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PERFORMANCE OF EQUITY FUNDS IN FINLAND DURING COVID-19 PANDEMIC

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ABSTRACT

The aim of this paper is to find the performance of equity funds in Finland during the COVID-19 pandemic and its impact on the funds. Sample contained in total 18 equity funds and these funds were divided into three groups; small cap funds, mid cap funds, and passive funds. Fund's performance was studied in two time periods 2015-2019 and 2020-2021. First period represents historical performance of the funds and the before COVID-19 pandemic, second period represent the time during the pandemic. Funds' performance was evaluated in groups as well individually by comparing returns and risk-adjusted performance measures.

Monthly closing prices of the funds, benchmark indices, and risk.the free rate were obtained from the Thomson Reuters Datastream service. Monthly logarithmic returns were calculated from the closing prices. First performance measures used in the paper were annualized returns and volatility. Followed by three risk-adjusted measures that were Sharpe ratio, Treynor ratio, and Jensen's alpha.

Main findings showed that small cap funds outperformed mid cap and passive funds in both periods. Pandemic did not have a long-lasting negative impact on the funds as the performance measures indicated stronger performance of all funds on average during the pandemic. However, majority of the funds underperformed indices when comparing returns and risk-adjusted returns.

Keywords: Equity fund, Risk-adjusted performance, Pandemic, Finland

INTRODUCTION

Historically stock markets have generated higher returns than other asset classes in the long run. On the other hand, stock market returns have been quite volatile compared to other assets and have been negative at times; for example, fixed income returns have been more consistent, but they have been lower in the long run than stock market returns (Siegel 1992). Typically, risk and reward go hand in hand, and the stock market offers an opportunity for greater returns for investors. By diversifying investments, investors try to reduce the risk of the investments. That means allocating investments to different financial institutions, industries and markets. In order to achieve a well-diversified portfolio, time, knowledge, active research and actions are required from the investor. Creating an investment portfolio with efficient diversification and good returns could be hard for many inexperienced and intermediated investors, even professionals. Financial institutions and banks offer a variety of mutual funds, exchange-traded funds (ETF), and alternative options that provide access to professionally managed portfolios to all investors. Investors may select a preferred option based on level of risk, strategy and more. (Pozen *et al*. 2015, 3-23)

Investing has been a growing trend among Finns over the past decade. In 2020 roughly 1,7 million persons owned either mutual funds or shares listed in Finland. Half of those investing in mutual funds were women and the other half were men. In listed shares, however, gender distribution differed as follows, 40 percent were women and 60 percent were men (Official Statistics of Finland 2022). Partially growth in participants can be perceived as increased new investments and growth in fund capital. The total fund capital of Finnish investment funds was the highest in history at 162,7 billion euros, whereof 70,6 billion euros was equity mutual fund capital at the end of 2021 (Bank of Finland 2022a). These equity mutual funds can be divided into two groups by management style, active and passive. Number of active equity mutual funds that invest mainly in the equities of companies listed on the Finnish stock exchange (Nasdaq Helsinki) is multiplex compared to passive ones with the same geographical focus.

Scientists discovered a rapidly infectious virus known as COVID-19 in December 2019 and traced its origin to Wuhan, China. Since then, the virus has spread worldwide. Thereupon, World Health

Organization (WHO) declared a pandemic on 11.3.2020. The uncertainty caused by the virus shook the global economy, equities fell sharply, and volatility spiked worldwide as a result. Since the pandemic breakout, much research has been done regarding COVID-19 effects on the economy. Baker *et al.* (2020) stress that burdensome restrictions hurt service-driven economies significantly. Zhang *et al.* (2020) point out that prodigious volatility caused by the pandemic has increased significantly financial market risk. The pandemic is still ongoing and affects companies' operations daily to some extent when the author was writing the paper. The pandemic was chosen as the focus of the study due to its topicality.

This thesis aims to determine how equity funds focusing on the Finnish stock market have performed during the pandemic. Furthermore, examine how the pandemic has affected the overall performance compared to the historical returns of the funds, benchmark indices, and risk-adjsuted measures. Author formulated two research questions in order to study the performance of these funds:

1. How have equity funds in Finland performed during the COVID-19 pandemic?
2. How has the COVID-19 pandemic affected the performance of Finnish equity funds?

In total 18 funds primarily investing in Finnish stocks were selected: 15 actively managed funds and 3 passive funds. These funds were divided into three groups which are small cap funds, mid cap funds, and passive funds. Selected funds were studied individually as well as in groups. Funds and benchmark indices performance were monitored in two different time periods in order to understand the COVID-19 pandemic's effect on these funds. The first time period 31.1.2015-31.12.2019, represents the time before the pandemic. The second time period 31.1.2020-31.12.2021, represents the time during the pandemic. The closing prices of the previous month have been used to calculate the returns for the first month of both time periods. OMX Helsinki Small Cap Growth Index was used as the benchmark index for small cap funds, and OMX Helsinki Growth Index for mid cap funds and passive funds. Monthly closing prices were obtained between 31.12.2014.-31.12.2021 of the funds, benchmark indices, and risk-free rate. Performance measures used in this paper were logarithmic returns, volatility, Sharpe ratio, Treynor ratio, and Jensen's alpha. All the measures are presented as annualized averages based on the monthly price data.

The paper consists of three chapters. The first chapter provides a necessary theoretical framework for the study by reviewing principles of fund management, modern portfolio theory, capital asset

pricing model, efficient market hypothesis and summarizing previous relevant research. The second chapter describes chosen funds and benchmark indices, the study period and the methodology conducted in the study. The findings of the study are presented in the third chapter which finishes with a discussion and conclusions of the findings.

1. KEY CONCEPTS AND PERFORMANCE OF EQUITY FUNDS

This chapter goes through the essential background, theory and literature for the study. The chapter begins with an overview of mutual funds and fund management. Following subchapters introduce modern portfolio theory, capital asset pricing model and efficient market theory. At the end of the chapter, an overview of the historical performance of equity funds is presented.

1.1. Fund management

Mutual funds can be divided into several groups by asset classes they are investing in. Four main groups by asset class are equity funds, fixed-income funds, money market funds, and hybrid funds. Equity or stock funds invest principally in stocks, if not merely. Fixed-income or bond funds invest in various debt and bond securities that commonly pay fixed interest or dividends to the fund in addition to the principal amount. In turn, money market funds invest in highly liquid instruments. Typically, these are short-term debt securities and currencies. Hybrid funds invest in two or more asset classes, generally in stocks and bonds. (Kumar 2014, 207–242)

This paper focuses only on equity funds which can be categorized by several other factors for example strategy, level of risk, and management style. (Rolland 2010, 230). The last-mentioned consist two traditional management styles: active and passive.

Active fund management refers to activities in which the fund manager strives to achieve a higher return than the fund's benchmark index. The purpose is to take distinctive view of the market and its future development to generate higher returns than the benchmark index. Investments of an actively managed fund usually differ to a certain extent from the stocks included in the benchmark index. Ambachseer and Farrell Jr (1979) stated that fund managers' ability to recognise, forecast, and utilise stocks in theory and practice builds the foundation for successful active fund management.

Active manager can add value compared to benchmark index only by deviating from it. That can be achieved commonly by two different factors, stock selection and factor timing. Stock selection is an activity where a fund manager acquires certain stocks that are expected to perform better according to their interpretation, compared to other similar stocks within the benchmark index. Factor timing, on the other hand, is based on the weights of the stock in the fund that change over time according to systematic risk factors. Systematic risk factors are any systematic risk associated with the benchmark, for example, industries and sectors (Cremers, Petäjistö 2009). Hence, active fund managers have to rely on their interpretation of the right stock selections and systematic risk taken to be able to produce higher returns than the benchmark index.

