



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Do actively managed Sweden funds yield higher return better than passively managed funds, during a volatile market, when taking risk into account?

Abstract:

This paper is examining if Swedish actively managed funds is creating more value for investors compared to Swedish index funds. The study is focused on the time period 2012-2022. Three risk-adjusted measurements are used to execute this mission. The Sharpe ratio, Treynor ratio and Jensen's alpha are computed after deducting management fees for each fund. Further, two-tailed f-tests are performed to test whether the average value for each performance measure is significantly different between actively managed funds and index funds on the Swedish stock market. Even though there is some small difference where actively managed funds performed slightly better than the index funds the result presented is that there is no statistic significant difference between the two groups of funds on a risk-adjusted basis over the period 2012-2022. Identical tests are also executed for the time period of 2022 to get an insight whether the war in Ukraine has a big impact on the result. Since there is no difference in the results the conclusion is that actively managed funds on the Swedish stock market do not manage to perform better than Swedish index funds when taking risk into account.

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The Gothenburg School of Business, Economics and Law at the University of Gothenburg

Supervisor: Aineas Mallios

Authors:	Year of Birth:
Allan Mohideen	931111
Robin Lopes	021014

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1 Introduction

1.1 Background

Over the years there has been much attention over different financial discussions. One of which is comparing the relative advantage of actively managed funds versus passively managed funds, also known as index funds. There has been much research around this topic, which generally shows that actively managed funds do not often outperform index funds in terms of justifying their higher cost. Gruber (1996) concluded that, on average, actively managed funds did not beat index funds on a risk-adjusted basis, which is one example of such findings. This occurred as a result of the study's consideration of the various funds' distinct risk profiles. However, it is worth noting that there are studies that have found the opposite (Bloomberg, 2017). Engstrom (2004) discovered, however, that Swedish actively managed funds could offer superior risk-adjusted returns compared to the index. Recent studies have explored the impact of various factors, including the Covid-19 pandemic such as Linde & Tingets (2021) and Törnroos & Hellgren (2019). We aim to delve into the effects of the war in Ukraine on performance.

A professional portfolio manager or a team of managers that manage investment funds actively select certain stocks, bonds, or other securities based on their research of market trends, economic conditions, and other factors to outperform the market or a given benchmark. The portfolio manager actively purchases and sells securities to outperform the market in terms of returns.

By owning a portfolio of assets that closely resembles the index, passively managed funds, commonly referred to as index funds, seek to duplicate the performance of a particular market index, such as the S&P 500. As they require less research and analysis than actively managed funds, these funds often charge lower fees.

Passive funds are not managed by a portfolio manager and instead aim to match the returns of a specific market index. Since passive funds do not involve extensive research and trading, they tend to have lower fees than actively managed funds (Seeking Alpha, 2022).

A trend has grown in the past year showing an upsurge in demand for index fund products among Swedish fund investors. According to Fondbolagen (2022), taking a look over the period between

2012 and 2022, we observe a sizeable intake of index funds by the Swedish population of SEK 353 billion. The reason we chose this time span is because we found the market to have matured after the financial crash in 2008. In contrast, only about SEK 14 billion was put into new actively managed funds during the same time period. Notwithstanding this trend, actively managed funds still hold the majority of all equity fund assets. In contrast to actively managed funds' net outflow of SEK 41 billion, index funds saw a net inflow of SEK 44 billion in 2022 alone. From 6% in 2010 to about 20% by the end of 2022, the percentage of assets held in index funds has increased dramatically (Fondbolagen 2022). This data demonstrates that Swedish investors are increasingly choosing cost-effective index funds over actively managed funds that are more expensive.

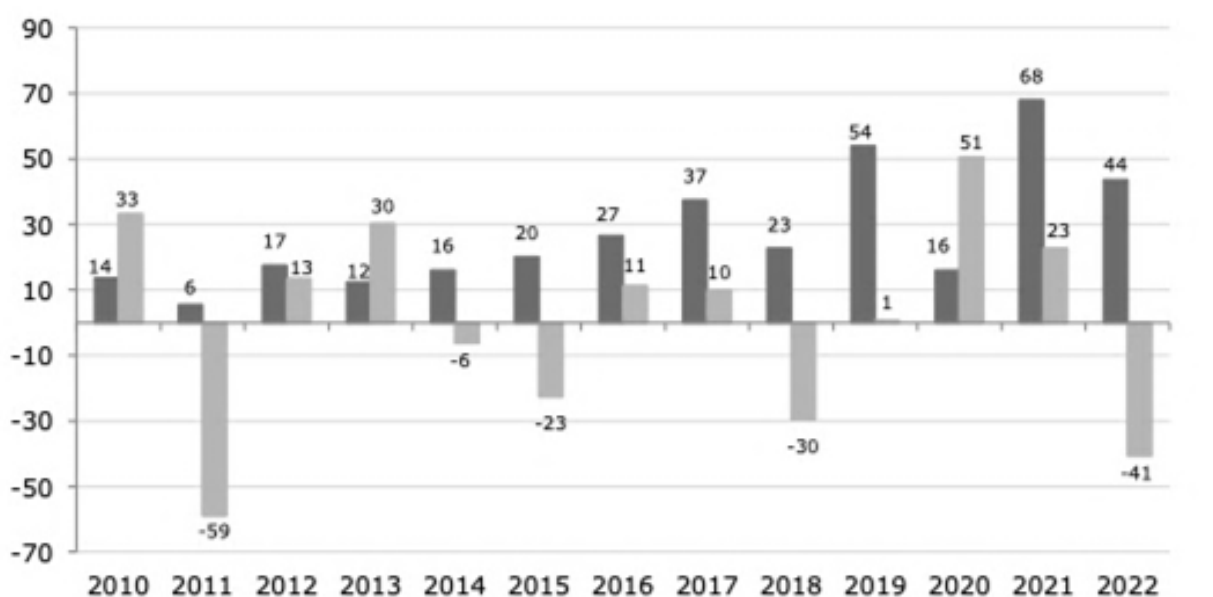


Figure 1.1 - Net savings in actively managed equity funds 2010-2022, SEK billion. Black is index funds, gray is actively managed equity funds.

