1 5.3, 6.1

IQ5: Have active managed open end funds investments outperformed the Danish market during COVID-19?	3.1.1, 3.1.2 3.1.5, 3.2.1 3.2.2, 3.2.3 3.2.4, 3.3, 3.4 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6	4.2.1, 4.2.2 4.3.1, 4.3.2 4.4.2	3.4, 5.1 5.3, 6.1

1.4 Demarcation

As the analysis is based on Nordic countries' investment performance, only mutual funds with origin in the Nordic countries were taken into consideration, as well, only mutual funds that had been operative and had complete historical data for the two-year period chosen were considered. This thesis report does not consider another type of asset's performance but only open-end mutual funds.

Only indexes from the mutual fund's origin countries were compared, as the country currency used when extracting raw data will be the same nation for both the mutual fund and index. Therefore S&P500 and other bigger and most important indexes are out of scope in this report.

1.5 Benefits

The author considered interesting to analyze if actively managed mutual funds performed better against a determined indexes benchmark in a period of high global economic instability. As mentioned, the active investment strategy offers great flexibility to managers to adjust their portfolios depending on the market fluctuations; hence, in theory, it can be assumed that these actively managed funds will outperform the market and offer better returns than passively managed funds. Therefore, it seems of a quite importance to see how active investors added value and if they succeed in challenging periods.

1.6 Thesis Structure

The thesis structure aims to form a logical whole that supports the object of study and that each chapter and section serves to answer the study research. With this objective, the report is structured as follows, an introductory chapter, where it was already introduced the background, thesis objective, and research question that is aimed to answer as demarcations and benefits of this study.

The literature review will look backward at what has been written about the research study topic and go through the main concepts to demonstrate knowledge of the subject of study. However, the literature review is not included in the report structure guidelines for research-based thesis in GLOBBA program, the author considered it important to include this particular chapter on a literature review to analyze the main concepts related to the research, as help to justify the research topic and that will lay the foundation for the theoretical framework.

The purpose of the theoretical background will be to guide the research by relying on formal theory. (Grant & Osanloo 2013, 2). Therefore, the theories connected to the research and measurement performances that intend to answer the research question will be described comprehensively in this chapter. The theoretical background will serve as a clear link to the empirical part study.

The empirical part will review the research method, data selection, and further analysis. In the concluding chapter, the results of this study will be presented and evaluated objectively, basing them on the data collected in the previous chapter. The discussion chapter will present a summary of the results and an analysis of the reliability of the research, including the author self's evaluation of the thesis project and learning process. Finally, the appendix will provide supplementary information used during the report, which served as background data when developing the thesis.

2 Literature Review

This chapter will present an overview of key concepts related to the research question; as mentioned, this chapter aims to lay the foundation for the theoretical framework. The author considered it essential to include in the thesis report a particular chapter to present the main concepts studied in this thesis report from the research perspective.

Nevertheless, a thorough study of these terms could be performed, this will not directly the analysis in this report; hence, the study of these concepts and subsequent presentation has been displayed to introduce the lector to the active vs. passive discussion perspective.

2.1 Passive Investing

In this subchapter, the author will give an overlook to passive investing based on the literature reviewed, along with a brief story of passive investing with the aim to understand its development through the years and also note that, as many authors declare, index funds are becoming of increasing importance in nowadays global economy. (Reynolds, 2022). Lastly, it will be described the benefits and disadvantages of this investment strategy that the author finds relevant for the thesis study object.

Passive investing can be defined as a long-term strategy that doesn't intend to outperform the stock market but instead maximize returns by minimizing buying and selling. (Chen, 2020) The strategy consists of a "buy and hold" portfolio strategy consisting of a broad set of diversified assets that try to minimize the trading. (Field 2021) The purpose behind this is to avoid the fees and limited performance that could occur in the case of active investment. Passive investment doesn't intend to produce profits in the short term but rather in a long-term strategy based on the assumption that the market will bring positive results on a long-term basis. Passive managers believe that it is difficult to outperform the market, so they attempt to mirror market or sector performance. (Chen, 2020)

Passive investing arose in notoriety in the 1970s when the first index fund was introduced in The Vanguard Group's investment company by its CEO John Bogle. (Chen, 2020) This indexes fund allowed to buy shares in a fund that mirrored the S&P 500. At that time, there was strong confidence in investment managers adding value to portfolios; therefore, at start this type of index funds weren't the most popular initially. However, by 1977, these same index funds were holding nearly 3 billion of pension fund money, reaching 91 billion by 1985. (Reynolds, 2022)

As a passive investing strategy accepts average market returns, it aims to reduce fees and expenses and maintain a diversified portfolio (Kahler, 2016); several benefits can be displayed. The following were studied and selected from different sources in relevance to the research study:

- Lower costs: As passively managed funds track an index as a benchmark, the cost associated with their management fees are low as there is not an active management involved. The authors noted that the average expense ratio for passive mutual funds in 2020 was 0.06%; passive ETFs came in at 0.18%. (Napoletano & Schmidt 2021)

- Transparency: It allows investors to know at any time which securities they hold in their index fund. (Chen 2020)

- Simplicity: Index investing and owning an index, or a group of indices is significantly easier to implement and comprehend compared to actively managed securities that require constant tracking. (Goyanka 2020)

- Higher returns: According to Morningstar's Active/Passive Barometer for 2021, it was shown that only 25% of all active funds topped the average of their passive rivals over the 10-year period ended June 2021. (Johnson 2021)

On the other side, it might be worth mentioning some downsides of passive investment, this strategy is exposed to market fluctuations as the index funds involved track the performance of the market. They also don't have the flexibility to buy or sell securities. In the case that there are rises or falls in the stock market, passively managed funds will be directly affected. (Goyanka 2020) This situation can directly harm or benefit the funds depending on the market performance as an investment manager cannot sell or buy securities depending on the market performance; hence this leads to a lack of reactive ability (Pinsent 2022)

2.2 Active Investing

Active investing is an investment strategy that aims to outperform the stock market. (Direct Investing 2022). It involves investment managers who use the information available to develop a strategy and actively buy and sell stocks, monitoring their activity to get higher returns and a certain amount of risk (Anderson 2020). In contrast with passive investing, it can be stated that this strategy requires strong involvement from the investment manag-

ers to add value (Chen 2020) According to Gordon, 2022, an investment manager constantly assesses the price movements and analyzes the stock market to buy and sell according to as they can modify their portfolios; it is worth mentioning that typically active investors seek short-term profits.

Investors can utilize active investing to capitalize on short-term trading opportunities. For example, when looking at the different past financial crises, investment managers could have the possibility to minimize risk by improving their portfolios. (Gordon 2022) Active investment can have various types; it could start from an independent investor actively managing its portfolio individually. A professional investment manager who manages an investment portfolio on behalf of their clients actively manages mutual funds, hedge funds, pension funds, and others. (Lehner Investments 2021)

The benefits and drawbacks of active investing are relevant for this study, as this was also taken into account when studying the long-term debate of active vs. passive investing. Some benefits of active investing could be as follows.

- Risk Management: Chen, 2022 suggests that as it is possible to adjust actively managed portfolios, investment managers have the possibility to reduce or increase their exposure to market conditions in periods of economic instability. For example, in the past financial crises, active investors could adjust and buy or hold securities depending on the economic context, which will minimize risks.

- Flexibility: As previously noted, investment managers have the possibility to quickly modify their portfolios and adjust them to outperform the market by selling or buying different securities. (Anderson 2020)

- Short-term opportunities: Investment managers can sell or buy in short periods, days, or weeks to maximize returns. An important strategy to mention is swing trading. (Gordon 2022)

Some disadvantages of active investment that could be mentioned are that costs are higher if compared to passive investment (Gordon 2022), investment manager fees and transaction costs are higher than a passive investment strategy. (Chen 2022)

2.3 Mutual Funds

Mutual funds can be defined as a professionally managed portfolio of stocks, bonds, money market instruments, and other assets. A mutual fund is a very simplistic way to diversify money within the stock market by only buying one thing. Its purpose is to have a diversified portfolio to generate better returns for the investors than investing in single stocks. (Benson & Voight 2022)

When an investor buys a share of a mutual fund, it not only represents a part of investments of different stocks the mutual fund has and becomes part-owner of the fund (Finra 2022), but is buying is a part of the performance of the portfolio, this is the reason why mutual funds can be defined as an investment and also an actual company. (Hayes 2021)

Mutual funds have become a popular way to invest lately, as this type of investment pools money in different shares, which seem a better strategy than just investing in certain stock or bond, as well as they are professionally managed, the investor doesn't need a professional or extensive knowledge on investment to start investing in mutual funds. (Finra 2022).

Some other advantages of mutual funds can be that as they are professionally managed, there is a professional team in charge of managing the portfolio, and it offers diversifications, as a mutual fund can be seen as a basket of stocks, bonds, or other assets and intrinsic to this it allows to participate in a wide variety of investments. (Palmer 2021)

On the other side, mutual fund's actively managed and carry with them costs and fees for their own management, as well as, depending on the investor's capacity to overperform the market, this in some cases, may lead to a weak strategy and losses. (Palmer 2021)

3 Theoretical Framework

In this chapter, fundamental theories that have an effect in this study research and performance measures use to analyze data will be reviewed. The intend of this chapter is to act as a direct link to the research study, based on this, the theories and concepts as performance measures presented above have been carefully selected for this purpose.

Main investment theories related to the debate on passive vs. active investment will be explain in the first subchapter and it will be followed by a description on the performance measures and how these have been selected to benefit this study.

3.1 Main theories

3.1.1 Efficient Market Hypothesis

This investment theory was derived from Eugene Fama research included in his book “Efficient Capital Markets: A Review of Theory and Empirical Work” in 1970. (CFI 2021) The efficient market hypothesis (EMH), also known as efficient market theory (Downey 2021), is a theory that states that markets are efficient when prices reflect all relevant information at any point in time. As a consequence, stock prices capture how much the stock is worth, and no matter how much analysis is performed, investment managers cannot outperform the market. (Downey 2021) As new information and changes in the economy have a direct reflection on stock markets. For example, when news come, prices in stocks can be seen directly affected by this as well, if a stock might be overvalued, the prices will immediately be changed as investors will buy these stocks, and their real value will be demonstrated immediately. (Wolla 2016)

This theory supports the passive investment strategy, as it states that the market is efficient, and that all information related to the stocks is already present. Consequently, the theory supports the “buy and hold” strategy based on the passive investment. (Wolla 2016). Although the validity of this theory has been widely discussed, it has among its supporters’ prominent figures such as Warren Buffet and its opponents in favor of the market inefficiency. (Downey 2021)

The efficient market hypothesis has three different forms, the weak form states that stocks already reveal all their information, including historical prices, and any fundamental or technical analysis will not help to beat the market. The semi-strong form suggests that stock prices inform all public information, and the same investors cannot use analysis to outperform the market. The strong form suggests that all the information, public and unpublic as inside information, is already represented in the stock prices. (Maverik 2022)

3.1.2 Behavioral Finance

Behavioral finance can be defined as the study of how physiological influences from investors can affect market outcomes (Hayes 2021). This theory is favorable for active managers as its bases on the theory that investors are not always rational and can be influenced by different aspects, as they are defined as “normal” rather than rational beings, and they can make particular decisions that can have a direct impact on investment markets. (CFI 2022) From the behavioral theory perspective, investors could be directly affected by physiological influences; this is indeed the purpose of behavioral finance, to understand why people make particular choices and how these directly impact financial markets. (Hayes 2021)

This theory can explain, for example, some asset bubbles, as it will be understood why at some point in time, the price of some assets rises without any rational justification. As behavioral finance proposes that in reality, it is people giving a nonrational higher valuation to determined securities, an investor can act with overconfidence (Lin 2016), and this could lead to committing mistakes and cause an underperformance or overperformance in the case of asset bubbles. As well, this theory could reduce confidence in markets, and it could be stated that its application will mainly be based on individual investors rather than on big institutions. (Juneja 2021)

3.1.3 Risk-Free Rate

The risk-free rate is the interest rate that investors can earn on an investment that carries no risk. It is often used in the financial literature, and it greatly influences the CAPM and the chosen performance measures.

The choice of the risk-free rate is therefore of great importance. Government bond yields are used as a proxy for risk-free rates (EY 2015). The yield on a government bond can however not be used as a representative of a risk-free asset if the underlying bond is used for speculative trading.

3.2 SPIVA Scorecard

S&P Indices Versus Active (SPIVA) Scorecard is one of the most reliable sources of information about fund performance, and it is produced semiannually by S&P Dow Jones Indices. (Powell 2018). The indice compares the performance of active equity and fixed income mutual funds against their benchmarks (S&P Global 2021).
The advantage of this scorecard is that it compares funds of a particular type against s corresponding type of benchmarks; for example, it compares large-cap U.S. funds against

the S&P 500, the midcap funds against the S&P Midcap 400. (S&P Global 2021). It also indicates the impact of survivorship bias, style consistency (Coleman 2022), and the equal- and asset-weighted returns. (S&P Global 2021).

