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Strategic and tactical asset allocation - is it really used?

A study of two investment strategies within Swedish balanced funds

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Abstract

Title: Stategic and tactical asset allocation - is it really used? - A study of two investment strategies within Swedish balanced funds

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Key words: Strategic asset allocation, tactical asset allocation, asset allocation, investment strategies, balanced funds

Purpose: To examine *if* strategic and tactical asset allocation are used within Swedish balanced funds and outline *how* these investment stratgies are used, by identifying trends.

Method: Compiled data over the asset allocation within swedish balanced funds 12 years back will be analyzed by defining strategic and tactical asset allocation in quantitive terms. Hypothesis tests will verify trends.

Conclusions: There are significant long term trends for three out of four asset classes. Over time, the amount of equities has decreased and the amount of other derivatives and unit trusts have increased. Tactical asset allocation has been used within Swedish balanced funds and it is a function of stock index, conjunction indicator and interest rates for almost all asset types.

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1. BACKGROUND

This chapter will serve as an introduction. It will present the problem and the purpose of this thesis. It will also outline relevant delimitations.

1.1 Introduction

If modern portfolio theory would be applicable on all markets and all asset and investors would believe in CAPM (Capital Asset Pricing Model), the best alternative would then be to invest in the market portfolio, an index fund.[1]

Fortunately for the fund industry, people believe that individual fund managers can outperform the market. Otherwise there would not be 30 billion Swedish kronor in hedge funds, during the beginning of 2014.[2] As a hedge-fund manager, or a fund manager for any fund that is not an index fund, you are expected to beat the performance of passive investments even after risk has been considered.[3] This is where investment strategies comes in. The purpose with an investment strategy is to maximize the wealth of an investment over a period of time. An investment strategy could be anything from investing according to patterns of historical prices or looking for arbitrage.[4] In simple terms, it could be security selection or asset allocation.[5]

This thesis will analyze the usage of asset allocation within Swedish balanced funds. It will examine strategic asset allocation (long term) and tactical asset allocation (short term). It will also present a definition and relevant terms in order to understand investment strategies. Hence, a quote by Meir Statman will initially introduce the differences in an illustrative way;

"Good strategic asset allocation is like tailoring a well-fitting suit. Good tactical asset allocation and security selection is weaving the suits fabric at a low cost. Both are important, but they are distinct. High-quality fabric woven at a low cost provides little comfort when it drapes a size 40 body in a size 46 suit."[6]

[1] H Byström, *Finance – Markets, Instruments and Investments,* Studentlitteratur, Lund, 2007, p. 15
[2] Nysparande och fondförmögenhet 2014, http://www.fondbolagen.se/Statistik--index/Nysparande-i-fonder/ *2014-04-19*
[3] H Byström, *Finance – Markets, Instruments and Investments,* p. 15
[4] C Erlwein, R Mamon, M Davidson, 'An examination of HHM-based investment strategies for asset allocation', *Applied Stochastic Models in Business and Industry*, December 2009, pp. 1
[5] Z Bodie, A Kane, A Marcus, *Investments and Portfolio Management,* ninth edition, McGraw Hill, New York, 2011, p. 36
[6] M Statman, *The 96,3 % Question of Financial Advisors*, 2000, pp. 16

1.2 Purpose and problem

The purpose of this text is to examine strategic and tactical asset allocation and see whether and how the investment strategies are used in a practice. The aim is to identify general trends, upon which the conclusion will rely on. The research will be done quantitatively on Swedish balanced funds with support of relevant literature. A multiple regression analysis and hypothesis testing will be done in order to quantify the results. The problem that the thesis will answer follows:

Are strategic and tactical asset allocation used within Swedish balanced funds in a way that trends could be identified?

The two different investment strategies will be quantified and compared in relation to stock market, conjunction indicator and interest rate.

1.3 Delimitation

In order to write this thesis according to the given guidelines, some delimitation will be determined.

To start with the data is delimit to Sweden, and fund companies that are under the Financial Supervisory Authority, *Finansinspektionen.* I consider my knowledge of the Swedish market superior to my knowledge within other markets, and the data for Swedish funds easier to access.

The second delimitation is by only researching on balanced funds. For the definition of balanced funds, this thesis refers to a definition by Morningstar:

> *"A mutual fund that has an investment mandate of "balancing" its portfolio holdings. The fund generally includes a mix of stocks and bonds in varying proportions according to the fund's investment outlook."*[7]

These funds are considered to more flexible than other funds in the asset allocation between asset classes.

[7] Morningstar: Balanced Fund, http://www.morningstar.com/InvGlossary/balanced_fund_definition_what_is.aspx *2014-02-06*

2. THEORY

Relevant theories will be presented in this chapter; a brief presentation of modern portfolio theory and explanations regarding the concepts of investment strategies, asset allocation, strategic asset allocation as well as tactical asset allocation. An outline of regression analysis and hypothesis testing will also be included for readers not familiar with these concepts.

2.1 Modern portfolio theory

Modern portfolio theory is often considered founded by Harry Markowitz in 1952 and the development of the mean-variance analysis. According to this analysis, there is a best way of maximizing return (mean) given a preferred level of risk (variance), for investors who cares only about return and risk. In the diagram below stocks are representing assets with high risk and bonds are representing assets with low risk.[8] There are numerous of kinds of other assets that could be included in a portfolio, but these will not be considered in order to simplify the model.

The curved line in the diagram below is called the portfolio frontier, it illustrates possible combinations of assets with higher risk and assets with lower risk. The investor should choose a combination that will put them as much to the up-left on the curve as possible. The upper part of the curve is called the efficient frontier, all portfolios on the upper part of the curve will have the same risk but higher expected return than portfolios on the lower part of the curve.[9]

A straight line illustrate the set of means and standard deviations that could be achieved when cash is added to a portfolio on the curved line. The point where the two lines touch is called the tangency portfolio, which is the best mix of stocks and bonds. According to financial theory, every investor who cares about only mean and variance should hold the tangency portfolio but add more or less cash, depending on their risk-preferences.[10]

[8] J Campbell, , LM Viceira, *Strategic Asset Allocation: Portfolio Choice for Long Term Investors*, Oxford University Press: 2002, p. 2
[9] H Byström, *Finance – Markets, Instruments and Investments*, p. 131-134
[10] J Campbell, , LM Viceira, *Strategic Asset Allocation: Portfolio Choice for Long Term Investors*, pp. 2

