

Johanna Marttila

## Investing in Mutual Funds:

A Study of the relationship between net subscriptions to Finnish registered equity funds and stock indices from 2008 to 2014

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<p>This research investigates the relationship between net subscriptions to Finnish equity funds in 2008-2014 and four chosen stock indices, when any other factors are not taken into account. To define the relationship, coefficient of correlation is used. To understand the concepts of fund investing, net subscription, correlation and investor behaviour, the literature review offer a closer look into the basic concepts and theories behind these.</p> <p>Mutual fund investing has become more popular in Finland which can be seen in increased investments to mutual funds. After the negative year of 2008, net subscriptions have been growing steadily reaching the peak of 8.6 billion euros of money invested in mutual funds in 2014.</p> <p>When people make their investment decisions, they do not always behave rationally. Finnish investors react easily to market changes and in fear of losing money they redeem money from funds, when prices start to drop and invest again only when prices start to rise. This does not allow investors to earn high revenues from their investments. Results of the analysis indicate that there is strong positive correlation between the net subscriptions and stock indices. This means, that net subscriptions follow the changes on stock markets, which also reflects the investor behaviour in Finland.</p>	
Keywords	fund investing, mutual fund, equity fund, stock index, net subscription, correlation, investor behaviour

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## **1 Introduction**

Fund investing has become more popular in Finland in recent years as it is an easy way to diversify even a small amount of money. The writer of this research works in a Finnish fund management company and the idea of this research started to take shape at work, when noticing that people tend to withdraw their money from funds when stock prices go down. The researcher became interested in looking further to see if there is some kind of relationship between money invested in funds and the stock markets. The researchers own expectation was that there exists a correlation between the money invested in funds and stock market value changes.

This research focuses on to finding evidence if there is a relationship between the money invested in funds and the value changes on the stock markets. More accurately the research investigates whether there is a correlation between net subscriptions to Finnish equity funds and a select number of relevant stock indices. This research also look at how the money invested in funds has been developing over the years. The time period of this research is from 2008 until the end of 2014. To understand the nature of basic concepts and terms, this research introduces the theory related to fund investing.

It is also interesting to see how the average investor behaves when he makes investment decisions. People tend to be careful, when it comes to investing their money and who wants to lose money? If the researcher's hypothesis proves to be correct and indeed investors are investing when prices are high and redeeming when prices are low, it is important to look at research into investor behaviour to better understand this peculiarity. Therefore this research introduces some theories about human behaviour in investing.

### **1.1 Objectives and scope of research**

The main goal of this study is to find out whether there is a correlation between the net subscriptions to equity funds and four specific stock indices. Equity funds invest in stocks and the value of equity funds is dependent upon stock prices. In this research we are investigating how well the net subscriptions correlate with stock index value

change; in other words when stock markets drop, do investors take their money out from equity funds and when stock markets go up, do investors invest more money in equity funds? It also takes a closer look at the net subscriptions, how they have developed over the years 2008-2014 and how big is the equity fund proportion from total net subscriptions to all mutual funds.

The stated research questions to are the following:

Is there a correlation between specific stock indices and net subscriptions to equity funds registered in Finland in the period of 2008-2014?

How have net subscriptions to equity funds developed over the years?

## 1.2 Research Structure

This thesis consists of five different chapters as seen in Figure 1. The first chapter is the introduction to the objectives and scope of this research. Literature review consists of theoretical introduction of the main objectives used in the analysis, to offer the basic knowledge to understand the results. Literature review is followed by research methodology and the results of the study. The results answer the stated research questions supported by evidence. The final part presents the conclusion and recommendations for further research.



Figure 1. Research structure

## 2 Literature Review

To understand the later analysis and results, this chapter introduces the main concepts and theories related the topic. To understand what net subscription is and why it is important to fund management companies, we need to understand the basics of fund investing, fund management companies and mutual fund. We also look at the chosen stock indices and the overall financial market situation in Finland during the years 2008-2014. To understand the results, the concept of correlation is explained as well. Finally, we look at the main theories related to how people behave when they make investment decisions and identify similar researches done on similar topics to this thesis.

### 2.1 Fund Investing

In fund investing, investors buy fund units from fund management company managing the fund and the gathered assets are re-invested. The investor can buy (subscribe to) or sell (redeem) the units on every banking day; however the fund rules determine if the fund diverges from this principle (FIN-FSA, 2014).

The Finnish Ministry of Finance accepted the Act on Common Funds in 1987 and the fund investing slowly started in Finland. Recession in 1990s slowed down investing in mutual funds, but it started to grow in the 2000s. In 2007 asset under management reached the current peak of almost 70 billion. In 2008 due the euro crisis, assets dropped rapidly by 40 billion euros followed by a slow recovery starting in 2009 (Puttonen and Repo 2010: 29). At the end of the year 2014 assets under management totalled 85.1 billion euro, a new all-time high (Investment Research Finland, 2015).

Investing in funds is a good option for anyone, also for investor with limited time, knowledge or interest to follow the stock markets all the time and make investment decisions. Investor may also consider fund investments when investing only a small amount of money. When investing in funds the investment is automatically diversified which reduces the risk of losing money. Fund investments are easy to liquidate, unlike some of the stocks and other money market instruments. An investor may leave the

decision making of investing the money to professionals and just follow the fund value online (Puttonen and Repo 2010: 19-28).

The most typical reason to use mutual funds is to accumulate wealth. Basically the investor uses mutual funds over a long time period to gain more investment capital with a modest level of risk. Investors may also seek a place to store their investment capital in a fairly secure place and yet still have a relatively good rate of return, until more attractive investment options appear. Most of the mutual funds are long-term in nature and therefore not meant to be used for active trading (Gitman, Joehnk and Smart, 2011).

### 2.1.1 Fund Management Company

A fund management company manages one or several funds, but does not own the money invested in the funds. A fund management company has its own assets separated from the fund assets and assets of the funds are given to a custodian to hold (Kivisaari and Puttonen 1997, 28). The company can also offer asset management services and investment advice as well as safekeeping and administration of shares in mutual funds and undertakings for collective investment in transferable securities (UCITS) (FIN-FSA, 2011).

Fund management companies are strictly controlled and supervised by Financial Supervisory Authority (FIN-FSA). FIN-FSA must recognize the company and in the application process, a company's key practises as well as internal guidelines and control are examined. Companies must also have the necessary financial strength to operate effectively (FIN-FSA, 2011).

According to the Act on Mutual Funds, fund management companies must submit their financial accounts to FIN-FSA and they also must supply financial data during the financial year. Annual and interim reports, fund prospectuses, details of change in company management as well as calculation errors must be submitted to FIN-FSA. FIN-FSA also ensures that investment limits are not exceeded by observing fund portfolios monthly (FIN-FSA, 2011).



### 2.1.2 Market Shares

In 2008 there were 29 fund management companies registered in Finland and the number has remained almost the same in past years. In 2014 20 out of 31 companies were the same as in 2008, just two of companies operated with changed name. Even the top three companies by market share have remained the same, Nordea Funds Oy having by far the largest market share (37.8 %) in 2014. Op-Rahastoyhtiö Oy had a market share of 20 % and Danske Invest Rahastoyhtiö Oy 12.7%. Only the five largest companies had more than a 5 % market share (FIN-FSA, 2015).