During the last 20 years, more than 95% of all USA active stock fund managers underperformed their S&P benchmarks. Likewise, almost 93% of international stock fund managers could not beat their respective S&P indexes in the international markets (Coleman 2022).

Taking into consideration the trustworthiness of this scorecard, the SPIVA Scorecard was reviewed for the end year period of 2020 and 2021, as these are covered in the two-year period of the data sample study, with the aim to get a general picture of how actively managed funds performed over an index benchmark in one of the biggest markets in the world.

For 2021, 79.6% of U.S domestic equity funds lagged the S&P Composite 1500; in 16 of the 18 categories tracking U.S. equities-focused funds, more than half the funds underperformed their benchmark. 85% of Large-cap funds underperformed the S&P 500 (Liu 2022)

For 2020, Approximately 60% of actively managed funds underperformed the index. Large-cap funds (60%) underperformed theS&P500. For international markets, Roughly50%of global, international, international small-cap, and emerging markets funds beat the S&P Global 1200, S&P International 700, S&P Developed Ex-U.S. SmallCap, and S&P/IFCI Composite, respectively. (Liu & Sinha 2020)

3.3 Performance Ratios

3.3.1 Jensen’s Alpha

The Jensen's measure, or Jensen's alpha, is a risk-adjusted performance measure that represents the average return on a portfolio or investment. (Chen 2020). This was developed by Michael Jensen and used at beginning in mutual funds. (Wikipedia 2022) The formula is at follows:

$$\alpha j = Ri - [Rf + \beta im(Rm - Rf)]$$

Where αj is Jensen's alpha, Ri the portfolio return, Rf the risk-free rate $\beta \mathrm{im}$ and Rm the market return. (Wikipedia 2022)

According to Chen 2021, Jensen's measure is one of the ways to determine if a portfolio is earning the proper return for its level of risk. A higher positive value for Jensen’s Alpha, the higher the returns the portfolio is having.

3.3.2 Treynor Ratio

Also called the reward-to-volatility ratio indicates how much return an investment earned for the amount of risk the investment assumed (Kenton 2020). As it has a higher value the Treynor Ratio offers, there is a more favorable risk/return scenario (CFI 2020).

$$Treynor\ ratio = \frac{rp - rf}{\beta p}$$

Where rp is the portfolio return, rf the risk free rate and βp the beta of the portfolio (CFI 2020).

3.3.3 Sharpe Ratio

The Sharpe ratio indicates how well an equity investment performs compared to the rate of return on a risk-free investment (Maverick 2022). The higher the Sharpe ratio compared to other investments, the greater the investment return relative to the amount of risk taken. (CFI 2020)

$$Sharpe\ Ratio = \frac{Rx - Rf}{StdDev\ Rx}$$

Where Rx is the expected portfolio return, Rf the risk-free rate of return and, $StdDev\ Rx$ the standar deviation of portfolio return. (CFI 2020)

3.3.4 Information Ratio

The information ratio is a performance ratio that measures the portfolio returns against the returns of a benchmark. (Murphy 2020) The skills of investment managers could be measured with this ratio as it can be understood through this ratio if the investment manager generated excess returns compared to a benchmark. (Murphy 2020)

$$Information\ Ratio = \frac{rp - rm}{opm}$$

Where rp is the portfolio return, Rm the market return and opm the standard deviation of the active return. The higher information ratio, the better. (Murphy 2020).

3.3.5 Capital Asset Pricing Model

Capital Asset Pricing model that is also called CAPM) is an investment theory that shows a relationship between the expected return of an investment and the bonded risk of investing on it. (CFI 2021). The formula for the CAPM is used to calculate expected returns of an assets and it is as follows:

$$Ra = Rrf + \beta(Rm - Rrf)$$

Where Ra is the expected return on a security, Rrf refers as the risk-free rate, that is a rate of return with zero risk as it shows the minimum amount an investor expects from their investment (Hayes 2021), β shows the relationship between the investment and the market, being the market beta 1, Rm is the expected return on the stock market. Important to mention that Risk Premium is the expected return of the market minus the risk-free rate. (CFI 2021)

As McClure 2022 suggests, there is always a level of risk even if investment managers have a well-diversified portfolio. CAPM is widely used as investors want higher returns when the risk taken is higher, as it is possible to see if a stock is valued correctly, taking into consideration the risk and the time value of money (Kenton 2022). In the Appendix, it has been included figures on CAPM that have been used to understand this concept, and it will provide additional information.

3.4 COVID-19 effect on investments

This section will describe the significance Covid-19 had for investments, taking principally sight on active and passive investments. Although the Covid-19 effect on investments could be widely studied as the pandemic itself and its effect globally on all levels, health, social, and economic, the author will delimitate its study to the research topic thesis perspective. When studying this section, the primary aim was to get more insight into how both strategies, active and passive investment strategies, were affected.

The Covid-19 pandemic caused an unseen global crisis that directly impacted health, society, and economics (Helsinki City 2021). From the investment perspective, Covid-19 caused massive volatility in global markets; having instability and constantly upcoming fresh information caused a considerable challenge for passively and actively managed investments. (Limouzi 2020)

According to Chazal 2020, it is important to mention that information was constantly changing during the most critical months of the pandemic. As a result, markets moved

rapidly; however, this could have been seen as an advantage for actively managed investments against passive investments. It also can be supposed to be a challenging time for investment managers to outperform the market in those unstable conditions. In any case, what would be expected from investment managers is the ability to succeed when trying to safeguard investment portfolios.

On the other side, there is a debate on the side for passively managed investments; this pandemic could have taught us that rapidly changing market conditions and global crises have a direct effect on investment, and it might be worth a certain amount of flexibility to manage and adapt to these changes. (Chazal 2020) Alternatively, as other authors mentioned, the Covid-19 crisis could have reaffirmed the “buy and hold” strategy and not gotten carried away with panic and pessimism, rather than holding and keeping the stocks. (Sulivan & Curry 2021). As the financial planner Topeka, 2021 wrote in a Forbes article: “If you sold in March, you would have gotten hammered. Doing nothing really does work”. (Topeka 2021).

4 Empirical part

This chapter will describe the research method and its implementation. The first subchapter offers an introduction to the research method used and an introduction to the research analysis. In the second subchapter, the mutual fund's selection and the criteria on which base these mutual funds were selected will be reviewed, as well as the benchmark chosen.

4.1 Research Method

The research method used will be quantitative research based on secondary data taken from the Bloomberg database and SPIVA report. Both sources have been used as they contain historical data performance of mutual funds chosen and indexes; descriptive statistics and performance ratios will be used to carry out the analysis.

The performance of actively managed open-ended mutual funds with origin in the Nordic countries will be analyzed against each country's most important index and S&P Country subindex during a two-year period starting on 31.12.2019 and ending on 31.12.2021.

The data will be analyzed as a single investment spread across the top 10 active open-end funds in each Nordic Country compared to a single investment spread evenly across the four countries' benchmark indexes during a two-time period. Following strict criteria, the sample used was 40 carefully chosen actively managed open-ended mutual funds from the Nordic countries that are divided as follows, 10 Swedish active mutual funds, 10 Finnish active mutual funds, 10 Danish active mutual funds, and lastly, 10 Norway active mutual funds against the most important indexes and S&P BMI by country.

Additionally, it will be analyzed in closer detail, the best and worst active portfolio performance by country, and each mutual fund will be studied separately against its country's OMX index. The selection will be in base on the relative annualized returns results of Active Portfolios against OMX Index by country and S&P Country BMI.

4.2 Selection Criteria

4.2.1 Mutual Funds

The criteria decided chosen for the mutual fund’s selection were as follows:

- It was chosen that only equity mutual funds with origin in the Nordic countries were taken into consideration
- Mutual funds that have a historical data for the two-year period in consideration

- The type of mutual fund chosen is open-ended fund as this type of fund has more flexibility and higher liquidity than closed-ended funds and is exposed to higher market risk. (Aditya Birla Capital 2019).
- An expense ratio higher than 7 as this will filter out the pension funds.
- Mutual funds that have 100 million assets under management.

With these criteria, a total of 1043 open-ended mutual funds were presented, and it was taken as a sample for the analysis of the 40 top largest mutual funds in the Nordic countries, divided respectively as 10 Swedish active open-ended mutual funds, 10 Finnish active open-ended mutual funds, 10 Danish active open-ended mutual funds, and lastly, 10 Norway active open-ended mutual funds.

The data were pooled from the Bloomberg database as monthly weighted average returns by each mutual fund and weighted average of an active portfolio by country. Annualized total returns and relative annualized returns. Net present value was also collected for further regression analysis. The data were collected monthly in the two years period taken that, gave a total of 2066 data figures that were used in the analysis. The sample data used was attached in the Appendix of the thesis report.

4.2.2 Benchmarck indexes

For the index benchmark the criteria was to select only indexes from the mutual fund's origin countries and that will be compared against, as the country currency used when extracting raw data will be the same national for both, mutual fund and index.

The main stock market indexes from the four Nordic countries were selected for the comparison OMX Stockholm 30 Index (OMXS30), OMX Helsinki 25 Index (OMXHEX25), OMX Copenhagen 20 (OMXC20) and OMX Oslo 20 (OMXO20) Index.

Also, was taken as index benchmark the S&P Country BMI Sub Index, the reason for that as the OMX index consist in the securities with highest trading value and the S&P Country BMI includes all the eligible companies domiciled in each country. (S&P Norway BMI 2022). The author considered interesting to make a comparison of active mutual funds against the highest trading value indexes in each country and also comparing with the performance of all companies in each country using the S&P BMI.

Consequently, the Swedish active mutual funds portfolio will be benchmarked against the OMX Stockholm 30 Index (OMXS30) and S&P Sweden BMI Subindex, the Finnish active mutual funds portfolio will be analyzed against the OMX Helsinki 25 Index (OMXHEX25)

and S&P Finland BMI Subindex, the Danish mutual funds portfolio will be analyzed against the OMX Copenhagen 20 (OMXC20) Index and S&P Denmark BMI Subindex and lastly, 10 Norwegian active mutual funds against OMX Oslo 20 (OMXO20) Index and S&P Norway Subindex.

4.3 Analysis as a single investment

The data will be analyzed as a single investment spread across the top 10 active open-end funds in each Nordic Country compared to a single investment spread evenly across the four countries' benchmark indexes during a two-time period, from 31.12.2019 to 31.12.2021.

For this analysis, it will be created 4 country actively managed portfolios that would have the weighted average of each mutual fund they include, and it is assumed monthly re-balancing and dividend reinvestment.

In the appendix, tables with monthly total returns in Nordic Countries against OMX Nordic Indexes and Monthly total returns in Nordic Countries against S&P Country BMI were included.

4.3.1 Relative Annualized Returns Analysis

Annualized total returns data was extracted from the Bloomberg database and S&P Countries BMI with SPIVA Report. The following table will show the relative annualized returns and the percentage change in relation to the Indexes Benchmark for the two-year data period.

Table 2. Relative Annualized Returns of Active Portfolios against OMX Index and S&P by country

	Annuallized total returns			**Relative An. Returns**		**Percentage Change**	
Country	**Portfolio**	**S&P BMI**	**OMX Index**	**S&P BMI**	**OMX Index**	**S&P BMI**	**OMX Index**
Denmark	17,14	30,18	29,96	-13,04	-12,82	-43,21 %	-42,79 %
Finland	16,27	18,8	17,77	-2,53	-1,5	-13,46 %	-8,44 %
Norway	15,96	12,75	12,55	3,21	3,41	25,18 %	27,17 %
Sweden	30,09	25,89	19,34	4,2	10,75	16,22 %	55,58 %

Taking a look at the country actively managed portfolios against the OMX Index by country, it can be seen that the Swedish and Norwegian actively managed portfolios have beat the market performance. The Swedish actively managed portfolio had an outstanding

55,58% better performance than the OMX Stockholm 30, the Norwegian actively managed portfolio had an over 27,17% performance compared to the OMX Oslo 20.

On the other side, the Finnish actively managed portfolio underperformed the OMX Helsinki 25 under -8,44% percent, and the Danish actively managed portfolio underperformed the OMX Copenhagen 20 under -42,79% percent during the time period.

Same as with the OMX Nordics, when comparing the active portfolio against S&P Country BMI, the only two countries that were able to outperform the market were Sweden and Norway. Sweden had a 16,22% performance over the S&P Sweden BMI, and Norway had a 25,18% performance over the S&P Norway BMI.

On the other side, similar to OMX Nordics, the Danish actively managed portfolio underperformed the market hugely under -43,21% compared to the S&P Denmark BMI, and the Finish portfolio had an underperformance of -13,46% against the S&P Finland BMI.

4.3.2 Statistical Analysis

Descriptive statistics will be presented in this section for each active portfolio country against the OMX Index and S&P Country BMI with monthly returns during the two-years period. For the study, only selected measures of dispersion were taken into consideration and subsequently presented; however, measures of central tendency were also calculated in the statistical analysis.

In the table above, the standard deviation will show the dispersion of data from the average, the kurtosis will help to determine how much risk the active portfolio took, as it identifies whether the tails of a given distribution contain extreme values. (CFI, 2020). Finally, the skewness will analyze the distributions of the returns of the investments lastly minimum will present the worst return, and the maximum, the best returns the active portfolio has achieved during the two-years period.

