



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Department of Economics

Does Cap-Size Matter?

- A Study of ten Swedish Small and Large-Cap Funds

Abstract

This study aims to examine and compare the performance of five small-cap funds and five large-cap funds during a ten-year time period and two sub-periods. The used performance measures to evaluate the funds are Jensen's alpha, Sharpe and Treynor ratio. The investigation indicates that the selected small-cap funds outperform the large caps in every single time period, based on the risk-adjusted return. Remarkable is that the large-cap funds performed best during the period of crisis compared to the pre-crisis and full-time period. However, the small-cap funds seem to be a superior investment despite the economic downturn.

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Tutor: Charles Nadeau

Authors:

Anna-Lina Boström 860213-5900
Johanna Petersson 870225-4049

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1. Introduction

Investment decisions and capital allocation are essential issues for private investors, as well as for portfolio and fund managers. The investment decision depends, beyond other things, on the risk aversion and the knowledge of the investor. Mutual funds are likely to be an easier and safer investment than for example stocks, since the investor simply has to decide what kind of fund to put his money in and then the fund manager will take care of the rest. However, the investment decision is not as simple as that. There are a lot of funds to pick from, which makes the decision even more complicated.

This thesis aims to investigate and evaluate a number of small and large-cap funds. The funds will be evaluated upon the return and risk an investor is facing when investing in these specific funds. Large-cap funds are often regarded as a safer investment, whereas small-cap funds are considered riskier. When an investment is viewed as risky, the golden rule within finance is to advocate a higher return to compensate for the risk taking.

First, some background concerning funds and saving in funds will be presented, followed by the purpose and hypothesis of this thesis. Thereafter, assumptions, delimitations and literature review will be treated as well as the general outline. Second, the relevant theory for this examination will briefly be interpreted, and then the methodology and calculations will be presented. Third, the results from this study will be featured followed by an analysis. Finally, a conclusion will take place to resume the findings of this thesis.

1.1 Background

There are many reasons why it is attractive to invest in funds. Investing in a fund is consistent with becoming a partner of the fund's assets, diversifying the risk and handing over the investment management function to specialists (Aktie och Fondhandboken, 2009). The phenomena of saving in funds influenced the Swedish population in the mid 1980's. At this time, people realised the benefits and the risen safety associated with fund saving, and it became more and more common to invest and save in funds (Fondbolagens Förening, 2009).

Ever since the funds' breakthrough in Sweden, the market has experienced several fluctuations. The introduction of fund-saving was faced by a fair upturn of the market in the 80's. Thereafter, in the beginning of 1990, the widespread real estate crisis was a fact, although the decade ended up with an all-time high on the stock exchange. However, this large increase on the market was later referred to as the information technology bubble, which came to crack in 2000. The decade of 2000 is known as the period of globalization and, from the perspective of fund investors, this meant a world of possibilities in connection with the large number of emerging market funds that were introduced on the Swedish market. On the other hand, the decade of possibilities got an ending strongly associated with the credit and liquidity crisis in the US in 2008, which was developed as a worldwide financial crisis from which the impress is still visible (Fondbolagens Förening, 2009).

Even though the market is still not completely stable, the Swedish population continues to be loyal fund investors. The total value of fund assets in 2010 was amounted to 1 964 thousand million, which is the largest value ever (Fondbolagens Förening, 2009). There are different forms of funds and the risk varies among them. Equity funds, one of the most common forms of funds, usually have a higher risk than bond funds and balanced funds. These equity funds have different orientations, such as regional funds, country funds and sector funds. In addition, equity funds are categorised by whether they are actively or passively managed, and if the funds are investing in small or big firms (Pensionsmyndigheten, 2010). The latter is a complex definition. Morningstar ranks the funds according to stock market value. Large-cap stocks are regarded as the largest stocks in a certain region that all together stands for 70 percent of the total stock market value in the underlying region. The remaining 20 percent accounts for as mid-cap stocks and the latter 10 percent are referred to as small-cap stocks (Morningstar, 2011). A controversial and heavily debated topic is whether small caps outperform large caps or not.

Viewed historically, small-cap funds have, on average, risen in value more than large-cap funds. Globally, the return of small caps and large caps do not follow a specific trend. Small-cap funds performed better in the early 1990's, whereas large-cap funds did better during the upswing in the 90's. On the contrary, small caps succeeded better each year during the upturn 2003-2006, whereas large caps performed better during the financial crises in the 2000's (Lindmark, 2010). Large-cap firms usually have wider economy, and the chance is greater that the company will be subsidised by the government. Small-cap firms tend to grow at faster rates, but since small caps are less diversified than large caps they are more sensitive in economic downturns. Hence, it can be riskier to invest in small-caps firms, but since the volatility is high, the fund should also provide higher yields (Rawson, 2010).

1.2 Purpose

As mentioned in the previous section, some funds are considered to be riskier than others. Small-cap funds are regarded as a riskier investment than large-cap funds, and according to finance theory these funds should also yield a higher return. However, markets do not always comply with the theory, and exceptions will always exist.

The purpose of this paper is to investigate whether or not investing in small-cap funds generate a higher risk-adjusted rate of return than investing in large-cap funds. This is done by evaluating ten different funds, five large-cap funds and five small-cap funds, using a number of common recognised performance measures.

Furthermore, this thesis will focus on Swedish funds with the major investment proportion on the Swedish market. The desirable result of this study is to possibly state if the randomly chosen small-cap funds are a superior investment than the large cap-funds, evaluating on the risk-adjusted return.

1.3 Hypothesis

The hypothesis investigated in this thesis is that the chosen small-cap funds outperform the selected large-cap funds on a ten-year period. The performance is measured in several different performance measures such as Sharpe ratio, Treynor ratio and Jensen's alpha. The funds' performance will be compared to each other, as well as to an index, in order to determine whether or not small-cap funds are a better investment focusing on the return and risk.

1.4 Assumptions

This study aims to investigate the performance of some Swedish funds. However, there are hardly any existing funds investing entirely on the Swedish market. Consequently, in this study, a fund is treated as Swedish when investing approximately ten percent abroad and the remaining proportion in Swedish firms. Furthermore, the assumptions of CAPM and Markowitz Portfolio Theory are assumed to be fulfilled.

1.5 Delimitations

The investigation will solely contain five small and five large-cap funds. Consequently, it will be impossible to apply and generalise the compiled result to all Swedish small and large-cap funds. However, the chosen funds will be evaluated thoroughly using a number of different measures, which would be impossible, due to time constraints, if a larger number of funds were chosen.

Furthermore, any scrutiny concerning the credibility of the funds' true investment directions is not taking place in this examination. Funds claiming to be small-cap funds will thereby be regarded and treated as small-cap funds and no further investigation concerning this will take place in this thesis. The same reasoning applies to the funds claiming to be large-cap funds.

1.6 Literature Review

This thesis is influenced by different fields of financial theory such as Markowitz' Modern Portfolio Theory and Fama's Efficient Market Hypothesis. A large number of studies that deals with size, and its effect on risk and return, have been performed during the past years, and the researchers do still not agree upon this debated subject.

Banz was one of the first in this field and he showed in 1978 that securities considered by only a part of the investors yield higher risk-adjusted returns than those examined by all investors. Furthermore, in 1981, he noticed an evident negative relationship between a firm's market capitalization and the yielding return of the firm's stocks. Reingaum later strengthened this statement in 1981. Klein and Bawa found in 1977 that small firms yield higher returns due to lack of information about the underlying firms, which in turn leads to limited diversification and higher returns for the neglected firms. Moreover, Chen et al stated in 2004 that liquidity and organisational diseconomies contribute to an eroding performance consistent with the size of the fund. Both Yan (2008) and Fuss et al (2009) strengthened Banz' previous studies and observed once again a significant negative relationship between fund size and performance. Furthermore, Agarwal et al claimed in 2004 that larger funds, associated with higher flows are related to poor future performance. However, Ding et al (2009) showed that the relationship between fund size and performance depends on the measures used in the evaluating process.

2. Theory

2.1 Modern Portfolio Theory

The modern portfolio theory was first developed by Harry Markowitz in 1952 and refers to the notion that an investor can reduce risk and obtain a higher expected return through a diversified portfolio. Holding two securities instead of one will, more often than not, reduce the total risk and increase the total return (Markowitz, 1952).