By departing from the index's composition, actively managed funds seek to outperform what is possible with index management in terms of return. They search for equities that can outperform the index using various investment strategies and company assessments. Thus, actively managed funds typically charge a higher management cost than index funds (CNBC, 2022). Yet, Fama (1970)'s Efficient Market Hypothesis served as one of the key counterarguments to the claim that actively managed funds do not provide any benefit to investors. According to this theory, stock markets are efficient because the stock price accurately represents all available information.

Therefore, it should not be possible to predict stock price movements and outperform the index on an efficient market where stock prices only change/react to new information.

The SPIVA Scorecard (S&P Dow Jones Indices, 2020) revealed that in the United States, over a 10-year period ending in 2019, more than 85% of large-cap fund managers failed to outperform the S&P 500 index, supporting the idea that active fund managers typically underperform the market over time. In addition to that, an S&P study found that in Europe as a whole, 4 out of 5 active equities funds failed to exceed their benchmark during the previous 5 years, and that percentage increased to 86% over the previous 10 years (Financial Times, 2016).

Despite these findings, some argue that actively managed funds can still provide value to investors by offering more diversification, active risk management, and the potential for higher returns in certain market conditions. For example, during the Ukrainian war, an actively managed fund might outperform an index fund since it can make fast and accurate decisions. Furthermore, some investors prefer to invest in funds managed by human professionals who they believe can add value through their experience and knowledge of the market. Since the war resulted in higher inflation because of, for example, the increased energy prices, the interest rates increased as well and some people think that actively managed funds can adapt better to a volatile market caused by these parameters.

Actively managed funds may have certain advantages over passively managed funds in times of conflict and instability. These kinds of funds might be better equipped to respond to market fluctuations and seize emerging opportunities. Additionally, by actively managing risk and modifying their portfolios accordingly, active fund managers may be better prepared to negotiate ambiguous market conditions. Before making any investment selections, one must carefully assess their investment objectives and risk tolerance. It is vital to realize that investing in actively managed funds during times of war and uncertainty can also come with higher risks and potentially higher costs. Forbes (2022) argues that fund managers can be more effective at navigating uncertain market conditions, but that they may also be more prone to making mistakes. The article notes that during times of war or crisis, active managers may be better able to adjust their portfolios to take advantage of new opportunities or to mitigate risk.

In summary, the debate between actively managed and passively managed funds remains ongoing. While most studies suggest that actively managed funds generally fail to justify their higher fees compared to index funds, some studies show the opposite. When deciding which type of fund to invest in, investors must consider their investment objectives, risk tolerance, and investment horizon.

1.2 Purpose

The goal of the study is to determine if there are any notable variations in risk-adjusted return between Swedish actively managed funds and Swedish index funds. The objective is to be able to make inferences from the perspective of an investor to determine if actively managed funds live up to their higher costs and succeed in providing investors with greater value than index funds do in relation to the higher fees inside the actively managed funds. We will focus on funds that are widely oriented toward companies on the Swedish market between the years 2012 and 2022. This study will also demonstrate whether the differences in return between these two categories have grown as a result of the ongoing conflict in Ukraine.

1.3 Research question

Prior analyses of these two types of funds' performance have primarily concentrated on markets outside than the Swedish market. Additionally, analyses conducted for the Swedish market look at other time periods and do not consider the Ukrainian war as a consideration because it began in 2022. As a result, this study might give the reader an idea of how differences appear in the Swedish capital markets right now. We have the following specific research questions:

- Do actively managed Sweden funds yield higher return better than passively managed funds, during a volatile market?

To determine whether there is a significant difference between the actively managed funds and the index funds in terms of three different risk-adjusted performance indicators, we use two-tailed f-tests. The Sharpe ratio, Treynor ratio, and Jensen's alpha are the three performance measures used to help us achieve the result. We test the null hypothesis for every one of these.

1. Actively managed Sweden funds and index funds focused on the Swedish stock market have a similar average Sharpe ratio.
2. The average Treynor ratio of actively managed Sweden funds and index funds with a Swedish stock market investment focus.
3. The average Jensen's alpha of actively managed Sweden funds and index funds with a Swedish stock market investment focus.

2 Literature study

The risk-adjusted performance of actively managed funds and indexes has been the subject of numerous previously completed studies, most of which are based on the US market. For instance, between 1945-1964, Jensen (1968) analyzed 115 various American actively managed mutual funds. This was one of the first studies under this topic which also became an important study for future research. He discovered that, on average, the active funds were unable to predict stock performance in a way that would enable them to outperform investing in index funds. The funds Jensen investigated could not generate a positive alpha which was also the main reason why he made his conclusion. The findings indicated that, on average, the active funds did not generate a return that could cover the higher management fee and that, on a risk-adjusted basis, they did not outperform the index.

Ippolito used a similar methodology to Jensen (1989), tracking 143 actively managed funds for a 20 year period. He utilized alpha value as a proxy for the funds' risk-adjusted performance. He discovered that the funds examined at the time had generated greater value than the benchmark indexes. S&P 500 and a mix of S&P 500 and Salomon Brothers bond index were the indexes that were put as benchmark. Ippolito's study showed a different result from Jensen, who believed that actively managed funds more frequently generated negative alpha values. Actively managed funds overall generated positive alpha values according to Ippolito and this was the opposite of what Jensen tried to explain.

Based on both Ippolito and Jensen's surveys, Elton, Gruber, Das, & Hlavka (1993) conducted their own analysis and found that Ippolito's findings were a result of the S&P 500 being used as the

index. The problem discovered was that Ippolito included funds that also made investments in businesses outside of the S&P 500 in the analysis. By adjusting for this, they later found out that the outcome would have been the same as for Jensen, negative alpha values for the observed active funds.

Malkiel (1995) looked at all of the actively managed stock funds in America between 1971 and 1991 in an attempt to approve Jensen's findings from 1976. He found out that the average alpha value for actively managed funds was negative. Both with and without taking into consideration the higher fees, the negative alpha values were a fact. Following the period in which the funds were examined, he presented the result that actively managed funds were outperformed by indexes as S&P 500 and Wilshire 5000 on a risk-adjusted basis.