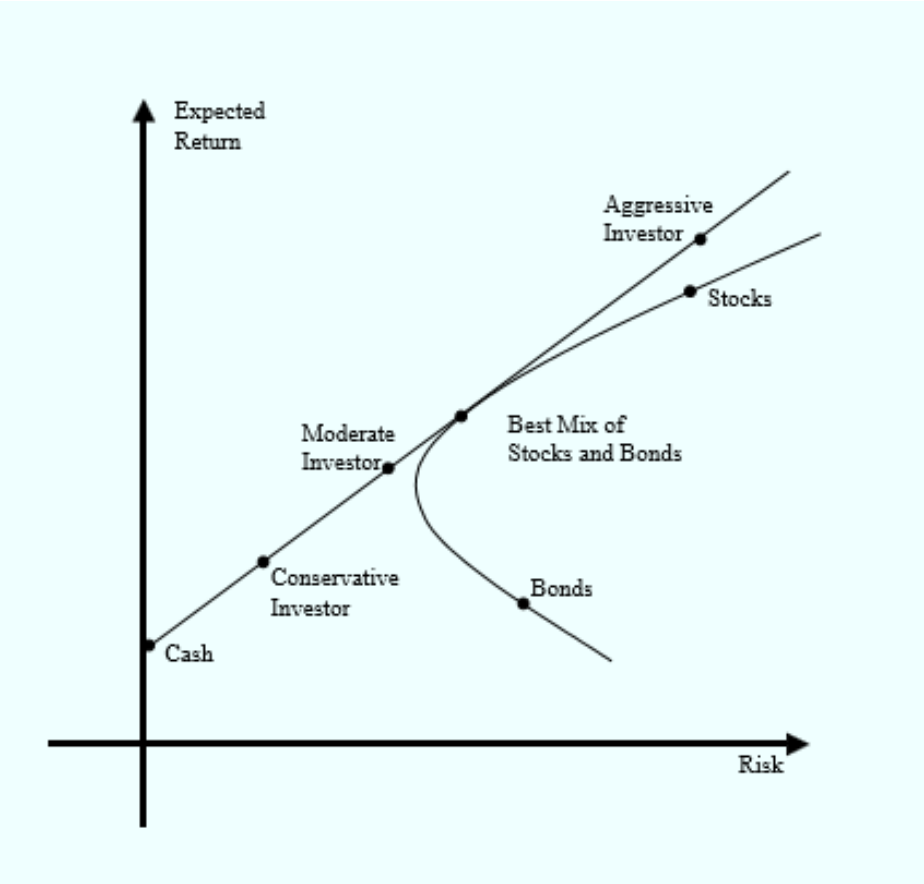

Figure 1. Mean-Variance Diagram[11]

The mean-variance analysis has been developed into CAPM, Capital Asset Pricing Model, an equilibrium theory of the market portfolio. The model is stating that all asset in the long term will be a part of the market portfolio and therefore be paid the price of their risk premium, an equilibrium price. Attempts to outperform the market portfolio will consequently be unnecessary, since all asset is priced correctly.[12]

[11] Ibid., pp. 3
[12] Z Bodie, A Kane, A Marcus, *Investments and Portfolio Management*, p. 308-311

2.2 Investment strategies

The purpose with investment strategies is to maximize the wealth of an investment over a period of time. The mean-variance model, accounted for in previous chapter, is a classical model aiming to maximize return in relation to risk. An essential factor of the model is the adoption of an efficient market. Investors who do not believe that the market is efficient, will instead use investment strategies in order to benefit from the inefficiencies. Technical analysis of historical asset prices and arbitrage strategies are two examples of such investment strategies.[13]

Essentially, there are two types of investment decisions within investment strategies. Asset allocation is the decision between broad asset classes, and security selection is the decision of particular securities.[14] This chapter will only focus on asset allocation, since security selection is less relevant for this thesis.

2.2.1 Asset Allocation

Asset allocation as an investment strategy aims to allocate the investments among different types of assets in order to match the investors risk tolerance, goals and time horizon. A general consensus within finance is that there are no such thing as a general asset allocation, it is rather an investment strategy starting from individual preferences as illustrated in mean-variance diagram above. Although, asset allocation focus on the asset classes rather than individual securities.[15]

There is no definite definition of what an asset class is even though asset allocation is a widely known concept. Asset allocation could be defined in comprehensive terms, including only three different asset types – equities, bond and cash. By defining asset allocation in a comprehensive way there is a risk that there are securities who could not be clearly defined, such as derivatives.

[13] C Erlwein, R Mamon, M Davidson, 'An examination of HHM-based investment strategies for asset allocation', *Applied Stochastic Models in Business and Industry*, p. 1
[14] P Z Bodie, A Kane, A Marcus, *Investments and Portfolio Management,* p. 36
[15] Investopedia: Asset Allocation, http://www.investopedia.com/terms/a/assetallocation.asp#ixzz1QTuSzfhn *2014-03-31*

An alternative approach of defining is according to cash flow; capital assets, consumable/transformable assets and store-of value assets. According to this definition stocks and bonds would be categorized as capital assets, commodities as consumable/transformable assets and fine-art as store-of-value assets.[16]

2.2.2 Strategic asset allocation

Strategic asset allocation is a buy and hold strategy with target allocations for different asset classes. The target allocation depends on different factors, such as the time horizon, risk-willingness and the type of assets that investments are allocated between. If the investor's references change over time, the target allocation will consequently have to change. The portfolio will also have to be rebalanced back to the original strategic target allocations, if the performance of the different assets classes change the original proportions.[17]

The term strategic asset allocation was coined by Brennan, Schwarz and Lagnado, in 1997 in the paper "Strategic Asset Allocation", described as a long-term response to time-varying investment opportunities.[18]

The optimal portfolio on the efficient frontier, in Markowitz mean-variance model, have been seen as a static, one-period, strategic asset allocation decision. Although, financial actors such as pension funds, usually have a planning horizon many years ahead and cannot for that reason use a static, one-period asset allocation decision. Strategic asset allocation in practice is more dynamic.[19]

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[16] T Idzorek, *Strategic Asset Allocation and Commodities,* Ibbotson, Chicago, 2006, pp. 3-4
[17] Investopedia: strategic asset allocation http://www.investopedia.com/terms/s/strategicassetallocation.asp *2014-03-31*
[18] J Campbell, YL Chan, M Viceira, 'A multivariate model of strategic asset allocation', *Journal of Financial Economics',* vol. 67, January 2002, pp. 42
[19] TK Sui, 'Long-term strategic asset allocation with inflation risk and regime switching', *Quantitative Finance,* vol. 11, May 2009, pp. 1

2.2.3 Tactical asset allocation

One of the earliest to introduce tactical asset allocation was Harry Markowitz, describing it as a "systematic allocation of investment portfolios across broad asset classes such as bonds, stocks and cash". As an investment strategy, tactical asset allocation gained popularity with the crash of the stock market in 1987. By investing according to the strategy investors would have been able to avoid being affected of the crash, by allocating their money from equities to other assets in time.