Passive funds are typically either index funds or exchange traded funds (ETF). Both try to replicate their benchmark index as closely as possible. Thus, passive fund managers do not take their own view of the market. Passive fund managers update their portfolios only a certain amount over a period of time only to make adjustments according to the benchmark. Naturally, passive funds try generate similar returns as their benchmark indexes. However, trading costs and management fees slightly lower the returns from the benchmark (Brentani 2004, 85).

Fundamental difference between active and passive fund management styles is the way they replicate their benchmark indexes. Passive fund management traditionally strives to copy benchmark index development accurately. Hence, funds managers do not make anomalous stock selections of the benchmark and updates are made more rarely only to check that portfolio is in line with the benchmark index with the stock selections and weights. That activity is commonly known as indexing (Maginn *et al.* 2007, 7). In turn, active fund management strives to produce higher returns than the benchmark index. Thus, they pursue to outperform the market by active stock selection differing from the benchmark. Increased activity is also related to higher costs. Active management requires more research, time and costs related to stock purchases are higher compared to passive management. Where passive management tries to reach benchmark index, active management is not only aiming to outperform the benchmark index but also has to be done under higher operating costs.

Both active and passive fund managers have limitations on their operations imposed by the fund's investment policies and rules. These limitations might be but are not limited to, share of different asset classes, geographical focus, risk diversification, and financing of the fund. Almazan *et al.* (2004) examined fund limitations' impact on fund managers' performance of U.S. domestic equity

funds between 1994 and 2000. Findings of the research suggest that there are no significant indifferences in returns when comparing low- and high-constraint funds which were otherwise similar. In addition, the research concluded that typically funds have selected necessary policies to create optimal contracts between the fund and investors. Naturally, policies limit fund manager's level of risk-taking and ensure that the fund is in line with its objectives.

1.2. Modern portfolio theory

Markowitz (1952) presented a widely recognised modern portfolio theory which can be seen as a framework for evaluating risk and return. According to the theory, securities with similar features are exposed to similar risks and the risk can be mitigated by diversification. The principle of the theory is that the equity is allocated into several different securities, reducing the risk associated with the investments. Investors should select securities which returns correlate as little as possible. Hence, a possible decrease in the value of one security does not result in negative returns in the entire portfolio. Moreover, a possible increase in the value of other securities keeps the portfolio's total return positive. Thus, the risk of the portfolio is reduced when single security does not significantly affect the total return. Markowitz (1952) noticed risks cannot be completely avoided in diversified portfolios. The reason behind it is that systematic risks correlate throughout different securities to a certain extent. For that reason, returns cannot be achieved without taking any risk.

The aim of the modern portfolio theory is to compile an efficient portfolio where either expected return is maximized for a given level of risk or risk is minimized for a given level of expected return. Portfolios that meet the previous requirement are located on the efficient frontier curve and are regarded as optimal portfolios. Any portfolio that falls below the curve should not be selected as for the same level of risk higher returns can be achieved (Markowitz 1952). Risk is measured by variance and therefore modern portfolio theory is also known as mean-variance theory.

1.3. Capital asset pricing model

Developed by Sharpe (1964), Lintner (1965), and Mossin (1966) the Capital Asset Pricing Model (CAPM) derives from abovementioned Markowitz's (1952) portfolio theory and is used to calculate the expected return of an investment in relation to its risk. In CAPM, investors create

only ”mean-variance-efficient” portfolios by utilizing Markowitz’s theory, which includes many assumptions about investors and markets that in reality do not come to fruition.

The following fundamental assumptions of Markowitz (1952) are the starting point of his theory. Firstly, all investors are rational risk-aversers, who utilize the portfolio theory and having the only goal of maximizing profit with correct diversification and choosing investments depending on the rate of returns which relates to level of risk. Also, the investors have the same horizontal period for their investments, which is assumed to be a long one. There are no transaction costs or taxes limiting the purchasing or selling investments and inflation affecting interest rates and investors can buy any investments with low prices, because all the securities are liquid and can be divided into small parts. Shorting is allowed, (since all trade is done publicly, assets are in public holding and information about the capital markets is in public distribution and available.) Individual investors’ decisions on selling or buying in the capital markets do not affect the prices, since the markets are in equilibrium. (Elbannan 2015)

Sharpe (1964) and Lintner (1965) add two more assumptions to the model which are key factors in CAPM: all investors have a shared expectation on returns and risk of the investment with a similar horizontal period and all investors can have risk-free rate borrowings or lendings without restrictions (Elbannan 2015). Their core assumptions lean on the perfectly competitive outcome and efficient markets and portfolios, which do not correspond the real-life situation. In addition, Roll’s critique (1977) argues that CAPM does not create a fully diversified portfolio with only holding stocks and comparing them to the most famous index S&P 500, when diversified portfolio should include additionally other assets and have vaster geographical diversification outside the United States.

Taking these assumptions into account, the CAPM calculates the expected rate of return on an investment in a very simplified way, which is commonly used in the pricing of securities. The CAPM creates a rate of return on the risk-free interest rate and a market risk premium, which consists of the ratio of the beta factor to the difference between the market portfolio and the risk-free interest rate. When effectively diversified portfolios collectively create an efficient market portfolio, the security does not bear unsystematic risk. If the beta is exactly one, the rate of return is the same as the market portfolio, so no anomaly is detected, and pricing is in line with the average market level. If the beta is higher than one, the investment is riskier than the market average and is above the SML. In contrary, if the beta is lower than one, it means that the security

bears a lower risk than the market portfolio and is below the SML. (Cvitanic, Zapatero 2004, 409-432)

The CAPM only considers the systematic risk of beta factor, which describes the risk of an individual investment to the average risk in the market by placing it in the security market line (SML) (Sharpe 1964).

Jensen's alpha (Jensen 1968) is utilized to determine the actual pricing of the CAPM, which is obtained by distinguishing between the expected return on the CAPM and the actual return on the security. If the alpha value is positive, then the security is underpriced and the rate of return exceeds expectations. In turn, a negative Jensen alpha refers to an overpriced security when compared to the risk an investor has taken to obtain a return on his investment. The study later introduces Jensen's alpha in more detail.

1.4. Efficient market theory

According to the efficient market hypothesis, the prices of securities should immediately and wholly reflect all available information. With total efficiency, the prices of securities change only as new information enters the market. When the market works efficiently, investments are automatically directed to the securities which offer the best risk-return ratio. Thus, randomness improves market efficiency and availability of information puts investors in an equal setting. As all relevant information is available to investors and included in the price of the securities, excess returns through the advantage of information are not possible. The condition for realising the hypothesis is that all relevant information is free and available to all investors. In addition, investors must have similar expectations of the future returns of securities and there must be no transaction costs in the market. (Fama 1970)

One requirement for efficient market theory is that all investors act rationally, all though that is impossible. Previous stock market bubbles like the "internet bubble" at the end of the 1990s showed that investors overvalued high-tech companies' stock prices at that time. Malkiel (2003) noted that some investors will make mistakes in stock selections as long as stock markets exist.