Similar result to Malkiel was achieved by Gruber (1996) after conducting a study where he looked at differences in performance between American actively managed funds and index funds following S&P 500 between the years 1985-1994. He showed that index funds on average had a higher alpha value than the actively managed funds and therefore also generated a higher return according to risk. Gruber used index funds as the benchmark and not the index itself since he argued that investors cannot invest in indexes but rather in funds trying to replicate different indexes. Later on, a study by McGuigan (2006) was made with the purpose of measuring the performance among different fund managers between 1983-2003. His study presented a result not quite different from the results in previously presented studies. Since the percentage of active managers who over time succeeded better than the index was very small, we argued that investing in funds with active management does not pay off.

Between 1968 and 1980 a study analyzing 116 American funds consisting of stocks was made by a man called Roy D. Henriksson (1984). Henriksson wanted to investigate whether active management did pay off in comparison to passive management if there is good timing on the stock market. He concluded that actively managed funds generate a lower systematic risk but that was not enough to outperform index funds. He was referring to a lower beta. The fund's managers cannot predict the volatility on the market, and it was therefore an impossible task to beat the index by having a good timing.

Curbertson, Nitzsche & O'Sullivan (2010) conducted a critical analysis of the different empirical surveys that have been carried out throughout the years. By studying the results of the various studies, they concluded that actively managed funds between 1975 – 2002 in United State of America and United Kingdom had on average generated a lower alpha value than index funds and were not attractive investments. They also discovered that it was only reasonable to expect that 10% of the actively managed funds produced very positive alpha values. Some of the studies above were subjects that the conducted the critical analysis on.

There are not as many research available that are aimed at the Swedish market since the Swedish fund market is not studied as well as the American. Dahlquist, Engström, & Söderlind (2000) decided to investigate specific fund characteristics to see if this had any impact on their average performance. The study discovered that actively managed funds managed to perform on par with the index or slightly better than the index on a risk-adjusted basis. 126 Swedish equity funds between the years 1993 and 1997 were examined for this study where they focused on measuring the funds' alpha values. They also presented a result that actively managed funds with higher fees do not necessarily perform as well or better as funds with lower management fees.

112 actively managed Swedish funds were looked at between 1996 and 2000 in another study by Engström (2004) that concentrated on the Swedish market. The survey was based solely on Swedish companies and funds investing in smaller firms. Based on these 4 years of period he concluded that, on average, the funds outperformed the performance of the indexes used as a benchmark.

The Swedish fund market was also studied by Asal (2016) between 2007-2015. He followed 243 Swedish funds to see if the abnormal return that was generated was based on skills or luck. The average fund could not beat the benchmark it was put up against according to Asal and he believed that the ability to choose right stocks was not strong enough to outperform the index. Those fund managers that did succeed to perform better than their benchmark was not having luck, instead these managers were actually good enough to do so.

Flam & Vestman conducted a study based on the Swedish market (2014) between 1999 and 2009 where they looked at 15 index funds and 115 actively managed Swedish funds. Both before and after fees, they discovered that the average alpha value of the actively managed funds was much larger than that of the index funds. However, they could not prove that the performance was due to the ability of the active fund managers to pick the right stocks and have perfect timing. Therefore, the conclusion and advice were that investors should invest in index funds over actively managed funds. They believed that those actively managed funds that performed better than index funds were doing so by luck rather than skills.

2.1 Assessing the Impact: The War in Ukraine and Its Multi-faceted Consequences

Earlier research we have found does not examine the specific case that we are wanting to analyze, although there are a lot of scientific articles written about the performance of index funds vs actively managed funds that we can benefit from. To complement these articles and find research regarding the effects of the current war we also found several articles regarding war's effects on stock markets. We can learn from their shortcomings as well as take advantage of the progress they have made in the subject. By using their results and conclusions we can further develop and apply them to our case as well as confirm or deny their results with our specific case.

Crane & Crotty (2018) have analyzed if Index funds have skill, in comparison to actively managed funds. The idea of actively managed funds is that someone with knowledge – skill – handles the fund, making it successful and valuable which is why they can take a higher fee on the funds. If it would have been luck rather than skill, it would instantly become riskier. That leaves the question – are index funds based on some sort of skill as well? The result from this study is that index funds do in fact have a type of skill as well, even so that it is proportionate to that of actively managed funds. This idea would be interesting to test out in the case of war and unsure times as an actively managed fund might have an advantage as they can perhaps hedge for it in a different way than index funds. The natural thought that comes to mind is that human intelligence should be able to have more skill and be more valuable than an index fund in times of uncertainty, giving us more incentive to go through with this research proposal.

Tower (2009) investigates multiple questions – including “Did Vanguard’s managed funds outperform their indexed counterparts?”. Tower also investigates if the two are comparable and if investors should hold a mix of both rather than just focus on one. Vanguard is a multinational investment company that has both index funds as well as actively managed funds. To achieve a trustworthy result, Tower does a couple of tests. He looks at a specific 10-years period for the average actively managed fund, and also looks at the median actively managed fund and compares it to its index basket counterparts. The results showed that the average actively managed fund overperformed the index fund and the opposite was true for the median actively managed fund. However, to put the results in black and white does not show the whole truth. The fact is that the average actively managed fund only overperformed in the first three years of the ten-year period. But when the results are evened out over the span of 10 years, it still shows a positive alpha (if $\alpha > 0$, managed funds overperformed the index). So, another way to interpret the results would be that actively managed funds were a better investment but were no longer one compared to index funds. Another point worth commenting on, which they also mention in the paper, is that the ten-year span lasts from 1998 to early 2008, meaning that the volatility that came with the 2008 financial crisis did not affect the results. This would have been interesting as it could have shown if the results were the same during unsure times, such as the war which we are investigating right now.