Tactical asset allocation is a matter of timing, it is a single period strategy which requires the investor to have a mean-variance criteria defined over one period. According to Brennan, Schwarz and Lagnado, there are two critical aspects with tactical asset allocation. First, returns are often not defined in a single period and by having such a short-term strategy, one have to make a proxy. Secondly, since the timing in tactical asset allocation is crucial the investor must be able to predict the future market returns in a correct way. An investor which invests according to the tactical asset allocation strategy cannot believe in the random walk hypothesis.[20][21]

2.2.4 Applied modern portfolio theory

The theory of the efficient frontier is applicable on investment strategies such as strategic and tactical asset allocation. The diagram below shows the efficient frontier, which is only the upper part of the portfolio frontier curve. As mentioned in previous chapter, all portfolios on the upper part of the curve will have the same risk but higher expected return than portfolios on the lower part of the curve.[22]

Tactical asset allocation could be described as a shift *of* the efficient frontier. It is illustrated in the diagram below as a shift from 1 to 2. Strategic asset allocation, on the other hand, is a shift *on*

[20] M Brennan, ES Schwarz, R Lagnado, 'Strategic Asset Allocation', *Journal of Economic Dynamics & Control*, vol. 21, 1997, pp. 1377-1378
[21] Definition: "The theory that stock price changes have the same distribution and are independent of each other, so the past movement or trend of a stock price or market cannot be used to predict its future movement." http://www.investopedia.com/terms/r/randomwalktheory.asp *2014-03-31*
[22] H Byström, *Finance – Markets, Instruments and Investments,* p. 131-134

the efficient frontier. It is illustrated as a shift from A to B in the figure below. Strategic asset allocation requires a selection of assets that fits the risk attitudes of the investors, and it could be described as the management of *investors*. Tactical asset allocation could then be described as the management of *investments*.[23]

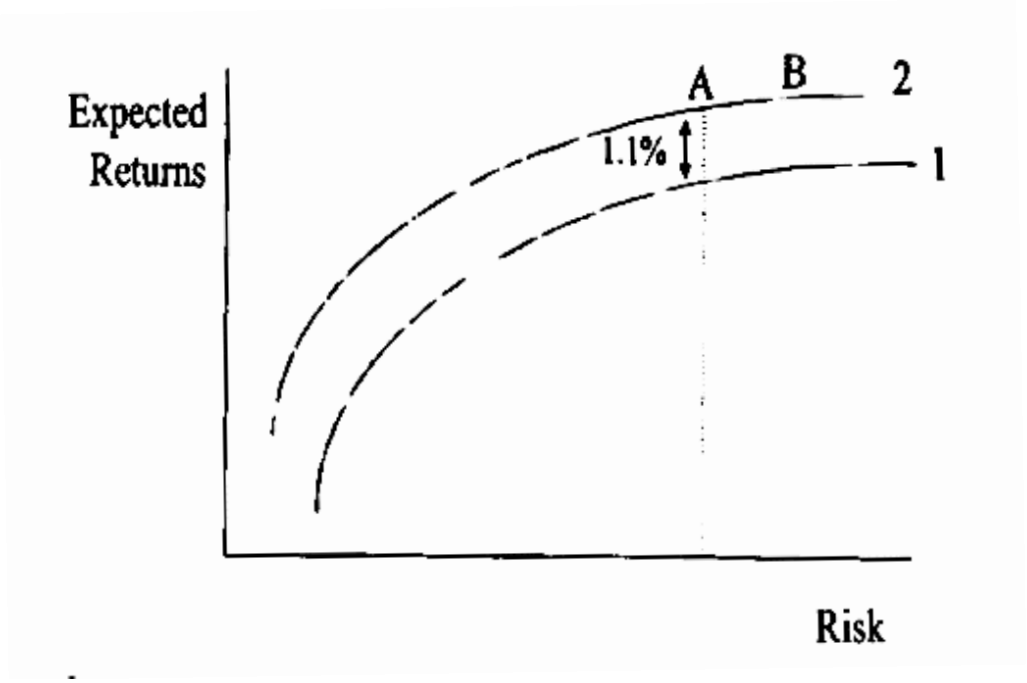

Figure 2. Strategic Asset allocation versus Tactical Asset allocation[24]

[23] M Statman, *The 96,3 % Question of Financial Advisors*, pp. 17
[24] Ibid., pp. 17

2.3 Econometric concepts

2.3.1 Regression analysis

A regression analysis is used in order to analyze a relationship between two variables, where both variables are quantitative and assume many values. In order to analyze a relationship between more than two variables, a multiple regression analysis is used.[25] Below is presented an example of a summary output on a multiple regression analysis. This example is taken from a multiple regression analysis done in this essay, where the relationship between equities and stock index, purchasing manager index and interest rates index is analyzed. A simple regression analysis will not be presented since it is done in the same way but with only one variable.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.6052							
R Square	0.3663							
Adjusted R Square	0.3176							
Standard Error	1.7170							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3.0000	66.4665	22.1555	7.5148	0.0004			
Residual	39.0000	114.9816	2.9482					
Total	42.0000	181.4481						
	Coefficients	*Standard*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	96.2039	2.2239	43.2590	0.0000	91.7056	100.7021	91.7056	100.7021
OMX Stockholm 30 index	-0.0038	0.0102	-0.3753	0.7094	-0.0244	0.0168	-0.0244	0.0168
Swedbank PMI	0.0096	0.0230	0.4166	0.6793	-0.0369	0.0560	-0.0369	0.0560
Stockholm Interbank Rate 3M	0.0397	0.0088	4.4999	0.0001	0.0219	0.0576	0.0219	0.0576

Figure 3. Regression Analysis

There are two types of variables in a regression analysis, the X-variables, also known as the independent variables (in this example OMX Stockholm 30 index, Swedbank PMI and

[25]K Dahlström, *Från datainsamling till rapport*, femte upplagan, Studentlitteratur, 2001, p. 218

Stockholm Interbank Rate 3M) and the Y-variable, also known as the examined variable or the dependent variable (in this example equity).[26]

When plotting these variables in a graph, a relationship could (or could not) be identified by a regression line. A least square method is then used to calculate regression coefficients in order to make the squared distance between the actual plot and the estimated regression line as small as possible.[27] The formula of regression line is determined as:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3$$

The coefficient in front of X_1 is recognized as the average change in Y if X_1 increase one unit and all other independent variables are fixed.[28] The regression line of the above example would then be:

$$\hat{Y} = b_0 - 0.0038X_{OMXS} + 0.0096X_{PMI} + 0.0397X_{Rate\,3M}$$

From this line a conclusion could be drawn; if OMXS is increased by one unit, the amount of equity is lowered by 0.0038 units.