A well-diversified portfolio is a portfolio that contains securities from different industries and different markets. Furthermore, asset allocation is essential to decrease the risk and increase the return. When an investor allows asset allocation and possesses a well-diversified portfolio, the result will resemble that of holding a market portfolio. This means that the investor has succeeded to diversify away the diversifiable risk by investing in different types of securities and assets. Consequently, the investor is solely exposed to the systematic risk (Bodie, Kane and Marcus, 2011).

2.2 The Efficient Frontier

The efficient frontier displays the best risk-return relationship combination for a set of stocks. The diagram below shows an example of an efficient frontier when adding stocks to a portfolio. By combining well diversified securities in this way, an investor will improve the efficient frontier. To be able to obtain the best possible set of risk-return combinations, stocks should be added in order to let all different investment opportunities be represented (Berk and DeMarzo, 2011).

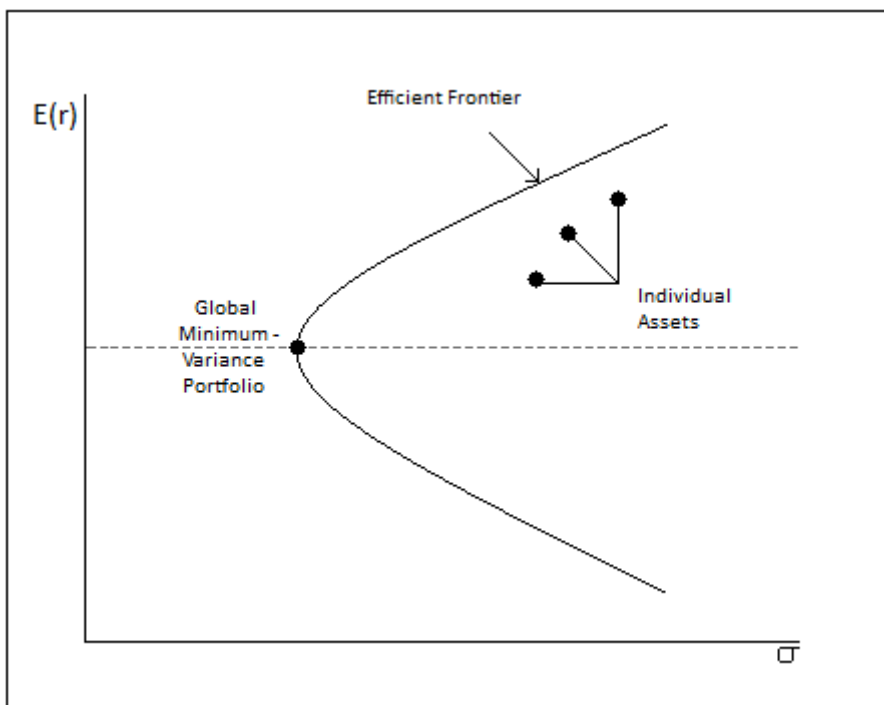


Figure 1: Efficient Frontier Source: Bodie, Kane and Marcus, 2011.

2.3 Efficient Market Hypothesis

The efficient market hypothesis was developed by the American economist Eugene Fama in 1970 in “*Capital Market Efficiency*” and refers to the idea that stock prices already incorporate and reflect all publicly available information in one market (Bodie, Kane and Marcus, 2011). The prices today depend on today’s information and can by no means predict the prices of tomorrow. The stock prices should follow a random walk where no specific patterns are deduced (Vinell, Fischerström and Nilsson, 2007). When market efficiency is present, it is worthless to obtain technical and fundamental analyses since all available information concerning a firm is already incorporated in this firm’s stock price. Fama distinguishes between three versions of an efficient market; weak-form, semi strong-form and strong-form (Bodie, Kane and Marcus, 2011).

Weak-form efficiency is present when the market fully reflects all available historical data. It is useless for an investor to analyse historical data and trends in order to obtain positive alphas, since this information is already reflected and included in the stock prices (Bodie, Kane, Marcus, 2011).

Semi strong-form efficiency exists in the case where the stock prices reflect all publicly available information regarding the forecast of a firm. This means that the stock prices include all available publicised information about a firm, as well as firm specific relevant information such as management skills, information about the products, earning forecasts and so on (Bodie, Kane, Marcus, 2011).

Strong-form efficiency, according to the efficient market hypothesis, is when the market fulfills the criteria of the weak and semi strong-form of the hypothesis and the stock prices also reflect information available to only company insiders (Bodie, Kane and Marcus, 2011).

However, the efficient market hypothesis is a much-disputed issue among researchers. The hypothesis states that investors should be compensated through a higher expected return for gathering and analysing costly and inaccessible information. When the information is inexpensive to obtain and few resources are needed to explore information, the efficient market hypothesis seems to be well-functioning. On the contrary, if gathering information is a costly and demanding project, then the market fails to be efficient since those who are obtaining information have to be compensated for this procedure through a higher return (Grossman and Stiglitz, 1980).

2.3.1 The Small-Firm Effect

According to Banz (1981) there is an evident relationship between a firm’s market capitalization and the yielding return of the firm’s stock. The fact that small-cap stocks tend to yield higher risk-adjusted returns is known as the *small-firm effect*. The small-firm effect occurs mainly for very small firms, whereas the observed difference in return is not significant between large-cap firms and average-sized firms (Banz, 1981). However, economists do not agree upon the fact that the small-firm effect really exists and several different explanations for the underlying effect can be found.

Lustig and Leinbach (1983) argue that the small-firm effect is simply a misspecification of CAPM. The authors suggest that CAPM is an appropriate measure to evaluate the behavior of large firms, but the model fails to give a correct interpretation of the performance of small firms. The reason for this is that the determined factor market in CAPM is defined as the sum of the market weighted values of the largest stocks on the market. Hence, CAPM is maladjusted for small stocks, and this is the reason for the abnormal returns that can be obtained by investors (Lustig and Leinbach, 1983).

Lustig and Leinbach (1983) also state that the gained abnormal return from small-cap stocks is a compensation for the effort of obtaining information about these stocks. Since it can be costly and resource-demanding to gather information connected to small-cap stocks, analysts and investors suffering this procedure must be compensated with a higher return. Consequently, the abnormal return might disappear if the purchase price of the stock includes the opportunity cost of the additional effort of information gathering (Lustig and Leinbach, 1983).

Another interpretation of the small-firm effect is the *neglected-firm effect*, which indicates that small-firm stocks yield higher return since these firms tend to be neglected by large institutional traders. Hence, the small-firm stock becomes a riskier investment due to the rising information deficiency, which is a result of the firms being neglected (Bodie, Kane and Marcus, 2011). According to Merton (1987), neglected firms appear to earn higher equilibrium returns and this could be interpreted as a compensation for the extra risk taking involved when investing in small stocks with little information available. However, the excess return yielded by neglected-firm stocks can be interpreted as additional risk premium rather than market inefficiency (Merton, 1987).

Both the small-firm and neglected-firm effect are likely to be related to the degree of liquidity on stock returns (Bodie, Kane and Marcus, 2011). Less liquid stocks involve higher trading costs, and a higher risk premium is required by investors (Amihud and Mendelson 1991). The liquidity effect can explain the abnormal returns for the neglected firms since these firms tend to be less liquid (Bodie, Kane and Marcus 2011).

2.4 The Capital Asset Pricing Model

The capital asset pricing model is a developed version of Markowitz's portfolio theory compiled by William Sharpe, John Litner and Jan Mossin in 1964. The model is an equilibrium model that describes the relationship between risk and return (Bodie, Kane and Marcus, 2011).

Sharpe (1964) stated that since an investor is able to diversify away risk until the systematic risk is the single risk remaining, the market risk is the only risk lasting even in efficient combinations. Hence, the only thing that matters to an investor is how the market risk influences the asset's rate of return when evaluating the asset's degree of risk (Sharpe 1964). Therefore, according to CAPM, the price of an asset should be set according to the market risk, and not with regard to the total risk. This is due to the investor's ability to diversify away the non-systematic risk (Vinell, Fischerström and Nilsson, 2007).

The market risk is measured in terms of beta (Vinell, Fischertröm and Nilsson, 2007) and defines the contribution of the stock to the variance of the market portfolio. As a result, the required risk premium on a specific stock must be a function of the beta of the stock (Bodie, Kane and Marcus, 2011).

$$E(r_i) = r_f + \beta_i [E(r_M) - r_f]$$

$E(r_i)$: Expected return on the asset
 r_f : Return of the risk – free asset
 $E(r_M)$: Expected market return
 β_i : Beta of the asset
 $r_M - r_f$: Risk premium on the asset

$$\beta_p = \frac{Cov(r_i, r_M)}{\sigma_M^2}$$

$Cov(r_i, r_M)$: Covariance between the asset and the market portfolio
 σ_M^2 : Variance of the market portfolio

$\beta > 1$	<i>The portfolio return is more volatile and move more than the market return</i>
$\beta < 1$	<i>The portfolio return is less volatile and move less than the market return</i>
$\beta = 1$	<i>The portfolio moves with the market</i>

Figure 2: Source: Vinell, Fischerström & Nilsson, 2007.