Hudson & Urquhart (2015) used a variety of econometric and statistical techniques to analyze the nature of the British stock market during the war. In the early years of war, when investors were strongly concerned about the economic impact of the war, the study identified that the stock market experienced a significant decline. The British economy began to recover as the war progressed and they had time to adapt to wartime conditions. During the war certain sectors, such as industries related to the war effort, performed better than other sectors, such as services and goods. A strength of the study is the use of a variety of statistical and econometric methods such as event studies to analyze the British stock market. The variety of methods paints a detailed picture of the market responses to different conditions and events during the war. However, the study primarily focuses on the impact of the war on the British stock market only, a further development of the study would be to analyze and provide detailed pictures on more stock markets than the British. One important aspect the study brings up is the negativity effect, which states that people have a strong tendency

of being more strongly influenced by negative information than positive information. This is one potential explanation to the significant decline in the early days of the war. Overall, this is a valuable study that provides insights on the impact of World War II on the British stock market, as well as confirming the negativity affect which is a concept that we will discuss when analyzing the Swedish stock market.

Kumari, Kumar & Pandey (2023) describe the potential vulnerability of 11 European Union stock markets with regards to the current conflict between Russia and Ukraine is investigated. The authors used an event study as their methodology to examine how different stock markets reacted to the news of the war. In addition, to investigate the relationship between the war and stock market returns, they performed panel data regression analysis. Further on, the study is determining causality between stock market performance and war by using Granger causality tests. The authors found a significant negative impact on the chosen stock markets in EU, where the most affected markets are Germany, Austria and Poland. In the introductory phase of the war the impacts on the stock market are higher, and then steadily decrease. The article brings valuable information on the relationship between the stock markets and the war, although it has its limitations. The authors do not consider other factors, such as domestic political events, that could have affected the stock markets during the period of the study. Further on, the study only analyzes the short-term effects of the war on stock market and does not consider how the current events of the war can change investor behavior in a more long-term perspective. In conclusion this paper is a well written study that explains what short term effects that the war has had on the studies European stock markets, but to fully understand the impact of the conflict further research must be done.

In summary, most studies suggest that index funds tend to outperform actively managed funds. However, there are some exceptions to this trend as highlighted by Dahlqvist et al. (2000) and Engström (2004), who found the opposite to be true. These findings cause the need for further research to compare the performance of actively managed funds and index funds.

3 Theory

3.1 Modern Portfolio Theory (MPT)

Markowitz (1952) is a pioneer in this subject when he, during 1950th proposed his portfolio theory that later became the modern portfolio theory. Risk-averse investors can employ Modern Portfolio Theory (MPT) as a technique to build diversified portfolios that maximize their profits while minimizing unacceptable levels of risk. This risk is dependable on the variance of the return. Along with the unique risk that each asset carries, it focuses on the connections among the assets in a portfolio. It takes advantage of the fact that losses on one asset are offset by gains on a negatively linked one. For instance, there is a negative correlation between airline stock values and crude oil prices (Mayesd etc., 1983).

3.2 The Efficient Market Hypothesis (EMH)

According to Investopedia, the Efficient Market Hypothesis suggests that financial markets are "informationally efficient" (Investopedia). This indicates that financial markets are effective at processing all information that is available regarding securities, including stocks and bonds, and that the market price of an asset accurately reflects all information.

EMH states that it is challenging to continuously outperform the market by purchasing and selling stocks based on publicly available information because markets are efficient. Because of this, it is unlikely that a retail investor or a professional portfolio manager will regularly generate returns that are higher than the market, after fees and transaction costs.

The EMH has three forms:

- *Weak Form*: This form states that the current market price of the security already takes into account historical trading volumes and prices. Because of this, technical analysis, which is based on the examination of past price trends, is useless for forecasting future price changes.
- *Semi-Strong Form*: This form implies that the market price of a security already considers all publicly available information, such as historical prices and financial statements. Hence, using fundamental analysis, which is based on the evaluation of financial statements and current economic conditions, to constantly outperform the market would be useless.
- *Strong Form*: This form implies that the market price of a security already considers all information, both public and private. Consequently, even having access to insider information would not be helpful for continuously outperforming the market.

While the EMH is a widely debated topic in the academic community, it remains an important concept in modern finance and Fama (1970) suggests a wide base that financial assets are valued based on the information available.

3.3 Capital Asset Pricing Model

Several financial models and theories have been developed as a result of Markowitz's modern portfolio theory. One such model is the Capital Asset Pricing Model (CAPM), which was developed by Sharpe (1964), Lintner (1965), and Mossin (1966) as an extension of Markowitz's work. The Black-Scholes model and the Jensen index (Jensen, 1968), are just some performance indicators employed in this thesis, strongly related to the CAPM, which has persisted in current finance (Black & Scholes, 1973).

The formula for CAPM is as follows:

$$E(R_i) = R_F + \beta_i(E(R_M) - R_F)$$

$E(R_i)$ is the expected return on an asset (CAPM), R_F is the Risk-Free Rate (rf): The return received from risk-free investments - most often proxied by the 10-year treasury yield, β_i is the Beta (β): The measurement of the volatility (i.e. systematic risk) of a security compared to the broader market (S&P 500), $(E(R_M) - R_F)$ means the Equity Risk Premium: The incremental return received from investing in the market (S&P500) above the risk-free rate (rf, as described above).

3.4 Beta

Beta is a measure of the volatility or systematic risk of a particular security or portfolio in relation to the overall market. It is typically calculated by comparing the returns of the security or portfolio to the returns of the market as a whole, represented by an index such as the S&P 500. A beta of 1 indicates that the security or portfolio moves in line with the market, while a beta greater than 1 indicates that it is more volatile than the market, and a beta less than 1 indicates that it is less volatile than the market. Beta is often used by investors to evaluate the risk of a particular security or portfolio in relation to the broader market.

3.5 Performance measures

The three performance measures used in this study are Jensen's Alpha, Treynor Ratio and Sharp Ratio. They are all common and focus on risk-adjusted return.

Jensen's measure is used for evaluating excess returns, given the level of risk assumed (Sharpe, 1994). It is named after the economist Michael Jensen, who developed the measure in the 1960s (Jensen, M. C., 1968). Excess returns are the returns generated by an investment or portfolio that exceed the expected returns (Black, F. etc., 1972). For example, if an investment generates a return of 10% while the expected return was 8%, then the excess return is 2%.

The level of risk assumed by an investment or portfolio refers to the amount of risk taken, which can be measured in many ways. One common way is to use standard deviation, which measures how much the returns of an investment or portfolio vary from its average return. The higher the standard deviation, the higher the risk (Statman, M., 2002).