The standard error next to the coefficient is the standard error of the slope coefficient.[29] It is recognized as the distance of the regression line from the points of the independent variables.[30]

The t-statistics is defined as

$$\boldsymbol{t_{b1} = \frac{b_1 - \beta_1}{s_{b1}}}$$

In most regression programs, such as the one in Microsoft Excel, β_1 is defined as zero.

$$\boldsymbol{\beta_1 = 0}$$

Student's t-statistics will therefore be the coefficient divided by the standard error.[31]

[26] Ibid., p. 219
[27] Ibid., p. 221-222
[28] Ibid., p. 224
[29] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, eight edition, Pearson, USA, 2013, p. 441
[30] Ibid., p. 439
[31] Ibid., p. 440

$$t_{b1} = \frac{b_1 - \beta_1}{s_{b1}} = \frac{b_1}{s_{b1}}$$

R^2 is the squared correlation coefficient, it is the coefficient of determination and could be explained as the percent explained variability. With some exemptions, the higher values indicated better regression.[32]

2.3.2 Hypothesis test

A hypothesis test is a way of testing a causation, often an experiment including a number of units such as persons, mice or municipals.[33] In this thesis the units will be different asset classes. A common example of a hypothesis test is testing the effect of new pharmaceuticals. A number of people (or animals) is then divided in two groups, where one group is treated with the pharmaceutical and the other with placebo. If the difference between the two groups are so considerable that it could not have been caused randomly, the difference is then said to be significant.[34]

When testing a hypothesis on a regression analysis the aim is to determine if there is a relationship or not. If the regression slope is determined by β_1 and β_1 equals 0 a conclusion could be done that there is no relationship or trend between the independent and the dependent variable, X and Y. The hypothesis will then be denoted:

$$\boldsymbol{H_0: \beta_1 = 0}$$

$$\boldsymbol{H_1: \beta_1 \neq 0}$$[35]

[32] Ibid., p. 435
[33] K Dahlström, *Från datainsamling till rapport,* p. 382
[34] Ibid.
[35] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics,* p. 440

H_0 is the null hypothesis and H_1 is the alternative, which is valid if the null hypothesis is rejected.[36] In a hypothesis test of a regression analysis a test variable is used to test the null hypothesis. There are different methods for testing a hypothesis, and below will only be presented the method that is relevant for this thesis. Given that b_1 is normally distributed, this will be denoted:

$$\boldsymbol{t_{b1} = \frac{b_1 - \beta_1}{s_{b1}}}$$

Since the null hypothesis is β1 equals 0 (there is no relationship) this could be rewritten as

$$\boldsymbol{t_{b1} = \frac{b_1}{s_{b1}}}$$

If b_1 is the coefficient of the independent variable and s_{b1} is the standard deviation of this coefficient then Student´s t-statistics will be the division of these. If the t-statics is a large number a conclusion could be drawn that there is a strong evidence to reject the null hypothesis and a strong relationship between the dependent and the independent variable. In order to determine a limit of an acceptable t-statistics a decision rule is set before the test.

H_0 is rejected if

$$\boldsymbol{\frac{b_1 - \beta_1}{s_{b1}} > t_{n-K-1,\alpha/2}}$$

or

$$\boldsymbol{\frac{b_1 - \beta_1}{s_{b1}} < -t_{n-K-1,\alpha/2}}$$[37]

[36] K Dahlström, *Från datainsamling till rapport*, p. 241
[37] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, p. 442, 497

$t_{n-K-1,\alpha/2}$ is the critical value, a number gained from a table. It consists of the number of observations, the number of categories and the confidence interval.[38] A 95% confidence interval means that 95% of all intervals will cover the true value with a normally disturbed curve.[39] Alfa is the number 1 subtracted by the confidence interval, for example 5%. In a two-tailed test with 60 observations and a 95% confidence interval, a Student´s t-statics with a greater value than 2 indicate that there is a relationship between the dependent and the independent variable.[40]

A confirmation could be done by looking at the p-value, because the p-value is the probability that the null hypothesis is true.[41]

3. PREVIOUS RESEARCH

This chapter serve as an overview to relevant previous research about strategic and tactical asset allocation.

In 1986, Gary Brinson, L. Randolph Hood and Gilbert Beebower published a six page article on the topic "Determinants of Portfolio Performance". In the article, they concluded that 96, 3% of the variation in total pension plan returns could be explained by investment policy. To Brinson and Hood, the article was a way to establish a theory they have come up with when working with institutional pension clients. They argued that there was too much focus on the selection of investment managers and too little focus on reviewing asset allocation policies. The research was done 1974 -1983 on 91 large corporate pension plans. In brief, it concluded that the proportions of broad asset classes included in the portfolio had a significant effect of the return.[42] The article started a debate on asset allocation and portfolio performance[43].

[38] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, p. 440-443
[39] K Dahlström, *Från datainsamling till rapport,* p. 273
[40] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, p. 440-443
[41] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, p. 441
[42] RL Hood, 'Determinants of Portfolio Performance - 20 years later', *Financial Analysts Journal*, 2005, pp. 6 – 7
[43] Ibid., pp. 8

One of the debaters was William Jahnke, whom in 1997 published "The Asset Allocation Hoax" in which he strongly criticized the article in several ways. As an example, he argued that asset weights for an investor should not fixed as they were in the research. The expected return, he said, could not be fixed, since the investment opportunities differs over time.[44]

In 2000, Meir Statman discussed both views in "The 96, 3% Question of Financial Advisors". He concluded that Brinson, Hood and Beebower were correct when arguing that strategic asset allocation was more important than tactical asset allocation and security selection. But, in contrary to their findings, he concluded that it was because of the 1, 1% detracted from the return by using tactical asset allocation and security selection. He argued that financial advisors should focus on investor management rather than investment management.[45]

Roger G. Ibbotson and Paul D. Kaplan published in 2000 a research on whether asset allocation explains 40, 90 or 100 percent of the performance. They concluded that it was a matter of the way asking the question. Focusing on the variation of the return among funds that are explained by policy, it is 40 percent. But in a typical fund and the variability in return across time, 90 percent is explained by policy. Finally, on average 100 percent of the level of returns is explained by the policy return level.[46]

4. METHODOLOGY

In the chapter of methodology the scientific methods for this essay will be presented. The procedure of the examination will be described as well as definitions of concepts. In addition to this, an outline will be presented of the statistical methods used in the regression analysis and hypothesis testing. In the end of this chapter, possible weaknesses will be accounted for.