Table 3. Denmark Active Portfolio descriptive analysis

Descriptive Statistics	Portfolio	OMXC20	S&P BMI	OMXC20 Comparision	S&P Comparision
Standard Deviation	5,75	3,77	0,23	1,98	5,52
Kurtosis	6,17	-0,79	-0,84	5,38	5,73
Skewness	-0,53	-0,54	-0,45	0,01	-0,08
Minimum	-16,35	-4,26	-0,29		
Maximum	18,04	8,8	7,47		

For the Denmark Portfolio, the standard deviation shows that the returns on the investment fluctuated around 5,75% monthly, it is 1,98% greater compared with OMXC20 and 5,54% greater than the S&P BMI. This indicates higher volatility of the investment in the Active portfolio compared to investments in the OMXC20 and S&P BMI.

The kurtosis indicates the risk that the investment will yield occasional extreme results, as these returns can be positive or negative. (Shakti 2020). Compared to the OMXC20 and S&P BMI, the Danish portfolio had a really high risk of extremely large or smaller returns on the investment.

A negative skewness shows that the Danish portfolio expected rarer small losses and large recurrent returns if compared to the OMXC20. However, it is not that distant from the OMXC20, with a -0,01 point, and with a -0,08 point ahead of the S&P BMI.

The worst minimum monthly return was reached in the actively managed portfolio with a -16,35%, compared to the OMXC20 the worst minimum of -4,26%, and -0,29% in the S&P BMI. Pretty high worst return when comparing it against the indexes benchmarks. On the other side, the maximum return was obtained for the Danish actively managed portfolio with an 18,04%, and it represented almost double that of the OMXC20 and S&P BMI.

Table 4. Finland Active Portfolio descriptive analysis

Descriptive Statistics	Portfolio	OMXHEX25	S&P BMI	OMXHEX25 Comparision	S&P Comparision
Standard Deviation	4,76	5,76	3,05	-1,00	1,71
Kurtosis	2,69	3,41	0,97	-0,72	1,72
Skewness	-1,04	-1,12	-0,6	0,08	-0,52
Minimum	-12,02	-16,61	-7,31		
Maximum	10,04	11,92	6,65		

The Finish active portfolio standard deviation shows a lower fluctuation above the average of the returns on investments a 4,76% compared to the OMXHEX25 and higher volatility than the S&P BMI. However, the standard deviation for the active portfolio is between the OMXHEX25 and S&P BMI figures.

The kurtosis as well presents slightly different results when comparing the portfolio against the OMXHEX25 and S&P separately. The portfolio had a lower risk of presenting extremely large or small returns on investment than the OMXHEX 25 but a higher risk when compared to the S&P BMI.

The lower negative skewness of the Finnish portfolio than the OMXHEX25 shows that the portfolio had fewer small wins and rare bigger shortfalls, but the opposite in the comparison against the S&P BMI.

The OMXHEX25 reached the worst minimum monthly return with a -16,71%, 4,59% above this return stands the active portfolio works return. On the other hand, the best maximum return was also reached for the OMXHEX25, being the portfolio 1,88% points below this result.

Table 5. Norway Active Portfolio descriptive analysis

Descriptive Statistics	Portfolio	OMXO20	S&P BMI	OMXO20 Comparision	S&P Comparision
Standard Deviation	3,88	5,42	4,16	-1,54	-0,28
Kurtosis	2,45	3,08	1,35	-0,64	1,10
Skewness	-0,91	-0,17	-0,51	-0,74	-0,40
Minimum	-9,38	-13,18	-10,26		
Maximum	9,16	15,71	10,11		

The standard deviation of the Norwegian portfolio of 3,88% is lower when compared to the OMXS30 and S&P, which indicates a lower fluctuation of monthly returns in the portfolio and, in consequence, lower investment volatility compared to both indexes.

The portfolio kurtosis had a lower result compared to the OMXS30 and a higher result than the S&P. The negative skewness on the portfolio was better than the OMXS30 and the S&P, which means that the portfolio had several minor better returns and rare large losses during the two-year time period than both indexes. On the other hand, the OMXS30 performed with the worst minimum and best maximum monthly return.

Table 6. Sweden Active Portfolio descriptive analysis

Descriptive Statistics	Portfolio	OMXS30	S&P BMI	OMXS30 Comparision	S&P Comparision
Standard Deviation	4,67	5,06	3,04	-0,39	1,62
Kurtosis	1,95	0,85	0,09	1,09	1,86
Skewness	-1,04	-0,41	-0,39	-0,64	-0,65
Minimum	-10,43	-11,02	-5,95		
Maximum	11,30	11,85	7,28		

For the Swedish Portfolio, the standard deviation shows that the returns on the investment fluctuated around 4,76% monthly, -0,39% lower compared with OMXC20 and 1,62%

greater than the S&P BMI. The portfolio kurtosis resulted in higher figures than both indexes; in consequence, the Swedish portfolio had a really high risk of extremely large or smaller returns on the investment.

The portfolio's negative skewness was higher than OMXS30 and S&P BMI, which means that the portfolio had several minor better returns and rare significant losses during the two-year time period than both indexes. The worst minimum monthly return was reached in OMXS30, with a -11,02%, followed not by far by the active portfolio with a -10,43%. The best maximum return was obtained as well for the OMXS30 with an 11,85%.

4.4 Analysis of the best and worst country active portfolio performance

Based on the previous analysis, it was decided to analyze individually the 10 Swedish actively managed open-ended funds' performance against the OMX Stockholm 20 as this was the best performance of active funds in the Nordic countries for funds that have 100 million assets under management. The worst performance was in the active Danish portfolio, and for this reason, the 10 Danish actively managed open-ended funds will be analyzed individually against the OMX Copenhagen 20.

For each country analysis, firstly, a table summary will the data analysis of 10 mutual funds will be presented and will be given a summary of the results will be developed further in the conclusion chapter. Then lastly, it will be presented the performance analysis carried out for each active mutual fund. The data was taken from excel spreadsheet calculations, explained in the methodology, and also attached as part of the Appendix.

4.4.1 Performance Analysis methodology

This section will describe the methodology used to calculate the selected performance measures and ratios in analyzing each active mutual fund in both countries. The performance measures selected for the active mutual fund analysis are as follows: Standard Deviation, Average Return, Beta, Jensen's Alpha, Sharpe Ratio, Information Ratio, and Treynor Ratio.

The first step was collecting the raw data for the monthly closing NAVs of the mutual funds, and the closing value of the benchmark index was collected from Bloomberg. Then, the returns were calculated based on the closing values using the formula for Return.

$$Ri = \frac{Closing\ Value(next\ month) - Closing\ Value(previous\ month)}{Closing\ Value(previous\ month)}$$

The Risk-Free Rate chosen was the average Risk-Free Rate for each country for the past five years. The Excess Return of the Mutual Fund was calculated in base on the Capital Asset Pricing Model already reviewed in the theoretical framework and as follows (CFI, 2021):

$$Ri - Rf = \beta * (Rm - Rf)$$

The Excess return of the Index was calculated using the following formula:

$$Excess\ Return\ of\ Market\ (Rm - Rf) = Market\ Return - Risk\ Free\ Rate$$

In the analysis of the excess return of the mutual fund, β, beta was calculated by doing a regression analysis of the mutual fund excess return by the market in Excel Data Analysis.

4.4.2 Danish active mutual funds vs. OMXC20

Below is presented a summary table with the selected performance measures calculations for the ten actively managed mutual funds against the OMXC20. The Risk-free rate chosen for Denmark was 0,10%, as is the average for the past five years.

Table 7. Danish active mutual funds against OMXC20

	Sd. Dev	Avg. Return	Beta	Jensen's Alpha	Sharpe ratio	Information Ratio	Treynor ratio
NOIPAKT DC	2,91	0,53	1,55	0,1	2,93	0,30	0,65
NDIGSTK1 DC	3,51	0,31	1,04	-0,14	1,56	-0,05	0,34
PBPGAF3 DC	4,37	0,47	1,42	0,06	2,90	-0,07	0,87
PBPGAF1 DC	3,89	0,35	1,63	-0,02	4,57	-0,50	0,61
PBPGAF2 DC	5,42	0,45	1,02	0,12	3,14	-0,18	0,73
NIPEMOA DC	4,56	0,19	1,03	-0,29	6,08	0,68	0,25
SPIVA DC	3,26	0,27	1,17	0,02	2,70	-0,07	0,68
NORIKOM DC	4,17	0,59	0,98	0,1	5,53	-0,03	0,77
VAIGLOA DC	2,54	0,33	1,19	-0,03	4,61	-0,50	0,44
CARN DC	4,15	0,27	0,97	-0,16	3,44	0,66	0,54
OMXC20	3,77	0,63	1	-	6,75		0,63

The standard deviation for the 10 mutual funds oscillates between the value reached by NIPEMOA DC with a 4,56% and VAIGLOA DC with a lower value of 2,54%. Only 3 mutual funds had a lower standard deviation than the OMXC20, indicating higher volatility when investing in the other 7 mutual funds than the OMXC20.

The lowest average monthly return was reached by CARN DC with a 0,27%, and the highest average monthly return was achieved by NORIKOM DC with a 0,59%. However, none of these had a greater average monthly return than the OMXC20, which reached a 0,63%.

Taking a look at the beta, the highest value for NOIPAKT DC a 1,55%, and the lowest value was for CARN DC at 0,97 %. In total, eight of the funds present a higher beta value than 1, which indicates that 80% of the total amount of funds selected presented more volatility than the OMXC20 during the two-year period.

The Jensen's Alpha shows that half of the mutual funds performed relatively well, and the other half worse than it was expected. The Sharpe ratio shows that none of the mutual funds performed better than the market, NIPEMOA DC reached a closer value to the OMXC20, and the lowest value for the Sharpe ratio was reached by NDIGSTK1 DC.

The information ratio for the Danish mutual funds indicates that 7 of the mutual funds had a negative figure and could not outperform the OMXC20. Lastly, when taking a look at the Treynor ratio, 5 mutual funds, the same that had a positive Jensen's Alpha, obtained a result higher than the OMXC20.

Below is presented the regression analysis calculations performed on each of the Danish mutual funds are represented above as a table summary.

- **Performance Analysis of NOIPAKT DC Equity**

Standard Deviation	2,91
Average return	0,53
Beta	1,55
Jensen's Alpha	0,1
Sharpe ratio	2,93
Information Ratio	0,3
Treynor ratio	0,65

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,72
R Square	0,51
Adjusted R Square	0,49
Standard Error	0,04
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,03	0,03	22,01	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Inter-cept(Alpha)	0,1	0,01	0,21	0,84	-0,01	0,02	-0,01	0,02
X Variable 1(Beta)	1,55	0,08	4,69	0,00	0,22	0,57	0,22	0,57

- **Performance Analysis of NDIGSTK1 DC Equity**

Standard Deviation	3,51
Average return	0,31
Beta	1,04
Jensen's Alpha	-0,14
Sharpe ratio	1,56
Information Ratio	-0,05
Treynor ratio	0,34

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,80
R Square	0,64
Adjusted R Square	0,62
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,04	0,04	37,56	0,00
Residual	21,00	0,02	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,01	0,01	0,37	0,71	-0,01	0,02	-0,01	0,02
X Variable 1	1,04	0,13	6,13	0,00	0,52	1,05	0,52	1,05

- Performance Analysis of PBPGAF3 DC Equity

Standard Deviation	4,37
Average return	0,47
Beta	1,42
Jensen's Alpha	0,06
Sharpe ratio	2,9
Information Ratio	-0,07
Treynor ratio	0,87

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,58
R Square	0,33
Adjusted R Square	0,30
Standard Error	0,04
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,02	0,02	10,43	0,00
Residual	21,00	0,04	0,00		
Total	22,00	0,06			

	Coeffi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,01	0,01	0,59	0,56	-0,01	0,02	-0,01	0,02
X Variable 1	1,42	0,09	3,23	0,00	0,10	0,46	0,10	0,46

- **Performance Analysis of PBPGAF1 SS Equity**

Standard Deviation	3,89

Average return	0,35
Beta	1,63
Jensen's Alpha	-0,02
Sharpe ratio	4,57
Information Ratio	-0,5
Treynor ratio	0,61

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,59
R Square	0,35
Adjusted R Square	0,32
Standard Error	0,04
Observations	21,00

Anova

	df	***SS***	***MS***	***F***	***Significance F***
Regression	1,00	0,02	0,02	10,39	0,00
Residual	19,00	0,04	0,00		
Total	20,00	0,05			

	Coef-fi-cients	***Stan-dard Error***	***t Stat***	***P-va-lue***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	0,12	0,01	0,13	0,90	-0,02	0,02	-0,02	0,02
X Variable 1	1,63	0,10	3,22	0,00	0,11	0,52	0,11	0,52