The formula for Jensen's Measure is as follows:

$$\text{Alpha} = R(i) - R(f) + \beta \cdot (R(m) - R(f))$$

$R(i)$ is the Actual Return: the actual return earned by the investment or portfolio over a certain period, $R(f)$ is the Risk-Free Rate: the rate of return on a risk-free investment, such as a Treasury bill or bond, β means the Beta: a measure of the investment or portfolio's volatility relative to the benchmark index. A beta of 1 indicates that the investment has the same volatility as the benchmark, while a beta greater than 1 indicates higher volatility and a beta less than 1 indicates lower volatility, $R(m)$ is the Benchmark Return: the return earned by the benchmark index, a relevant market index, over the same period.

In summary, Jensen's Measure (alpha) is a risk-adjusted performance measure that is used to evaluate the excess returns of an investment or portfolio. This takes into consideration the level of risk assumed. It provides a quantitative measure of a portfolio or investment manager's ability to generate returns above the expected level for the level of risk taken.

The Treynor Ratio, or the reward-to-volatility ratio is a ratio that was developed by the economist Jack Treynor and has become a popular evaluation tool for portfolio managers. It measures the excess return of an investment or portfolio considering the level of beta, or systematic risk. By including beta, this ratio also becomes a risk-adjusted performance (Treynor, J. L., 1965).

The formula for the Treynor ratio is as follows:

$$\text{Treynor ratio} = \frac{(\text{portfolio return} - R(f))}{\beta}$$

where:

Portfolio return represents the actual return of the investment or portfolio over a specific period. And the rest has been described in the previous ratio above.

The Treynor ratio shows us the excess return per unit of systematic risk. This provides valuable insight on how much return is being generated for each unit of risk assumed (Sharpe, W. F., 1966). The higher the Treynor ratio is, the higher excess return per unit of systematic risk, thus reflecting a better risk-adjusted performance. It is particularly useful in evaluating portfolios with a high level of systematic risk, like those heavily invested in the stock market (Chen, Z. etc., 2010).

In conclusion, the Treynor ratio is a valuable risk-adjusted performance measure that helps investors evaluate portfolio managers' performance by assessing the excess return generated relative to the level of systematic risk taken on.

The Sharpe Ratio was developed by William F. Sharpe to help investors evaluate return relative to its risk. This ratio helps particularly in comparing the performance of two different investments, taking into account not only the return but also the risk. It provides valuable insight into how much return per risk unit is generated and the excess return per risk unit taken on. The formula for the Sharpe ratio:

$$\frac{(\text{portfolio return} - R(f))}{\sigma p}$$

σp is the portfolio's standard deviation, the rest have been mentioned in the ratios above.

The Sharpe ratio is calculated as the difference between the portfolio return and the risk-free rate, divided by the portfolio's standard deviation.

According to Sharpe (1966), a higher Sharpe ratio indicates a higher risk-adjusted return, which makes an investment more desirable. The Sharpe ratio is an important tool for investors to assess and compare different investment options.

4 Method & Data

4.1 Choice of method

This bachelor's thesis will be out of a quantitative method and conduct common theories used in finance. The study will follow a deductive method approach. This because we base our hypothesis on already existing and established theories. Based on our question in hand we have chosen the theories above. They are not only relevant to the question but also show a key relationship between risk and expected return which is necessary for our research. To answer the question at issue, of whether actively managed funds provide a better risk-adjusted return than index funds, three performance measures are used: Jensen's alpha, the Sharpe ratio and the Treynor ratio. These occur in both research and fund institutions and are three commonly used performance measures in the financial world, hence the choice to use them as performance measures.

4.2 Data analysis

To aid in our selection process of actively managed funds and index funds, we rely on the Morningstar database. This database is recognized as the largest independent publisher of fund information worldwide. We use it to obtain crucial information such as fund availability, holdings,

and background details. This information helps us determine whether a specific fund meets the selection criteria we have established.

To meet our selection criteria, the chosen fund must be a Swedish fund that is available to both private investors and larger institutions. For the index funds, it should follow a benchmark index and invest widely. Meanwhile, the actively managed fund should have no more than 20% of its total assets invested in foreign markets. Dividends must be reinvested since the majority of Swedish funds do not pay out dividends. Additionally, the fund must have been active from at least 2012 to 2022.

The exclusion of funds with more than 20% of assets invested in foreign markets is necessary because our survey is focused on the Swedish stock market. Moreover, since the selected index funds track an index on the Swedish market, it will be fairer to examine the results in this manner. The data collected consists of the yearly net return from each fund between the period January 2012 – December 2022. The yearly net return refers to the return after management fee. This data was collected from a Morningstar. We also used Morningstar when picking funds to examine with respect to the criteria. Using the search motor from Morningstar we get a list of 36 actively managed funds and 15 index funds that match our criteria and will be the selection for our study (see Appendix A).

4.3 Data processing

We have selected the SIX Portfolio Return Index (SIXPRX) to represent the overall development of the Swedish stock market. This index accounts for weight restrictions that Swedish funds must comply with under the UCTIS directive and tracks the average performance of all shares listed on NASDAQ OMX Stockholm.

To ensure that the portfolio remains diversified, no single company can constitute more than 10% of the total holdings, and companies weighing 5% or more together are not allowed to exceed 40% of the portfolio's total assets. Furthermore, SIXPRX is taking reinvestment of dividends into account, which is comparable to the funds in our sample.

Considering these restrictions, we find that SIXPRX is the most suitable market index for our study. Data and information on the development of SIXPRX will be gathered from Fondbolagens Förening.

To calculate the performance measures, a risk-free asset is required. The risk-free asset consists of interest in the form of a 1-month treasury bill. Data on the treasury bill and rates was taken from the Swedish central bank, for each month between the period 2012–2022 (Riksbank 2023).

According to Berk & DeMarzo (2013), the asset with the lowest probability of failing payments is a treasury bill and could therefore be considered risk-free. That is why we have chosen to use a Swedish treasury bill with a maturity of one month (SSVX-1M) as a measure of the risk-free interest rate in Sweden when calculating the three different risk-adjusted performance measures.