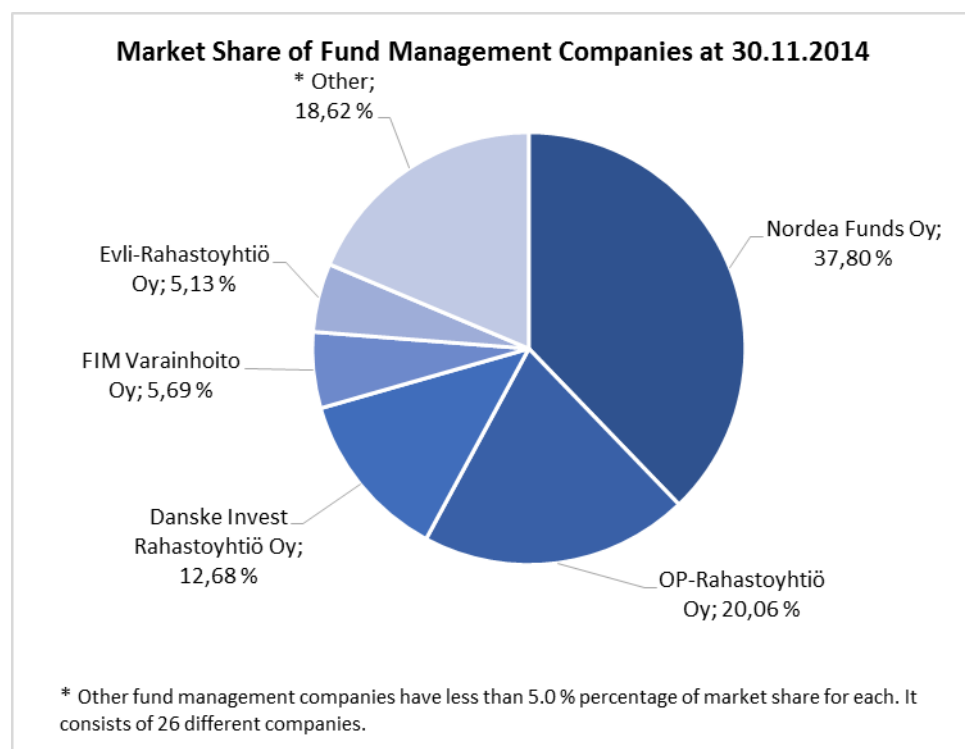


Figure 2. Market shares of fund management companies at 30.11.2014

As we can see from Figure 2 above there are a couple of big players in the field, but most of the companies have just small a piece of the market. Market share is based on the domestic- and foreign assets under management totalling 85.1 billion in November 2014 (FIN-FSA, 2015). In the Figure 3 below we can see the total assets of mutual funds divided between equity funds and other funds in 2008-2014

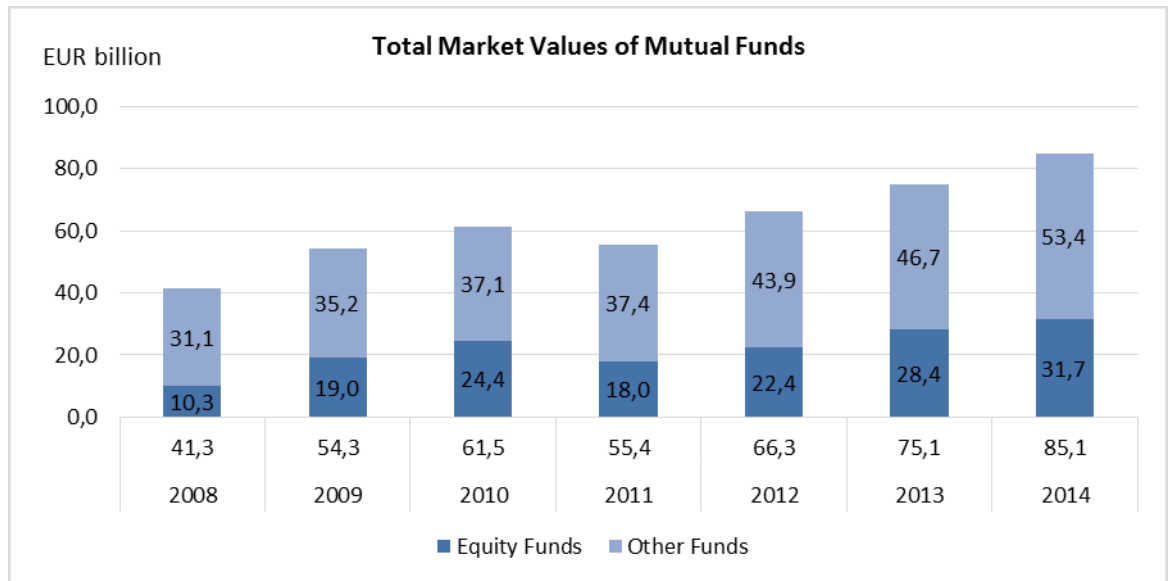


Figure 3. Total market values of mutual funds

## 2.2 Mutual Funds

Mutual funds operates so that investors invest their money in the fund and the money is re-invested into market securities. Fund is divided into shares, which each give an equal right to the fund assets (Kivisaari and Puttonen 1997, 27). Fund is managed by the fund management company and normally it has at least one portfolio manager who is responsible for investment decisions. Fund units can be divided into accumulation units and distribution units. (Puttonen and Repo 2010: 30-33).

Before subscription in mutual fund, the fund management company is obliged to provide enough information for the investor to make a decision. Each fund has a defined minimum subscription amount, which can vary a lot between different funds. Funds must to always have enough cash, if an investor wants to redeem their investment, but also a readiness to invest when more money is invested (Puttonen and Repo 2010: 30-33).

Auditors monitor the fund net asset value calculation at least six times a year; in addition the fund's activities are supervised by its custodian. All fund activities are strictly controlled and its rules must be approved by FIN-FSA (Puttonen and Repo 2010: 30-33).

### 2.2.1 Fund Assets

Fund assets consist of net subscriptions from investors, which are then reinvested in stocks and other financial instruments (Puttonen and Repo 2010: 30). Most of the assets come from institutions, which are institutional investors themselves, but the amount of investments from households has also increased over the years (Bank of Finland, 2014). Investing in funds offers an opportunity to gain the benefits of a large investor in a cost-effective manner (Puttonen and Repo 2010: 30).

Fund assets depend on how much money is subscribed to or redeemed from the fund, but it also depends on stock prices and changes in interest rates. Net asset value is determined by stock prices and exchange rates. Net asset value is the value of one share. In Finland it is normally calculated every banking day.

From most of the funds, shares can be bought or redeemed every banking day, but there are differences and the practise is defined in the rules of each fund. Share price is always the same for everyone, which is market value of fund divided by the amount of outstanding shares (net asset value). Fund assets increase when new subscription is made (Pörssisäätiö 2012).

### 2.2.2 Shareowners

Three biggest investor sectors in 2013 were insurance institutions, investments abroad and households as we can see in Figure 4. Finnish households invested little over 1 billion euros in mutual funds, which is the most since 2009, when households invested 1.4 billion euros. The change has been remarkable since 2011 when Finnish households redeemed a staggering 1.3 billion euros. Insurance institutions invested 1.3 billion and other Finnish sectors (companies, mutual funds etc.) 1.4 billion euros in 2013 (Investment Research Finland, 2014).