[44] W Jahnke, 'The Asset Allocation Hoax', *Financial Design – White paper,* vol. 1, February 1997, pp. 3
[45] M Statman, Meir, *The 96,3 % Question of Financial Advisors*, pp. 19
[46] RG Ibbotson, PD Kaplan, *Does Asset Allocation Policy Explain 40,90 or 100 percent of Performance*, *Financial Analysts Journal,* Jan/Feb 2000, pp. 26

4.1 Scientific methods

There are three research philosophies to consider; positive, hermeneutic and critical. A strict positive philosophy will rely on a quantitative method and logical reasoning. With this approach, a thesis will serve as an observation. A positive research philosophy have been used throughout this thesis.

A hermeneutic philosophy is stating the opposite, and a thesis with a hermeneutic approach will be an interpretation rather than an observation. Critical research philosophy is a mix of the positive and hermeneutic, aiming to combine the participating and observing perspective.[47]

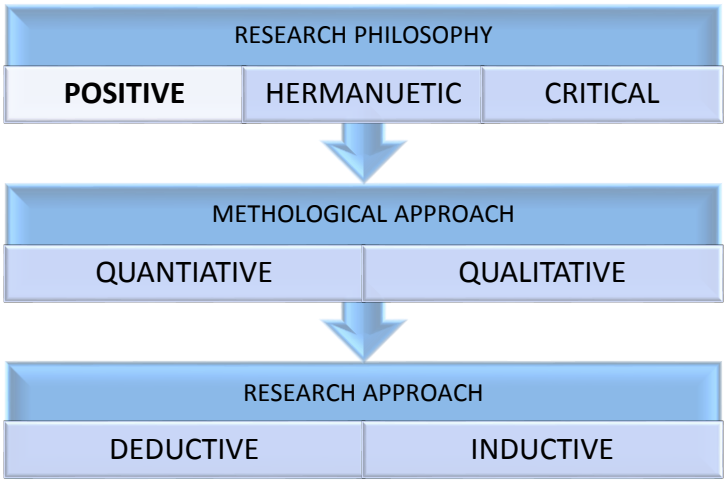

Figure 4. Research philosophy

A thesis also could be either quantitative or qualitative. A quantitative method is used when the primary data is based on a numerical observation or can be transformed into a numerical observation. [48] A qualitative method is on the contrary *not* a numerical observation, the observation or conclusion is often instead examined by using words as a tool.[49] Quantitative data is normally regarded as "hard facts" and qualitative data as "soft facts". [50]

[47] F Wiederheim-Paul, LT Eriksson, *Att utreda, forska och rapportera*, Liber ekonomi, Malmö, 1999 p. 218-222
[48] J Backamn, Rapporter och Uppsatser, Studentlitteratur AB, Lund, 2010, p. 33
[49] Ibid., p. 33
[50] F Wiederheim-Paul, LT Eriksson, *Att utreda, forska och rapportera*, p. 65

For this thesis, a quantitative method was selected. A qualitative method could have been done by interviews. A quantitative method was considered to be superior because it provided a more general view that contained more information than a qualitative would have given.

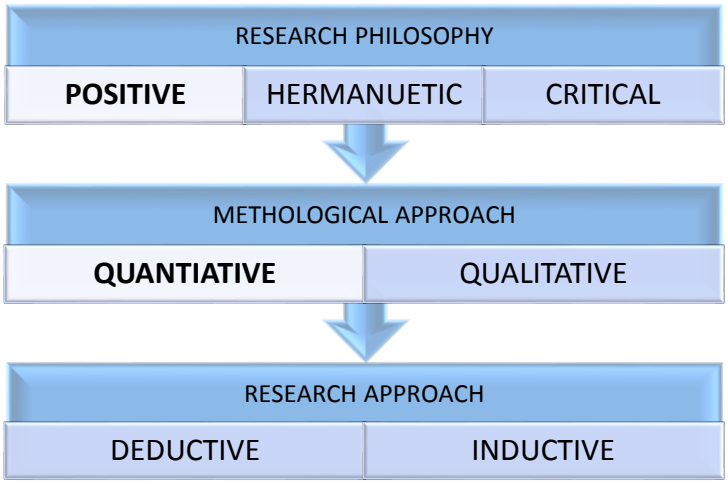

Figure 5. Methodological approach

Finally, there are two types of logical reasoning; deductive reasoning and inductive reasoning. The approach the author choose to take affects the pattern to which the final conclusion is reached.[51]

Deducative reasoning is normally the easiest form of logical reasoning. A deductive reasoning consist of major and minor arguments that are linked together. A conclusion is drawn by simply putting them together. For instance; a first argument "birds fly", and a second argument "I am a bird". The conclusion with deductive reasoning will be: "therefore I fly".[52] A deductive reasoning has been used in this thesis due to the quantitative material that have been available.

Inductive reasoning is more complex since it implicates an identification of common factors among arguments that are not necessary linked to each other.[53] An example with using inductive reasoning could be; "She studies diligent", "She has intelligent parents", "She masters social

[51]B Minto, *The pyramid principle. Logic in writing and thinking*, third edition, Pearson Education, Essex, 2009, p. 63
[52] Ibid., p. 63-67
[53] Ibid.,, p. 69

skills". From those three arguments the conclusion will then be: "She has keys to success in today's society".[54]

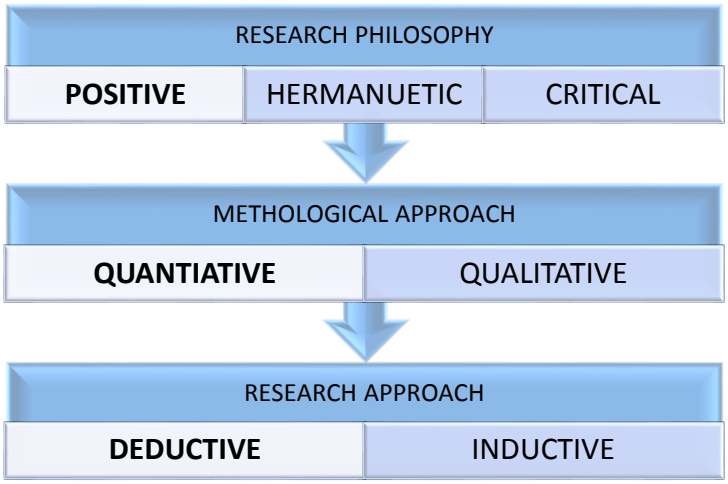

Figure 6. Research approach

4.2 Procedure

To collect information about all Swedish balanced funds and their holdings, information was gained from the website of the Swedish Financial Supervisory Authority, *Finansinpektionen*.[55] As a government authority they are collecting information from all fund companies under their supervision, and it is a requirement for almost every financial services company to be under their supervision.[56] The information from the fund companies regarding their holdings is compiled quarterly and regards the last business day the previous quarter.[57]