Fama (1970) divides efficient markets into three groups that are weak, semi-strong, and strong. In a weak market, security prices contain all past market trading information. Therefore, excess returns cannot be achieved by analysing historical market data. In a semi-strong market, all new relevant published information is reflected immediately in security prices. Therefore, excess returns cannot be achieved by a fundamental analysis of the securities. In a strong market, all existing information is reflected in security prices. Thus, excess returns cannot be achieved in theory or practice. In semi-strong and strong efficiency markets, actively managed funds would not be able to beat the market as all published information is available and reflected in stock prices. In such environment, fund managers should try to follow the market index as closely and cost-efficiently as possible.

1.5. Historical performance of equity funds

A lot of research has been done in the past on the performance of equity funds. However, researchers have not been able to find common ground on whether an active fund is a better option than a passive fund. Findings have been supporting both active and passive funds.

Otten and Bams (2002) studied performance of 506 equity funds from UK, Germany, France, Italy, and Netherlands between 1991-1998. Findings suggested that small cap funds tended to have positive alphas even after costs. Thus, leading to excess returns of the fund. In addition, passive and other active funds mostly managed to produce positive risk-adjusted returns to investors. Otten and Reijnders (2012) measured the performance of small cap in UK from 1992 to 2011. Findings supported Otten and Bams (2002) argument that small cap funds are able to generate net excess returns. Moreover, small cap fund managers were able to successfully time the market with stock selections (Otten, Reijnders 2012).

Malkiel (1995) studied equity funds performance in U.S from 1971 to 1991. He noticed that those funds that were still among the best performing funds in the 1970s had fallen among the least successful in the 1980s. According to him, this confirms that active funds are unable to maintain long-term returns in excess of the index. Furthermore, in general, active funds were not able to gain excess returns of the index after cost and before cost deductions. Therefore, investors might prefer passive funds as active management fails to produce excess returns.

Wermers (2000) compared equity fund performance between 1975-1994 in U.S. market. In his study equity funds outperformed board market index by 1.3 percent on average before costs. However, after deducting costs, funds underperformed the market index by one percent on average. Underperformance was partly explained by funds' non-stock holdings of fixed assets. One of the main findings was that high-turnover funds managed to outperform benchmark index and significantly low-turnover funds. Even though high-turnover funds' cost adjusted returns underperformed their benchmark, management showcased skill to create excess value before costs.

According to Bogle's (2004) research, around 95 percent of actively managed were not able to beat their benchmark index in long term. The research compared selected U.S. equity funds returns against Wilshire 5000 index between 1983 and 1998. Only every sixth active fund managed to generate higher returns than the index used in the study. Bogle compared gross returns of the funds which are favourable for active funds.

Petäjistö (2013) studied 2740 equity funds' activity and performance between 1980-2009. During the financial crisis in 2008 equity funds were affected heavily but managed to recover well in the following year. On average actively managed funds underperformed their benchmark indices. However, the most active funds were able to outperform their benchmark indices by 1.26 percent on average after costs. Hence, most active fund managers were able to produce excess value for investors. Therefore, he suggested either selecting the most active funds or index funds. Active funds that were not able to outperform their indices tended to be a less profitable option than their passive counterparts.

European equity funds average gross returns were 11.0 percent in 2010-2019 time period. A year before ten-year average gross returns were 9.0 percent and between 2008-2017 only 5.3 percent. Active funds had higher average gross returns than passive funds (excluding ETFs) in ten year period in 2018 and 2019 outperforming them by 0.8 and 0.4 percentage points, respectively. However, passive funds performed better in one year period. In 2019 passive funds generated gross returns of 12.2 percentages on average and active funds 10.6 percentage. When compared to top-performing funds active funds had greater potential, generating higher gross returns than passive funds on average in one, three, seven and ten year periods. On the other hand, the downside was smaller for the worst-performing passive funds than active funds. The top-performing 25 percent of the active funds managed to outperform their indices in one year and ten year period. However,

active funds always underperformed their benchmark indices after costs. Finnish equity funds were among seven top-performing countries. (ESMA 2021)

2. DATA AND METHODOLOGY

This chapter first describes chosen funds which have been divided into three groups based on their characteristics and were studied individually in a group over two time periods. Following the overview of the funds and benchmark indices, performance measurements used in the study are presented.

2.1. Sample

Focus of the research was geographically limited; selected funds invested majority of the fund capital in the Finnish stock market. Fund selection process was carried out in Morningstar fund screener and only funds that appeared in "Finland stocks" filter were considered. Funds' country of registration did not influence the selection process. However, only one fund was registered outside of Finland. In addition, funds have had to be active from the beginning of the whole study period until the end of it. The author selected unit types of funds that do not distribute dividends but reinvest all income to the fund. Therefore, possible dividends of the fund's holdings increase the unit price. In total 18 equity funds were selected for the study. 15 of those were actively managed funds and only three passive index funds. Five of the active funds mainly invest their assets in listed small and medium cap stocks. The rest of the active funds invest their assets mainly in large and medium-sized stocks. Selected passive funds invest mainly in large cap stocks. Funds were divided into three groups: actively managed funds were seperated into two groups small cap funds and mid cap funds based on their Morningstar style box size raiting, and passively managed funds formed their own group passive funds regardless of previously mentioned rating. Selected funds were studied individually and in groups. In the Morningstar style box, funds are grouped on vertical axis by its stock holdings market capitalization in proportion to its weight in the fund. Large cap stocks cover the highest 70 percent by market capitalization, mid cap stocks the following 20 percent, and small cap stocks the rest. Groups for Finnish stocks are determined by comparing their market capitalization at a European wide level (Morningstar 2018). Nasdaq's definition provides a more detailed reference to the size class of the stocks invested by the funds. Companies with a market value of less than EUR 150 million belong to the small cap group,

companies with less than EUR 1,000 million belong to the mid cap group and those exceeding 1,000 million belong to large cap group (Nasdaq 2017). Only one fund, passively managed index fund Nordnet Indeksirahasto Suomi belonged to large cap group and the other two passive funds were in the mid cap group. By size category sample contains five small cap funds, 12 mid cap funds, and one large cap fund.

Appendix 1, shows basic information about the selected small cap, mid cap and index funds. Small cap funds are Aktia Mikro Markka A, Evli Suomi Pienyhtiöt B, OP-Suomi Pienyhtiöt A, Säästöpankki Pienyhtiöt B, and SEB Finaland Small Cap B. These funds invest in small and medium cap stocks and aim to produce higher returns than their benchmark index with active stock selection. The largest small cap fund was SEB Finaland Small Cap B with a fund size of EUR 1509.63 million and the smallest was Aktia Mikro Markka A with a fund size of EUR 96.98 million. Mid cap funds are Aktia Capital B, Danske Invest Suomi Osake K, eQ Suomi 1 K, Evli Suomi Select B, Fondita Equity Spice B, Nordea Finnish Stars Fund A Growth, Nordea Pro Suomi K, OP-Suomi A, S-Pankki Fenno Osake A, and Säästöpankki Kotimaa B. These funds invest mainly in mid cap and large cap listed stocks in Finland and aim to produce higher returns than their benchmark index with active stock selection. The largest mid cap fund was OP-Suomi A with a fund size of EUR 948.02 million and the smallest was Fondita Equity Spice B with a fund size of EUR 19.16 million. Passive funds are Nordea Suomi Passiivinen B, Nordnet Indeksirahasto Suomi, and Seligson & Co Suomi Indeksirahasto A. These funds aim to replicate their benchmark index returns and adjustments are made only few times per year. These funds mainly invest in large cap and mid cap stocks. The largest passive fund was Nordnet Indeksirahasto Suomi with a fund size of EUR 540.27 million and the smallest was Seligson & Co Suomi Indeksirahasto A with a fund size of EUR 172.82 million. The oldest fund in the sample was Danske Invest Suomi Osake K which was incepted on 15.10.1987 and the newest was SEB Finland Small Cap B incepted on 17.6.2014. Nordnet Indeksirahasto Suomi is registered in Sweden and it was the only found registered outside of Finland. However, it is available for Finnish investors hence it is equally comparable with the other funds.