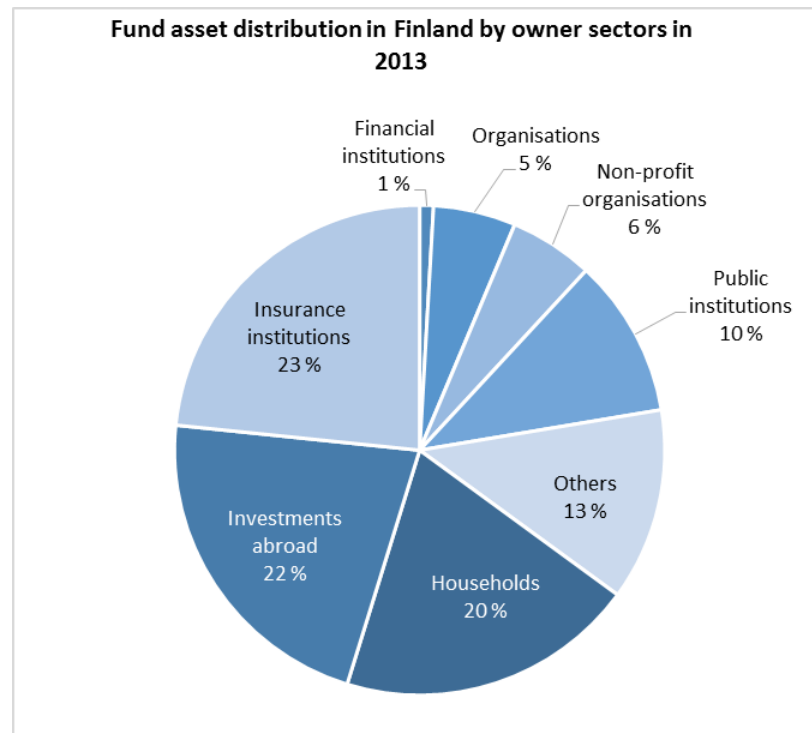


Figure 4. Fund asset distribution in Finland by owner sectors in 2013

### 2.2.3 Risks and return

Fund investing has the same risks as other diversified investments. The value of investment may fall or rise and the previous performance does not guarantee anything about what happens in the future. The more the value fluctuates, the more risky the investment is, but the return is often better than in less risky investments. Funds' risks can be evaluated by using different indicators (FIN-FSA, 2014).

**Market risk** is a risk related to stocks and mutual funds. Because stock prices cannot be forecasted, there is a risk that prices suddenly fall and the value of investment decreases drastically. In short-time investments the risk is highest; in long-term stocks have been the most productive investment option. Market risk can be reduced by diversifying investments, but it cannot be avoided. The risk can be measured by using volatility as an indicator.

**Foreign exchange risk** exists when the fund invests outside the Eurozone. When the foreign currency strengthens against euro the value of investments increases and vice versa. **Active risk** is related to the performance of portfolio manager and the invest-

ment decisions made. Fixed-income funds also relate **interest rate risk**, where the interest rates affect the value of investment.

#### 2.2.4 Types of Funds

Mutual funds can be divided into three groups by Act on Common Funds: UCITS funds, non-UCITS funds and alternative investment funds (FIN-FSA, 2014). UCITS (Undertakings for the collective investment in transferable securities) are investment funds regulated at European Union level (Directive 2014/91/EU) (European Commission, 2014). These are the only funds that can use the term "common funds" in their company name and they are regulated on behalf of FIN-FSA by the Act on Common Funds. Non-UCITS funds diverge from the principle of diversification of risk defined in the Act on Common Funds; they may concentrate investments in fewer assets. Since March 2014 these funds have been regulated by the Act on Alternative Investment Fund Managers. It must be indicated in the name of fund that it is a non-UCITS fund. Alternative investment funds can invest in almost everything. Operations are not regulated; however the Act on Alternative Investment Fund Managers specifies the information the fund must provide (FIN-FSA, 2014).

Beyond this, funds can be divided based on what kind of instruments they invest in. The main fund types are explained below. From Figure 5 below, we can see the total amount of investment funds in Finland in November 2014. We can also see the how they are divided into different types of funds. Total amount of investment funds was 490, most of them (54%) equity funds (Bank of Finland, 2014).

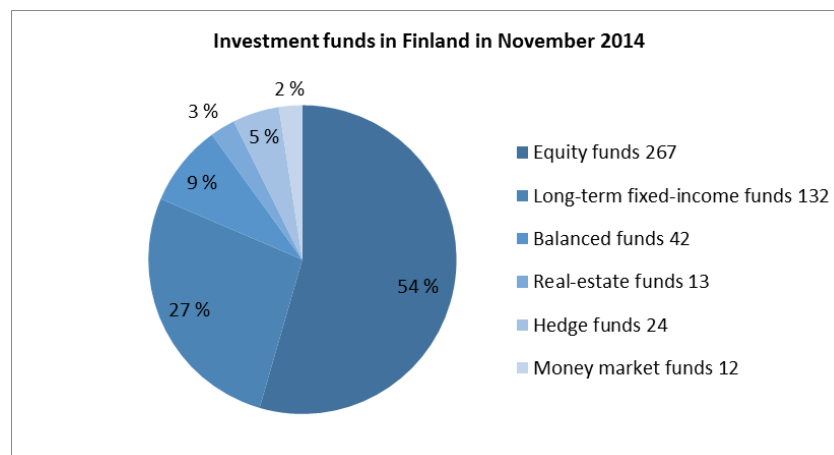


Figure 5. Investment funds in Finland in November 2014

**Equity Funds** invest mainly on stocks and can be divided in many ways; by geography, industry of companies invested in or the size of the companies invested in. For example the fund may invest only in European companies, but it can define it more specifically to invest in European small-cap companies that operate in health care and bio-technical industry (Pörssisäätiö, 2012). The smaller and more less-developed markets the fund invests the higher the risks are compared to funds investing in large global corporations (FIN-FSA, 2014).

The target return of a fund is usually to exceed a chosen benchmark index, for example if we assume that the fund invests in Finland, the benchmark index could be OMX Helsinki - yield index. This index illustrates the average development of Finnish stock markets including the dividends. However, not all equity funds have the benchmark index at all (Pörssisäätiö, 2012).

**Fixed-income funds** include short-term, medium-term and long-term fixed-income funds, which invest in interest-bearing bonds. Short-term fixed-income funds can be further divided into money market funds and other short-term funds. Money market funds are considered to have low risk level. Long-term fixed-income funds invest in long-term maturities to seek higher returns; also the risk level is then higher (FIN-FSA, 2014).

**Balanced funds** invest in equities and interest-bearing securities and the ratio between these is determined in the fund rules. Risk level lies normally between fixed-income and equity funds, depending on the allocation of assets to different instruments (FIN-FSA, 2014).

The remaining types have a small market share and are therefore not covered in this research.

### 2.3 Stock indices

As we are investigating the relationship between net subscriptions and selected stock indices, it is important to know what a stock index is and what it means.

Stock index contains a group of specific stocks and reflects the average price level of the stocks in the index. When we look at stock markets we have to look at a variety of stock indices as not one index tells enough about the markets (NYSE, 2006). It measures the value fluctuations of stock prices (Pörssisäätiö, 2014).

For this research indices were chosen the indices based on geographical areas, which reflect the investments of Finnish mutual funds the best. According to Bank of Finland, in October 2014 the biggest equity investments were in Finnish companies, almost 20% of all equity investments. From Figure 6 we can see the percentages of all investments divided by geographical areas, where Finland is separated from the rest of the Europe at the end of year 2014 (Bank of Finland, 2014).

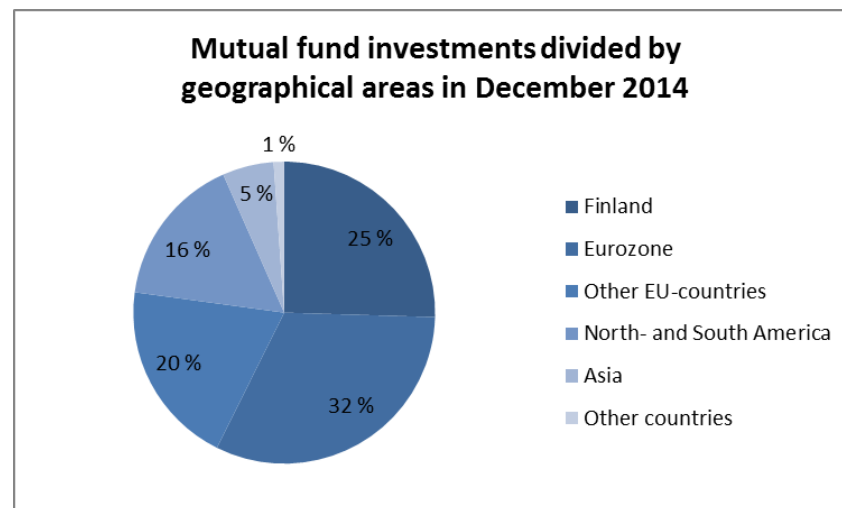


Figure 6. Mutual fund investments divided by geographical areas in December 2014

**STOXX® Europe 600** represents large, mid and small cap companies in 18 different countries of the European region with a fixed number of 600 components. It represents the leading companies in Europe and it was created 1991.