2.5 Performance Measures

2.5.1 Sharpe Ratio

Sharpe's ratio is one of the most widely used measures when evaluating a fund's performance. The measure calculates the average excess return per unit of overall risk. A higher Sharpe ratio indicates a better performing fund (Scholz, 2006).

$$\text{Sharpe ratio} = \frac{\bar{r}_p - r_f}{\sigma_p}$$

\bar{r}_p : Average return of the asset

r_f : Average return of the risk – free asset

σ_p : Risk of the portfolio

2.5.2 Treynor Ratio

Treynor's measure calculates the average excess return per unit of systematic risk. This measure is useful when evaluating assets in well-diversified portfolios or funds since the measure takes into consideration the systematic risk instead of the total risk (Bodie, Kane & Marcus, 2011).

$$\text{Treynor ratio} = \frac{\bar{r}_p - \bar{r}_f}{\beta_p}$$

\bar{r}_p : Average return of the asset

\bar{r}_f : Average return of the risk – free asset

β_p : Beta of the Asset

2.5.3 Jensen's Alpha

Jensen's alpha is a measure that represents the average return on the portfolio over and above the return forecasted by the capital asset pricing model (Bodie, Kane and Marcus, 2011). A positive alpha value indicates that the stock yields an abnormal return inconsistent with the systematic risk taking. An alpha value of zero means that the market is efficient (Vinell, Fischerström and Nilsson, 2007).

$$\alpha_p = \bar{r}_p - [\bar{r}_f + \beta_p(\bar{r}_M - \bar{r}_f)]$$

\bar{r}_p : Average return of the asset

\bar{r}_f : Average return of the risk – free rate

β_p : Beta of the asset

\bar{r}_M : Average market return

2.6 Problems with a Negative Sharpe Ratio

As stated earlier, the Sharpe ratio is calculated by dividing the excess return by the standard deviation. This excess return is also known as the risk premium, which is given by subtracting the average risk-free return from the average return of the asset. The risk premium is expected to be positive, but it is also possible that the excess return can be negative when the risk-free investment exceeds the actual return or when the actual return is negative. The effect of this is that if the standard deviation in the denominator increases, the ratio becomes higher rather than lower. This reduces the reliability of the measure and complicates the ranking process (Israelson, 2004). However, the difficulty that arises when the Sharpe ratio becomes negative will not be treated in this thesis.

2.7 Econometrics

2.7.1 The Simple Linear Regression Model

In order to test the significance of the relevant parameters, the statistical software program, STATA, is used. The tests are based on the simple linear regression model, which shows the relationship between a dependent variable and an independent variable. Initially, two hypotheses are set up in order to present the predictions of the test. The null hypothesis is rejected when the p-value is lower than the chosen significance level or if the t-value lies within the critical region (Hill, William and Guay, 2008). In this thesis a significance level of 0.05 is used.

$$y = \beta_1 + \beta_2 x + e$$

y : Dependent variable
 β_1 : Intercept of the regression model
 β_2 : Slope of the regression model
x : Independent variable

2.7.2 Testing the Significance of Alpha

Following hypothesis were set up in order to determine the significance of the alpha:

$$H_0 : \beta_2 = 0$$

$$H_1 : \beta_2 \neq 0$$

$$\text{Test statistics: } t = \frac{b_2 - \beta_2}{se(b_2)}$$

$$\text{Critical value: } t_{(\alpha/2, N-2)}$$

$$\text{Rejection rule: Reject } H_0 \text{ if: } - t_{(\alpha/2, N-2)} \geq t \geq t_{(\alpha/2, N-2)}$$

2.7.3 Testing the Significance of Beta

Following hypothesis is set up in order to determine the significance of the beta:

$$H_0 : \beta_2 = 1$$

$$H_1 : \beta_2 \neq 1$$

$$\text{Test statistics: } t = \frac{b_2 - \beta_2}{se(b_2)}$$

$$\text{Critical value: } t_{(\alpha/2, N-2)}$$

$$\text{Rejection rule: Reject } H_0 \text{ if: } t < -t_{(\alpha/2, N-2)}$$

3. Methodology

3.1 Data

The historical fund prices are collected from Handelsbanken's web page and are thereby treated as secondary data. Handelsbanken presents historical fund prices for more than hundred Swedish and foreign fund companies for at least a ten-year time period. The fund prices were picked from the last trading day every month and were then transformed to monthly returns.

Handelsbanken's web page was not the primary choice of source for the funds prices, but since limited resources were faced in the data collection phase, this was the best possible option. The limited resources refer foremost to the restricted access to several databases, among them Morningstar and Six Trusts. The available data bases could not provide the information needed to examine the admitted hypothesis. Due to time and resource constraints, the authors had to consider other possible options. However, the contributing advantage to the choice of Handelsbanken is that from this source, all the needed information can be provided, and thereby all the fund prices are taken from the same source. This makes the data easy to interpret since all the data contains the same costs and profits.

The fund prices used are the net asset value for the chosen funds. The net asset value is given once per day and is defined as the closing market price per share in the fund, including reinvested dividends and income for interest rate, with allowance to the administrative charges (Glas-Möller, 2011).

3.1.1 Fund Selection

The funds were chosen randomly upon Morningstar's classification of small and large-cap funds, which is treated in the background. The selection contains solely funds that have been trading on the market for the chosen time period of ten years.

3.1.2 Time Periods

The performance evaluation of the funds will be based on a ten year time period. The risk and return for the whole time will be calculated and presented and then the ten-year period will be divided into two sub-periods. The division of the data will be made taking into account the financial crisis of 2008. Due to the turbulence on the capital markets during and after this time period, it would be appropriate to divide the investigation to one time period before the financial crisis and one period during the financial crisis. Thus, the data will be divided into two sub-periods where the first period contains calculations from 2001-2007 and the second time period is treating data from 2008-2010.

3.1.3 The Index

The market index, SIX Return Index, is used as the benchmark for the chosen funds. Since both Swedish small and large-cap funds are evaluated in the thesis, it is appropriate to use an index which shows the development of the entire market. SIXRX is a market-weighted index that presents the market development of the companies listed on the Stockholm Stock Exchange. In addition, SIXRX is estimated with reinvested dividends, which are reversed on the ex-dividend date. The index is calculated as follows in real time (SIX Telekurs, 2011).

$$SIXRX = \left(\sum (A_t * K_t) / \sum (((A_{t-1} * K_{t-1}) + J) - U_t) \right) * SIXRX_{t-1}$$

SIXRX = Index value today

A_t : The company's total number of ordinary shares today

K_t : Last traded price for the company's largest series of shares today

U_t : Dividend today

A_{t-1} : The company's total number of ordinary shares yesterday

K_{t-1} : Last traded price for the company's largest series of shares yesterday

J : Amount for adjustment of base value at issues, etc.

SIXRX_{t-1} : Index value yesterday

3.1.4 The Risk-Free Rate

The risk-free rate is approximated by using the monthly rate of return on ten-year Swedish government bonds picked from the web page of the Swedish Riksbank (Sveriges Riksbank, 2011). The ten-year bond is used as an approximation since it is appropriate to evaluate investment decisions with the same time horizons. When using the ten-year bond rate, it is easier to compare the return an investor can earn by investing the money in funds compared to investing the money in risk-free assets.

3.2 Calculations

3.2.1 Monthly Returns

The monthly returns of the funds are measured as the increase or decrease in the net asset value of the fund plus income and capital gain distributions, divided by the net asset value at the beginning of the investment period (Bodie, Kane and Marcus, 2011).

$$E(R) = \frac{NAV_1 - NAV_0 + \text{Income and capital gain distributions}}{NAV_0}$$

E(R) : Expected rate of return

NAV₀ : Net asset value at the start of the period

NAV₁ : Net asset value at the end of the period

3.2.2 Arithmetic Average of Returns

The expected rate of return is calculated through summing the historical returns and divide these by the number of periods. This measure provides an appropriate forecast of the expected rate of return if the historical returns follow the true probability distribution of the fund (Bodie, Kane and Marcus, 2011).

$$E(r) = \frac{1}{n} \sum_{s=1}^n r(s)$$

E(R) : Expected rate of return
n : Number of observations
r : Rate of return

3.2.3 Risk Measures

The risk for a security can be interpreted as the deviation of the expected return for the underlying security. Hence, the variance is obtained by measure the average squared deviations from the estimated expected return. The standard deviation is then given by the square root of the variance (Bodie, Kane and Marcus, 2011).