- **Performance Analysis of NIPEMOA DC Equity**

Standard Deviation	4,56
Average return	0,19
Beta	1,03
Jensen's Alpha	-0,29
Sharpe ratio	6,08
Information Ratio	0,68
Treynor ratio	0,25

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,44
R Square	0,19
Adjusted R Square	0,15
Standard Error	0,05
Observations	21,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,01	0,01	4,58	0,05
Residual	19,00	0,04	0,00		
Total	20,00	0,05			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,18	0,86	-0,02	0,02	-0,02	0,02
X Variable 1	1,03	0,15	2,14	0,05	0,01	0,61	0,01	0,61

- **Performance Analysis of SPIVA DC Equity**

Standard Deviation	3,26
Average return	0,27
Beta	1,17
Jensen's Alpha	0,02
Sharpe ratio	2,7
Information Ratio	-0,07
Treynor ratio	0,68

Summary Output for regression analysis

Regression Statistics	
Multiple R	0,66
R Square	0,43
Adjusted R Square	0,41
Standard Error	0,04
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,03	0,03	16,12	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,01	0,01	1,34	0,20	-0,01	0,03	-0,01	0,03
X Variable 1	1,17	0,15	4,02	0,00	0,29	0,91	0,29	0,91

- **Performance Analysis of VAIGLOA DC Equity**

Standard Deviation	2,54
Average return	0,33
Beta	1,19
Jensen's Alpha	-0,03
Sharpe ratio	4,61
Information Ratio	-0,5
Treynor ratio	0,44

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,80
R Square	0,65
Adjusted R Square	0,63
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Signifi-cance F*
Regression	1,00	0,04	0,04	38,22	0,00
Residual	21,00	0,02	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,68	0,50	-0,02	0,01	-0,02	0,01
X Variable 1	1,19	0,13	6,18	0,00	0,52	1,04	0,52	1,04

- **Performance Analysis of NORIKOM DC Equity**

Standard Deviation	4,17
Average return	0,59
Beta	0,98
Jensen's Alpha	0,1
Sharpe ratio	5,53
Information Ratio	-0,03
Treynor ratio	0,77

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,80
R Square	0,65
Adjusted R Square	0,63
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,04	0,04	38,22	0,00
Residual	21,00	0,02	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,68	0,50	-0,02	0,01	-0,02	0,01
X Variable 1	0,98	0,13	6,18	0,00	0,52	1,04	0,52	1,04

- **Performance Analysis of CARN DC Equity**

Standard Deviation	4,15

Average return	0,27
Beta	0,97
Jensen's Alpha	-0,16
Sharpe ratio	3,44
Information Ratio	0,66
Treynor ratio	0,54

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,68
R Square	0,47
Adjusted R Square	0,44
Standard Error	0,04
Observations	23,00

ANOVA

	df	***SS***	***MS***	***F***	***Significance F***
Regression	1,00	0,03	0,03	18,27	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coef-fi-cients	***Stan-dard Error***	***t Stat***	***P-va-lue***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	1,42	0,01	0,18	0,86	-0,02	0,02	-0,02	0,02
X Variable 1	0,97	0,20	4,27	0,00	0,44	1,26	0,44	1,26

4.4.3 Swedish active mutual funds vs. OMXS30

Below is presented a summary table with the selected performance measures calculations for the ten Swedish actively managed mutual funds against the OMXS30. The Risk-free rate chosen for Sweden was 0,10% as is the average for the past five years.

Table 7. Danish active mutual funds against OMXC20

	Sd. Dev	**Avg. Return**	**Beta**	**Jensen's Alpha**	**Sharpe ratio**	**Informa-tion Ratio**	**Treynor ratio**
SWCONTU	4,27	25,82	0,56	0,02	4,60	1,79	0,44
SWIPAKT	4,06	16,71	0,64	0,01	2,58	-0,59	0,24

ROBAIVA	4,05	21,11	1,57	0,01	1,34	1,04	0,35
SWKAPIT	8,50	35,66	0,81	0,02	4,38	0,72	0,43
HHA1SEK	5,86	20,83	1,01	0,01	2,05	-0,95	0,20
HASVINE	7,28	26,34	1,09	0,01	2,41	0,51	0,23
HSMABOL	3,99	16,43	0,58	0,01	2,80	0,60	0,26
HUTLAND	6,11	21,52	1,06	0,01	2,01	0,68	0,19
DGAKTIE	4,08	18,07	0,60	0,01	3,01	0,77	0,29
SWESVGB	4,08	18,07	0,60	0,01	3,01	0,43	0,29
OMXS30	5,06	19,34	1,00	-	1,92	-	

For the Swedish actively managed funds, the standard deviation shows that only three mutual funds had a higher result than the OMXS30, the other seven had a lower result which indicates that these funds had a lower fluctuation over their return.

HSMABOL reached the lowest average monthly return; only another three mutual funds experienced a lower average return than the OMXS30. The beta for six of the funds was lower than one, which indicates that these six mutual funds presented less volatility than the OMXS30. Jensen's alpha calculations show positive results in all the mutual funds' performance, indicating the mutual funds had returns higher than expected during the two-year period.

The Sharpe ratio shows that nine of the funds performed better than the OMXS30, only ROBAIVA has a slightly lower performance than the OMXS30. Furthermore, the Treynor ratio, same as Jensen's Alpha, had a positive result, being the highest value of 0,43%reached by SWKAPIT and the lowest value reached by HUTLAND.

Below are presented the regression analysis calculations performed on each of the Danish mutual funds represented above as a table summary.

- **Performance Analysis of SWIPAKT SS Equity**

Standard Deviation	4,06
Average return	16,71
Beta	0,64
Jensen's Alpha	0,01
Sharpe ratio	2,58
Information Ratio	-0,59
Treynor ratio	0,24

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,68
R Square	0,47
Adjusted R Square	0,44
Standard Error	0,04
Observations	23,00

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,03	0,03	18,55	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0,01	0,01	-1,07	0,30	-0,03	0,01	-0,03	0,01
X Variable 1	0,64	0,19	4,31	0,00	0,43	1,24	0,43	1,24

- **Performance Analysis of ROBAIVA SS Equity**

Standard Deviation	4,05
Average return	21,11
Beta	1,57
Jensen's Alpha	0,01
Sharpe ratio	1,34
Information Ratio	1,04
Treynor ratio	0,35

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,83
R Square	0,69
Adjusted R Square	0,67
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,04	0,04	46,09	0,00
Residual	21,00	0,02	0,00		
Total	22,00	0,06			

	Coef-fi-cient s	*Stan-dard Error*	*t Stat*	*P-value*	*Lo-wer 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,36	0,72	-0,02	0,01	-0,02	0,01
X Variable 1	1,57	0,16	6,79	0,00	0,74	1,39	0,74	1,39

- **Performance Analysis of SWKAPIT SS Equity**

Standard Deviation	8,5
Average return	35,66
Beta	0,81
Jensen's Alpha	0,02
Sharpe ratio	4,38
Information Ratio	0,72
Treynor ratio	0,43

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,74
R Square	0,54
Adjusted R Square	0,52
Standard Error	0,04
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,03	0,03	24,99	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coeffi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0,01	0,01	-0,79	0,44	-0,02	0,01	-0,02	0,01
X Variable 1	0,81	0,19	5,00	0,00	0,56	1,35	0,56	1,35

- **Performance Analysis of HHA1SEK SS Equity**

Standard Deviation	5,86
Average return	20,83
Beta	1,01
Jensen's Alpha	0,01
Sharpe ratio	2,05
Information Ratio	-0,95
Treynor ratio	0,2

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,50
R Square	0,25
Adjusted R Square	0,21
Standard Error	0,05
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,02	0,02	6,98	0,02
Residual	21,00	0,05	0,00		
Total	22,00	0,06			

	Coeffi-cients	*Stan dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,46	0,65	-0,03	0,02	-0,03	0,02
X Variable 1	1,01	0,12	2,64	0,02	0,07	0,55	0,07	0,55

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- **Performance Analysis of HASVINE SS Equity**

Standard Deviation	7,28
Average return	26,34
Beta	1,09
Jensen's Alpha	0,01
Sharpe ratio	2,41
Information Ratio	0,51
Treynor ratio	0,23

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,90
R Square	0,81
Adjusted R Square	0,80
Standard Error	0,02
Observations	23,00

ANOVA

	df	***SS***	***MS***	***F***	***Significance F***
Regression	1,00	0,05	0,05	90,88	0,00
Residual	21,00	0,01	0,00		
Total	22,00	0,06			

	Coef-fi-cients	***Stan-dard Error***	***t Stat***	***P-va-lue***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	0,00	0,00	-0,91	0,38	-0,01	0,01	-0,01	0,01
X Variable 1	1,09	0,08	9,53	0,00	0,63	0,98	0,63	0,98

- **Performance Analysis of HSMABOL SS Equity**

Standard Deviation	3,99
Average return	16,43
Beta	0,58
Jensen's Alpha	0,01
Sharpe ratio	2,8
Information Ratio	0,6
Treynor ratio	0,26

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,78
R Square	0,61
Adjusted R Square	0,59
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,04	0,04	33,28	0,00
Residual	21,00	0,02	0,00		
Total	22,00	0,06			

	Coeffi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0,01	0,01	-0,76	0,45	-0,02	0,01	-0,02	0,01
X Variable 1	0,58	0,10	5,77	0,00	0,36	0,77	0,36	0,77

- **Performance Analysis of HUTLAND SS Equity**

Standard Deviation	6,11
Average return	21,52
Beta	1,06
Jensen's Alpha	0,01
Sharpe ratio	2,01
Information Ratio	0,68
Treynor ratio	0,19

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,76
R Square	0,58
Adjusted R Square	0,56
Standard Error	0,03
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,04	0,04	29,34	0,00
Residual	21,00	0,03	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,01	-0,24	0,81	-0,02	0,01	-0,02	0,01
X Variable 1	1,06	0,18	5,42	0,00	0,62	1,39	0,62	1,39

- **Performance Analysis of DGAKTIE SS Equity**

Standard Deviation	4,08
Average return	18,07
Beta	0,6
Jensen's Alpha	0,01
Sharpe ratio	3,01
Information Ratio	0,77
Treynor ratio	0,29

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,91
R Square	0,83
Adjusted R Square	0,82
Standard Error	0,02
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1,00	0,05	0,05	103,34	0,00
Residual	21,00	0,01	0,00		
Total	22,00	0,06			

	Coef-fi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,00	-1,03	0,32	-0,01	0,00	-0,01	0,00
X Variable 1	0,6	0,08	10,17	0,00	0,62	0,94	0,62	0,94

- **Performance Analysis of SWESVGB SS Equity**

Standard Deviation	4,08
Average return	18,07
Beta	0,6
Jensen's Alpha	0,01
Sharpe ratio	3,01
Information Ratio	0,43
Treynor ratio	0,29

Summary Output for Regression analysis

Regression Statistics	
Multiple R	0,91
R Square	0,83
Adjusted R Square	0,82
Standard Error	0,02
Observations	23,00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regres-sion	1,00	0,05	0,05	103,34	0,00
Residual	21,00	0,01	0,00		
Total	22,00	0,06			

	Coeffi-cients	*Stan-dard Error*	*t Stat*	*P-va-lue*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,00	0,00	-1,03	0,32	-0,01	0,00	-0,01	0,00
X Variable 1	0,6	0,08	10,17	0,00	0,62	0,94	0,62	0,94

5 Results

In this chapter, the results of the data studied will be presented, and the analysis and conclusions will be made with a direct connexion to the research question. Then, the results will be structured in sub-chapters according to research objectives. In the end, a summary of the results will be given.

The results will be divided into three areas; firstly, it will be presented the results obtained as a single investment, secondly and based on the previous point, it will be analyzed the best and worst active mutual funds country portfolios and take a closer look at its performance in each country. Lastly, a summary of the results will be given.

5.1 Results as a single investment

In two Nordic countries, Sweden and Norway, the actively managed portfolios were able to beat the market, particularly Sweden overperformed with outstanding results against the OMX Stockholm and the S&P Sweden BMI. On the other hand, the Denmark portfolio was the worst performance of the four Nordic countries, not reaching either the OMX Copenhagen or the S&P Denmark BMI.

The Danish actively managed portfolio showed higher volatility than the index's benchmarks using descriptive statistics. It was also more exposed to extremely large or smaller monthly returns on the investment. During the two-year period, it also presented by far the worst return. On the opposite, it has almost a double maximum monthly return when comparing it against the indexes benchmarks.

The Finnish active portfolio showed slightly different results compared to the OMXHEX25 and S&P BMI separately. It presented a lower fluctuation above the average of the returns on investments and higher volatility compared to the S&P BMI. Same with the kurtosis, the portfolio had a lower risk of presenting extremely large or small returns on investment than the OMXHEX 25, but a higher risk when compared to the S&P BMI. The Finnish active portfolio did not reach the best maximum and worst maximum results for the OMXHEX25.

The Norwegian active portfolio indicated a lower fluctuation of monthly returns in the portfolio compared to both indexes. Results in the portfolio kurtosis showed different results comparing them to the OMXS30 and S&P BMI. However, the portfolio's negative skewness was better than the OMXS30 and the S&P, which means that the portfolio had several minor better returns and rare large losses during the two-year time period.