**S&P 500 ®** is often regarded as the best single measure of large cap equities including 500 top companies in USA. It covers approximately 80 % of available market capitalisation. It was created in March 1957 and it was the first US market-cap-weighted stock market index.

**MSCI AC World Index EUR Net** is designed to measure the equity market performance of developed markets. It consists of 23 developed market country indexes and with 1 636 constituents it covers approximately 85 % of the free float-adjusted market capitalization in each 23 countries. It was launched on 31 March, 1986.

**The OMX Helsinki** represents all shares listed on the Helsinki Stock Exchange. It aims to reflect the current situation and changes in the market. The index was developed as of December 28, 1990 (Bloomberg, 2015).

#### 2.4 The financial market situation in Finland in 2007-2014

In the Appendix 1 are shown the net subscriptions and the change of stock index returns from years 2008 to 2014. To get a good picture of where it all started and to explain the situation behind the figures, the financial markets will be investigated in Finland from the end of 2007 until the end of year 2014, focusing on fund investing.

On the third quarter of 2007 share prices started to fall and decreased share prices and net redemptions together reduced the values of mutual funds. However, the assets under management were still 66 billion euro, which was 8 percent higher than a year before. Money market funds overtook equity funds as most popular fund type (Bank of Finland, Financial Market Report 02/2008).

2008 was very difficult year for financial sector, uncertainty characterised the entire year and the general development of economy was weakening (Bank of Finland, Financial Market Report 04/2008). For 18 months in a row, the net subscriptions were negative, redemptions from all mutual funds were almost 15 billion euros in this period. Collapse of stock prices was the main reason, why the market value of assets decreased about 15 billion euros. Assets in equity funds decreased a little over 17 billion euros (Bank of Finland, Financial Market Report 01/2009).

In February 2009 net subscriptions were first time positive since July 2007; investors started their slow return to the financial markets. Before the crisis one third of all assets were in equity funds, but in February they represented less than a quarter of assets (Bank of Finland, Financial Market Report 01/2009). Financial crisis has also re-



duced the number of mutual funds. Average size of Finnish investment funds is quite small, slightly over 100 million euros and number of share owners stays often under 100. Due the crisis funds have been terminated or merged with other funds. In July 2009 there were 481 mutual funds registered in Finland and at the highest peak the number has been around 10% more. In 2009 assets in mutual funds rose 8.6 billion euros, mainly because of the increased stock prices. New investments to mutual funds have focused on equity funds (2 billion euros) and long-term fixed-income funds (Bank of Finland, Financial Market Report 04/2009).

In October 2010 there was precisely 500 equity funds in Finland, more than half of them (259) were equity funds. Amount of equity funds had been rising slightly in past 1.5 years at the expense of money market funds. Together equity funds, money market funds and long-term fixed-income funds created 90 % of the total of 59.6 billion euros of assets in Finnish mutual funds (Bank of Finland, Financial Market Report 03/2010).

The year 2011 was 5.0 billion euros negative for mutual funds after two profitable years, but it was not as bad as the year 2008. The unprofitable year was mostly due to declining stock prices, net redemptions were 1.4 billion euros. Equity funds suffered the most, as they accounted for 4.8 billion euros of the total loss. Assets under management were about 56 billion euros at the end of the year (Bank of Finland, 2011)

The previous year's unprofitable result turned to a 6.6 billion euros increase in 2012. Equity funds had by far the biggest part of the net assets, 5.9 billion euros, mainly because of increased value of stocks. Expenses that mutual funds pay, have also been increasing over the years. In 2011 mutual funds paid expenses of 0.8 billion euros, and this number increased up to 1.1 billion euros in 2012, which weakens the annual profits. Assets under management increased 11 billion euros totalling 67 billion euros at the end of the year. Also more money was invested than redeemed, annual net subscriptions were 4.6 billion euros positive (Bank of Finland, 2012).

In August 2013 assets under management reached 70.7 billion euros in mutual funds registered in Finland. Already in 2013 assets rose for 4 billion euros and two thirds has come from new investments (Bank of Finland, Financial Market Report 02/2013).

In 2014 Federation of Finnish Financial Services (FFI) published a research, which revealed that around one million Finns own mutual fund shares. Net subscriptions rose in over 8.6 billion euros, which is 83 % more than year before. 4.6 billion euros was invested in long-term fixed-income funds, 2.6 billion euros in balanced funds and 1.1 billion euros in equity funds. Due to rise in stock prices the value of equity funds rose 2.9 billion euros in 2014. Assets under management broke the previous records twice, first in April, totalling 78 billion euros and finally in December reaching the all-time record of 85.1 billion euros (Bank of Finland, 2014).

## 2.5 Covariance and correlation

To see whether there is a relationship between the net subscription and stock indices we need to calculate covariance and correlation. Covariance and correlation describe the relationship between two variables. Depending on whether the variables move into same direction or the opposite directions variables are either positively related or negatively related. Correlation also tells the degree to which the variables tend to move together. Example of positive relation between two variables would be that traditionally when the economy grows, stock market returns grow as well. These two variables move in the same direction. On the other hand, when oil production increases the gasoline prices fall; there is a negative relation as these variables move in to opposite directions (Columbia Business School, 2015).

### 2.5.1 Covariance

Covariance indicates how two variables are related, if the value is positive, there is a positive relation and when it is negative there is negative relation. Covariance can be used to measure variables with different units of measurement. However, covariance between different types of variables cannot be compared, as the units of the measure affect the value of covariance (Columbia Business School, 2015).

Covariance can be calculated with the formula shown below.

$$\text{COV}(x, y) = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{n - 1}$$

Where

x = the independent variable

y = the dependent variable

n = number of data points in the sample

$\bar{x}$  = the mean of the independent variable x

$\bar{y}$  = the mean of the dependent variable y

### 2.5.2 Correlation

Correlation does not only determine the relationship between two variables, but also the degree to which the variables tend to move together. After calculating the covariance between the two variables, we can use correlation to calculate the degree between the two variables as correlation standardises the measure of interdependence between two variables.

The correlation measure is called the coefficient of correlation and it always takes the value between +1 and -1. The symbol "r" is used to express correlation. When the correlation coefficient is +1, the two variables have perfect positive correlation. This means that if one variable moves a certain amount the other variable follows proportionally in the same direction. Correlation coefficient less than +1 indicates less perfect correlation, where a value close to one means stronger positive correlation than a value closer to zero.

Coefficient correlation of 0 means that there is no correlation at all between the variables. When one variable moves, the movements of the other variable cannot be predicted. Negative coefficient of correlation means negative correlation between the variables. -1 is the perfect negative correlation; when one variable moves a certain amount, the other variable moves exactly the same amount to the opposite direction.

So while one variable increases the other variable decreases. A negative correlation coefficient greater than -1 indicates less perfect negative correlation (Columbia Business School, 2015).

Correlation can be calculated using the formula shown below.

$$r_{(x,y)} = \frac{\text{COV}(x,y)}{S_x S_y}$$

Where

$r_{(x,y)}$  = correlation of the variables x and y

$\text{COV}(x,y)$  = covariance of the variables x and y

$S_x$  = sample standard deviation of the random variable x

$S_y$  = sample standard deviation of the random variable y

### 2.5.3 Scatterplot

Scatterplot graph presents the compared values on x- and y- axes. It illustrates either positive or negative correlation depending on whether the plots exhibit an upward or downward slope – upward slope tells about positive correlation between two variables and when there is a downward slope the correlation is negative. Even when the dots are more widely scattered, we can still find out a correlation between the variables as we can see in the Figure 6 below. When there is no correlation between the variables the dots seem to be randomly scattered (Koop, 2000).