Two time periods were chosen for the study. The first period 31.1.2015-31.12.2019 represents the time before the pandemic. The second period 31.1.2020-31.12.2021 represents the time during the pandemic. All funds were established before the year 2015, hence, funds can be compared within the study period. Funds were valued on the last day of each month and data were gathered from the Thomas Reuters DataStream service. In order to calculate the first period’s first month's

returns, the last values of the year 2014 of the funds were obtained as well. Second period's first month's returns for the funds were calculated from the previous year's last value.
Two benchmark indices OMX Helsinki Cap Growth Index (OMXHCAPG) and OMX Helsinki Small Cap Growth Index (OMXHSCGI) were selected for the study. Growth indices include possible stock dividends and therefore reflect better overall stock market development. OMX Helsinki Cap Growth Index is used as a benchmark for mid cap and index funds. It includes all the shares listed in Helsinki stock exchange (Nasdaq 2022a). Thus, it reflects overall stock market development in Finland. OMX Helsinki Small Cap Growth index is used as benchmark for small cap funds. It includes all small cap stock listed in Helsinki stock exchange (Nasdaq 2022b). Data of the benchmark indices were obtained from the Thomson Reuters Datastream service from the same time periods as funds and returns for both time periods were calculated in the exactly same manner.

As risk-free return 1-month Euribor rate was chosen. Euribor is a measure of the interest rate at which European banks can obtain euro-denominated funding on the money market without the use of collateral (Bank of Finland, 2022b). 1-month Euribor rates were obtained from the last day of each month between 31.01.2015-31.12.2021 from the Thomson Reuters Datastream service.

Appendix 2, provides a table of descriptive statistics of the sample funds, benchmarks, and risk-free rate. Values were calculated from the monthly returns. In the first period, there are 60 observations for each value and in the second period, there are 24 observations for each value. The sample appears to be skewed to the left as the median values tend to be higher than the mean values in both periods. Monthly mean returns are higher in the second period, but less evenly distributed hence higher variance between the monthly returns. The only exception to the previously mentioned trend in the sample is the risk-free rate which had a lower mean value in the second period and the monthly returns were more evenly distributed. Aktia Mikro Markka A had the highest monthly mean returns in the first period (1.53%) and in the second period (2.66%). Fondita Equity Spice B had the lowest monthly mean returns in the first period (0.63%) and Seligson & Co Suomi Indeksirahasto A in the second period (1.35%). Säästöpankki Pienyhtiöt B had the highest single month return (11.43%) and the lowest (-12.91%) in the first period. In the second period, Aktia Mikro Markka A had the highest single month return (14.93%) and OP-Suomi Pienyhtiöt A the lowest (11.06%). All of the funds had positive mean monthly returns and negative lowest single month returns in both periods.

2.2. Methods

Simple performance measuring methods used in this paper were logarithmic returns and volatility. Followed by risk-adjusted performance measures Sharpe ratio, Treynor ratio and Jensen's alpha.

Logarithmic returns were used due to likelihood of calculations being more normally distributed (Strong 1992). Funds' and benchmark indices' monthly returns were calculated as continuously compounded returns. This is calculated by using logarithmic returns, see formula 1, (Benninga 2014, 198).

$$r_t = ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

where
r_t – monthly return in period t,
P_t – price in period t,
$P_{t\text{-}1}$ – price in period t -1.

Annual returns were calculated from the monthly returns within the periods by adding 1 to each monthly return, multiplying these values, annualized by raising the value to the power of 1 / years in period, and subtracting 1.

Volatility is the simply way to describe the risk of an investment. It shows how much the return on an investment over a period differs from the mean return over the period also known as standard deviation. Volatility for the funds and benchmark indices were also calculated from the monthly logarithmic returns and are shown in annualized form. Annual volatility is calculated as the standard deviation of monthly returns and then multiplied with the square root of 12 (Benninga 2014, 219).

Sharpe (1966) is the developer of the widely used performance measurement Sharpe ratio. The ratio measures a fund's risk-adjusted returns using standard deviation. Sharpe ratio measures both systematic and unsystematic risk. A higher Sharpe ratio indicates portfolio's higher returns to the relative risk taken. A higher value of standard deviation indicates higher level of risk. Sharpe ratio was calculated by formula 2, (Brentani 2004, 42-43).

$$Sharpe\ ratio = \frac{r_p - r_f}{\sigma_p} \quad (2)$$

where
r_p – return of the portfolio,
r_f – risk-free return,
σ_p – standard deviation of the portfolio return.

Treynor (1965) is the devoleper of widley used performance measurement Treynor ratio which is based on the CAPM. Treynor ratio is calculated by dividing the portfolio's excess return by the portfolio's beta. It compares the return to the market risk, a higher value of the ratio better the portfolio has performed. Treynor and Sharpe ratio are similar, however, Treynor ratio takes only systematic risk into account. Treynor ratio was calclulated by formula 3, (Brentani 2004, 43).

$$Treynor\ ratio = \frac{r_p - r_f}{\beta_p} \tag{3}$$

where
r_p – return of the portfolio,
r_f – risk-free return,
β_p – CAPM beta of the portfolio.

CAPM beta of the portfolio is the slope of the regression equation of portfolio excess returns and benchmark excess returns. It can be calculated also by dividing the covariance of excess returns of the portfolio and benchmark by the variance of the benchmark's excess returns (Vinod, Reagle 2004, 39-44).

Jensen (1968) is the developer Jensen's alpha measure which is also based on CAPM. It describes the success of a portfolio compared to the risk it contains. Alpha measures the difference between the actual and expected return of the portfolio. The portfolio has outperformed expectations when the alpha is positive. Jensen's alpha can be calculated by formula 4, (Schneider 2010, 8-9).

$$\alpha = r_p - \left(r_f + \beta_p\left(r_m - r_f\right)\right) \tag{4}$$

where
r_p – return of the portfolio,
r_f – risk-free return,
β_p – beta of the portfolio,
r_m – return of the bencmark index.

In this paper alpha is obtained from the regression equation used to determine beta. Alpha is the intercept of the regression equation (Vinod, Reagle 2004, 50-51).

3. EMPIRICAL FINDINGS AND DISCUSSION

This chapter presents the empirical results of the study. First equity funds performance is measured by using fairly simple indicators such as annual return and volatility. Following risk-adjusted measurement methods Sharpe ratio, Treynor ratio and Jensen's alpha. Risk-adjusted measures were calculated from monthly data and shown as monthly values. Findings will be displayed in two time periods, 2015-2019 representing the time before the COVID-19 pandemic and 2020-2021 representing the time during the pandemic. All values representing the groups as a whole are arithmetic mean values of the individual funds' values displayed in the tables. The chapter will finish with a discussion of the findings.

3.1. Returns and volatility

Table 1, provides information of the funds' and indices' annual returns and annual volatilities between 2015-2019 and 2020-2021. From henceforth author shall refer to these time periods as pre-pandemic and pandemic, respectively.