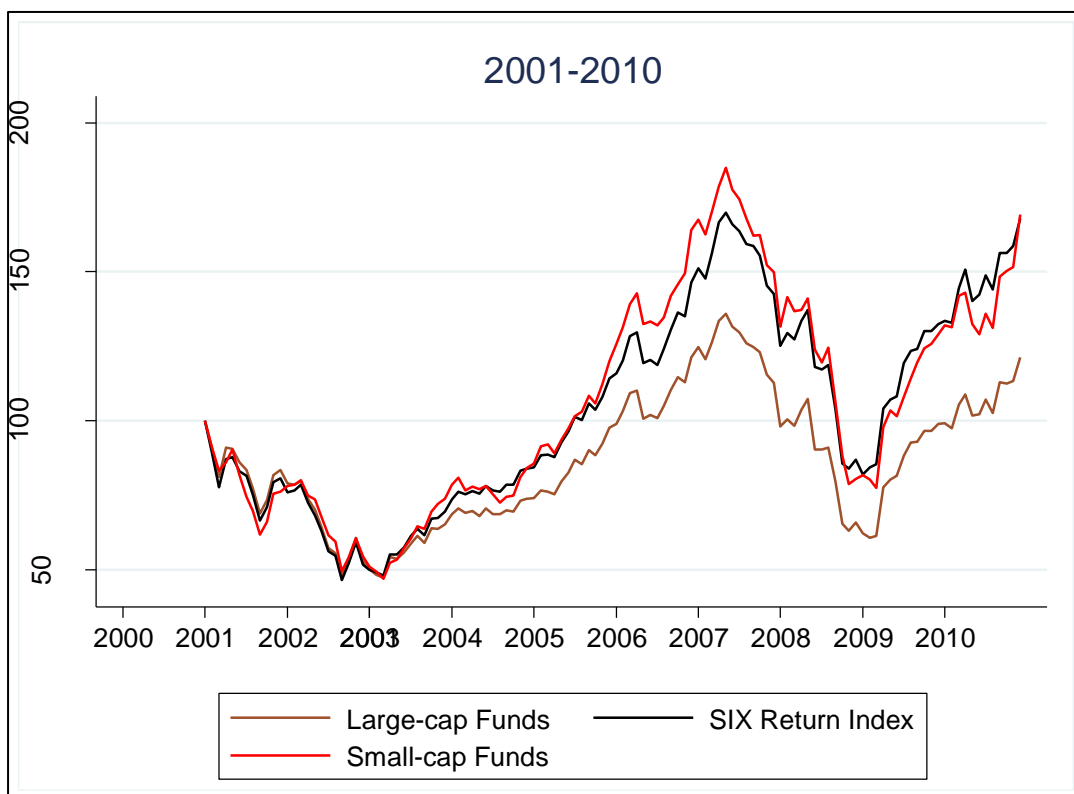
$$\sigma^2 = \frac{1}{n} \sum_{s=1}^n [r(s) - \bar{r}]^2$$

$$\sigma = \sqrt{\text{variance}} = \sqrt{\frac{1}{n} \sum_{s=1}^n [r(s) - \bar{r}]^2}$$

σ : Standard deviation
n : Number of periods
r(s) : Rate of return
̄r : Average rate of return

4. Results

Graph 1 shows the result, in terms of average price development for the small and large-cap funds. A price index with the base-year 2001 is displayed on the vertical axis and the years on the horizontal axis. From 2001 until mid-2003, both the small and large-cap funds show development consistent with the index. Thereafter, the small-cap funds show an upward trend, more or less constant with the trend of SIXRX. The large-cap funds show the same trendy behavior, but are below both the index and the small-cap funds. Even though the small and large-cap funds seem to follow the same pattern, the peak in mid-2008 is much higher for the small-cap funds, whereas the large-cap funds show a peak lower than both the small caps and the market index. However, the fall in the end of 2008 is much greater for both the index and the small caps than for the large-cap funds. The small-cap funds tend to recover from the crisis faster than the large caps, however. In conclusion, from mid-2003, the small caps follow the index closely, whereas the large caps have underperformed, in comparison with the index.



Graph 1: Average Price Development for Small and Large-Cap Funds Source: Calculations based on price and return data from Handelsbanken and SIX Telekurs (2011).

4.1 Full-Time Period 2001-2010

4.1.1 Risk and Return for the Large-Cap Funds

The performance measures for the chosen large-cap funds during the full-time period are presented in Table 1 in Appendix A. According to the table, the monthly returns vary from 0.25% to 0.52% and it is Danske Invest Sverige that obtains the highest return among the chosen funds. As table 1 suggests, there is no huge difference between the several funds in terms of risk when interpreting the standard deviation. The risk is highest for Handelsbanken Sverigefond, which has a standard deviation of 6.70%, in contrast to Danske Invest Sverige, which has the lowest risk, a standard deviation of 6.37%.

4.1.2 Performance Measures for the Large-Cap Funds

Commencing with the beta, all the large-cap funds show beta values close to one, which indicates that the funds in general follow the pattern of the market returns. The largest beta value is demonstrated by Handelsbanken Sverigefond, which indicates that this fund has the highest systematic risk with respect to the chosen benchmark, SIXRX. Two of the funds, SEB Sverigefond Stora Bolag and Danske Invest Sverige have a beta value of less than one, which is an indication of a subnormal market risk.

There is only one of the chosen large-cap funds which has a positive Sharpe ratio during the full-time period. The difficulty to analyze a Sharpe ratio that is negative will, however, not be treated in this thesis and thereby the conclusion drawn for this measure is simply that Danske Invest Sverige is the large-cap fund with the best Sharpe ratio of 0.02760. The same reasoning holds for the Treynor ratio, which evaluates the performance relative to the systematic risk. Danske Invest Sverige is the single fund showing a positive Treynor ratio and is thereby the only fund that offers a positive reward compared to the risk.

All of the large-cap funds have a negative Jensen's alpha, which is a sign of an offered return that is below the return suggested by CAPM.

4.1.3 Risk and Return for the Small-Cap Funds

Table 2, in Appendix A, shows the performance measures for the small-cap funds during the given time period. The average monthly return of 1.23% is undoubtedly highest for Lannebo Småbolag. The lowest return of 0.50% is provided by Ålandsbanken Swedish Small Cap. Conversely, Ålandsbanken Swedish Small Cap has the highest standard deviation, 7.18%, whereas Lannebo Småbolag shows the lowest risk, its standard deviation amounts only to 5.83%.

4.1.4 Performance Measures for the Small-Cap Funds

The majority of the small-cap funds have a beta value close to one; Ålandsbanken Swedish Small Cap is the only fund showing a beta value higher than one. Hence, the average returns of the chosen funds seem to follow the average return of the market approximately well.

Concerning the Sharpe ratios, all of the funds show positive values where the highest ratio of 0.15241 is the reward-to-volatility ratio when investing in Lannebo Småbolag. Ålandsbanken Swedish Small Cap has the lowest Sharpe ratio of 0.02287. The remaining three funds all have ratios close to 0.05. The Treynor ratios for several funds are also positive for all of the funds and show a lower value

than the Sharpe ratios. However, in this case, the Treynor ratio ranks the different funds in the same way as the Sharpe ratio does.

According to Jensen's alpha measure, three of the five funds, Handelsbanken Svenska Småbolag, Lannebo Småbolag and Skandia Småbolag Sverige, have positive alpha values and thereby yield abnormal returns. On the contrary, SEB Sverigefond Småbolag and Ålandsbanken Swedish Small Cap achieve a lower return than that suggested by CAPM. However, all the alpha values are close to zero, which indicates a decent prediction of the returns by CAPM.

4.2 Pre-Crisis Period 2001-2007

4.2.1 Risk and Return for the Large-Cap Funds

As table 3 in Appendix A shows, the highest average monthly return, 0.44%, was obtained by Danske Invest Sverige during the pre-crisis period. The lowest return of 0.23% was reached by Nordea Sverigefond, Öhman Sverigefond not far behind with an average monthly return of 0.28%. Concerning the risk, Danske Invest Sverige anew shows the lowest standard deviation among the chosen funds. Handelsbanken Sverigefond has the highest standard deviation of 6.29% during the period.