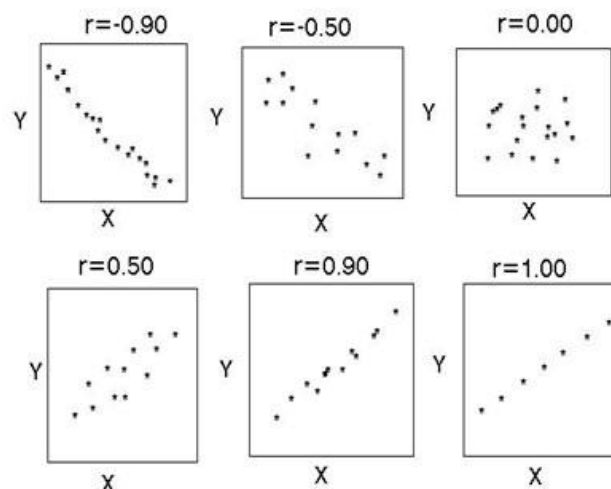


Figure 7. Scatterplot examples

## 2.6 Investor Behaviour

In this chapter we look at two different schools of thought called Efficient Market Hypothesis and behavioural finance to explain how investors tend to behave. To support our expectation that there is a relationship between net subscription and stock indices it is important to examine the general behavioural models affecting investor's decision making when investing.

### 2.6.1 Efficient Market Hypothesis

Estimating the value of a stock is difficult as many variables affect the stock value and the information related to those variables may become available for different investors in different times. According to the Efficient Market Hypothesis (EMH) the market price is right as the investor pool tends to be right. Therefore the market price reflects everything that investors know at the moment. Information generally known in the markets is greater than a single investor can replicate.

Not all investors have access to the same information, some might think that the stock is overvalued and others might see it undervalued. A stock price moves when investors change their point of view about its value, which is influenced by new arriving information. Stock prices move in seemingly random fashion as new information is something investors did not previously have and new information itself is unpredictable. This argument is taken even further and efficient market advocates say that even if stock prices did create some patterns, they will not last long and prices move at random. In other words this theory states that looking at the price patterns in the past will not help predicting the prices in the future and investors looking at the past patterns are likely to outperform (Gitman, Joehnk and Scott, 2011).

There are different levels of the Efficient Market Hypothesis, which define the levels of efficiency corresponding to different types of information. When stock prices fully reflect any relevant information from an analysis of past price movements it is a weak form of EMH. This form says that investor cannot use the past data to predict future price changes. Semi-strong form of the EMH holds that stock prices reflect any information obtained from public sources (Jones and Netter, 2008). This means that publicly available information cannot be used to consistently earn abnormally high returns. That is because in the time you take to download the report, read the company's good

news and call your broker to buy shares, the price of the stock has already increased. It has been proven that stock prices react within minutes, if not seconds to any important information. The final form of EMH, strong form of EMH holds that there is no information that allows investor to consistently earn abnormal returns, because stock prices adjust to any information rapidly, whether it is available to all investors or not.

The message that EMH is trying to say is that markets are hard to beat and actively buying and selling securities does not make much sense. There are several studies supporting this theory, which say that more conservative buy-and-hold investors make higher annual returns (Gitman, Joehnk and Scott, 2011).

### 2.6.2 Behavioural Finance

Behavioural finance is a relatively new field, but through a number of scientific contributions it has shown that in a world where rational and irrational individuals interact, irrational behaviour can have a significant impact on the stock prices (Schindler, 2007). Behavioural finance states that psychological biases affect the investor's decision making and lead investors to make predictable mistakes in certain situations. Mistakes may lead into systematic patterns and investors not making mistakes get an opportunity to earn unusually high profits without accepting unusually high risk (Gitman, Joehnk and Scott, 2011).

On average, people tend to be too overconfident; they put too much faith in their own capability. Self-attribution bias is closely linked to overconfidence. It means that when something good happens people think that it was because of their attribution, but when something bad happens it was because of bad luck or other external factors beyond their control (Gitman, Joehnk and Scott, 2011).

Research finding suggests that "a person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise" (Kahneman and Tversky 1979 cited in *Advances In Behavioral Finance*, 1993, p.507). This can be related to a term called loss-aversion, which basically means that individuals feel the pain of loss more acutely than they feel the pleasure of gain. An individual is ready to gamble if he is losing money and therefore taking higher risks than when winning money

(Gitman, Joehnk and Scott, 2011). It happens that individuals sell the winners too early and keep the losers too long, when standard theory suggests otherwise (Thaler, 1993).

People tend to have difficulties thinking about randomness in outcomes, which can be referred to as representativeness. Imagine if a fund performs exceptionally well for three years in a row, which according to efficient market hypothesis (EMH) is more of a good luck than skill. Research shows that many investors pour money into fund and overestimate the likelihood that the trend will continue. In other words they underestimate that such success could be the outcome of random change and overestimate the likelihood that the success will continue in the future. Representativeness may also lead to under reaction in certain instances (Gitman, Joehnk and Scott, 2011).

Many people also analyse situations from small perspective forgetting the larger context. Such behaviour is called narrow framing. Belief perseverance on the other hand means that people tend to ignore the information conflicting with their own beliefs. For example when believing the stock is good purchasing it, they later ignore any signs of possible trouble. They may even refuse to gain any information contradicting their existing beliefs (Gitman, Joehnk and Scott, 2011).

Factors mentioned above, suggest that behavioural finance has an important role in investing. The main objective of behavioural finance is to identify certain psychological factors which lead investors to make systematic mistakes. These systematic mistakes may contribute to predictable patterns in stock prices (Gitman, Joehnk and Scott, 2011). One of the objections to behavioural finance is that even if few individuals behave irrationally, the majority will act rationally and prevent the traded asset prices from moving too far from their "true" value. However, there are number of scientific contributions showing that in a world where rational and irrational individual interact, irrational behaviour may have a significant influence on traded prices (Schindler, 2007).

## 2.7 Similar research

To support findings in this research, this chapter presents results from similar research. According to the latest 2014 release of Dalbar's Quantitative Analysis of Investor Behaviour (QAIB), the greatest losses occur after a market decline and investors start

investing again only after the markets have recovered. So investors make poor decisions about when to buy or sell stocks.

Federation of Finnish Financial Services has published research about household fund investing behaviour in 2012. The message is the same as in QAIB, households react easily to changes when the market prices are high and investments are sold when prices are declining. Households also react easily to changes on the markets. This research also compares household's net subscriptions to Nasdaq OMX Helsinki index. Net subscriptions pretty much follow the market changes. Similar results are also reported from USA, when Investment Company Institute published a 2014 Investment Company Fact Book. This research says that net subscriptions and stock market performance are positively correlated.

The above research present results, which support the expectation that net subscriptions follow the market movements and that there is a positive correlation between net subscriptions and stock indices. The average investor is afraid to invest when prices are low and risk is higher. Investment decisions are often driven by emotions, which is a characteristic of behavioural finance.



### **3 Research Methodology**

The research model used in this thesis is called correlational research design. Correlational research determines the extent to which two variables are related. The two variables are individually observed. To measure the variables we use the correlation coefficient to identify the extent to which the variables are related. To illustrate this relationship we can draw a scatterplot graph. When using correlation design, we must remember that correlation does not show causality (Privitera 2013).

In this study the possible correlation between two variables, net subscription and stock index value, is examined. In this study, we do not take into consideration any other variables that might affect the amount of net subscription. However, one should understand that there are also other variables that affect the amount of net subscription, but at the same time these factors may affect the value of stock indices as well. Limitations of this study are introduced later in this research.