Aktia Mikro Markka A had the highest returns during both time periods. Fund's pre-pandemic average annual return was 18.67 percent, and it outperformed its benchmark index OMXSCGI by 0.92 percentage points. Fund's average annual return was 32.78 percent during the pandemic which was 1.85 percentage points higher than its benchmark index. Fondita Equity Spice B had the lowest pre-pandemic average annual return which was 6.88 percent. During the pandemic Nordea Pro Suomi K had the lowest average annual return of 14.53 percent.

On average small cap funds had the highest returns during the both time periods. However, Aktia Mikro Markka A was the only small cap fund to outperform the benchmark index during either time period. Mid cap funds had the lowest pre-pandemic returns. Among mid cap funds eQ Suomi 1 K performed the best and managed to outperform its benchmark index OMXHCAPGI. The fund generated 0.55 percentage points higher average annual returns than its benchmark index. However, six of the ten mid cap funds managed to outperform the benchmark index during the

pandemic and on average mid cap funds had 0.61 percentage points higher returns than the benchmark index. On average mid cap funds annual returns more than doubled during the pandemic compared to the pre-pandemic period. Surprisingly two of three passive funds managed to outperform the benchmark index OMXHCAPGI during the pre-pandemic period. In theory passive funds should not be able to outperform benchmark index. That can be explained by the chosen benchmark for passive funds in this study as it is not the benchmark these funds are following. However, during the pandemic passive funds had the lowest average annual returns of 15.18 percent and remained 2.60 percentage points below the benchmark index. Overall five out of 18 funds managed to outperform their benchmark index during the pre-pandemic, seven during the pandemic, and three during both periods.

Table 1. Annual returns and volatilities of the funds and indices.

Fund	Returns p.a	Volatility p.a	Returns p.a	Volatility p.a
	2015-2019		2020-2021	
Small cap	14.48 %	14.80 %	27.53 %	23.94 %
Aktia Mikro Markka A	18.67 %	15.02 %	32.78 %	25.44 %
Evli Suomi Pienyhtiöt B	14.43 %	14.53 %	28.61 %	24.48 %
OP-Suomi Pienyhtiöt A	10.54 %	15.00 %	22.96 %	23.67 %
Säästöpankki Pienyhtiöt B	13.13 %	15.29 %	28.57 %	24.39 %
SEB Finland Small Cap B	15.62 %	14.17 %	24.74 %	21.74 %
Mid cap	8.46 %	13.12 %	18.39 %	22.88 %
Aktia Capital B	7.95 %	13.93 %	21.34 %	21.89 %
Danske Invest Suomi Osake K	7.04 %	12.90 %	15.32 %	23.71 %
eQ Suomi 1 K	10.74 %	13.31 %	19.54 %	23.94 %
Evli Suomi Select B	10.25 %	11.77 %	18.52 %	22.59 %
Fondita Equity Spice B	6.88 %	13.78 %	19.55 %	22.26 %
Nordea Finnish Stars Fund A Growth	9.04 %	12.67 %	18.91 %	23.68 %
Nordea Pro Suomi K	9.29 %	12.83 %	14.53 %	22.77 %
OP-Suomi A	8.44 %	14.08 %	15.90 %	21.42 %
S-Pankki Fenno Osake A	7.15 %	12.49 %	23.25 %	23.17 %
Säästöpankki Kotimaa B	7.78 %	13.46 %	17.05 %	23.37 %
Passive	10.25 %	13.54 %	15.18 %	21.48 %
Nordea Suomi Passiivinen B	9.68 %	13.20 %	14.78 %	21.99 %
Nordnet Indeksirahasto Suomi	10.58 %	13.59 %	16.17 %	20.24 %
Seligson & Co Suomi Indeksirahasto A	10.48 %	13.84 %	14.59 %	22.23 %
Index				
OMXHCAPGI	10.19 %	12.90 %	17.78 %	20.44 %
OMXHSCGI	17.75 %	14.82 %	30.93 %	25.20 %

Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

During pre-pandemic Säästöpankki Pienyhtiöt B had the highest average annual volatility (15.29%) and Evli Suomi Select B had the lowest (11.77%). On average small cap funds were the most volatile funds (14.80%) and mid cap funds the least volatile (13.12%). 13 of the 18 funds had higher volatility than their benchmark index and the ratio stayed the same during the pandemic. During the pandemic Aktia Mikro Markka A was the most volatile fund (25.44%) and Nordnet Indeksirahasto Suomi was the least volatile fund (20.24%). During the pandemic small cap funds were the most volatile funds on average (23.94%) and passive funds were the least volatile funds on average (21.48%). Thus, on average small cap funds returns deviated the most from the funds' mean returns.

OMXCAPGI can be seen as the market index for the Finnish stock market. Thus, small cap funds have generally outperformed the market pre-pandemic and during the pandemic. However, costs have not been deducted from the average annual returns. Hence, net returns are closer to the market index or below.

3.2. Risk-adjusted performances

Sharpe's ratio measures how much risk the fund has had to take to gain excess return relative to risk. Hence, a higher Sharpe ratio indicates a better return on risk for the investment. Table 2, Sharpe ratios were first calculated by finding the excess return, which is the difference between the monthly return and the risk-free return (1-month Euribor). Then monthly Sharpe ratios were obtained by dividing excess returns of the funds by the standard deviation of excess returns. Sharpe ratios are based on the monthly logarithmic returns.

Small cap funds stood out as well in Sharpe ratio measurements. Aktia Mikro Markka A had the highest pre-pandemic Sharpe ratio at 0.421. SEB Finland Small Cap B and Säästöpankki Pienyhtiöt B, on the other hand, had the highest Sharpe ratio during the pandemic at 0.411. Overall small cap funds averaged highest ratios for the pre-pandemic period and performed better than the market in both periods, although they did not reach the level of their own benchmark. On average, passive funds' Sharpe ratio remained the same during the periods, although two out of the three passive funds' Sharpe decreased during the pandemic. Mid cap funds performed the worst before the pandemic as a group. Nevertheless, these funds improved the most on average when comparing Sharpe ratios before and during the pandemic.Three funds outperformermed their benchmark

index before the pandemic, two of those were mid cap funds. Only two funds outperformed their benchmark index during the pandemic, both were mid cap funds. 11 of the 18 funds improved performance during the pandemic. However, majority of the funds were not able to generate excess risk-adjusted returns

Table 2. Monthly Sharpe ratios.

Fund	Sharpe ratio	
	2015-2019	2020-2021
Small cap	0.359	0.400
Aktia Mikro Markka A	0.421	0.401
Evli Suomi Pienyhtiöt B	0.365	0.410
OP-Suomi Pienyhtiöt A	0.288	0.366
Säästöpankki Pienyhtiöt B	0.328	0.411
SEB Finland Small Cap B	0.394	0.411
Mid cap	0.282	0.328
Aktia Capital B	0.257	0.372
Danske Invest Suomi Osake K	0.255	0.287
eQ Suomi 1 K	0.323	0.329
Evli Suomi Select B	0.349	0.333
Fondita Equity Spice B	0.239	0.348
Nordea Finnish Stars Fund A Growth	0.301	0.325
Nordea Pro Suomi K	0.303	0.286
OP-Suomi A	0.264	0.317
S-Pankki Fenno Osake A	0.265	0.376
Säästöpankki Kotimaa B	0.261	0.308
Passive	0.308	0.308
Nordea Suomi Passiivinen B	0.304	0.297
Nordnet Indeksirahasto Suomi	0.314	0.335
Seligson & Co Suomi Indeksirahasto A	0.307	0.292
Index		
OMXHCAPGI	0.321	0.352
OMXHSCGI	0.416	0.421

Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

Treynor ratios were calculated by dividing monthly average exceed returns by the beta factor. Beta factors were calculated using a regression analysis of the excess monthly returns of the funds and the excess monthly returns of the benchmarks. Beta factors were calculated separately for both time periods and are shown in table 4.