[54] SÅ Hörte, *Hur kan man ge struktur åt rapporter och uppsatser?*, Luleå Tekniska Universitet, Avdelningen för Industriell Organisation, pp. 7
[55] Swedish Financial Supervisory Authority – Fund holdings, http://fi.se/Register/Fondinnehav/ *2014-03-31*
[56] Swedish Financial Supervisory Authority – Registered companies not under the supervisory of FI, http://fi.se/Register/Foretagsregistret/Registrerade-foretag-som-inte-star-under-FIs-tillsyn/ *2014-03-31*
[57] Swedish Financial Supervisory Authority – About fund holdings, http://fi.se/Register/Fondinnehav/Om-fondinnehav/ *2014-03-31*

To identify balanced funds in the information from the Swedish Financial Supervisory Authority a categorization was used from the Swedish version of Morningstar. Morningstar categorize funds based on the previous three years portfolio statistics. New funds are categorized based on an estimate and thereafter given a more permanent category when portfolio statistics is available.[58]

I wanted to specifically look at balanced funds since my view was that they normally have the possibility to allocate with less restrictions than e.g. equity funds.

After identifying all the balanced funds, the relevant information was collected of which funds to include and their holdings. Although the holdings were specified, such as "H&M B", there was a need to identify the asset class for this instrument as the correct one, in this case "equities". In order to do so, ISIN was used. ISIN is the "International Securities Identification Number", it is a worldwide system to classify securities. Every security has a 12 digit ISIN-number, which consist of a mixture of letters and numbers.[59]

The program Datastream was then used to identify what kind of asset class every ISIN-number was connected to. Some of the holdings were not able to be identified by their ISIN in Datastream or by other resources. In those cases they had to be manually categorized by their name. By identifying common identifiers, such as Ltd, Fut, AK all holdings that were not categorized by Datastream could be identified. This created a complete workbook telling which balanced funds with what asset type that had existed the last twelve years.

The data was tested in a simple and multiple regression analysis based on set definitions. OMX Stockholm 30 Index, Swedbank PMI SA and Stockholm interbank rate 3 months was collected from Bloomberg in order to identify trends. Hypothesis tests evaluated the significance of the initially asked problem.

[58] Morningstar – Category, http://www.morningstar.com/InvGlossary/morningstar_category.aspx *2014-03-31*
[59] ISIN, http://www.isin.org/isin/ *2014-03-31*

4.3 Assumptions

4.3.1 Defining strategic and tactical asset allocation

In order to gain information about strategic and tactical asset allocation the allocations had to be defined in relation to the data. When doing so, the long term trend was determined to be define as strategic asset allocation, and the deviation from that line as the tactical asset allocation. Below is an example illustrating strategic and tactical asset allocation, the dotted line marks the strategic asset allocation and the filled line marks the tactical asset allocation.

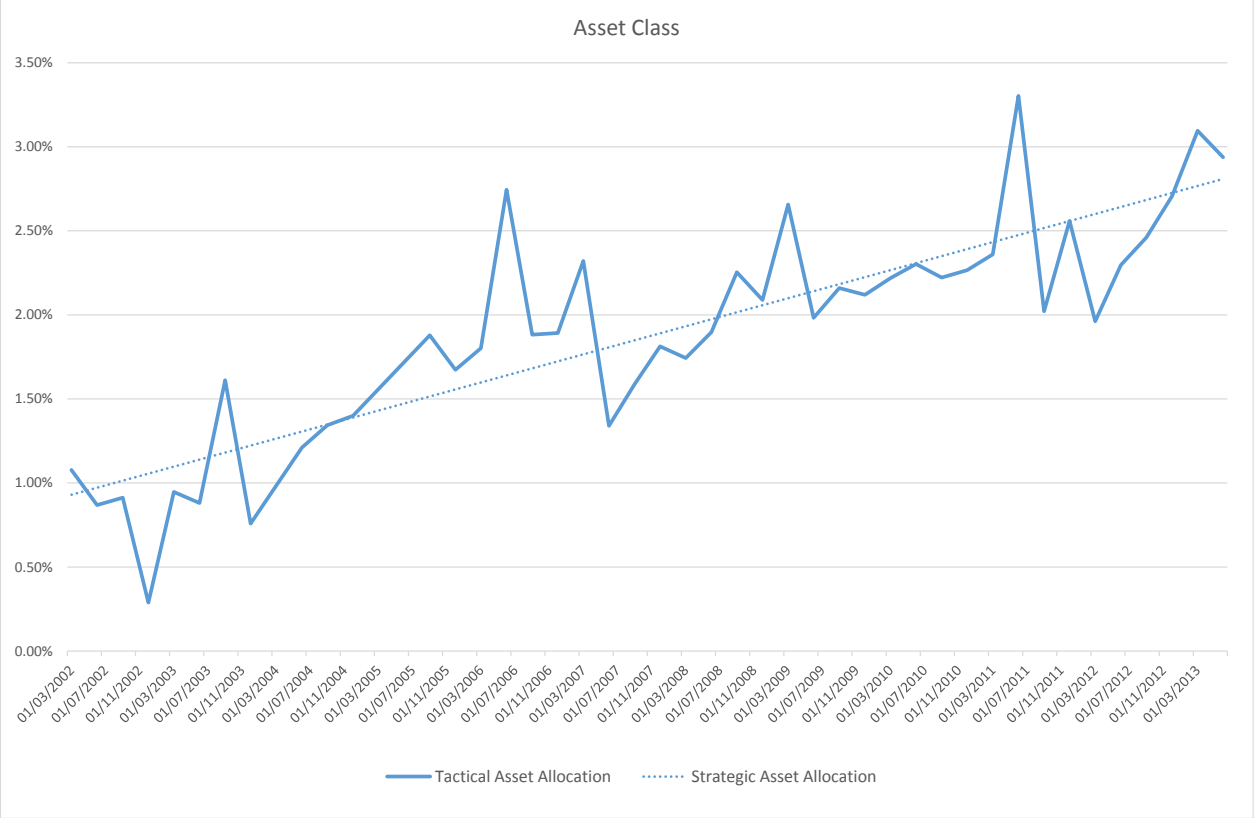

Figure 7. Illustration of strategic and tactical asset allocation

The reason for defining strategic asset allocation as a long term trend and not as a fixed average was because the information gained from an average would not be as accurate as the trend. As argued by Meir Statman;

"..but investors might change their strategic asset allocations if they change their trade-off between their expected returns and risk. Investors might also change their strategic asset allocations if they revise their estimates of expected returns or risk, but strategic asset allocation are found on the acceptance of the current market valuations, not on challenge to them."