4.2.2 Performance Measures for the Large-Cap Funds

All of the chosen funds except Danske Invest Sverige have a beta value that exceeds one. The highest value is obtained by Handelsbanken Sverigefond, which amounts to 1.03246. The lowest beta value of 0.87702 occurs for the fund Danske Invest Sverige. Once again, all of the funds present beta values close to one, indicating that the fund's average returns follow the market's average return fairly well.

Even in this time-period the majority of the large-cap funds tend to have negative Sharpe ratios. Danske Invest Sverige is the only fund showing a positive ratio of 0.01352. The same reasoning as for the full time period could be applied in this time period, meaning that the interpretation of a negative Sharpe ratio will be put aside. Thereby, the following conclusion is that Danske Invest Sverige is the best performing large-cap fund during the time period according to the Sharpe ratio. The Treynor ratio ranks the funds in the same way as the Sharpe ratio. Hence, also in this case, Danske Invest Sverige performs best.

The calculated Jensen's alpha for the large-cap funds shows that all the funds yield a lower return than that predicted by CAPM, although the alpha values are fairly close to zero.

4.2.3 Risk and Return for the Small-Cap Funds

According to table 4, the fund obtaining the highest return in the pre-crisis period is Lannebo Småbolag. The fund yields an average monthly return of 1.37%. The lowest return is the one yielded by Ålandsbanken Swedish Small Cap of 0.43%, whereas the remaining three funds show returns between 0.69 and 0.77%. In terms of risk, Skandia Småbolag Sverige and Ålandsbanken Swedish Small cap are the only funds with a standard deviation exceeding 6%. Lannebo Småbolag has the lowest standard deviation, 5.33%.

4.2.4 Performance Measures for the Small-Cap Funds

None of the chosen funds show a beta value that exceeds one. The fund with the highest beta value is Ålandsbanken Swedish Small Cap, whereas the lowest value, 0.79175, is obtained by Lannebo Småbolag.

The Sharpe ratio classifies Lannebo Småbolag as the best performing large-cap fund during the time period. The Sharpe ratio for Lannebo Småbolag amounts to 0.18833, compared to 0.00960 which is the Sharpe ratio for Ålandsbanken Swedish Small Cap, the weakest performing large-cap fund during the given time period. The same reasoning refers to the Treynor measure.

In terms of Jensen's alpha, all the funds have yielded abnormal returns during the pre-crisis period. Lannebo Småbolag is the fund with the highest excess return above that predicted by CAPM. Ålandsbanken Swedish Small Cap is the single fund that obtains a negative alpha value, indicating that this fund yielded a lower return than that predicted by CAPM.

4.3 Crisis Period 2008-2010

4.3.1 Risk and Return for the Large-Cap Funds

As can be seen from table 5 in Appendix A, Handelsbanken Sverigefond, Nordea Sverigefond and Öhman Sverigefond show all of them approximately similar results around 0.33%. SEB Sverigefond Stora Bolag has the lowest return, and the highest return among the large-cap funds is shown by Danske Invest Sverige, which yields a return of 0.69%. Concerning the standard deviation, Danske Invest Sverige has the highest one, whereas Öhman Sverigefond, Nordea Sverigefond and Handelsbanken Sverigefond show similar results of 7.53%, 7.54% and 7.56% respectively.

4.3.2 Performance Measures for the Large-Cap Funds

All of the funds show a beta value above one except for SEB Sverigefond Stora Bolag, which has a beta value of 0.96096. Once again, Handelsbanken Sverigefond, Nordea Sverigefond and Öhman Sverigefond show similar beta values close to 1.03. The beta values indicate that the majority of the funds' average returns follow the average return of the market well.

During the time period, all the funds except for SEB Sverigefond Stora Bolag succeeded in obtaining positive Sharp ratios. The best ratio was shown by Danske Invest Sverige, which reached 0.05068. Nordea Sverigefond and Öhman Sverigefond again show similar results with a Sharpe ratio of approximately 0.005. The same reasoning holds for the Treynor ratio, with one exception. The Treynor ratio ranks the Öhman Sverigefond as superior to Nordea Sverigefond, but the difference between the two funds is small.

The measure Jensen's alpha, gives all of the funds negative abnormal returns. Hence, all the returns of the funds were lower than the returns forecasted by CAPM.

4.3.3 Risk and Return for the Small-Cap Funds

Table 6 shows the performance measures for the small-cap funds during the crisis period. Lannebo Småbolag possesses the highest return of 0.89%, followed by Handelsbanken Svenska Småbolag with a return of 0.70% and Ålandsbanken Swedish Small Cap with the return 0.68%. SEB Sverigefond Småbolag obtains the lowest return; the fund reaches 0.35% during this time period. In terms of risk,

Lannebo Småbolag shows the lowest standard deviation of 6.82%, whereas Ålandsbanken Swedish Small Cap has the highest risk of 8.73%.

4.3.4 Performance Measures for the Small-Cap Funds

All the small-cap funds have a beta higher than one except for Lannebo Småbolag. The highest beta value is shown for Ålandsbanken Swedish Small Cap with a value of 1.07597. The lowest beta is once again found for the fund Lannebo Småbolag that obtains a beta value of 0.87417.

All of the small-cap funds have positive Sharpe ratios; Lannebo Småbolag shows the best performance during the time period with a Sharpe ratio of 0.09021. The lowest ratio is obtained by SEB Sverigefond Småbolag. The Treynor ratio ranks the funds in the same way as the Sharpe ratio.

When it comes to Jensen's alpha, Lannebo Småbolag solely obtains an abnormal return. All the other funds show negative alpha values, which indicates that the actual yielded return is lower than the return predicted by CAPM.

5. Analysis

5.1 Full-Time Period 2001-2010

In the full-time period the small-cap funds have on average higher return than the large-cap funds. The single time, when a small-cap fund does not outperform any of the large caps, is in the case of Ålandsbanken Swedish Small Cap. This fund has an average monthly return of 0.50%, which is only 0.02 percentage units lower than the best performing large-cap fund, Danske Invest Sverige. Hence, concerning the returns, the conclusion is that small-cap funds tend to outperform large caps in almost all the cases. This is also consistent with previous studies in this field, Banz, Klein and Bawa among others showed similar results. This outperformance can be due to well-performing small caps, but in this case it seems that the large-cap funds have underperformed during the full-time period. Small caps faced an upturn in the beginning of 2000's, whereas the large caps underperformed even in good economic climate.

There is no huge difference between the funds when it comes to the standard deviation. Remarkable is that the small-cap fund yielding the highest average return, Lannebo Småbolag, is also the fund with the lowest standard deviation among all the funds. Banz' theory concerning the small-firm effect, which states that small firms yield a higher risk-adjusted return than larger firms, is thereby applicable on Lannebo Småbolag. On the contrary, Banz' theory is not consistent with the behavior of Ålandsbanken Swedish Small Cap. This fund yields the lowest return among the small caps and has, in addition, the highest standard deviation among all the funds. However, Ålandsbanken Swedish Small Cap fits in the template of critics. Among others, Lustig and Leinbach criticised the small-firm effect and meant that taking a higher risk, as in investing in a small-cap fund, should by no means be compensated with a higher return. This holds when comparing Ålandsbanken Swedish Small Cap to the large-cap funds as the fund yields a higher return than all the large caps except of one.

All the large-cap funds, except Danske Invest Sverige, tend to have negative Sharpe ratios during the full-time period. The Treynor ratio follows the same pattern as the Sharpe ratio. It is thereby obvious that the small-cap funds perform better, evaluating on risk-adjusted return, during this time period. Even though Danske Invest Sverige shows a positive Sharpe ratio, it is still among the lowest compared to the small-cap funds. Once again, the results are strengthened by Banz' small-firm theory and other previous studies.

All the funds, both small and large-cap funds, have a positive beta values that lie around one. This implies that the funds are as volatile as the market. Notable is that the small-cap fund Lannebo Småbolag is the fund with beta value deviating most from the other funds' betas. The beta value of Lannebo Småbolag is the lowest among all the funds and is also statistically significant, indicating that the fund is less volatile than the market. Furthermore, Lannebo Småbolag yields the highest return and has the lowest systematic risk, which implies the highest Treynor ratio of the funds. This result agrees with previous studies, such as Banz' and Yan's.