The Swedish active portfolio showed higher volatility compared to the index's benchmarks compared. The portfolio kurtosis resulted in higher figures than both indexes. Consequently, the Swedish portfolio had a really high risk of extremely large or smaller returns on the investment. The negative skewness for the portfolio was higher than both indexes, indicating that the portfolio had several minor better returns and rare significant losses during the two-year period.

5.2 Results by worst and best country performance mutual funds

The Danish active mutual funds did not perform well against the OMXC20, and this was shown through the performance measures calculations. Seven out of ten mutual funds showed higher volatility when investing in them compared to the OMXC20. Furthermore, the mutual funds did not have a greater average monthly return than the OMXC20.

Eight of the funds present a higher beta value than 1, which indicates that 80% of the total amount of funds selected presented more volatility than the market during the two-year period. Looking into the Sharpe ratio, none of the mutual funds performed better than the market, and the same is displayed through the Information ratio.

Based on this analysis, it can be stated that passively investing in OMXC20 was a better strategy compared to investing in Danish actively managed mutual funds.

On the other side, when taking a look at the Swedish actively managed funds, most part of them had a lower fluctuation over their return compared to the OMXS30. Six of the mutual funds presented less volatility than the index benchmark, and looking through the Jensen's Alpha calculations, the mutual funds had returns higher than expected during the two-year period.

The results on the Sharpe ratio are consistent with the previous, as nine of the funds performed better than the OMXS30, and only ROBAIVA has a slightly lower performance than the OMXS30. Lastly, the Treynor ratio, the same as Jensen's Alpha, had a positive result.

In conclusion, it can be stated that the active managers in Sweden performed better during the two-year period of COVID-19.

6 Discussion

In this chapter, a reflection on the research findings and achievement of the thesis objective will be given. Some future improvement ideas and the author's insights and reflection on the thesis process and own learning through the process will be given.

6.1 Thesis objective achievement

The thesis object was to analyze the performance of active vs. passive investments during the COVID-19 pandemic. The research results were divided as in two of the Nordic countries, Sweden and Norway, the active mutual fund's selected sample outperformed both selected indexes chosen. In contrast, the Danish OMXC20 and Finnish OMHEX25 were shown to be a better decision to invest during the two-year period than the actively managed funds portfolio. It was decided to perform a detailed analysis on the best and worst-performing country to bring more value to the report and study a closer look at the actively managed funds sample selection against the country OMX.

The analysis relied on the theoretical framework studied, understanding of the described investment theories, performance ratios measurement and significance, and lastly, the effect of COVID-19 on investments help to move forward with the thesis analysis and to reach results and further conclusions.

As mentioned in the future development section of this chapter, the author considered a few developments that could be done when selecting the sample of mutual funds and benchmark that might help narrow the results and perform a thorough analysis on this matter.

6.2 Validity and reliability

The validity of the results reached in the thesis was verified by comparing the OMX index to each actively managed mutual fund by country in Bloomberg and taking a five-year period. No discrepancies with the results achieved in the thesis were founded. The database from which the data was taken is one of the most important and used for professional investors worldwide. The descriptive statistics and performance measures were created and analyzed in Excel spreadsheets.

6.3 Challenges in the analysis

Particularly the start planning and structure of the thesis were challenging, the theoretical framework and literature were reviewed in the past year, but the first challenge came with

the sample selection to perform the analysis. Historical data performance on mutual funds is not available publicly, and it was of crucial importance to fund a database to extract this information. This was challenging as, normally, these databases are only available for professional investors. However, in the end, data was acquired, which delayed the thesis delivery hugely.

Another relevant challenge was developing quantitative research that brings value to answering the research question. The data was selected from almost four thousand mutual funds, and different performance measures were chosen carefully.

In the latest stages of the thesis, when the project was almost concluded, the data selection was changed, and calculations and further results had to be redone again, as it was noticed that from the mutual fund's sample, it was picked four pension funds from Norway and Denmark, as the expense ratio was not used when extracting data from Bloomberg database. This was not in coherence with the thesis aim, as pension funds are not a type of fund that can be chosen by any investor at the time of deciding whether he/she wants to invest in passive or active funds.
As well, the index benchmark was chosen again. At first, the mutual funds were compared against S&P 500 index benchmark, but this did not take into consideration the currency exchanges. Moreover, it was reviewed that mutual funds chosen returns to include dividends paid when extracting them from the database. These corrections were carried out to ensure the thesis report brings value to the subject study and directly relates to the report's objective.

6.4 Future development and improvement

In the future, a deeper analysis of the selected mutual funds can be performed, especially using daily returns can bring more accurate results. Instead of comparing the mutual funds against the highest trading indexes by country, the study could be performed by comparing funds of a particular type against a more appropriate corresponding type of benchmarks for the particular type of fund. This approach could bring more accurate results when studying the active vs. passive investment performance.

Another development idea in the actively managed funds study against a benchmark could also be looking at their previous performance prior to the pandemic to understand better how it affected their performance and the benchmark’s performance.

Furthermore, the mutual funds could be compared against a Volatility index and subject to changes in the risk-free rate; other performance ratios and the Fama-French 3 Factor model can be used to study deeper the outcomes of these.

6.5 Reflection on learning

Reflecting on the thesis process and learning outcomes, the most meaningful learning for the author, was the enormous complexity of the stock market and how mutual funds work in the Nordic countries taking a practice approach. Nevertheless, the literature review and theoretical framework laid the bases for the study, it was in developing the actual research where the author considers it was learned the most, using actual data and evaluating individually and as a single investment how mutual funds performed during the COVID-19 pandemic. As it was noted in the challenges section, the thesis experienced some significant changes during the process; however, this also brought learning to recognize these failures in data selection and take measures to correct them and perform an analysis that brings more value to the thesis objective.

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Appendices

Appendix 1. Sample Data

Ticker	Name	Domicile	Fund Asset Class F	Fund Type	Tot Asset (M)	Expense Ratio
NOIPAKT DC Equity	NORDEA INVEST-PORTE AKTIER	Denmark	Equity	Open-End Fund	33 251	0,72
NDIGSTK1 DC Equity	NORDEA INV-GLOBL STARS KL 1	Denmark	Equity	Open-End Fund	9 078	1,57
PBPGAF3 DC Equity	PBPM GLOB AKTR FOKUS KL 3	Denmark	Equity	Open-End Fund	8 648	0,79
PBPGAF1 DC Equity	PBPM GLOBALE AKTR FOKS KL 1	Denmark	Equity	Open-End Fund	8 648	0,79
PBPGAF2 DC Equity	PBPM GLOB AKTR FOKUS KL 2	Denmark	Equity	Open-End Fund	8 648	0,79
NIPEMOA DC Equity	NORDEA INVEST PF AKT STRAT	Denmark	Equity	Open-End Fund	6 265	0,73
SPIVA DC Equity	SPARINVEST VALUE AKTIER KL	Denmark	Equity	Open-End Fund	4 034	2,23
VAIGLOA DC Equity	VALUEINVEST GLOBAL-A	Denmark	Equity	Open-End Fund	3 909	2,71
NORIKOM DC Equity	NORDEA INV KLIMA OG MILJO	Denmark	Equity	Open-End Fund	3 655	1,49
CARN DC Equity	C WORLDWIDE GLOBALE AKTIER	Denmark	Equity	Open-End Fund	3 282	2,29
NORIVEM DC Equity	NORDEA IN EM MT KL 1	Denmark	Equity	Open-End Fund	3 141	1,57
JIALVIN DC Equity	JYSKE INVEST-AKT L KL-INC	Denmark	Equity	Open-End Fund	2 603	1,33
DKIDXAK DC Equity	DANSKE INVEST GLBL INDEKS	Denmark	Equity	Open-End Fund	2 225	1,01
NORSTAK DC Equity	NORDEA INVEST STABILE AKT-IN	Denmark	Equity	Open-End Fund	2 138	1,54
NYKGLFK DC Equity	NYKREDIT INV GLOBALE FOKUSAK	Denmark	Equity	Open-End Fund	2 073	1,61
UNIAKTR DC Equity	NORDEA INV AKT KL 1	Denmark	Equity	Open-End Fund	1 911	1,44
NYDAAKT DC Equity	NYKREDIT INVEST DANSKE AKT A	Denmark	Equity	Open-End Fund	1 899	1,45
DANINYE DC Equity	DANSKE INVEST NYE MARKER FND	Denmark	Equity	Open-End Fund	1 867	1,68
DIDM DC Equity	DANSKE INVEST-DANMARK FUND	Denmark	Equity	Open-End Fund	1 802	1,25
STOCKRT DC Equity	FUNDAMENTAL INV STOCK PICK	Denmark	Equity	Open-End Fund	1 778	3,44
NYKFOAK DC Equity	NYKREDIT FOKUSAKIER AKK	Denmark	Equity	Open-End Fund	1 749	0,75
DKIGSFUT DC Equity	DI GLOBAL SUSTAINABLE FUTURE	Denmark	Equity	Open-End Fund	1 593	1,28
NYKGSRI DC Equity	NYKREDIT GLOBALE AKT SRI	Denmark	Equity	Open-End Fund	1 593	1,58
NISDAAK DC Equity	NORDEA INV DN AT FKL 1	Denmark	Equity	Open-End Fund	1 560	1,48
DIJP DC Equity	DANSKE INVEST JAPAN FUND	Denmark	Equity	Open-End Fund	1 490	1,6
DKEAHUD DC Equity	DANSKE INV EUR HOJT UDBYTTE	Denmark	Equity	Open-End Fund	1 477	1,96
BIKD DC Equity	DANSKE INVEST INDEKS EUROPA	Denmark	Equity	Open-End Fund	1 476	1,01
AIVB DC Equity	NORDEA INV DNMK KL 1	Denmark	Equity	Open-End Fund	1 452	1,35

Raw Data Download | Sample | Stats | Data Equal-Weighted | FinlandGraph | Danishgraph | Swedishgraph | Den_Stats | Finland_stats | Norway stats | norwaygraph | Finland

Count: 1043

Appendix 2. Raw Data Count 1043 mutual funds

Ticker	Name	Domicile	Fund Asset Class Focus	Fund Type	Tot Asset (M)	Expense Ratio
NOIPAKT SS Equity	NORDEA INVEST-PORTE AKTIER	Sweden	Equity	Open-End Fund	33 251	0,72
NDIGSTK1 SS Equity	NORDEA INV-GLOBL STARS KL 1	Sweden	Equity	Open-End Fund	9 078	1,57
PBPGAF3 SS Equity	PBPM GLOB AKTR FOKUS KL 3	Sweden	Equity	Open-End Fund	8 648	0,79
PBPGAF1 SS Equity	PBPM GLOBALE AKTR FOKS KL 1	Sweden	Equity	Open-End Fund	8 648	0,79
PBPGAF2 SS Equity	PBPM GLOB AKTR FOKUS KL 2	Sweden	Equity	Open-End Fund	8 648	0,79
NIPEMOA SS Equity	NORDEA INVEST PF AKT STRAT	Sweden	Equity	Open-End Fund	6 265	0,73
SPIVA SS Equity	SPARINVEST VALUE AKTIER KL	Sweden	Equity	Open-End Fund	4 034	2,23
VAIGLOA SS Equity	VALUEINVEST GLOBAL-A	Sweden	Equity	Open-End Fund	3 909	2,71
NORIKOM SS Equity	NORDEA INV KLIMA OG MILJO	Sweden	Equity	Open-End Fund	3 655	1,49
CARN DC Equity	C WORLDWIDE GLOBALE AKTIER	Sweden	Equity	Open-End Fund	3 282	2,29
NOHLAGA FH Equity	NORDEA HALLB AKTIER GLBA SEK	Finland	Equity	Open-End Fund	10 633	0,9
NONNSAV FH Equity	NORDEA-NORWEGIAN STARS-A	Finland	Equity	Open-End Fund	5 190	1,49
NODSECS FH Equity	NORDEA DISCRTN SWED EQU-CSEK	Finland	Equity	Open-End Fund	3 874	0,7
NOHBSAA FH Equity	NORDEA HALLB BALANE-SEK A A	Finland	Equity	Open-End Fund	3 261	1,48
NORSWAG FH Equity	NORDEA SWEDISH IDEAS-AG	Finland	Equity	Open-End Fund	3 229	1,5
NONHTSA FH Equity	NORDEA HALLBAR GB TILLV-SEKA	Finland	Equity	Open-End Fund	2 774	1,47
MNNORSI FH Equity	NORDEA NORDIC SMALL CAP-AKAC	Finland	Equity	Open-End Fund	2 598	1,6
NORGLTI FH Equity	NORDEA GLOBAL TILLVAXT	Finland	Equity	Open-End Fund	2 311	1
MAAILMK FH Equity	NORDEA WORLD-A K ACC	Finland	Equity	Open-End Fund	2 311	1
NORGDAD FH Equity	NORDEA GLB DIVIDEND FD-A DIS	Finland	Equity	Open-End Fund	1 673	1,5
DINORTE NO Equity	DNB TEKNOLOGI-A	Norway	Equity	Open-End Fund	31 945	1,21
STGLOBS NO Equity	SKAGEN GLOBAL FUND-A	Norway	Equity	Open-End Fund	25 361	1,29
STKONTI NO Equity	SKAGEN KON-TIKI-A	Norway	Equity	Open-End Fund	21 685	2,14
NSAKSET NO Equity	NORDEA STABILE AKSJER GB ETI	Norway	Equity	Open-End Fund	13 541	1,5
DKGLEM NO Equity	DNB GLOBAL EMERGING MARKTS-A	Norway	Equity	Open-End Fund	8 817	1,87
ODNORDN NO Equity	ODIN NORDEN-C NOK	Norway	Equity	Open-End Fund	6 295	2
DNBN100 NO Equity	DNB AKTIV 100-A	Norway	Equity	Open-End Fund	5 981	1,88
NONORVE NO Equity	NORDEA NORGE VERDI	Norway	Equity	Open-End Fund	5 091	1,5
NORAVKA NO Equity	NORDEA AVKASTNING	Norway	Equity	Open-End Fund	4 671	1,5
KLPAKNO NO Equity	KLP AKSJENORGE-P	Norway	Equity	Open-End Fund	4 662	1,25
SWCONTU DC Equity	SWEDBANK ROBUR TECHNOLOGY	Denmark	Equity	Open-End Fund	82 222	1,25
SWIPAKT DC Equity	SWEDBANK ROBUR GLOBALFOND A	Denmark	Equity	Open-End Fund	80 316	1,26
ROBAIVA DC Equity	ALLEMANSFOND KOMPLETT	Denmark	Equity	Open-End Fund	72 529	1,26
SWKAPIT DC Equity	SWEDBANK ROBUR KAPITALINVEST	Denmark	Equity	Open-End Fund	48 706	1,25
HHA1SEK DC Equity	HAALLBAR ENERGI-A1 SEK	Denmark	Equity	Open-End Fund	44 550	1,5
HASVINE DC Equity	HB SVERIGE IND CRIT- A1 SEK	Denmark	Equity	Open-End Fund	39 184	0,9
HSMABOL DC Equity	HANDELSB SVENSKA SMB-A1 SEK	Denmark	Equity	Open-End Fund	36 266	1,5
HUTLAND DC Equity	GLOBAL TEMA-A1 SEK	Denmark	Equity	Open-End Fund	32 288	2,1
DGAKTIE DC Equity	DIDNER & GERGE AKTIEFOND	Denmark	Equity	Open-End Fund	30 967	1,22
SWESVGB DC Equity	SWDBNK ROBUR TRANSITION GL-A	Denmark	Equity	Open-End Fund	30 631	1,25