In table 3, a higher Treynor ratio indicates better performance. Once again, small cap funds performed well and received the highest values and outperformed benchmark index in both periods on average. Aktia Mikro Markka A had the highest Treynor ratio for both periods. That can be explained by its relatively small beta and high excess returns compared to the funds in the sample. On the other hand, Danske Invest Suomi Osake K received the lowest Treynor ratio in both periods. As in the Sharpe ratio, passive funds had a higher pre-pandemic Treynor ratio on average than mid cap funds and still the lowest during the pandemic.

Table 3. Monthly Treynor ratios

Fund	Treynor ratio	
	2015-2019	2020-2021
Small cap	0.0183	0.0311
Aktia Mikro Markka A	0.0218	0.0330
Evli Suomi Pienyhtiöt B	0.0180	0.0312
OP-Suomi Pienyhtiöt A	0.0147	0.0279
Säästöpankki Pienyhtiöt B	0.0159	0.0312
SEB Finland Small Cap B	0.0212	0.0323
Mid cap	0.0110	0.0198
Aktia Capital B	0.0103	0.0227
Danske Invest Suomi Osake K	0.0098	0.0171
eQ Suomi 1 K	0.0124	0.0196
Evli Suomi Select B	0.0132	0.0201
Fondita Equity Spice B	0.0103	0.0215
Nordea Finnish Stars Fund A Growth	0.0115	0.0197
Nordea Pro Suomi K	0.0115	0.0172
OP-Suomi A	0.0103	0.0190
S-Pankki Fenno Osake A	0.0103	0.0228
Säästöpankki Kotimaa B	0.0100	0.0184
Passive	0.0116	0.0184
Nordea Suomi Passiivinen B	0.0114	0.0178
Nordnet Indeksirahasto Suomi	0.0118	0.0199
Seligson & Co Suomi Indeksirahasto A	0.0116	0.0175
Index		
OMXHCAPGI	0.0119	0.0208
OMXHSCGI	0.0177	0.0307

Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

All small cap funds and two mid cap funds had higher Treynor ratio than their benchmark index in pre-pandemic period. During the pandemic four of the five small cap funds and three mid cap

funds had a higher Treynor ratio than their benchmark index. These three mid cap funds were different funds than the previously mentioned two in the pre-pandemic period.

In table 4, funds' Jensen's alpha, beta, and r-squared values are presented. Jensen's alphas were calculated using a regression analysis of the excess monthly returns of the funds and the excess monthly returns of the benchmarks. A positive Jensen's alpha indicates fund manager's ability to generate added value in excess of the market-based beta, while a negative one indicates a failure of the portfolio manager to do that.

Table 4. Monthly Jensen's alpha, beta, and r-squared values

Fund	Beta	Jensen's alpha	R2	Beta	Jensen's alpha	R2
	2015-2019			2020-2021		
Small cap	0.841	0.043 %	-	0.905	0.041 %	-
Aktia Mikro Markka A	0.844***	0.344 %	0.695	0.967***	0.225 %	0.919
Evli Suomi Pienyhtiöt B	0.848***	0.025 %	0.745	0.932***	0.046 %	0.920
OP-Suomi Pienyhtiöt A	0.849***	-0.261 %	0.700	0.897***	-0.245 %	0.912
Säästöpankki Pienyhtiöt B	0.905***	-0.162 %	0.769	0.929***	0.048 %	0.922
SEB Finland Small Cap B	0.759***	0.266 %	0.627	0.801***	0.129 %	0.863
Mid cap	0.970	-0.095 %	-	1.097	-0.112 %	-
Aktia Capital B	1.002***	-0.162 %	0.860	1.039***	0.193 %	0.942
Danske Invest Suomi Osake K	0.970***	-0.207 %*	0.942	1.148***	-0.422 %*	0.980
eQ Suomi 1 K	1.002***	0.044 %	0.945	1.162***	-0.141 %	0.985
Evli Suomi Select B	0.898***	0.116 %	0.968	1.081***	-0.071 %	0.956
Fondita Equity Spice B	0.922***	-0.153 %	0.748	1.041***	0.075 %	0.914
Nordea Finnish Stars Fund A Growth	0.955***	-0.038 %	0.945	1.126***	-0.118 %	0.947
Nordea Pro Suomi K	0.976***	-0.041 %	0.961	1.098***	-0.398 %	0.973
OP-Suomi A	1.043***	-0.172 %	0.915	1.033***	-0.186 %	0.973
S-Pankki Fenno Osake A	0.922***	-0.146 %	0.910	1.106***	0.218 %	0.953
Säästöpankki Kotimaa B	1.014***	-0.196 %	0.946	1.133***	-0.271 %	0.982
Passive	1.037	-0.032 %	-	1.041	-0.255 %	-
Nordea Suomi Passiivinen B	1.011***	-0.049 %	0.976	1.064***	-0.323 %	0.979
Nordnet Indeksirahasto Suomi	1.045***	-0.016 %	0.984	0.984***	-0.088 %	0.988
Seligson & Co Suomi Indeksirahasto A	1.054***	-0.033 %	0.965	1.074***	-0.353 %	0.976

Notes: * significant at 10% level ($p<0.1$);
** significant at 5% level ($p<0.05$);
*** significant at 1% level ($p<0.01$).
Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

During the pre-pandemic period, five of the 18 funds had positive alpha and three of those were small cap funds and the other two were mid cap funds. Mid cap funds that had a positive alpha in pre-pandemic had negative alpha during the pandemic. Four of the five small cap funds had positive alpha which indicates small cap funds' good performance during the pandemic as did the other risk-adjusted measures. Aktia Mikro Markka A had the highest alpha in pre-pandemic period and during the pandemic. OP-Suomi Pienyhtiöt A and Danske Invest Suomi Osake K had the lowest alphas in pre-pandemic and during the pandemic, respectively. Danske Invest Suomi Osake K was the only fund that had significant alpha at a risk level of 0.1.

All beta values were statistically significant at a risk level of 0.01 in both periods. P-values of the alphas and betas are in appendix 3. Beta values higher than 1 indicate that fund is more volatile than its benchmark. Beta lower than 1 indicates that the benchmark is exposed to greater volatility than the funds. Small cap funds had the lowest beta values in both periods, and none of the beta values exceeded 1 in the group. Passive funds had the highest beta in pre-pandemic period, though, mid cap funds during the pandemic. R-squared also known as coefficient determination, expresses variation of the fund returns which can be explained by the benchmark returns. Value closer to 1 indicates a stronger correlation between the fund's and benchmark's returns. Passive funds had the highest r-squared in both periods, which is explained by index funds aim to replicate their benchmark's returns. In the pre-pandemic period mid cap and passive fund's r-squared values were between 0.860 and 0.984. Small cap funds correlated less having values between 0.627 and 0.745. During the pandemic, all funds strongly correlated with their benchmark index, with values between 0.863 and 0.988.

3.3. Discussion

Small cap funds outperformed their peers in every observation performance measure, on average, except in volatility where the highest value necessary does not mean superiority. When comparing to the annual returns, the weakest performing small cap fund had higher returns in both periods than funds representing the other groups, except for two. It is noteworthy to notice that these small cap funds were by far the most volatile before the pandemic. Market uncertainty has generally increased the volatility of the returns which partly explains the vast growth of the funds' volatility during the second observation period.