5 Discussion

When discussing the preference of mutual funds or index funds and the Ukrainian wars effect we expected both options to have their advantages and disadvantages. Our hypothesis suggests that the performance is based on the time horizon and associated costs.

Mutual funds are managed by professional managers who can make decisions with the aim of outperforming the market. Due to their expertise and ability to adapt to their positions more frequently they could potentially have more return in the short term. Engström (2004) study of the Swedish market agrees with this and showed that over a 4 year period did actively managed funds outperform index funds. Consequently, we believed that mutual funds would outperform index funds in the short run and have the ability to adapt to changes during the war.

However, in the long run as time passes, we believed that the fees associated with having money invested in a mutual fund would be a significant factor that investors had to consider. This also goes hand in hand with the finding of Gruber (1996) where it was shown that index funds, over a 10 year period, had a higher alpha value than actively managed funds. Fees such as management fees, operating expenses, and transaction costs would in turn have a significant effect, eating away the funds' performance as time passes. Over time we believed that the compound effect of the fees

would lower the return on mutual funds, making it more attractive to invest in index funds as a long-term investor.

Therefore, while mutual funds might have performed better to changes during the war in the short-term, we believe that index funds are more attractive option for long term investors.

5.1 Study of discussion:

We have done a small calculation to back up our hypothesis test. We compared the 12 month return before and after the invasion to see the difference in the two groups, index or mutual funds.

RETURN 12 MONTHS **BEFORE** THE INVASION – FEVUARY

24, 2022

PLUS ALLABOLAG SVERIGE INDEX	6,98%
HANDELSBANKEN SVERIGE TEMA (A1 SEK)	-6,63%

RETURN 12 MONTHS **AFTER** THE INVASION – FEVUARY

24, 2022

PLUS ALLABOLAG SVERIGE INDEX	1,40%
HANDELSBANKEN SVERIGE TEMA (A1 SEK)	-10,92%

FULL TIME PERIOD – 24 MONTHS

PLUS ALLABOLAG SVERIGE INDEX	11,09%
HANDELSBANKEN SVERIGE TEMA (A1 SEK)	-13,28%



Table 5.2 - Graph over the 12 month return before and after the start of the Russian – Ukrainian war.

Table 5.1 - showing the 12 month return before and after the start of the Russian – Ukrainian war.

Looking at the data from the table 5.1 and 5.2, we can extract that return of the index fund (PLUS Allabolag Sverige Index) and the mutual fund (Handelsbanken Sverige Tema 1A). In this case, we can see that the index fund outperformed the mutual fund before, after and during the full time period of 24 months. This is, as said before, only calculations to back up the hypotheses, but the analysis will be of a much bigger period.

6 Results

To begin with, we computed the average yearly performance measure for each of our funds over the period of January 2012 – December 2022. The performance measures used were the Jensen's alpha, the Sharpe ratio and the Treynor ratio with the help of Thomson Reuters Eikon. This is highly regarded for its extensive market coverage and robust financial data and analytics capabilities. Additionally, we also got the return of each fund, over the same period, adjusted for the management cost charged by the funds, implying that the return is indicated after the management fee has been subtracted. We also calculated the beta for each fund.

To determine whether actively managed funds beat passively managed funds on a risk-adjusted basis, we analyzed the data and assessed the significance of our three null hypotheses. We test the null hypothesis that there is no statistical difference in the average value for each performance measure between the actively managed funds and the index funds. We picked the F-test to determine whether the difference in average values between two groups is statistically significant. Three assumptions must be met when running the test to get a fair result. To check if the groups are normally distributed, we use histogram to test for normality. Lastly, we create diagrams to check if there are any outliers within the groups that significantly differ from the other values.

Below in the table, the returns for the chosen funds are represented, both active funds and passive funds (see Appendix A). These numbers represent the time period 2012-2022. These numbers are net returns where management fees have been deducted. The average return yearly for passively managed funds is 10.45% and 11.58% for actively managed funds. Based on the table, the average return is 1.13% higher for actively managed funds. This is an expected result when reading the study made by Engström (2004).

6.1 Beta

We used Thomson Reuters Eikon software to calculate the beta of both passively and actively managed funds during the period of 2012-2022. Our analysis shows that the passively managed fund has a beta of approximately 1, indicating that it moves in line with the market.

<i>2012-2022</i>	<i>Passively managed funds</i>	<i>Actively managed funds</i>
<i>Beta</i>	0.99917732	0.96763517

Table 6.1 – Shows the beta value for passively managed funds and actively managed funds, over the period 2012-2022.

In comparison, the actively managed funds demonstrate a moderate correlation with the market, although not as close as the passively managed funds. This finding is consistent with Gruber's (1996) study, which suggests that actively managed funds take on higher risk, requiring a higher return. Overall, our results support the idea that passively managed funds may offer a more reliable investment option for those seeking market returns with minimal risk.

For Jensen's Alpha, Sharpe ratio, and Treynor ratio, we assume that the distribution is approximately normal.

6.2 Jensen's Alpha

Looking at the Jensen's we can see a close, but slight, outperformance by the actively managed funds. To be exact, a 0.05117882 difference in the 10 years Alpha.

2012-2022	Passively managed funds	Actively managed funds
Jensens's Alpha for 1 Year to Last Month End	0.24817806	0.33805484
Jensens's Alpha for 10 Years to Last Month End (Benchmark)	0.148474	0.2002622

Table 6.2 – Shows the Jensen's Alpha value for passively managed funds and actively managed funds on a 10 year and 1 year basis counting to last month end.

Since this close outperformance a f-test is conducted to see if there is a significant different of the result between the two groups. The f-test did however not find any significant difference between the two groups.

Data	
Level of Significance	0.05
Large-Variance Sample	
Sample Size	35
Sample Variance	0.16645513
Smaller-Variance Sample	
Sample Size	15
Sample Variance	0.083581659
Intermediate Calculations	
F Test Statistics	1.9915
Population 1 Sample Degrees of Freedom	34
Population 2 Sample Degrees of Freedom	14
Two-Tail Test	
Upper Critical Value	2.7052
p-Value	0.1691
Do not reject the null hypothesis	

Table 6.3 - F-test to show if there is a difference between the Jensen's Alpha of passively and actively managed funds.