The large-cap funds show merely negative alpha values and among the small-cap funds, three of five funds, generate a positive abnormal return. This means that the large-cap funds yield lower returns than the returns predicted by CAPM, whereas the small caps yield higher returns than forecasted by CAPM. However, the alpha values for the small-cap funds are close to zero and none of them are statistically significant indicating that it is hard to draw a conclusion concerning the small cap's

abnormal returns. Concerning the large caps, three of five funds have statistically significant alpha values, meaning that the funds most likely show subnormal returns. Once again, both Banz and Merton strengthen these findings. However, the findings can also apply to the statement made by Lustig and Leinbach (1983), who claims that CAPM is a mal-adjusted model for small caps.

According to all the used performance measures, the small-cap funds have on average performed better than the large caps during the full-time period. On average, the small caps yield a higher return and a lower risk, both in terms of total and systematic risk. As mentioned above, both Banz and Merton show the same findings.

The underlying reasons for the outperformance of large-cap funds can depend on many different factors. Firstly, this investigation is based on a relative small number of funds, which means that it is difficult to apply and generalise these findings to all Swedish funds, since this would not give a fair interpretation of the result. Thereby, the examined large-cap funds in this thesis are perhaps funds that have underperformed compared to other large-cap funds on the market. Similarly, the chosen small-cap funds are likely to be funds that have over performed compared to other small-cap funds.

Secondly, another underlying factor can be that some industries tend to be more vulnerable to periods of crises than other industries. Since this thesis does not focus on the funds' investment directions and diversification, it is possible that some funds perform worse than others due to investments in "wrong" industries and a low degree of diversification.

Thirdly, there is existing research that definitively states the fact that small-cap funds are a better investment than large-cap funds in terms of both risk and return. This can be due to that small firms tend to be neglected, less liquid or simply that small firms have a higher potential to grow than larger firms. Banz, Hedges, Yan, Chen et al and Reinganum have all come to the same conclusion as the findings in this thesis.

5.2 Pre-Crisis Period 2001-2007

The small-cap funds have significantly higher yields during the pre-crisis period than the large caps. The single time a large-cap fund outperform a small-cap fund, in terms of returns, is in the case of Danske Invest Sverige, which yields an average monthly return of 0.44%. This is 0.01 percentage unit higher than the small-cap fund Ålandsbanken Swedish Small Cap, during the same period. Worth to mention is that Ålandsbanken Swedish Small Cap has the lowest average return among the small caps during this time period, indicating that the small caps are performing distinctly superior than the large-cap funds.

The standard deviation is greater for three of the five large-cap funds when comparing to the small caps. Common for both the small and large-cap funds is that the fund with the highest return also has the lowest standard deviation. Hence, this is an indication of inconsistency with the traditional theory since a higher expected return should impose a higher risk. For the small caps, the opposite is also valid; the fund with the lowest return faces the highest standard deviation. Over all, the small-cap funds have, on average, a higher return and a lower risk compared to the large caps. Even in this case, Banz' theory concerning higher risk-adjusted return for small-cap funds seems to hold.

The Sharpe ratios for the large-cap funds still show negative values, except for Danske Invest Sverige. All the small-cap funds have positive ratios, indicating that small caps are better performing funds.

Lannebo Småbolag is the small-cap fund with the best Sharpe ratio of 0.18833, meaning that an investment in this fund yields 0.18833 return per undertaken unit of risk. The highest Sharpe ratio, of 0.01352, for the large caps, has Danske Invest Sverige. Compared to the small cap-funds, the Sharpe ratio of 0.01352, is the second worst, solely Ålandsbanken Swedish Small Cap shows a lower ratio. Hence, this is once again a proof of better performing small cap-funds, all consistent with Banz' small-firm theory.

According to both the Sharpe and the Treynor ratio, large-cap funds performed worse in the pre-crisis period than during the full-time period. As mentioned above, all the funds faced negative Sharpe ratios except Danske Invest Sverige, whose Sharpe ratio actually worsened during the period of good economic climate. In contrary, the small-cap funds follow the logic reasoning and all of the funds, except Ålandsbanken Swedish Small Cap, experience better Sharpe ratios during the pre-crisis period compared to the full-time period.

In this instance, all the beta values for large-cap funds, except the one for Danske Invest Sverige, is relatively close to one. On the contrary, the beta values for the small-cap funds are all less than one and three of them are significant. Thereby, most of the large-cap funds are more volatile than the market, whereas small-cap funds are less volatile than the market. This is surprising, since small-cap funds are expected to be more volatile than the market and vice versa. In this case, small-cap funds seem to be a safer investment than large caps, in terms of systematic risk. According to Lindmark (2010), this is not unexpected, since small-cap funds are predicted to be a superior investment in economic upturns. The large-cap funds performed bad during the pre-crisis period, which makes small-cap funds a safer investment decision during this time period, both according to return and risk.

Regarding the difference in beta values compared to the full-time period, there is hardly any difference between the large-cap funds. Even though the difference is slightly, all the funds follow the same pattern when it comes to the changes in beta values. For the funds experiencing a higher return during the pre-crisis period, a slightly higher beta value can also be observed, and the opposite refers to the cases when the funds have a lower return during the pre-crisis period, compared to the full-time period. The changed beta values for the large caps are thereby completely consistent with previous studies concerning risk and return.

Common for all the small-cap funds is that the beta values have lowered during the pre-crisis period, even though the returns are mostly higher. Thereby, the small-cap funds show a pattern that contradicts the traditional and that of the large caps. Once again, this can be seen as consistent with Banz' small-firm theory, since the small caps have lower risk and higher return than what could be expected.

Furthermore, the large-cap funds have negative alphas and are therefore yielding subnormal returns, while small-cap funds achieve abnormal returns. Even in this time period, the alpha values for the small caps are close to zero and not significant, thereby it is impossible to state that small-cap funds have shown abnormal returns during this time period. However, the alphas for the large caps are, almost all, significant, indicating that these funds most likely have underperformed during the pre-crisis period.

For the large-cap funds, three of five have higher alpha values in the pre-crisis period than in the full-time period. Although, this is a good sign, but it is still surprising that none of the large caps experience an abnormal return during the pre-crisis period.

The small-cap funds have all, except for Ålandsbanken Swedish Small Cap, succeeded to achieve higher abnormal returns during 2001-2007 compared to the full-time period. Even though Ålandsbanken Swedish Small Cap has a more negative alpha compared to the previous time period, this seems to be justifiable, since this is the single fund, among the small caps, to achieve a lower return during this time period. Hence, a lower alpha value is also to be expected.

As in previous period, the small-cap funds perform better than the large-cap funds. The behavior of the small-cap funds is logical, when taking into account the well-functioning climate that characterized the Swedish economy during the mid-2000.

5.3 Crisis Period 2008-2010

During the period of crisis, it seems like the pattern has changed for the large-cap funds. Remarkable is that all the large-cap funds, except SEB Sverigefond Stora Bolag have achieved higher average monthly returns in the crisis period than in the pre-crisis period. However, the behavior of the small caps is more logical in this time period. Three of five, of the small-cap funds attain a lower return in this time period compared to the previous period. Although, Ålandsbanken Swedish Small Cap tend to perform better in the crisis than in the pre-crisis period, and increases the average return of 0.25%. Handelsbanken Svenska Småbolag does also experience an augment in the return with merely 0.01 percentage units. Nevertheless, the remaining small-cap funds incur significant differences in the yielding returns. The largest reduction stands for Lannebo Småbolag, which experiences a decrease in average return of 0.48 percentage units. However, the fund has still the highest return among all the chosen funds.

Compared to the full-time period, all the large-cap funds, except SEB Sverigefond Stora Bolag, attain higher average returns in the crisis period than in the full-time period. For these funds, the logical reasoning is thereby reversed. On the contrary, the small caps show a better and more logical conducting, since three of the small-cap funds have lower average returns during the crisis compared to the full-time period. Ålandsbanken Swedish Small Cap and Handelsbanken Svenska Småbolag achieve higher returns during the crisis, even though the difference in return for Handelsbanken Svenska Småbolag is only 0.01 percentage units. However, Ålandsbanken Swedish Small Cap seems to follow the pattern of large-cap funds better than that for small caps.

Continuing with the standard deviation, common for the large-cap funds is that the standard deviation is substantially higher in the crisis period than in the years 2001-2007. This seems like an appropriate result since the turbulence on the market should impose a higher risk. This holds also when comparing to the full-time period, the highest standard deviations for the large-cap funds are found in the crisis period.