The researcher decided to focus on mutual funds registered in Finland and more specifically on equity funds, because of the general interest through professional career in a Finnish fund management company. The four stock indices used in the research, were selected to present the geographical areas where Finnish equity funds invest the most.

All of the stock index data has been collected by using The Bloomberg Professional software from where the data has been uploaded to Microsoft Excel. Net subscription data has been uploaded to Microsoft Excel from Investment Research Finland's extra-net in which the researcher has access through work. After the data was collected, Microsoft Excel has been used to form tables and figures and to calculate the correlations.

Time period from the beginning of 2008 until the end of 2014 was selected, because of the interesting actions in the financial sector in past years, such as the euro crisis and its effects on financial markets.

## 4 The results of the study

This chapter provides answers to earlier stated research questions and evidence to support these answers. Results are based on numeric data and different figures based on the collected information. Because of the scope of this research, the researcher is not trying to answer why something happens, but rather to point out interesting relationships.

### 4.1 Correlation between net subscriptions and stock indices

The main objective of this research was to find out whether there is a correlation between net subscriptions to equity funds and chosen stock indices. As we can see from Figure 8 below, the net subscriptions and stock indices follow each other's shape quite well. However, this chart alone does not provide any information about the level of the correlation or any calculated values for the correlation.

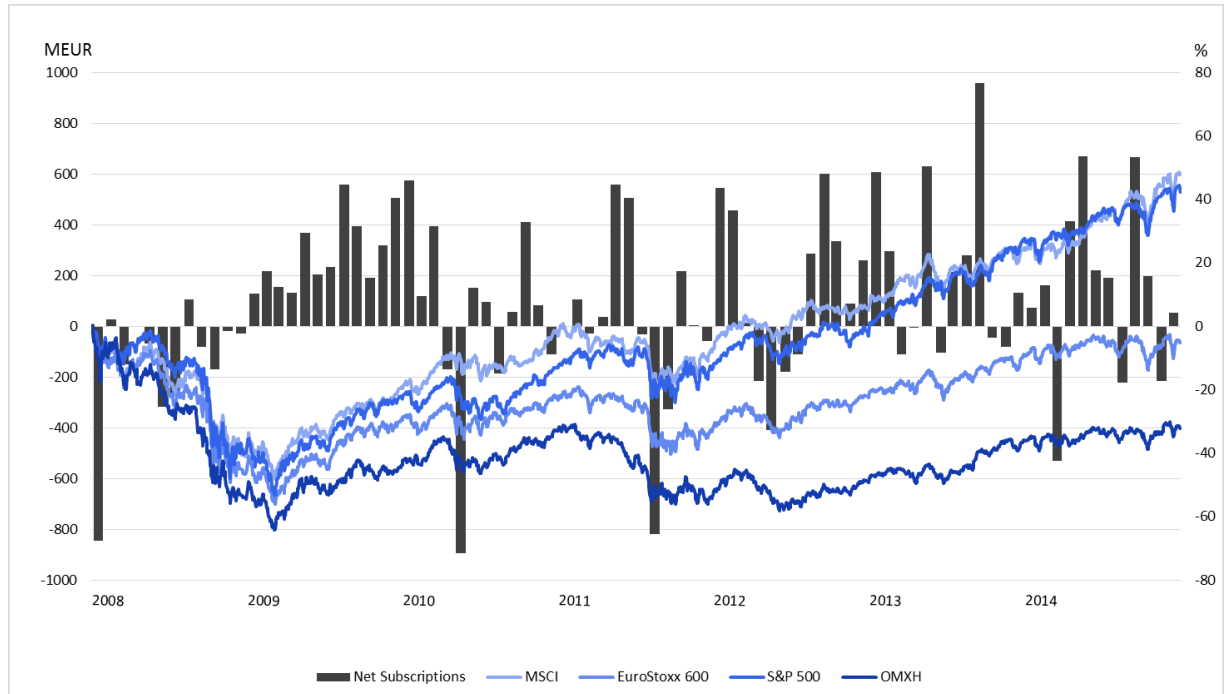


Figure 8. Net subscription (lhs) and stock index value (rhs) change comparison.

What we can also see from Figure 8 above is that in 2008 the net subscriptions were negative almost every month as the index values dropped and then again year 2009 was a very positive recovery year. The following five years have been more variable when it comes to net subscriptions, which tells about the overall uncertainty in financial markets that has prevailed the recent years. As we can see, in 2008-2009 there is a clear month over month trend, which changes in 2010. After 2010 we can see more dramatic changes from month to month. Investors seem to be more careful and reacting easily to the changes on the market. Despite the uncertainty in recent years, in annual level the net subscriptions reached the highest peak in 2014.

#### 4.1.1 Hypothesis of the relationship

In Figure 8 we saw that there is some visual relationship between net subscriptions and stock index values. We define net subscription as x-variable and stock index value as y-variable. We can also define that x-variable (net subscription) is the dependent variable and y-variable (stock index) is the independent variable. This means that in this experiment we measure the effects on net subscription as dependent variable caused by the changes in stock index as independent variable, but we are not trying to determine causality.

We can create two alternative hypotheses:

$H_0$  = There is no relationship between variable x and variable y.

$H_1$  = There is a relationship between variable x and variable y.

#### 4.1.2 Scatterplot graph

Scatterplot graph below in Figure 9 show us that there is strong positive correlation between quarterly returns of stock indices and quarterly net subscriptions. There is some dispersion, but the positive correlation can be seen.

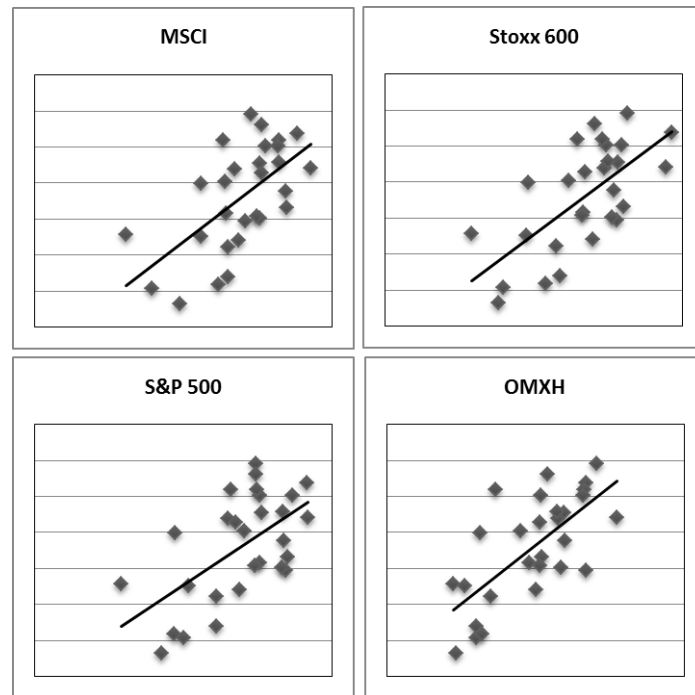


Figure 9. Scatterplot graphs of the results

#### 4.1.3 Correlation between variables

To provide more evidence of the existence of correlation, the researcher has calculated the quarterly returns of each four stock indices in years 2008-2014 and compared these percentages to changes in quarterly net subscriptions. The researcher has also calculated the annual returns to compare with annual net subscriptions. These values are presented in Appendix 1. Based on these values the covariance and correlation between individual stock indices and net subscriptions have been calculated. Table 1 below shows the calculated figures.

	<b>OMXH</b>	<b>S&amp;P 500</b>	<b>Stoxx 600</b>	<b>MSCI</b>
Quarterly Covariance	6349,56	4132,90	4703,43	3871,82
Quarterly Correlation	0,69	0,59	0,67	0,61
Annual Correlation	0,87	0,93	0,94	0,89

Table 1. Covariance and correlation figures

Correlation coefficient close to +1.0 indicates that changes in the independent variable will usually result in an identical proportional change in the dependent variable. Positive quarterly correlation coefficients, all above 0.59, in this research tell us that usually when stock index values change the net subscriptions are moving the same direction, so there is a positive correlation between the variables.