If strategic asset allocation had been fixed, changes in long term investment policies or closed and open balanced funds would not have been taken into consideration. For that reason, strategic asset allocation was chosen to be defined as the long term trend of tactical asset allocation and not as a fixed average.

Further explained by Meir Statman the tactical asset allocation is a way of timing the market and doing shifts in asset allocations.[60] The conclusion was made that this would best be interpreted from the deviations from what was defined as the strategic asset allocation.

4.3.2 Variables in regression analysis

The regression used for the strategic asset allocation only tested one independent variable, time. The dates were indexed from 1-46 with a gap for the three quarters were the Financial Supervisory Authority did not have the information. It was 43 observations in total.

The regression used for the tactical asset allocation was consisting of three variables other than the dependent variable, Y.

$$\hat{Y} = b_0 + b_1 X_{OMXS} + b_2 X_{PMI} + b_3 X_{Rate\,3M}$$

X_{OMX} is the OMX Stockholm 30 Index. The index consist of the 30 most traded stocks at OMXS.[61] It was compared to Stockholm all share, but due to higher volatility the OMX

[60] M Statman, *The 96,3 % Question of Financial Advisors*, pp. 2
[61] Avanza – OMXS30, https://www.avanza.se/index/om-indexet.html/19002/omx-stockholm-30, *2014-04-19*

Stockholm 30 Index was considered more useful for the analysis, since the market trends were more significant.

X_{PMI} is the Swedbank PMI Index. It is a purchasing manager index that consist of 200 purchasing managers within manufacturing in Sweden. It is a conjunction indicator founded in 1994.[62] A GDP measurement would have been an alternative way of approaching the behavioral finance through an indicator. Although, Swedbank PMI was considered giving more up-to date indicator of the market view.

$X_{Rate\ 3M}$ is the Stockholm interbank rate, Stibor, 3 months. It is a reference rate showing an average of interest rates that are being offered amongst a number of Swedish banks called Stiborbanks. The 3 months rate is the average rate without collaterals.[63] Repo rate was considered as an alternative to Stibor, but Stibor was considered favorable due to stronger reflections of economic conditions and market view. Other lengths of the Stibor rate could also have been used, but 3 months was considered relevant due to the horizon of tactical asset allocation.

The variables included three different aspects that affects the asset allocation; stock market, conjunction indicator and interest rate. There are many parameters left out, which is a possible weakness, but these three variables were considered the most relevant.

4.3.3 Variables in hypothesis test

The hypothesis test was done according to theoretical methods, presented in Chapter 2.3.2 *Hypothesis test.* The following variables were included:

Hypothesis

$$\boldsymbol{H_0: \beta_1 = 0}$$

$$\boldsymbol{H_1: \beta_1 \neq 0}$$

[62] Swedbank – PMI, http://www.swedbank.se/om-swedbank/analyser/samhallsekonomi/inkopschefsindex/inkopschefsindex,-mal-och-metodik/index.htm, *2014-04-19*
[63] National bank of Sweden – Explanation of the series, http://www.riksbank.se/sv/Rantor-och-valutakurser/Forklaring-till-serierna/Svenska-marknadsrantor/, *2014-04-19*

Test variable

$$t_{b1} = \frac{b_1 - \beta_1}{s_{b1}}$$

Decision rule,

H_0 rejected if

$$\frac{b_1 - \beta_1}{s_{b1}} > t_{n-K-1,\alpha/2}$$

or

$$\frac{b_1 - \beta_1}{s_{b1}} < -t_{n-K-1,\alpha/2}$$[64]

The variance of the population was unknown, therefore a student´s t-statistics was used.[65] The level of significance, α, was set to 5% and hence a confidence interval was determined to 95 % since 1-α = 0.95.[66] It was set to 5% due to praxis. A two-tailed critical value was chosen for all hypothesis tests in order to include both positive and negative trends.

Degrees of freedom was determined different depending on regression, giving different decision rules, and therefore different critical values.

[64] P Newbold, WL Carlson, BM Thorne, *Statistics for Business and Economics*, p. 442, 497
[65] Ibid., p. 382
[66] Ibid., p. 443

4.4 Possible weakness in method

In order to make the thesis more transparent, the advantages and disadvantages with the method will be discussed from the perspective of validity and reliability.

Validity is a systematical weaknesses that are built in the research design. Inner validity focuses on the weakness of the tools used when doing the research, and outer validity reveals if the result is comparable to reality.[67]

Two possible weaknesses in inner validity has been identified. In order to link the data of the balanced funds asset allocation with strategic and tactical asset allocation, it had to be defined according to these investment strategies. Although it was done based on critically examined resources, there is still a factor of interpretation. An option would have been to do a qualitative thesis, for instance asking fund managers what kind of strategy they use. But a quantitative research was considered superior due to a bigger sample and less bias in subjective interpretation.

Indices for stock market, conjunction indicator and interest rate was chosen in order to make a regression analysis. The indices was determined after a profound consideration, which is discussed more in chapter 4.3.2 Variables in regression analysis.

To continue, reliability of an essay is asking the question "If the same research would be done again, would it be the same result?" A survey might have asked a specific group of people a question, and when doing the survey one more time, other people might answer otherwise.[68]

The reliability of the thesis is considered overall strong, although, for the transparency of this thesis, there is a few things that should be highlighted. The data from the Financial Supervisory Authority was not complete, they had not been able to collect the information in 3/43 quarters. Despite this, it was the most complete information available, so the information was decided to be used anyway, but with carefulness.