The small-cap funds follow the same pattern as the large caps and show a significant higher standard deviation during the crisis period compared to both the full-time period and the pre-crisis period. However, in two of five cases, the small-cap funds show a lower standard deviation than the large-cap funds in this last time period. Hence, the benefits of investing in large-cap funds during periods of crises are not evident.

Analysing the Sharpe ratios, Lannebo Småbolag outperform both the small and large-cap funds in terms of reward-to-volatility. Subsequently, among the large-cap funds, Danske Invest Sverige is the only fund that can match the Sharpe ratios of the small-cap funds. The fund has the second best Sharpe ratio after Lannebo Småbolag, but otherwise, the small-cap funds outperform the large caps.

The large-cap funds obtain, without hesitation, the best Sharpe ratios during the period of crisis compared to previous time periods. This is surprising since all the funds have higher standard deviations during this period. However, the average return also increases which offsets the increase in standard deviation. In addition, the risk-free rate is lower during the crisis period, which contributes to a higher risk premium and thereby a higher Sharpe ratio.

Once again, regarding the Sharpe ratios during the crisis period, the small-cap funds tend to follow the logic pattern. All the small caps, except Ålandsbanken Swedish Small Cap, have lower Sharpe ratios during the crisis period compared to the pre-crisis period. When comparing to the full-time period, all the funds, except Ålandsbanken Swedish Small Cap, have also lower Sharpe ratios during the crisis period than during the whole time period. Ålandsbanken Swedish Small Cap follows, anew, the pattern of the large-cap firms, at least when comparing to the full-time period.

During the crisis period, the beta values for the different funds seem to be fairly similar. The values vary from 0.87417 for Lannebo Småbolag, to 1.10929 for Danske Invest Sverige. Notable is that a small-cap fund obtain the lowest systematic risk and is the single fund to show a significant value. In contrary, a large-cap fund stands for the highest beta value. However, all the beta values, except the one for Lannebo Småbolag, are close to one and none of them are statistically significant. This is an indication of that the funds are more or less volatile than the market. It is although remarkable that the small-cap funds show beta values close to one since they are supposed to be more volatile than the market.

According to Jensen's alpha, all the funds show subnormal returns, except Lannebo Småbolag, during the crisis. Consequently, most of the funds' underperformed when using CAPM as a measure. This is not a surprising result, since underperformance is expected during hard times. However, the alpha values are not significant which means that there is no guarantee for the abnormal or the subnormal returns.

For the large-cap funds, compared to the whole time period, the subnormal return is larger during the crisis period for three of five funds. When comparing to the pre-crisis period, three of the five large-cap funds show lower negative alpha values during the period of crisis compared to the pre-crisis period. However, the large-caps show a negative alpha during all of the chosen time periods.

Most of the small-cap funds show, without hesitations, lower alpha values during the years 2008-2010. The only exception is Ålandsbanken Swedish Small Cap, which shows a more negative alpha value during the pre-crisis period than during the crisis period. Once again, this fund seems to act like a large-cap fund most of the time. The same reasoning holds when comparing to the full-time period. The higher beta values and lower risk-free rate can be contributing factors to the lower alpha value during the crisis period.

Interpreting solely the behavior of the small-cap funds, they seem to follow the theory in a pretty good manner. During the financial crisis, the funds attained, in three of five cases, considerable decreases in the average returns, indicating that small-cap funds are a doubtful investment during recessions and crises when comparing to the other time periods. The large-cap funds do not face a significant decrease in return during the crisis, which is consistent with the theory stating that large-cap funds tend to be a safe investment during hard times. A reason for this can be due to increased confidence and thereby an increased demand for large-cap funds, resulting in higher prices and returns. Investors may thus change their investment directions from small-cap funds toward larger caps, a fact that can explain the failure of the small-cap funds during the crisis period. What contradicts the theory is the bad performance of the large-cap funds during the pre-crisis period.

6. Conclusion

The purpose of this study was to investigate whether or not five randomly selected small-cap funds outperformed five randomly selected large-cap funds during a ten-year time period and two sub-periods. The price and return data is collected from the web page of Handelsbanken, Sveriges Riksbank and SIX Telekurs. The results were to some extent astonishing, but partially strengthened by previous studies in this field.

In the full-time period, the small-cap funds outperformed the larger funds based on risk-adjusted return. Both the Sharpe and Treynor ratio showed mostly negative values for all the large caps, whereas the small-cap funds obtained positive ratios. Regarding Jensen's alpha, three small-cap funds attained abnormal returns compared to none of the large caps. During the pre-crisis period, the funds followed the same pattern of performance as in the full-time period. Consequently, the small caps outperformed the large-cap funds even in this instance.

During the financial crisis, the large-cap funds performed better compared to previous time periods, whereas the small-cap funds performed worse. All the larger caps, with one exception, obtained positive Sharpe and Treynor ratios and better alpha values. However, in comparison with the small-cap funds, the larger caps' performance is still inferior the one of the small-cap funds.

Interpreting and taking into account the different measures, it seems like small-cap funds outperform and are a safer investment than large-cap funds in every single time period. An investor receives a lower return when investing in small-cap funds in crises compared to upswings, but the yielded return is still higher than when investing in large caps. The behavior of the small-cap funds is consistent with previous studies but the large-cap funds are acting in a remarkable way, in particular during the pre-crisis period, when the performance was inferior the one in the crisis period. The underlying reasons for this conducting can be due to a small sample, bad selected funds investing in "wrong industries" or no further research concerning the funds' true investment directions. However, the outstanding performance of the small-cap funds is strengthened by Banz, Hedges and Yan, among others.

7. Further Research

Some mutual fund companies and the Stockholm Stock Exchange do not always classify funds in the same way. Some fund companies count a large-cap fund as a small-cap when it falls below a certain level of market capitalization. Since the funds' investment directions are not investigated in this thesis, it would be appropriate to make a comparison between funds that only invest in relatively small companies and funds that are said to be small-cap funds but invests in large companies.

Previous studies argue that there is no clear trend in the performance of the small and the large-cap funds in economic booms and recessions. Therefore, a larger sample of funds and more time periods could be analysed in order to see if small and large-cap funds follow a specific performance pattern.

Another subject for further research can be to investigate whether or not small-cap funds tend to have higher management fees than large-cap funds and how this, if so, affect the acquired return and the performance.

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9. Appendices

9.1 Appendix A

Table 1: Performance Measures for Large-Cap Funds - Full-Time Period

Full-Time Period	Monthly	Standard	Beta	Sharpe	Treynor	Jensen's
2001-2010	Return	Deviation		Ratio	Ratio	Alpha
SEB Sverigefond Stora Bolag	0.25%	6.40%	0.98696	-0.01410	-0.00091	-0.00428
Handelsbanken Sverigefond	0.33%	6.70%	1.03245	-0.00120	-0.00008	-0.00361
Nordea Sverigefond	0.26%	6.67%	1.02741	-0.01263	-0.00082	-0.00436
Öhman Sverigefond	0.29%	6.62%	1.01928	-0.00762	-0.00049	-0.00399
Danske Invest Sverige	0.52%	6.37%	0.96415	0.02760	0.00182	-0.00154

Table 1: Performance Measures for Large-Cap Funds 2001-2010 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 2: Performance Measures for Small-Cap Funds - Full-Time Period

Full-Time Period	Monthly	Standard	Beta	Sharpe	Treynor	Jensen's
2001-2010	Return	Deviation		Ratio	Ratio	Alpha
SEB Sverigefond Småbolag	0.64%	6.34%	0.90959	0.04707	0.00328	-0.00013
Ålandsbanken Swedish Small Cap	0.50%	7.18%	1.00130	0.02287	0.00164	-0.00178
Handelsbanken Svenska Småbolag	0.69%	6.65%	0.94006	0.05272	0.00373	0.00029
Lannebo Småbolag	1.23%	5.83%	0.82254	0.15241	0.01079	0.00607
Skandia Småbolag Sverige	0.73%	6.84%	0.96479	0.05684	0.00403	0.00059

Table 2: Performance Measures for Small-Cap Funds 2001-2010 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 3: Performance Measures for Large-Cap Funds - Pre-Crisis Period