As a whole, studied equity funds improved their performance during the pandemic on average. Mean and median values increased for the annual returns, Sharpe ratio, and Treynor ratio. The only risk-adjusted performance measure that did not develop positively was Jensen's alpha. Moreover, small cap funds were the only ones to receive positive alpha in either period. These funds had historically generated positive returns and improved their risk-adjusted performance during the pandemic. That is an important finding for the study as we wanted to find out the pandemic's effect on these funds focusing on Finnish equity markets. Weaker alpha values of the funds can be partly explained by the funds' underperformance compared to their benchmark indices.

Of all the funds, Aktia Mikro Markka A stood out. In terms of annual returns, Aktia Mikro Markka A had generated the highest returns before costs in both periods and outperformed its benchmark index. Remarkably it had increased annual returns from the pre-pandemic level of 18.67 percent to 32.78 percent during the pandemic. It also had the highest Sharpe ratio, Treynor ratio, and Jensen's alpha in both observation periods. However, Aktia Mikro Markka A had a lower Sharpe ratio and alpha in the pandemic period than in the pre-pandemic period. Notably, it managed to improve all risk-adjusted measures during the pandemic. Notable is that Aktia Capital B, Evli Suomi Pienyhtiöt B, Fondita Equity Spice B, SEB Finland Small Cap B, Säästöpankki Pienyhtiöt B, and S-Pankki Fenno Osake A managed to improve all three risk-adjusted performance measures during the pandemic.

OMXHCAPGI was determined as the benchmark index for the mid cap and passive funds. In addition, it was set as a market index to represent overall stock market development in Finland. Therefore, small cap funds managed to outperform the market index in terms of returns and risk-adjusted measures.

Finding resembles Otten and Bams (2002) argument of small cap funds' ability to outperform other mutual funds. Banz (1981) research concluded that small cap stocks tended to have higher risk-adjusted performance than mid cap and large cap stocks. This paper's findings follow the same trend. The risk-adjusted returns of mid cap and passive funds were closer to each other and the small cap funds were outliers in the sense that they stood out from the others with higher risk-adjusted returns. Fahling *et al.* (2020) showed that European small cap index had greater returns and Sharpe ratio than its comparable large cap index during the 12 year research period. However, as this paper does not focus on large cap funds, a direct comparison cannot be made. Nevertheless,

these previous findings highlight better performance of small cap stocks than similar larger ones. Small cap stocks outperforming their large cap peers phenom is known as small cap anomaly. In author's opinion, paper's findings support small cap funds ability to outperform their larger peers in Finland. Hence, inefficiency in evaluating small cap stocks appears in the Finnish stock market.

COVID-19 pandemics effects were short-lived in terms of funds returns. Author noticed remarkable drops in retunrs in February and March 2020 as well in September 2021. First two negative returns can be explained by the market crash. Author suspects that the last drop occurred partly due to state administrative agency's decision to enter stricter COVID-19 restrictions into force (STT 2021). Funds' increased returns during the pandemic might be reasoned with monetary policy adjustments, especially lower interest rates (Avalos, Dora 2020) and households' increased demand for savings (André 2021). Both lower interest rate and increase in stock market participation occurred in Finland during the pandemic. Therefore, author believes these factors explain funds' improved performance but not completely.

Paper's findings provide an overview of equity funds investing in Finnish stocks between different periods and might help investors to choose profitable funds. Investors should consider actively and passively managed funds as differences in returns were observed. Small cap funds have been able to generate highest yields for investors in both periods and therefore these might be an attractive option. Findings also clarify best performing funds in terms of return and risk-adjusted performance. However, historical returns do not denote similar performance in the future and should be used only as indicative information. In addition, the findings were limited as only 18 funds were included in this paper.

CONCLUSION

The aim of the study was to find the performance of equity funds in Finland during the COVID-19 pandemic and its impact on the funds. In total 18 equity funds were selected for the study and these funds were divided into three groups based on their characteristics. Actively managed funds formed small cap and mid cap fund groups, and passively managed funds represented passive fund group. Fund performance was studied in two time periods 2015-2019 and 2020-2021. First period representing historical performance of the funds and the before COVID-19 pandemic, second time period represent time during the pandemic. Funds' performance was evaluated with returns, volatility and with risk-adjusted measures that were Sharpe ratio, Treyonor ratio and Jensen's alpha.

Main findings highlighted small cap funds outperforming mid cap and passive funds. Pandemic did not have long lasting negative impact on the funds as the performance measures in two year pandemic study period indicated stronger performance of all funds compared to pre-pandemic period.

On average actively managed funds produced higer annual returns before costs than passive funds during the pandemic. Mid cap funds retunrs developed notably from pre-pandemic being the worst of the three groups to pandemic time period where they had doubled annual returns on average. However, small cap funds had the higest returns, though they still underperformed when compared to benchmark index. Funds that had the highest returns also were the most volatile.

Risk-adjusted performance measures indicated that small cap funds performed the best. However, Sharpe ratio decreased from the pre-pandemic level for the the small cap funds during the pandemic. In turn, mid cap funds had improved their performance the most between the time periods according to the indicators.

Small cap fund Aktia Mikro Markka A stood out individually and produced the highest annual returns and risk-adjusted returns of the funds in both time periods. It astonishingly averaged 32.78 percent returns before costs for the two-year review period of the pandemic.

Limitations of the study are connected with the chosen sample, methods and data. The number of equity funds investing mainly in Finnish stocks was small. Therefore, only 18 funds were included in the study and just three represented passively managed funds. Chosen methods describe only the returns, volatility and risk-adjusted returns before the management fees of the fund. Hence, funds' performance is smaller after deducting costs, and the difference between actively and passively managed funds is likely smaller. Obtained data consisted monthly values which limited the number of observations. Therefore, findings should be used only as estimates that provide information on the covered time periods and not as strong conclusions in general.

The author suggests further research on the topic that could include activity measures like tracking error and active share in order to determine if, and to what extent active management created value. In addition, sample size could be increased by adding funds from other countries with similar characteristics, for example, study equity funds investing in domestic stocks in Nordic countries. Furthermore, examine relationships between the fund groups. Future research could use more advanced risk-adjusted performance method like Fama-French three-factor model which adds market capitalization and book to market factors into CAPM.