Appendix 3. Monthly total returns Data

Monthly total returns in Nordic Countries against OMX Nordic Indexes

Date	Denmark	Finland	Norway	Sweden	OMXC20	OMXHEX25	OMXO20	OMXS30
31.12.2019					2,58	4,06	2,40	2,40
31.1.2020	1,06	1,34	1,04	3,60	3,45	2,21	-2,49	0,64
28.2.2020	-7,88	-8,90	(6,77)	-6,95	-4,26	-6,11	-9,07	-6,35
31.3.2020	-16,35	-12,02	(9,38)	-10,43	-3,56	-16,61	-13,18	-11,02
30.4.2020	18,04	9,62	9,16	11,30	8,80	11,39	9,35	6,94
31.5.2020	1,11	2,63	1,02	4,04	5,77	7,23	1,01	3,34
30.6.2020	3,27	1,02	2,95	3,28	0,71	0,11	-0,27	2,24
31.7.2020	-0,52	1,96	1,86	3,95	3,58	2,77	1,93	2,58
31.8.2020	3,21	4,70	2,16	6,12	2,93	6,32	3,57	3,48
30.9.2020	2,46	0,67	3,33	4,24	2,95	-0,42	-1,17	3,57
31.10.2020	-0,38	-4,53	(1,99)	-3,18	-2,67	-4,03	-5,04	-5,82
30.11.2020	6,81	10,04	7,57	8,75	6,14	11,92	15,71	11,85
31.12.2020	2,30	1,13	4,66	3,57	4,41	1,50	4,78	-2,15
31.1.2021	3,56	1,67	(0,26)	2,97	-3,11	2,09	0,49	3,95
28.2.2021	1,66	2,01	4,04	1,07	0,14	0,98	3,69	3,31
31.3.2021	4,32	6,32	2,22	5,26	4,42	3,28	5,20	9,87
30.4.2021	2,07	1,73	1,90	1,93	4,93	4,81	0,81	1,85
31.5.2021	1,34	1,23	2,59	-0,26	2,33	1,78	3,27	1,24
30.6.2021	2,75	1,58	2,25	4,36	4,88	2,56	1,34	0,95
31.7.2021	0,59	2,66	2,59	3,75	4,89	5,27	0,55	4,72
31.8.2021	3,52	2,01	0,59	2,27	3,94	0,97	0,51	-0,77
30.9.2021	-1,33	-1,95	(3,08)	-4,01	-4,00	-5,33	3,04	-3,84
31.10.2021	3,08	2,42	0,79	4,10	6,85	1,88	2,11	2,14
30.11.2021	0,40	2,50	1,51	4,63	-3,31	-2,38	-0,48	-1,93
31.12.2021	4,11	3,55	1,87	2,00	4,56	4,86	1,66	7,94

Monthly total returns in Nordic Countries against S&P Country IBMs

Date	Denmark	Finland	Norway	Sweden	S&P Denmark BMI	S&P Finland BMI	S&P Norway BMI	S&P Sweden BMI
31.12.2019					0,24	3,14	4,18	2,89
31.1.2020	1,06	1,34	1,04	3,60	0,07	0,19	-3,28	-0,99
28.2.2020	-7,88	-8,90	-6,77	-6,95	-0,29	-3,36	-5,66	-3,40
31.3.2020	-16,35	-12,02	-9,38	-10,43	-0,22	-7,31	-10,26	-5,95
30.4.2020	18,04	9,62	9,16	11,30	0,41	5,17	5,59	4,68
31.5.2020	1,11	2,63	1,02	4,04	0,39	4,09	3,49	4,78
30.6.2020	3,27	1,02	2,95	3,28	0,09	0,73	0,41	2,25
31.7.2020	-0,52	1,96	1,86	3,95	0,38	3,90	4,57	4,27
31.8.2020	3,21	4,70	2,16	6,12	0,23	3,50	4,15	2,69

30.9.2020	2,46	0,67	3,33	4,24	0,05	-1,13	-3,65	0,15
31.10.2020	-0,38	-4,53	-1,99	-3,18	-0,12	-2,48	-3,05	-2,44
30.11.2020	6,81	10,04	7,57	8,75	0,47	6,65	10,11	7,28
31.12.2020	2,30	1,13	4,66	3,57	0,30	1,21	3,67	2,43
31.1.2021	3,56	1,67	-0,26	2,97	-0,19	0,81	0,06	0,45
28.2.2021	1,66	2,01	4,04	1,07	0,02	0,54	2,08	1,12
31.3.2021	4,32	6,32	2,22	5,26	0,07	0,30	2,39	1,56
30.4.2021	2,07	1,73	1,90	1,93	0,31	3,13	1,95	2,59
31.5.2021	1,34	1,23	2,59	-0,26	0,19	1,64	1,23	1,78
30.6.2021	2,75	1,58	2,25	4,36	0,06	0,06	-1,09	-0,93
31.7.2021	0,59	2,66	2,59	3,75	0,20	2,51	-0,69	2,29
31.8.2021	3,52	2,01	0,59	2,27	0,17	0,10	1,19	-0,12
30.9.2021	-1,33	-1,95	-3,08	-4,01	-0,25	-3,27	0,96	-3,36
31.10.2021	3,08	2,42	0,79	4,10	0,29	0,87	2,55	3,38
30.11.2021	0,40	2,50	1,51	4,63	-0,29	-2,04	-3,66	-2,59
31.12.2021	4,11	3,55	1,87	2,00	0,23	2,60	2,32	2,56

Appendix 4. Swedish Mutual funds' Performance Analysis tables

Date	OMXS30	Market Return(Rm)	Excess Return over Market return (Rm - Rf)
31.1.2020	1174,757		
28.2.2020	1124,074	-4,31 %	-4,31 %
31.3.2020	1073,745	-4,48 %	-4,48 %
30.4.2020	1167,163	8,70 %	8,70 %
31.5.2020	1233,938	5,72 %	5,72 %
30.6.2020	1242,725	0,71 %	0,71 %
31.7.2020	1287,217	3,58 %	3,58 %
31.8.2020	1321,233	2,64 %	2,64 %
30.9.2020	1360,254	2,95 %	2,95 %
31.10.2020	1323,906	-2,67 %	-2,67 %
30.11.2020	1404,781	6,11 %	6,11 %
31.12.2020	1465,171	4,30 %	4,30 %
31.1.2021	1419,463	-3,12 %	-3,12 %
28.2.2021	1421,464	0,14 %	0,14 %
31.3.2021	1471,767	3,54 %	3,54 %
30.4.2021	1542,628	4,81 %	4,81 %
31.5.2021	1577,398	2,25 %	2,25 %
30.6.2021	1654,35	4,88 %	4,88 %
31.7.2021	1734,997	4,87 %	4,87 %
31.8.2021	1799,637	3,73 %	3,73 %
30.9.2021	1727,572	-4,00 %	-4,00 %
31.10.2021	1845,673	6,84 %	6,84 %
30.11.2021	1783,917	-3,35 %	-3,35 %
31.12.2021	1863,986	4,49 %	4,49 %

- **Performance Analysis of SWIPAKT SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	82,71		
28.2.2020	77,46	-6,35 %	-7,55 %
31.3.2020	72,19	-6,80 %	-8,00 %
30.4.2020	81,85	13,38 %	12,18 %
31.5.2020	83,72	2,28 %	1,08 %
30.6.2020	87,27	4,24 %	3,04 %
31.7.2020	90,17	3,32 %	2,12 %
31.8.2020	93,69	3,90 %	2,70 %
30.9.2020	96,85	3,37 %	2,17 %
31.10.2020	95,91	-0,97 %	-2,17 %
30.11.2020	100,49	4,78 %	3,58 %
31.12.2020	101,89	1,39 %	0,19 %
31.1.2021	106,56	4,58 %	3,38 %
28.2.2021	107,97	1,32 %	0,12 %
31.3.2021	114,28	5,84 %	4,64 %
30.4.2021	116,96	2,35 %	1,15 %
31.5.2021	115,20	-1,50 %	-2,70 %
30.6.2021	123,23	6,97 %	5,77 %
31.7.2021	125,78	2,07 %	0,87 %
31.8.2021	129,14	2,67 %	1,47 %
30.9.2021	127,45	-1,31 %	-2,51 %
31.10.2021	131,16	2,91 %	1,71 %
30.11.2021	140,90	7,43 %	6,23 %
31.12.2021	145,84	3,51 %	2,31 %

Performance Analysis of ROBAIVA SS Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	97,01		
28.2.2020	89,47	-7,77 %	-8,97 %
31.3.2020	83,02	-7,21 %	-8,41 %
30.4.2020	90,43	8,93 %	7,73 %
31.5.2020	92,21	1,97 %	0,77 %
30.6.2020	93,79	1,71 %	0,51 %
31.7.2020	96,65	3,05 %	1,85 %
31.8.2020	101,24	4,75 %	3,55 %
30.9.2020	103,62	2,35 %	1,15 %
31.10.2020	99,67	-3,81 %	-5,01 %
30.11.2020	107,75	8,11 %	6,91 %
31.12.2020	109,18	1,33 %	0,13 %
31.1.2021	112,27	2,83 %	1,63 %
28.2.2021	113,05	0,69 %	-0,51 %
31.3.2021	118,84	5,12 %	3,92 %
30.4.2021	120,81	1,66 %	0,46 %
31.5.2021	120,72	-0,07 %	-1,27 %
30.6.2021	125,48	3,94 %	2,74 %
31.7.2021	128,75	2,61 %	1,41 %
31.8.2021	131,32	2,00 %	0,80 %
30.9.2021	126,99	-3,30 %	-4,50 %
31.10.2021	131,67	3,69 %	2,49 %
30.11.2021	137,22	4,22 %	3,02 %
31.12.2021	139,49	1,65 %	0,45 %

- **Performance Analysis of SWKAPIT SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	159,37		
28.2.2020	149,42	-6,24 %	-7,44 %
31.3.2020	137,28	-8,12 %	-9,32 %
30.4.2020	152,30	10,94 %	9,74 %
31.5.2020	156,34	2,65 %	1,45 %
30.6.2020	163,72	4,72 %	3,52 %
31.7.2020	168,00	2,61 %	1,41 %
31.8.2020	173,47	3,26 %	2,06 %
30.9.2020	178,87	3,11 %	1,91 %
31.10.2020	176,75	-1,19 %	-2,39 %
30.11.2020	186,97	5,78 %	4,58 %
31.12.2020	192,31	2,86 %	1,66 %
31.1.2021	199,11	3,54 %	2,34 %
28.2.2021	202,00	1,45 %	0,25 %
31.3.2021	210,29	4,10 %	2,90 %
30.4.2021	215,09	2,28 %	1,08 %
31.5.2021	214,53	-0,26 %	-1,46 %
30.6.2021	223,16	4,02 %	2,82 %
31.7.2021	228,47	2,38 %	1,18 %
31.8.2021	235,71	3,17 %	1,97 %
30.9.2021	226,25	-4,01 %	-5,21 %
31.10.2021	231,66	2,39 %	1,19 %
30.11.2021	246,53	6,42 %	5,22 %
31.12.2021	253,17	2,69 %	1,49 %