Pre-Crisis 2001-2007	Monthly Return	Standard Deviation	Beta	Sharpe Ratio	Treynor Ratio	Jensen's Alpha
SEB Sverigefond Stora Bolag	0.33%	6.12%	1.00265	-0.00659	-0.00040	-0.00344
Handelsbanken Sverigefond	0.33%	6.29%	1.03246	-0.00597	-0.00036	-0.00350
Nordea Sverigefond	0.23%	6.27%	1.02082	-0.02199	-0.00135	-0.00447
Öhman Sverigefond	0.28%	6.19%	1.00951	-0.01435	-0.00088	-0.00395
Danske Invest Sverige	0.44%	5.39%	0.87702	0.01352	0.00083	-0.00193

Table 3: Performance Measures for Large-Cap Funds 2001-2007 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 4: Performance Measures for Small-Cap Funds - Pre-Crisis Period

Pre-Crisis 2001-2007	Monthly Return	Standard Deviation	Beta	Sharpe Ratio	Treynor Ratio	Jensen's Alpha
SEB Sverigefond Småbolag	0.76%	5.51%	0.84313	0.07150	0.00467	0.00138
Ålandsbanken Swedish Small Cap	0.43%	6.39%	0.95643	0.00960	0.00064	-0.00229
Handelsbanken Svenska Småbolag	0.69%	5.79%	0.86700	0.05557	0.00371	0.00058
Lannebo Småbolag	1.37%	5.33%	0.79175	0.18833	0.01269	0.00764
Skandia Småbolag Sverige	0.77%	6.22%	0.93390	0.06491	0.00432	0.00120

Table 4: Performance Measures for Small-Cap Funds 2001-2007 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 5: Performance Measures for Large-Cap Funds - Crisis Period

Crisis-Period	Monthly	Standard	Beta	Sharpe	Treynor	Jensen's
2008-2010	Return	Deviation		Ratio	Ratio	Alpha
SEB Sverigefond	0.07%	7.00%	0.96096	-0.02950	-0.00215	-0.00622
Stora Bolag						
Handelsbanken	0.34%	7.56%	1.03246	0.00804	0.00059	-0.00385
Sverigefond						
Nordea	0.32%	7.54%	1.03836	0.00539	0.00039	-0.00408
Sverigefond						
Öhman	0.32%	7.53%	1.03556	0.00520	0.00038	-0.00409
Sverigefond						
Danske Invest	0.69%	8.20%	1.10929	0.05068	0.00375	-0.00064
Sverige						

Table 5: Performance Measures for Large-Cap Funds 2008-2010 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 6: Performance Measures for Small-Cap Funds - Crisis Period

Crisis-Period	Monthly	Standard	Beta	Sharpe	Treynor	Jensen's
2008-2010	Return	Deviation		Ratio	Ratio	Alpha
SEB Sverigefond	0.35%	7.93%	1.02067	0.00947	0.00074	-0.00366
Småbolag						
Ålandsbanken	0.68%	8.73%	1.07597	0.04623	0.00375	-0.00061
Swedish Small Cap						
Handelsbanken	0.70%	8.33%	1.06189	0.05026	0.00394	-0.00040
Svenska Småbolag						
Lannebo Småbolag	0.89%	6.82%	0.87417	0.09021	0.00704	0.00238
Skandia Småbolag	0.63%	8.10%	1.01638	0.04368	0.00348	-0.00085
Sverige						

Table 6: Performance Measures for Small-Cap Funds 2008-2010 Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

9.2 Appendix B

Table 7: Significance of Beta and Alpha - Full-Time period

2001-2010		Parameter	Standard Error	t-value	Significant
Large-Cap Funds					
SEB Sverigefond Stora Bolag	β	0.9872816	0.0181826	-0.699481922	N
	α	-0.485384	0.137437	-3.53	Y
Handelsbanken Sverigefond	β	1.028073	0.0190274	1.475398636	N
	α	-0.2687613	0.1438233	-1.87	N
Nordea Sverigefond	β	1.031045	0.0187084	1.659415022	N
	α	-0.306833	0.1414117	-2.17	Y
Öhman Sverigefond	β	1.01931	0.0201442	0.958588576	N
	α	-0.3467257	0.1522643	-2.28	Y
Danske Invest Sverige	β	0.955742	0.0235415	-1.87999915	N
	α	-0.3030836	0.177944	-1.7	N
Small-Cap Funds					
SEB Sverigefond Småbolag	β	0.9066781	0.0359868	-2.593225849	Y
	α	-0.3856168	0.2720147	-1.42	N
Ålandsbanken Swedish Small Cap	β	1.00164	0.045702	0.035884644	N
	α	-0.2867787	0.3454495	-0.83	N
Handelsbanken Svenska Småbolag	β	0.9381851	0.0406327	-1.521309192	N
	α	-0.2224582	0.3071319	-0.72	N
Lannebo Småbolag	β	0.8070208	0.0352072	-5.481242473	Y
	α	-0.1334265	0.2661218	-0.5	N
Skandia Småbolag Sverige	β	0.963171	0.0427748	-0.860997597	N
	α	-0.1000124	0.3233232	-0.31	N

Table 7: Significance of Beta and Alpha Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telemekurs (2011).

Table 8: Significance of Beta and Alpha - Pre-Crisis Period

2001-2007		Parameter	Standard Error	t-value	Significant
Large-Cap Funds					
SEB Sverigefond Stora Bolag	β	1.00568	0.0204394	0.277894654	N
	α	-0.3342267	0.1515359	-2.21	Y
Handelsbanken Sverigefond	β	1.03071	0.0188797	1.62661483	N
	α	-0.2351144	0.1399722	-1.68	N
Nordea Sverigefond	β	1.032536	0.0217509	1.495846149	N
	α	-0.2899916	0.1612591	-1.8	N
Öhman Sverigefond	β	1.003189	0.0225633	0.141335709	N
	α	-0.3989771	0.1672822	-2.39	Y
Danske Invest Sverige	β	0.8785408	0.0207445	-5.855007351	Y
	α	-0.6447726	0.153798	-4.19	Y
Small-Cap Funds					
SEB Sverigefond Småbolag	β	0.8555504	0.0389245	-3.711020052	Y
	α	-0.4612433	0.2885824	-1.6	N
Ålandsbanken Swedish Small Cap	β	0.9622452	0.0482702	-0.78215545	N
	α	-0.5013122	0.3578707	-1.4	N
Handelsbanken Svenska Småbolag	β	0.8794731	0.0453326	-2.658724626	Y
	α	-0.4307138	0.3360913	-1.28	N
Lannebo Småbolag	β	0.7840185	0.0420238	-5.139504281	Y
	α	-0.1325418	0.3115602	-0.43	N
Skandia Småbolag Sverige	β	0.948826	0.0480239	-1.065594423	N
	α	-0.0895812	0.356045	-0.25	N

Table 8: Significance of Beta and Alpha Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).

Table 9: Significance of Beta and Alpha – Crisis Period

2008-2010		Parameter	Standard Error	t-value	Significant
Large-Cap Funds					
SEB Sverigefond Stora Bolag	β	0.9559015	0.0391048	-1.127700436	N
	α	-0.7407506	0.2916212	-2.54	Y
Handelsbanken Sverigefond	β	1.021897	0.0471414	0.464496175	N
	α	-0.3293041	0.3515539	-0.94	N
Nordea Sverigefond	β	1.016194	0.0388853	0.416455576	N
	α	-0.3257905	0.2899846	-1.12	N
Öhman Sverigefond	β	1.05493	0.0439451	1.249968711	N
	α	-0.3013101	0.3277173	-0.92	N
Danske Invest Sverige	β	1.09499	0.0548156	1.732900853	N
	α	0.1384473	0.4087833	0.34	N
Small-Cap Funds					
SEB Sverigefond Småbolag	β	0.9926483	0.0796092	-0.092347367	N
	α	-0.408131	0.5936801	-0.69	N
Ålandsbanken Swedish Small Cap	β	1.095058	0.1053212	0.902553332	N
	α	0.0031431	0.7854259	0	N
Handelsbanken Svenska Småbolag	β	1.041525	0.0873702	0.475276467	N
	α	0.0058606	0.6515571	0.01	N
Lannebo Småbolag	β	0.8419228	0.0703884	-2.245784817	Y
	α	-0.214347	0.5249163	-0.41	N
Skandia Småbolag Sverige	β	0.9944086	0.0941427	-0.059392815	N
	α	-0.1803716	0.7020625	-0.26	N

Table 9: Significance of Beta and Alpha Source: Calculations based on price and return data from Handelsbanken, Sveriges Riksbank and SIX Telekurs (2011).