We can see that the average alpha values for both passively managed funds and actively managed funds are positive. We can however according to the two-tailed test assume no significance in difference between the two types of funds when looking at the alpha value. This means that we do

not reject the null hypothesis. Actively managed funds and passively managed funds have similar performances when examining the alpha values for the funds during the time period 2012-2022. When looking at the alpha values, there is a small difference where actively managed funds perform slightly better. This is not surprising according to Dahlquist M, Engström, S & Söderlind P. (2000). They came up with the conclusion that actively managed funds perform on par or slightly better than passive funds, which gives the same picture given by the numbers above and the two-tailed test.

A second test was also conducted for the twelve months' time period during 2022 to see if there is big impact from the war I Ukraine. The result was similar and therefore we cannot draw any conclusions that show differences between the two groups of funds because of the war.

6.3 Sharpe ratio

The Sharpe ratio, which measures the return per unit of risk, was calculated by taking the average return of all funds in each category, and the risk was determined by the average standard deviation of those returns. The Sharpe ratio was found to be very similar across the different management methods.

<i>2012-2022</i>	<i>Passively managed funds</i>	<i>Actively managed funds</i>
<i>Sharpe ratio for 1 Year to Last Month End</i>	0.03297485	0.0439496
<i>Sharpe ratio for 10 Years to Last Month End (Benchmark)</i>	0.1756492	0.1789332

Table 6.4 – Shows the Sharpe ratio value for passively managed funds and actively managed funds on a 10 year and 1 year basis counting to last month end.

We can see that the average Sharpe ratio for these different funds has a low value. This indicates that the performance, in form of return, does live up to the risk they take. We see that the Sharpe ratios for the actively managed funds are a little higher, exactly 0.01097475 higher are the actively managed funds. We therefore decided to do a f-test to show if there is a difference between the result in the passively and actively managed funds.

<i>Data</i>	
<i>Level of Significance</i>	0.05
<i>Large-Variance Sample</i>	
<i>Sample Size</i>	35
<i>Sample Variance</i>	0.003747676
<i>Smaller-Variance Sample</i>	
<i>Sample Size</i>	15
<i>Sample Variance</i>	0.002499223
<i>Intermediate Calculations</i>	
<i>F Test Statistics</i>	1.4995
<i>Population 1 Sample Degrees of Freedom</i>	34
<i>Population 2 Sample Degrees of Freedom</i>	14
<i>Two-Tail Test</i>	
<i>Upper Critical Value</i>	2.7052
<i>p-Value</i>	0.4222
<i>Do not reject the null hypothesis</i>	

Table 6.5 - F-test to show if there is a difference between the Sharpe ratio of passively and actively managed funds.

The F-test shows that there is no significant difference between the two groups, and we cannot therefore say that the higher sharp ratio of 0.01097475 that the actively manage funds were because of coincidence or not.

This result is a poor performance from the actively managed funds since they are expected to perform over the passively managed funds. Looking at articles such as Flam, H., & Vestman, R. (2014) it is with no surprise that the actively managed funds could not outperform the passively managed funds.

We also did a test from 2022/01 – 2022/12 also showing there were no statistical differences between the Sharpe ratios for the actively and passively managed funds. This indicates that even though the unsustain times, there is not statistically significant that actively managed funds were not able to outperform the passively managed funds.

6.4 Treynor ratio

We conducted the Treynor ratio for 1 year and 10 years over the period 2012-2022 to compare the performance of passively- and actively managed funds.

2012-2022	Passively managed funds	Actively managed funds
Treynor ratio for 1 Year to Last Month End	0.23750744	0.30010518
Treynor ratio for 10 Years to Last Month End (Benchmark)	0.8239271	0.8636066

Table 6.6 – Shows the Treynor ratio value for passively managed funds and actively managed funds on a 10 year and 1 year basis counting to last month end.

Later doing a F-test to see if there is a statistical difference between the two groups.

Data	
Level of Significance	0.05
Large-Variance Sample	
Sample Size	35
Sample Variance	0.183903873
Smaller-Variance Sample	
Sample Size	15
Sample Variance	0.139629522
Intermediate Calculations	
F Test Statistics	1.4079
Population 1 Sample Degrees of Freedom	34
Population 2 Sample Degrees of Freedom	14
Two-Tail Test	
Upper Critical Value	2.7052
p-Value	0.5018
Do not reject the null hypothesis	

Table 6.7 - F-test to show if there is a difference between the Treynor ratio of passively and actively managed funds.

Looking at the Treynor ratio, the results are similar among the two different groups of funds. The two-tailed test tells to not reject the null hypothesis and therefor telling us that the average Treynor ratio of actively managed Sweden funds and index funds with a Swedish stock market investment

focus is not significantly different. This is an identical result as the test for the sharp ratio. After examining the table above, the actively managed funds have a higher average Treynor ratio than the passive funds. This indicates that these funds have performed better than the passive funds, when taking systematic risk into account. Systematic risk is often measured by beta, which is one of the inputs used to compute the Treynor ratio.

The table with beta values also shows that both passive and active funds have an average beta of around 1, meaning they move in line with the market. The active funds have a beta of 0.96763517, while the passive funds have a beta of 0.99917732. Given that both beta values are close to 1, the difference in performance according to the average Treynor ratio is likely due to differences in returns rather than differences in beta.

In conclusion, the three measures do not show any statistical difference between actively and passively managed funds.

7 Concluding remarks

In this study, we tried to examine the differences in performance between actively managed funds and passively managed funds. The goal was to be able to draw conclusions whether investors can create more value by investing in actively managed funds even though actively managed funds have higher fees. By comparing the risk-adjusted performance after fees have been deducted between the two different groups of funds, we got answers and results worth analyzing. Looking into 3 specific performance measures, Sharpe ratio, Treynor ratio and Jensen's Alpha for each fund during the time period 2012-2022 we were able to use the data to run two-tailed F-tests for each performance measure. The tests provided us with results where we could analyze whether there is any statistically significant difference between the average value for the actively managed funds and the index funds. Additionally, we conducted identical tests for the funds and their performances during the year 2022. This was done to see if the war in Ukraine has had any impact on the statistically significant differences in performance for the three measures used between the two groups of funds.