- **Performance Analysis of HHA1SEK SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	206,96		
28.2.2020	207,88	0,44 %	-0,76 %
31.3.2020	166,00	-20,15 %	-21,35 %
30.4.2020	190,86	14,98 %	13,78 %
31.5.2020	198,16	3,82 %	2,62 %
30.6.2020	212,30	7,14 %	5,94 %
31.7.2020	237,36	11,80 %	10,60 %
31.8.2020	264,83	11,57 %	10,37 %
30.9.2020	290,76	9,79 %	8,59 %
31.10.2020	301,80	3,80 %	2,60 %
30.11.2020	354,94	17,61 %	16,41 %
31.12.2020	399,63	12,59 %	11,39 %
31.1.2021	433,22	8,41 %	7,21 %
28.2.2021	403,03	-6,97 %	-8,17 %
31.3.2021	405,28	0,56 %	-0,64 %
30.4.2021	396,45	-2,18 %	-3,38 %
31.5.2021	385,44	-2,78 %	-3,98 %
30.6.2021	412,93	7,13 %	5,93 %
31.7.2021	422,60	2,34 %	1,14 %
31.8.2021	437,27	3,47 %	2,27 %
30.9.2021	421,09	-3,70 %	-4,90 %
31.10.2021	458,79	8,95 %	7,75 %
30.11.2021	457,39	-0,31 %	-1,51 %
31.12.2021	428,50	-6,32 %	-7,52 %

- **Performance Analysis of HASVINE SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	323,36		
28.2.2020	297,04	-8,14 %	-9,34 %
31.3.2020	257,06	-13,46 %	-14,66 %
30.4.2020	280,66	9,18 %	7,98 %
31.5.2020	296,14	5,52 %	4,32 %
30.6.2020	300,08	1,33 %	0,13 %
31.7.2020	317,53	5,82 %	4,62 %
31.8.2020	326,62	2,86 %	1,66 %
30.9.2020	343,14	5,06 %	3,86 %
31.10.2020	320,76	-6,52 %	-7,72 %
30.11.2020	358,54	11,78 %	10,58 %
31.12.2020	363,54	1,39 %	0,19 %
31.1.2021	370,94	2,04 %	0,84 %
28.2.2021	379,43	2,29 %	1,09 %
31.3.2021	409,35	7,89 %	6,69 %
30.4.2021	420,93	2,83 %	1,63 %
31.5.2021	432,56	2,76 %	1,56 %
30.6.2021	438,36	1,34 %	0,14 %
31.7.2021	470,83	7,41 %	6,21 %
31.8.2021	473,50	0,57 %	-0,63 %
30.9.2021	442,37	-6,57 %	-7,77 %
31.10.2021	463,98	4,89 %	3,69 %
30.11.2021	484,04	4,32 %	3,12 %
31.12.2021	500,21	3,34 %	2,14 %

- **Performance Analysis of HSMABOL SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	2 090,28		
28.2.2020	1 915,74	-8,35 %	-9,55 %
31.3.2020	1 577,82	-17,64 %	-18,84 %
30.4.2020	1 814,94	15,03 %	13,83 %
31.5.2020	1 968,04	8,44 %	7,24 %
30.6.2020	2 017,48	2,51 %	1,31 %
31.7.2020	2 166,55	7,39 %	6,19 %
31.8.2020	2 307,23	6,49 %	5,29 %
30.9.2020	2 497,07	8,23 %	7,03 %
31.10.2020	2 325,47	-6,87 %	-8,07 %
30.11.2020	2 574,72	10,72 %	9,52 %
31.12.2020	2 738,20	6,35 %	5,15 %
31.1.2021	2 698,31	-1,46 %	-2,66 %
28.2.2021	2 785,75	3,24 %	2,04 %
31.3.2021	2 929,62	5,16 %	3,96 %
30.4.2021	3 090,13	5,48 %	4,28 %
31.5.2021	3 126,61	1,18 %	-0,02 %
30.6.2021	3 118,92	-0,25 %	-1,45 %
31.7.2021	3 393,50	8,80 %	7,60 %
31.8.2021	3 448,08	1,61 %	0,41 %
30.9.2021	3 173,61	-7,96 %	-9,16 %
31.10.2021	3 355,44	5,73 %	4,53 %
30.11.2021	3 523,24	5,00 %	3,80 %
31.12.2021	3 584,60	1,74 %	0,54 %

- **Performance Analysis of HUTLAND SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	602,58		
28.2.2020	555,42	-7,83 %	-9,03 %
31.3.2020	517,94	-6,75 %	-7,95 %
30.4.2020	562,50	8,60 %	7,40 %
31.5.2020	573,67	1,99 %	0,79 %
30.6.2020	591,52	3,11 %	1,91 %
31.7.2020	594,92	0,57 %	-0,63 %
31.8.2020	631,47	6,14 %	4,94 %
30.9.2020	653,35	3,46 %	2,26 %
31.10.2020	626,51	-4,11 %	-5,31 %
30.11.2020	670,65	7,05 %	5,85 %
31.12.2020	690,70	2,99 %	1,79 %
31.1.2021	706,75	2,32 %	1,12 %
28.2.2021	711,93	0,73 %	-0,47 %
31.3.2021	741,82	4,20 %	3,00 %
30.4.2021	747,08	0,71 %	-0,49 %
31.5.2021	745,01	-0,28 %	-1,48 %
30.6.2021	781,38	4,88 %	3,68 %
31.7.2021	794,20	1,64 %	0,44 %
31.8.2021	821,67	3,46 %	2,26 %
30.9.2021	799,48	-2,70 %	-3,90 %
31.10.2021	819,43	2,50 %	1,30 %
30.11.2021	850,34	3,77 %	2,57 %
31.12.2021	861,46	1,31 %	0,11 %

- **Performance Analysis of DGAKTIE SS Equity**

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	2 943,95		
28.2.2020	2 722,95	-7,51 %	-8,71 %
31.3.2020	2 280,85	-16,24 %	-17,44 %
30.4.2020	2 549,12	11,76 %	10,56 %
31.5.2020	2 760,28	8,28 %	7,08 %
30.6.2020	2 829,51	2,51 %	1,31 %
31.7.2020	2 949,21	4,23 %	3,03 %
31.8.2020	3 167,86	7,41 %	6,21 %
30.9.2020	3 284,80	3,69 %	2,49 %
31.10.2020	3 137,00	-4,50 %	-5,70 %
30.11.2020	3 419,12	8,99 %	7,79 %
31.12.2020	3 467,93	1,43 %	0,23 %
31.1.2021	3 540,57	2,09 %	0,89 %
28.2.2021	3 720,99	5,10 %	3,90 %
31.3.2021	4 018,68	8,00 %	6,80 %
30.4.2021	4 131,93	2,82 %	1,62 %
31.5.2021	4 166,31	0,83 %	-0,37 %
30.6.2021	4 225,95	1,43 %	0,23 %
31.7.2021	4 418,37	4,55 %	3,35 %
31.8.2021	4 353,18	-1,48 %	-2,68 %
30.9.2021	4 142,76	-4,83 %	-6,03 %
31.10.2021	4 268,36	3,03 %	1,83 %
30.11.2021	4 327,46	1,38 %	0,18 %
31.12.2021	4 608,97	6,51 %	5,31 %

Appendix 5. Danish Mutual funds' Performance Analysis tables

Date	KFX	Market Return(Rm)	Excess Return over Market return (Rm - Rf)
31.1.2020	1 783		
28.2.2020	1 669	-6,42 %	-7,62 %
31.3.2020	1 482	-11,17 %	-12,37 %
30.4.2020	1 578	6,44 %	5,24 %
31.5.2020	1 630	3,29 %	2,09 %
30.6.2020	1 664	2,12 %	0,92 %
31.7.2020	1 707	2,58 %	1,38 %
31.8.2020	1 766	3,45 %	2,25 %
30.9.2020	1 829	3,57 %	2,37 %
31.10.2020	1 718	-6,11 %	-7,31 %
30.11.2020	1 918	11,64 %	10,44 %
31.12.2020	1 875	-2,23 %	-3,43 %
31.1.2021	1 949	3,95 %	2,75 %
28.2.2021	2 010	3,14 %	1,94 %
31.3.2021	2 193	9,10 %	7,90 %
30.4.2021	2 217	1,10 %	-0,10 %
31.5.2021	2 242	1,12 %	-0,08 %
30.6.2021	2 263	0,95 %	-0,25 %
31.7.2021	2 370	4,72 %	3,52 %
31.8.2021	2 351	-0,79 %	-1,99 %
30.9.2021	2 259	-3,92 %	-5,12 %
31.10.2021	2 291	1,40 %	0,20 %
30.11.2021	2 242	-2,15 %	-3,35 %
31.12.2021	2 420	7,94 %	6,74 %

Performance Analysis of NOIPAKT DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	156		
28.2.2020	155	-0,90 %	-2,10 %
31.3.2020	104	-32,87 %	-34,07 %
30.4.2020	131	26,15 %	24,95 %
31.5.2020	135	3,07 %	1,87 %
30.6.2020	135	0,29 %	-0,91 %
31.7.2020	135	-0,04 %	-1,24 %
31.8.2020	142	5,01 %	3,81 %
30.9.2020	140	-1,20 %	-2,40 %
31.10.2020	137	-2,71 %	-3,91 %
30.11.2020	150	9,94 %	8,74 %
31.12.2020	154	2,54 %	1,34 %

31.1.2021	157	1,71 %	0,51 %
28.2.2021	157	0,05 %	-1,15 %
31.3.2021	168	7,28 %	6,08 %
30.4.2021	170	1,33 %	0,13 %
31.5.2021	172	0,73 %	-0,47 %
30.6.2021	178	3,52 %	2,32 %
31.7.2021	180	1,20 %	0,00 %
31.8.2021	184	2,22 %	1,02 %
30.9.2021	180	-1,92 %	-3,12 %
31.10.2021	187	3,48 %	2,28 %
30.11.2021	185	-0,68 %	-1,88 %
31.12.2021	195	5,51 %	4,31 %

Performance Analysis of NDIGSTK1 DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	156		
28.2.2020	155	-0,90 %	-2,10 %
31.3.2020	104	-32,87 %	-34,07 %
30.4.2020	131	26,15 %	24,95 %
31.5.2020	135	3,07 %	1,87 %
30.6.2020	135	0,29 %	-0,91 %
31.7.2020	135	-0,04 %	-1,24 %
31.8.2020	142	5,01 %	3,81 %
30.9.2020	140	-1,20 %	-2,40 %
31.10.2020	137	-2,71 %	-3,91 %
30.11.2020	150	9,94 %	8,74 %
31.12.2020	154	2,54 %	1,34 %
31.1.2021	157	1,71 %	0,51 %
28.2.2021	157	0,05 %	-1,15 %
31.3.2021	168	7,28 %	6,08 %
30.4.2021	170	1,33 %	0,13 %
31.5.2021	172	0,73 %	-0,47 %
30.6.2021	178	3,52 %	2,32 %
31.7.2021	180	1,20 %	0,00 %
31.8.2021	184	2,22 %	1,02 %
30.9.2021	180	-1,92 %	-3,12 %
31.10.2021	187	3,48 %	2,28 %
30.11.2021	185	-0,68 %	-1,88 %
31.12.2021	195	5,51 %	4,31 %

Performance Analysis of NDIGSTK1 DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	124,91		
28.2.2020	111,46	-10,77 %	-11,97 %
31.3.2020	98,31	-11,80 %	-13,00 %
30.4.2020	107,95	9,81 %	8,61 %
31.5.2020	109,96	1,86 %	0,66 %
30.6.2020	113,18	2,93 %	1,73 %
31.7.2020	113,61	0,38 %	-0,82 %
31.8.2020	121,99	7,38 %	6,18 %
30.9.2020	118,64	-2,75 %	-3,95 %
31.10.2020	117,42	-1,03 %	-2,23 %
30.11.2020	130,10	10,80 %	9,60 %
31.12.2020	132,16	1,58 %	0,38 %
31.1.2021	130,51	-1,25 %	-2,45 %
28.2.2021	135,17	3,57 %	2,37 %
31.3.2021	143,12	5,88 %	4,68 %
30.4.2021	147,70	3,20 %	2,00 %
31.5.2021	146,31	-0,94 %	-2,14 %
30.6.2021	151,25	3,38 %	2,18 %
31.7.2021	153,11	1,23 %	0,03 %
31.8.2021	155,76	1,73 %	0,53 %
30.9.2021	152,30	-2,22 %	-3,42 %
31.10.2021	159,76	4,90 %	3,70 %
30.11.2021	155,67	-2,56 %	-3,76 %
31.12.2021	160,00	2,78 %	1,58 %