For annual correlation the annual returns for stock indices were first calculated and then compared with annual net subscriptions. Overall the annual correlation is higher, close to perfect correlation of 0.87 to 0.94.

If we look at the biggest investor sectors in Finland (Figure 4, p8.), Insurance Institutions and households are the biggest sectors together with investments coming from abroad. Households' interest towards investing has increased in 2000s due to increased capital available for investing. In 2012 approximately 17 % of Finns had fund investments and the amount has been slowly increasing in past ten years. Finns mention safety and low risk as their main criteria when investing, as well as effortless and liquidity and only after then the returns. Based on the research of FFI, interest towards fund investing seems to decrease when the uncertainty in markets increases and when stock prices go up the interest increases (FFI, 2012).

Based on the correlation findings and the evidence shown above, we can accept the alternative hypothesis (H1); there is a relationship between the two variables. FFI's research concerning Finnish investors and their criteria when investing support our findings about correlation; Finns are careful with their investments and react easily to changes in markets. These findings also support researchers own expectations towards this research.

#### 4.1.4 Lag-testing

When stock prices drop, the investor decision to redeem does not necessarily happen immediately. This is why we need to test the correlation after adjusting for lag. As in this research the correlation is calculated based on the quarterly returns, in testing for lag the lag period used is 1 quarter. As we can see in Table 2 below, the lagging correlation is even closer to 0 than correlation based on quarterly returns.

	<b>OMXH quarterly returns (%)</b>	<b>S&amp;P 500 quarterly returns (%)</b>	<b>Stoxx 600 quarterly returns (%)</b>	<b>MSCI quarterly returns (%)</b>
Correlation	0,61	0,59	0,67	0,61
Lag 1Q	0,11	0,17	0,21	0,14

Table 2. Lag-testing for correlation

The lag-test reveals that using a lag of one quarter weakens the correlation between the two variables. When considering the nature of stock markets and the fact that its reactions happen in days or even in hours, this finding makes sense. If we could calculate the correlation between daily stock index returns and daily net subscriptions, we could find a more accurate lag period.

#### 4.2 Limitations to the study

This study uses very limited data to only find out the correlation between certain stock indices and net subscriptions to Finnish equity funds in a relatively short time period of 2008-2014. To get more accurate results, we should investigate and compare different types of mutual funds with different kinds of stock indices.

There are many different factors which may affect the amount of net subscription, in this research we have only looked at stock index prices which illustrate the overall financial market situation in certain geographical areas. In this research we have looked at monthly net subscriptions to equity funds more closely and we have seen that net subscriptions differ a lot from month to month. The Figure 10 below shows the annual net subscriptions to equity funds in 2008-2014.

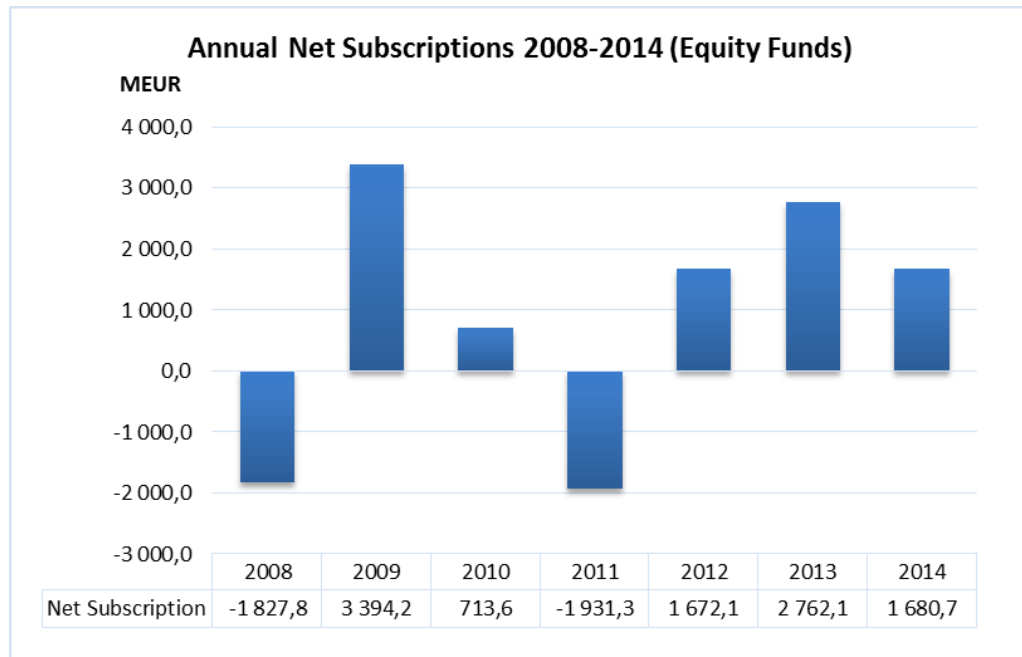


Figure 10. Annual net subscriptions 2008-2014 (Equity Funds)

Net subscriptions may differ a lot between different fund types, as people seem to always seek the most profitable investment options. Even if the net subscriptions to equity funds are positive, the total net subscriptions might be negative. The following Figure 11 illustrates the monthly net subscriptions to all funds; equity funds are shown with blue colour and other funds with red colour. As we can see from there is a lot of variation, not only monthly, but also between equity funds and other funds as well.

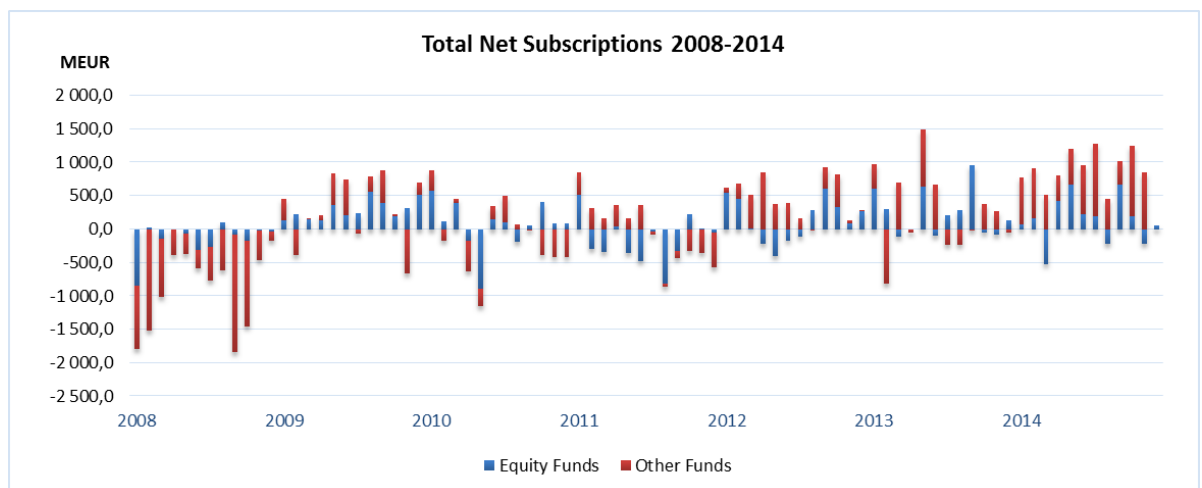


Figure 11. Total net subscriptions 2008-2014

Figure 12 below shows the difference between net subscriptions to equity funds and others on an annual level. It is interesting to see that in 2008 when total net subscriptions were strongly negative and in 2014 when they were strongly positive, equity funds represented only small portion of total net subscriptions. Equity funds might follow the stock markets as they invest in stocks, but they are only a part of total net subscriptions.