Our study reveals that the average actively managed fund in our sample outperformed the average passively managed fund in terms of Sharpe ratio, Treynor ratio, and Jensen's alpha. This finding is noteworthy, as it contrasts with the results of some previous studies, such as Curbertson, Nitzsche & O'Sullivan (2010), which have suggested that actively managed funds tend to generate lower alpha and cannot consistently outperform passively managed funds in the long run. We conducted an F-test to determine whether there was a significant difference in the performance of passively and actively managed funds in terms of Sharpe ratio, Treynor ratio, and Jensen's alpha. The results indicated that, at a 95% significance level, there was no significant difference between the two groups for all three tests. Therefore, we can conclude that the performance of passively managed funds was not statistically different from that of actively managed funds. And the result was with no surprise and went hand in hand with Flam, H., & Vestman, R. (2014) that showed that actively managed funds were not able to outperform passively managed funds in the long run.

In contrast to the findings of Vineeta Kumari, Gaurav Kumar & Dharen Kumar (2023) regarding the short-term effects of the Russian-Ukrainian war on the European stock market, we saw that the performance of actively and passively managed funds over the period of January-December 2022 using the same three performance measures, on average, actively managed funds outperformed passively managed funds during this period. However, a statistical test (F-test) showed that there was no significant difference between the two groups in terms of their performance.

In conclusion we did see a difference, but not a statistically significant difference, in the performance of actively managed funds and passively managed funds when looking at the period of 2012-2022. We also saw a better average performance of actively managed funds than passively managed funds but also here there were no proven statistical differences. We could therefore answer the question at issue and show that there is no statistical difference between the performance of actively managed funds and passively managed funds, when taking risk into account.

We also proved our three hypotheses and showed that there was no statistical difference between the performance measures Sharpe ratio, Treynor ratio, and Jensen's alpha, of actively versus passively managed funds.

7.1 Suggestions for further research

As we conclude our bachelor thesis, it is important to consider potential avenues for future research. Our study sheds light on the comparative performance of actively and passively managed funds during the period of January-December 2022, with a focus on three key performance measures. However, our findings raise several questions that could be addressed in future studies.

One of these questions is that it would be worthwhile to explore the potential long-term effects of the Russian-Ukrainian war on the Swedish and European stock market, and whether these effects could influence the relative performance of actively and passively managed funds in the future. Our study only focuses on the short-term impact of the conflict on the market, and it is possible that there may be longer-term implications that we did not account for.

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Appendix

Appendix (A)

List of funds

Passively managed funds	Fund return 10 years at an annual rate (%)	Actively managed funds	Fund return 10 years at an annual rate (%)
<u>Aktiespararna Topp Sverige Hållbar A</u>	9,66	<u>AstraZeneca Allemansfond</u>	16,81
<u>Swedbank Robur Access Sverige A ^{TRE}</u>	9,84	<u>Cliens Sverige B ^{TRE}</u>	13,46
<u>Öhman Marknad Sverige Bred A</u>	9,89	<u>Spiltan Aktiefond Stabil</u>	14,90
<u>Avanza Zero</u>	10,05	<u>Handelsbanken Sverige Selektiv ^{TRE}</u>	14,37
<u>Länsförsäkringar Sverige Index</u>	10,10	<u>Handelsbanken Sverige Selektiv (A1 EUR) ^{TRE}</u>	14,36
<u>Storebrand Sverige A SEK</u>	10,12	<u>Cliens Sverige A</u>	11,75
<u>Nordea Inst Aktief Sverige icke-utd ^{TRE}</u>	10,29	<u>Lannebo Sverige Plus</u>	14,25
<u>Handelsbanken Sverige 100 Ind Cri A1 SEK</u>	10,53	<u>SEB Sverigefond</u>	11,66
<u>Nordea Sverige Passiv icke- utd</u>	10,59	<u>Lannebo Sverige</u>	12,64
<u>Handelsbanken Sverige Index Criteria</u>	10,65	<u>SEB Swedish Value Fund</u>	11,39
<u>Skandia Sverige Exponering</u>	10,74	<u>Länsförsäkringar Sverige Vision B ^{TRE}</u>	12,04
<u>Nordnet Indexfond Sverige ESG</u>	10,80	<u>Länsförsäkringar Sverige Vision A</u>	11,96
<u>SEB Sverige Indexnära A</u>	11,04	<u>Lannebo Sverige Hållbar A SEK ^{TRE}</u>	11,67
<u>Case Hållbar Sverige Index A</u>	11,15	<u>Enter Sverige Hållbar Tillväxt A</u>	11,96

<u>Case Hållbar Sverige Index</u> <u>B</u>	11,36	<u>PriorNilsson Sverige Aktiv A</u>	12,19
		<u>Humle Sverigefond</u>	11,00
		<u>Folksam LO Västfonden</u>	11,29
		<u>SEB Sverige Expanderad</u>	11,00
		<u>Handelsbanken Sverige Tema</u> <u>(A1 SEK)</u>	10,93
		<u>Carnegie Sverigefond A</u>	11,64
		<u>Swedbank Robur Exportfond</u> <u>A</u>	12,39
		<u>Agenta Svenska Aktier</u>	11,88
		<u>Folksam LO Sverige</u>	10,33
		<u>Carnegie Spin-Off A</u>	10,23
		<u>Aktie-Ansvar Sverige A</u>	10,62
		<u>Swedbank Robur Sverige I</u> <u>TRE</u>	10,51
		<u>AMF Aktiefond Sverige</u>	9,48
		<u>Cliens Sverige Fokus A</u>	11,89
		<u>Enter Select Pro</u>	11,10
		<u>Swedbank Robur Sverige A</u>	9,64
		<u>Nordea Swedish Stars icke-</u> <u>utd</u>	9,77
		<u>Nordea Alfa</u>	9,29
		<u>Enter Sverige A</u>	9,62
		<u>Didner & Gerge Aktiefond</u>	10,25
		<u>Case Hållbar Select</u>	8,40
		<u>Enter Select A</u>	10,21
Average (%)	10.454		11.58

Appendix (A) - Table showing every passively- and actively managed funds used in this study, and their individual 10 year fund return at an annual rate.