Performance Analysis of PBPGAF3 DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	173,01		
28.2.2020	145,77	-15,74 %	-16,94 %
31.3.2020	113,60	-22,07 %	-23,27 %
30.4.2020	148,28	30,53 %	29,33 %
31.5.2020	148,03	-0,17 %	-1,37 %
30.6.2020	158,06	6,78 %	5,58 %
31.7.2020	154,90	-2,00 %	-3,20 %
31.8.2020	153,76	-0,74 %	-1,94 %
30.9.2020	169,12	9,99 %	8,79 %
31.10.2020	171,57	1,45 %	0,25 %
30.11.2020	173,70	1,24 %	0,04 %
31.12.2020	165,71	-4,60 %	-5,80 %
31.1.2021	177,11	6,88 %	5,68 %
28.2.2021	179,85	1,55 %	0,35 %
31.3.2021	179,15	-0,39 %	-1,59 %
30.4.2021	184,84	3,18 %	1,98 %
31.5.2021	188,98	2,24 %	1,04 %
30.6.2021	194,49	2,92 %	1,72 %
31.7.2021	192,51	-1,02 %	-2,22 %
31.8.2021	200,92	4,37 %	3,17 %
30.9.2021	196,94	-1,98 %	-3,18 %
31.10.2021	203,99	3,58 %	2,38 %

Performance Analysis of PBPGAF1 DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	173,01		
28.2.2020	145,77	-15,74 %	-16,94 %
31.3.2020	113,60	-22,07 %	-23,27 %
30.4.2020	148,28	30,53 %	29,33 %
31.5.2020	148,03	-0,17 %	-1,37 %
30.6.2020	158,06	6,78 %	5,58 %
31.7.2020	154,90	-2,00 %	-3,20 %
31.8.2020	153,76	-0,74 %	-1,94 %
30.9.2020	169,12	9,99 %	8,79 %
31.10.2020	171,57	1,45 %	0,25 %
30.11.2020	173,70	1,24 %	0,04 %
31.12.2020	165,71	-4,60 %	-5,80 %
31.1.2021	177,11	6,88 %	5,68 %
28.2.2021	179,85	1,55 %	0,35 %
31.3.2021	179,15	-0,39 %	-1,59 %
30.4.2021	184,84	3,18 %	1,98 %
31.5.2021	188,98	2,24 %	1,04 %
30.6.2021	194,49	2,92 %	1,72 %
31.7.2021	192,51	-1,02 %	-2,22 %
31.8.2021	200,92	4,37 %	3,17 %
30.9.2021	196,94	-1,98 %	-3,18 %
31.10.2021	203,99	3,58 %	2,38 %

Performance Analysis of PBPGAF2 DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	172,73		
28.2.2020	145,52	-15,75 %	-16,95 %
31.3.2020	113,40	-22,07 %	-23,27 %
30.4.2020	148,03	30,54 %	29,34 %
31.5.2020	147,77	-0,18 %	-1,38 %
30.6.2020	157,78	6,77 %	5,57 %
31.7.2020	154,63	-2,00 %	-3,20 %
31.8.2020	153,49	-0,74 %	-1,94 %
30.9.2020	168,83	9,99 %	8,79 %
31.10.2020	171,27	1,45 %	0,25 %
30.11.2020	173,40	1,24 %	0,04 %
31.12.2020	165,50	-4,56 %	-5,76 %
31.1.2021	176,88	6,88 %	5,68 %
28.2.2021	179,62	1,55 %	0,35 %
31.3.2021	178,92	-0,39 %	-1,59 %
30.4.2021	184,61	3,18 %	1,98 %
31.5.2021	188,74	2,24 %	1,04 %
30.6.2021	194,24	2,91 %	1,71 %
31.7.2021	192,27	-1,01 %	-2,21 %
31.8.2021	200,66	4,36 %	3,16 %
30.9.2021	196,69	-1,98 %	-3,18 %
31.10.2021	203,73	3,58 %	2,38 %

Performance Analysis of NIPEMOA DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	134,74		
28.2.2020	116,43	-13,59 %	-14,79 %
31.3.2020	98,41	-15,48 %	-16,68 %
30.4.2020	109,10	10,86 %	9,66 %
31.5.2020	112,27	2,91 %	1,71 %
30.6.2020	116,16	3,46 %	2,26 %
31.7.2020	115,25	-0,78 %	-1,98 %
31.8.2020	122,56	6,34 %	5,14 %
30.9.2020	121,73	-0,68 %	-1,88 %
31.10.2020	129,22	6,15 %	4,95 %
30.11.2020	131,28	1,59 %	0,39 %
31.12.2020	133,24	1,49 %	0,29 %
31.1.2021	142,01	6,58 %	5,38 %
28.2.2021	144,50	1,75 %	0,55 %
31.3.2021	145,74	0,86 %	-0,34 %
30.4.2021	147,90	1,48 %	0,28 %
31.5.2021	152,46	3,08 %	1,88 %
30.6.2021	154,46	1,31 %	0,11 %
31.7.2021	154,09	-0,24 %	-1,44 %
31.8.2021	166,95	8,35 %	7,15 %
30.9.2021	168,78	1,10 %	-0,10 %
31.10.2021	203,73	20,71 %	19,51 %

Performance Analysis of SPIVA DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	521,62		
28.2.2020	442,28	-15,21 %	-16,41 %
31.3.2020	372,83	-15,70 %	-16,90 %
30.4.2020	409,20	9,76 %	8,56 %
31.5.2020	408,74	-0,11 %	-1,31 %
30.6.2020	413,24	1,10 %	-0,10 %
31.7.2020	402,66	-2,56 %	-3,76 %
31.8.2020	421,55	4,69 %	3,49 %
30.9.2020	417,32	-1,00 %	-2,20 %
31.10.2020	408,67	-2,07 %	-3,27 %
30.11.2020	469,89	14,98 %	13,78 %
31.12.2020	478,05	1,74 %	0,54 %
31.1.2021	493,37	3,20 %	2,00 %
28.2.2021	471,24	-4,49 %	-5,69 %
31.3.2021	519,08	10,15 %	8,95 %
30.4.2021	527,35	1,59 %	0,39 %
31.5.2021	544,11	3,18 %	1,98 %
30.6.2021	544,25	0,03 %	-1,17 %
31.7.2021	545,99	0,32 %	-0,88 %
31.8.2021	559,31	2,44 %	1,24 %
30.9.2021	558,12	-0,21 %	-1,41 %
31.10.2021	569,21	1,99 %	0,79 %
30.11.2021	560,78	-1,48 %	-2,68 %
31.12.2021	593,05	5,75 %	4,55 %

Performance Analysis of VAIGLOA DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	244,08		
28.2.2020	199,71	-18,18 %	-19,38 %
31.3.2020	190,26	-4,73 %	-5,93 %
30.4.2020	204,23	7,34 %	6,14 %
31.5.2020	203,41	-0,40 %	-1,60 %
30.6.2020	203,93	0,26 %	-0,94 %
31.7.2020	201,98	-0,96 %	-2,16 %
31.8.2020	204,46	1,23 %	0,03 %
30.9.2020	206,60	1,05 %	-0,15 %
31.10.2020	195,88	-5,19 %	-6,39 %
30.11.2020	211,95	8,20 %	7,00 %
31.12.2020	213,52	0,74 %	-0,46 %
31.1.2021	215,21	0,79 %	-0,41 %
28.2.2021	190,37	-11,54 %	-12,74 %
31.3.2021	202,50	6,37 %	5,17 %
30.4.2021	202,63	0,06 %	-1,14 %
31.5.2021	207,66	2,48 %	1,28 %
30.6.2021	213,26	2,70 %	1,50 %
31.7.2021	212,46	-0,38 %	-1,58 %
31.8.2021	211,47	-0,47 %	-1,67 %
30.9.2021	208,99	-1,17 %	-2,37 %
31.10.2021	211,59	1,24 %	0,04 %
30.11.2021	209,41	-1,03 %	-2,23 %
31.12.2021	219,96	5,04 %	3,84 %

Performance Analysis of NORIKOM DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	133,98		
28.2.2020	123,00	-8,19 %	-9,39 %
31.3.2020	106,25	-13,62 %	-14,82 %
30.4.2020	118,80	11,81 %	10,61 %
31.5.2020	124,44	4,75 %	3,55 %
30.6.2020	129,07	3,72 %	2,52 %
31.7.2020	131,11	1,58 %	0,38 %
31.8.2020	138,93	5,96 %	4,76 %
30.9.2020	138,78	-0,11 %	-1,31 %
31.10.2020	139,63	0,61 %	-0,59 %
30.11.2020	153,64	10,04 %	8,84 %
31.12.2020	158,49	3,16 %	1,96 %
31.1.2021	158,75	0,16 %	-1,04 %
28.2.2021	162,46	2,34 %	1,14 %
31.3.2021	173,63	6,87 %	5,67 %
30.4.2021	177,12	2,01 %	0,81 %
31.5.2021	175,85	-0,72 %	-1,92 %
30.6.2021	183,02	4,07 %	2,87 %
31.7.2021	189,81	3,71 %	2,51 %
31.8.2021	196,66	3,61 %	2,41 %
30.9.2021	188,52	-4,14 %	-5,34 %
31.10.2021	200,23	6,21 %	5,01 %
30.11.2021	204,08	1,92 %	0,72 %
31.12.2021	210,84	3,31 %	2,11 %

Performance Analysis of CARN DC Equity

Date	Funds Closing NAV	Return of the fund(Ri)	Excess Return of the fund(Ri - Rf)
31.1.2020	754,39		
28.2.2020	687,60	-8,85 %	-10,05 %
31.3.2020	642,27	-6,59 %	-7,79 %
30.4.2020	708,41	10,30 %	9,10 %
31.5.2020	712,99	0,65 %	-0,55 %
30.6.2020	729,90	2,37 %	1,17 %
31.7.2020	737,49	1,04 %	-0,16 %
31.8.2020	766,67	3,96 %	2,76 %
30.9.2020	766,26	-0,05 %	-1,25 %
31.10.2020	750,13	-2,11 %	-3,31 %
30.11.2020	802,91	7,04 %	5,84 %
31.12.2020	823,40	2,55 %	1,35 %
31.1.2021	790,38	-4,01 %	-5,21 %
28.2.2021	791,55	0,15 %	-1,05 %
31.3.2021	829,55	4,80 %	3,60 %
30.4.2021	848,98	2,34 %	1,14 %
31.5.2021	837,90	-1,31 %	-2,51 %
30.6.2021	871,02	3,95 %	2,75 %
31.7.2021	899,42	3,26 %	2,06 %
31.8.2021	934,53	3,90 %	2,70 %
30.9.2021	922,64	-1,27 %	-2,47 %
31.10.2021	960,18	4,07 %	2,87 %
30.11.2021	987,04	2,80 %	1,60 %
31.12.2021	1 005,99	1,92 %	0,72 %

Appendix6. Performance Measures charts

Capital Asset Pricing Model

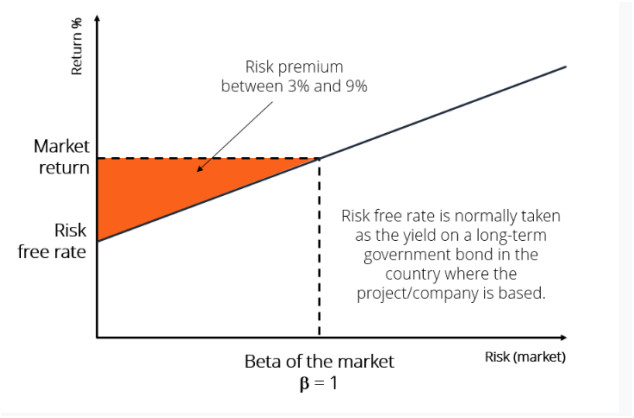

Table X. Capital Asset Pricing Model. Corporate Finance Institute. 2021

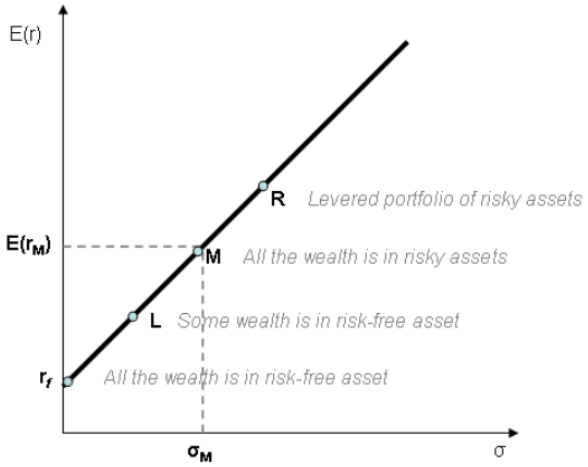

Table X. Capital Market Line. Wikipedia