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APPENDICES

Appendix 1. Basic information of the funds

Fund	Fund size (MEUR) 31.3.2022	ISIN	Inception date	Size category
Aktia Capital B	394.67	FI0008801071	15.5.1992	mid cap
Aktia Mikro Markka A	96.98	FI4000072780	2.12.2013	small cap
Danske Invest Suomi Osake K	278.14	FI0008803101	15.10.1987	mid cap
eQ Suomi 1 K	72.43	FI0008812169	13.6.2007	mid cap
Evli Suomi Pienyhtiöt B	362.95	FI0008804422	4.12.1992	small cap
Evli Suomi Select B	295.82	FI0008800107	16.10.1989	mid cap
Fondita Equity Spice B	19.16	FI0008802855	7.4.1997	mid cap
Nordea Finnish Stars Fund A Growth	364.99	FI0008800016	15.5.1992	mid cap
Nordea Pro Suomi K	538.29	FI0008800362	6.6.1994	mid cap
Nordea Suomi Passiivinen B EUR K	223.16	FI4000010533	28.1.2002	mid cap
Nordnet Indeksirahasto Suomi	540.27	SE0005993102	13.5.2003	large cap
OP-Suomi A	948.02	FI0008800206	1.3.2011	mid cap
OP-Suomi Pienyhtiöt A	290.92	FI0008805403	20.4.1994	small cap
S-Pankki Fenno Osake A	222.09	FI0008800339	17.8.1998	mid cap
Säästöpankki Kotimaa B	42.40	FI0008806625	10.3.1993	mid cap
Säästöpankki Pienyhtiöt B	228.95	FI4000014139	1.3.2010	small cap
SEB Finland Small Cap B	1509.63	FI0008802574	17.6.2014	small cap
Seligson & Co Suomi Indeksirahasto A	172.82	FI0008801758	1.4.1998	mid cap

Source: Morningstar (2022); compiled by the author

Appendix 2. Descriptive statistics of the sample

Object	Mean	Median	St. Dev.	Min	Max	N
	2015-2019					
Small cap						
Aktia Mikro Markka A	0.0153	0.0093	0.0433	-0.1034	0.10299	60
Evli Suomi Pienyhtiöt B	0.0122	0.0124	0.0420	-0.0867	0.09741	60
OP-Suomi Pienyhtiöt A	0.0093	0.0111	0.0433	-0.1108	0.09548	60
Säästöpankki Pienyhtiöt B	0.0113	0.0109	0.0441	-0.1219	0.11427	60
SEB Finland Small Cap B	0.0130	0.0045	0.0409	-0.0780	0.09455	60
Mid cap						
Aktia Capital B	0.0072	0.0087	0.0402	-0.1022	0.08726	60
Danske Invest Suomi Osake K	0.0064	0.0068	0.0372	-0.1001	0.08450	60
eQ Suomi 1 K	0.0093	0.0147	0.0384	-0.0961	0.09810	60
Evli Suomi Select B	0.0087	0.0095	0.0340	-0.0859	0.08481	60
Fondita Equity Spice B	0.0063	0.0059	0.0398	-0.1037	0.08743	60
Nordea Finnish Stars Fund A Growth	0.0079	0.0118	0.0366	-0.0864	0.08904	60
Nordea Pro Suomi K	0.0081	0.0146	0.0370	-0.0820	0.08654	60
OP-Suomi A	0.0076	0.0119	0.0406	-0.1160	0.09402	60
S-Pankki Fenno Osake A	0.0064	0.0126	0.0361	-0.0868	0.08255	60
Säästöpankki Kotimaa B	0.0070	0.0097	0.0389	-0.0965	0.08869	60
Passive						
Nordea Suomi Passiivinen B	0.0084	0.0124	0.0381	-0.0873	0.10459	60
Nordnet Indeksirahasto Suomi	0.0092	0.0117	0.0392	-0.0931	0.10443	60
Seligson & Co Suomi Indeksirahasto A	0.0091	0.0091	0.0400	-0.0906	0.10685	60
Index & risk-free rate						
OMXHCAPGI	0.0088	0.0094	0.0372	-0.0887	0.09139	60
OMXHSCGI	0.0146	0.0129	0.0428	-0.1100	0.12177	60
EURIBOR1MD	-0.0031	-0.0037	0.0012	-0.0046	0.00001	60
	2020-2021					
Small cap						
Aktia Mikro Markka A	0.0266	0.0409	0.0734	-0.1906	0.14930	24
Evli Suomi Pienyhtiöt B	0.0237	0.0351	0.0707	-0.1912	0.11817	24
OP-Suomi Pienyhtiöt A	0.0197	0.0251	0.0683	-0.1999	0.11062	24
Säästöpankki Pienyhtiöt B	0.0236	0.0350	0.0704	-0.1946	0.12478	24
SEB Finland Small Cap B	0.0205	0.0310	0.0628	-0.1465	0.11970	24
Mid cap						
Aktia Capital B	0.0182	0.0290	0.0632	-0.1599	0.12356	24
Danske Invest Suomi Osake K	0.0143	0.0194	0.0684	-0.2060	0.13713	24
eQ Suomi 1 K	0.0174	0.0297	0.0691	-0.2186	0.12454	24
Evli Suomi Select B	0.0164	0.0253	0.0652	-0.2086	0.11251	24

Appendix 2. Continued

Fondita Equity Spice B	0.0171	0.0306	0.0643	-0.1756	0.12241	24
Nordea Finnish Stars Fund A Growth	0.0169	0.0279	0.0683	-0.2074	0.14120	24
Nordea Pro Suomi K	0.0135	0.0160	0.0657	-0.1941	0.13659	24
OP-Suomi A	0.0143	0.0237	0.0618	-0.1945	0.11608	24
S-Pankki Fenno Osake A	0.0199	0.0271	0.0669	-0.2121	0.13519	24
Säästöpankki Kotimaa B	0.0155	0.0263	0.0675	-0.2081	0.11362	24
Passive						
Nordea Suomi Passiivinen B	0.0136	0.0183	0.0635	-0.1830	0.12943	24
Nordnet Indeksirahasto Suomi	0.0143	0.0162	0.0584	-0.1720	0.11272	24
Seligson & Co Suomi Indeksirahasto A	0.0135	0.0202	0.0642	-0.1892	0.12992	24
Index & risk-free rate						
OMXHCAPGI	0.0155	0.0243	0.0590	-0.1705	0.10930	24
OMXHSCGI	0.0253	0.0362	0.0728	-0.1836	0.12847	24
EURIBOR1MD	-0.0053	-0.0055	0.0004	-0.0058	-0.00423	24

Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

Appendix 3. P-values of alphas and betas

Fund	P-value (alpha)	P-value (beta)	P-value (alpha)	P-value (beta)
	2015-2019		2020-2021	
Small cap				
Aktia Mikro Markka A	0.310	1.35E-16	0.641	1.79E-13
Evli Suomi Pienyhtiöt B	0.933	7.31E-19	0.920	1.42E-13
OP-Suomi Pienyhtiöt A	0.439	8.65E-17	0.601	4.29E-13
Säästöpankki Pienyhtiöt B	0.589	4.08E-20	0.916	1.10E-13
SEB Finland Small Cap B	0.454	4.82E-14	0.809	5.72E-11
Mid cap				
Aktia Capital B	0.433	1.92E-26	0.573	4.26E-15
Danske Invest Suomi Osake K	0.097	1.46E-37	0.062	3.32E-20
eQ Suomi 1 K	0.723	3.64E-38	0.466	1.75E-21
Evli Suomi Select B	0.172	6.65E-45	0.818	1.96E-16
Fondita Equity Spice B	0.577	5.18E-19	0.860	3.45E-13
Nordea Finnish Stars Fund A Growth	0.749	2.92E-38	0.738	1.69E-15
Nordea Pro Suomi K	0.680	1.02E-42	0.111	9.47E-19
OP-Suomi A	0.293	1.02E-32	0.423	1.12E-18
S-Pankki Fenno Osake A	0.328	5.17E-32	0.505	4.12E-16
Säästöpankki Kotimaa B	0.118	1.88E-38	0.190	9.82E-21
Passive				
Nordea Suomi Passiivinen B	0.542	6.80E-49	0.129	6.46E-20
Nordnet Indeksirahasto Suomi	0.817	8.26E-54	0.537	8.84E-23
Seligson & Co Suomi Indeksirahasto A	0.750	5.48E-44	0.127	3.08E-19

Source: Author's calculations of data gathered from Thomson Reuters Datastream (2022)

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