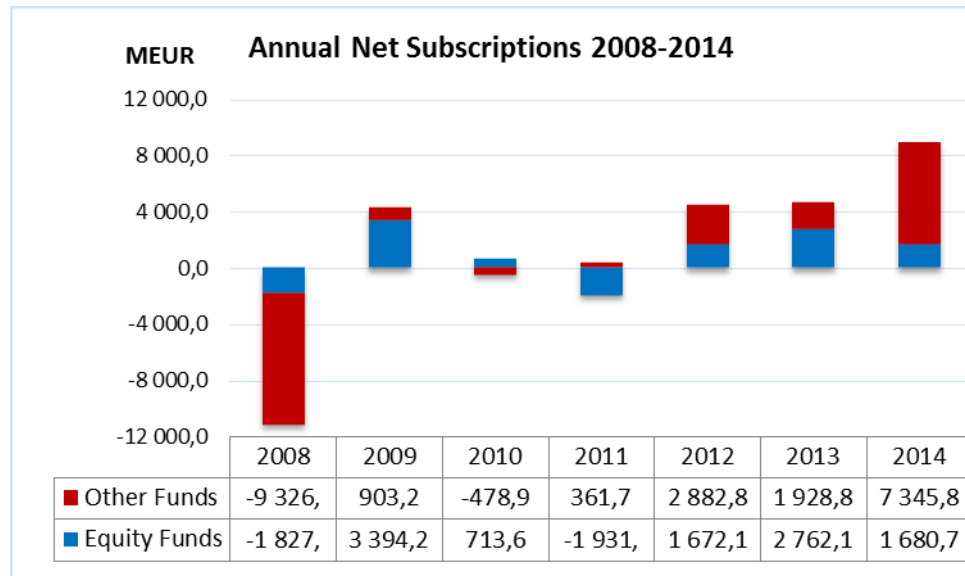


Figure 12. Annual Net Subscriptions 2008-2014

One of the most important limitations is that stock index values are published every banking day and net subscriptions only monthly. Not all funds are open daily and therefore the data is published on a monthly level. It could be more interesting to look at the correlation on a daily level, when we could also run a more accurate lag-test for the correlation.

This research assumes that there are no other factors affecting investment decisions than stock index prices, which is not the case in the real world. There are for example different behavioural models which can be used to explain investor's investment decisions and different companies are marketing their funds more than others. People also have different investment goals; some are looking for long-term investments and do not react market changes so quickly if at all.



## 5 Conclusion

Mutual fund investing has become more popular in Finland and the amount of money invested has increased over the years 2008-2014. The euro crisis in 2008 strongly affected mutual funds and investors redeemed a significant amount of money from mutual funds. Despite the uncertainty in the markets in the following years, in 2014 investors invested more money in mutual funds than ever before.

Finnish investors seem to be very careful and react easily to the changes on stock markets. They do not always behave reasonably, when it comes to investment decisions. In fear of losing money, investors redeem their money from equity funds, when stock market and prices of funds go down and therefore they are not making as much profit as they could, if they would sell when prices are high. Investors also tend to invest when the prices start to go up, as they are not willing to take the risk of investing when prices are low.

Based on the correlation calculations and other empirical findings we can conclude that there exists a correlation between the net subscriptions and certain stock indices. We were not able to calculate the accurate time lag for correlation, but when comparing quarterly changes in net subscriptions and stock index values, strong correlation was found.

This study was made based on the assumption that there are not any other factors affecting investment decisions. For further research we could add more variables affecting investor's decision making to see if we can still find some correlation. Such variables could be for example gross domestic product, possible conflicts affecting Finland (for example the Ukraine war and sanctions imposed against Russia) and at a corporate level, how fund management companies market their investment products.

Another interesting factor to look more deeply at would be investor behaviour. What affects the investor's investment decision? How do they choose in which investment products they invest in and when to invest? How much do they know about the investment product before investing and most interesting, what kind of investors do they themselves believe they are?

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### Correlation Figures

	<b>OMXH quarterly returns (%)</b>	<b>S&amp;P 500 quarterly returns (%)</b>	<b>Stoxx 600 quarterly returns (%)</b>	<b>MSCI quarterly returns (%)</b>	<b>Total net subscription quarterly</b>
<b>Q1/2008</b>	-15,87	-9,92	-16,09	-16,30	-968,50
<b>Q2/2008</b>	-12,10	-3,23	-5,42	-1,01	-390,60
<b>Q3/2008</b>	-19,12	-8,88	-11,52	-6,46	-246,90
<b>Q4/2008</b>	-22,10	-22,56	-22,53	-21,55	-221,80
<b>Q1/2009</b>	-14,85	-11,67	-11,04	-6,51	496,60
<b>Q2/2009</b>	21,87	15,22	16,64	15,72	700,20
<b>Q3/2009</b>	13,57	14,98	17,80	13,10	1185,67
<b>Q4/2009</b>	1,37	5,49	4,71	6,59	1011,70
<b>Q1/2010</b>	13,04	4,87	3,81	9,35	1090,00
<b>Q2/2010</b>	-14,34	-11,86	-7,68	-2,92	-914,70
<b>Q3/2010</b>	13,51	10,72	6,74	2,59	-31,60
<b>Q4/2010</b>	7,98	10,20	6,20	10,64	381,10
<b>Q1/2011</b>	-1,85	5,42	0,03	-1,28	70,40
<b>Q2/2011</b>	-10,68	-0,39	-1,10	-1,88	1096,63
<b>Q3/2011</b>	-21,51	-14,33	-17,11	-10,77	-1181,30
<b>Q4/2011</b>	1,58	11,15	8,12	10,78	160,00
<b>Q1/2012</b>	12,70	12,00	7,68	9,06	1016,10
<b>Q2/2012</b>	-15,94	-3,29	-4,61	-0,90	-805,40
<b>Q3/2012</b>	7,73	5,76	6,89	5,39	776,00
<b>Q4/2012</b>	6,14	-1,01	4,17	0,39	685,40
<b>Q1/2013</b>	5,80	10,03	5,04	9,35	790,10
<b>Q2/2013</b>	-3,95	2,36	-2,98	-1,63	516,40
<b>Q3/2013</b>	16,44	4,69	8,93	3,62	1451,70
<b>Q4/2013</b>	6,89	9,92	5,73	5,42	3,90
<b>Q1/2014</b>	0,20	1,30	1,84	1,06	-294,60
<b>Q2/2014</b>	3,09	4,69	2,26	5,74	1304,70
<b>Q3/2014</b>	1,18	0,62	0,36	5,88	635,10
<b>Q4/2014</b>	1,18	4,39	-0,16	4,83	35,50
<b>Covariance</b>	<b>6349,56</b>	<b>4132,90</b>	<b>4703,43</b>	<b>3871,82</b>	
<b>Correlation</b>	<b>0,69</b>	<b>0,59</b>	<b>0,67</b>	<b>0,61</b>	

	<b>OMXH an- nual re- turns (%)</b>	<b>S&amp;P 500 annual returns (%)</b>	<b>Stoxx 600 annual returns (%)</b>	<b>MSCI an- nual re- turns (%)</b>	<b>Total Net Subscription annual</b>
<b>2008</b>	-53,41	-38,49	-45,60	-39,20	-1827,80
<b>2009</b>	19,48	23,45	27,99	30,43	3394,17
<b>2010</b>	18,68	12,78	8,63	20,50	524,80
<b>2011</b>	-30,11	0,00	-11,34	-4,25	145,73
<b>2012</b>	8,33	13,41	14,37	14,34	1672,10
<b>2013</b>	26,47	29,60	17,37	17,49	2762,10
<b>2014</b>	5,75	11,39	4,35	18,61	1680,70
<b>Correlation</b>	<b>0,87</b>	<b>0,93</b>	<b>0,94</b>	<b>0,89</b>	0