[67] A Avdic, *Riktlinjer för rapportering*, version 2,8, Örebro Universitet, pp. 13
[68] A Avdic, *Riktlinjer för rapportering*, pp. 14

Not all of the assets had ISIN number. For those without I had to manually define their asset class based on their name, e.g. Lindex AK was defined as "Equities" based on AK (saying it is a stock). An alternative way would have been choose to not include the one without ISIN instead of defining them manually. But by doing so the result might have gotten a distorted, so the method of defining was considered superior.

5. DATA

In this chapter the primary and secondary data that has been used will be presented.

Primary data or primary sources is sources where the author has organized the data and the information on its own, whereas with secondary data/sources the information is given and the author already organized, so that the author is instead referring to this source.[69] This essay is based on both primary and secondary data.

5.1 Primary data

The primary data in this essay consist of information from Fund Companies under the supervision of Swedish Financial Supervisory Authority. The information has been collected quarterly since 2002 and consist of the fund companies' funds and the holdings of these funds. As an example:

[69] Ibid., pp. 12

Post	Quarter	Institution Number Fund Company	Fund Company	Institution Number Fund	Fund	Market Value	Fund Capital	NAV
info	31/03/2003	58060	SEB Fondförvaltning AB	52265	SEB Trygg Placeringsfond	699225512	905594000	948,538
Instrument	**ISIN**	**Country**	**Number of Instruments**	**Interest Rate**	**Exchange Rate**	**Market Value2**	**Unlisted**	**Home/Abroad**
ASI FA UTDELANDE	SE0000984148	SE	6,819,860,188	53,532	1	3650807		
ASSA AK B	SE0000255648	SE	40815	70	1	2857050		
ASTRAZENEC AK	GB0009895292	GB	36902	292	1	10775384		
ATLAS AK A	SE0000101032	SE	32075	170	1	5452750		
ATLAS AK B	SE0000122467	SE	1374	158	1	217092		
BILIA AK A	SE0000102295	SE	400	84	1	33600		
BILLERUD AK	SE0000862997	SE	10590	103,5	1	1096065		
BOLIDEN AK	SE0000869646	SE	27330	15,2	1	415416		
CASTELLUM AK	SE0000379190	SE	11650	113,5	1	1322275		
CYBERCOM AK	SE0000702169	SE	1170	11,5	1	13455		
DJ Euro Stoxx Bank 0306	FESBM3	EU	350	0	92,517,937	162137		
DJ EURO STXX50 0306	EU STXX 0306	EU	1580	0	92,517,937	-2248245		
ELECTROLUX AK B SEK	SE0000103814	SE	35834	134	1	4801756		
ENIRO AK	SE0000718017	SE	23220	55	1	1277100		
ERICSSON AK B	SE0000108656	SE	1717700	5,5	1	9447350		
EUR030519		SE	4722790	0	92,517,937	43547869		
FC Volvo 030513	SE0001039447	SE	48000000	3,62	1	47802919		
FTSE 100 Index 0306		GB	270	0	134,204,551	-650769		
FÖRENSPARB AK A	SE0000242455	SE	68107	98,5	1	6708539		
GBP030519		SE	1430950	0	134,204,551	19110875		
H&M AK B	SE0000106270	SE	90101	178	1	16037978		
HANDELSB AK A	SE0000193120	SE	48890	119,5	1	5842355		
INVESTOR AK B	SE0000107419	SE	57950	49,2	1	2851140		
iShares DJ US Healthcare	US4642877629	US	8000	49,05	84,988	3334929		
JM AK	SE0000806994	SE	15650	99	1	1549350		
JPY030519		SE	219100000	0	0,071605	15689723		
KINNEVIK AK B	SE0000104416	SE	28418	100	1	2841800		
LGPHOLDING AK	SE0000383499	SE	3210	23	1	73830		
LINDEX AK	SE0000267056	SE	3308	103,5	1	342378		
METRO SDB B	SE0000696858	SE	12960	3,67	1	47563		

Figure 8. Fund data – example

The primary data was supported with categorization from the Swedish version of Morningstar in order to identify the balanced funds. The following 162 funds was categorized as balanced funds and this is the funds on which this thesis is based on:

Humle Kapitalförvaltningsfond	Cicero World Asset Selection	Swedbank Robur Premium Modig	Fond i Fond Avanza 75
Carnegie Strategifond	IKC Sverige Flexibel	SPP Generation 50-tal	Danske Invest Horisont Offensiv
Lannebo Mixfond	IKC World Wide	Swedbank Robur Transfer 60	Avanza Fond i Fond +East Capital
Danske Invest Aktiv Förmögenhetsförvaltning	Skandia Skala 1:5	Handelsbanken Balans 50	Avanza Fond i Fond +BlackRock
Cliens Mixfond Sverige B	Skandia Skala 2:5	Danske Invest Horisont Försiktig	Avanza Fond i Fond +SKAGEN
AMF Balansfond	Skandia Skala 3:5	Skandia Balanserad	Cicero World 0-40
Cliens Mixfond Sverige A	Skandia Skala 4:5	Nordea Stabil	Cicero World 0-80
Swedbank Robur Mix Indexfond Sverige	Skandia Skala 5:5	Nordea Avtals Pensionspar Midi	Cicero World 0-100
Lärarfond 45-58 år	Fondbytesprogrammet 0-100	Swedbank Robur Bas Action	Navigera Balans
SEB Generation 60-tal	Fondbytesprogrammet 0-50	Nordea Stratega 50	Danske Invest Horisont Offensiv utd
SEB Generation 70-tal	Sensor Sverige Select	Lärarfond 59+	Danske Invest Horisont Balanserad utd
Swedbank Robur Transfer 80	SPP Leva	Swedbank Robur Bas Mix	Danske Invest Horisont Försiktig utd
KPA Etisk Blandfond 2	Peab-fonden	SEB Trygg Placeringsfond	Danske Invest Horisont Ränta utd
SEB Trygghetsfond Ekorren	Danske Invest Horisont Ränta	Catella Balanserad	Danske Invest Aktiv Förmögenhetsförv utd
Nordea Generationsfond 70-tal	Fondguide Offensiv	Swedbank Robur Etik Balanserad	Mobilis Mix A
Folksams Förvaltningsfond	TurnPoint Global Allocation	Länsförsäkringar Försiktig	Mobilis Stabil A
Nordea Generationsfond 60-tal	Länsförsäkringar Flexibel 0-100	Handelsbanken Flermarknadsfond	FBP Opportunities Flexible B
Nordea Generationsfond 50-tal	Allra Strategi Försiktig	Navigera Balans 1 SEK	Movestic Bevara
Länsförsäkringar Pension 2025	Solidar Fonder Flex 40	Länsförsäkringar Trygghetsfond	Movestic Bygga
Länsförsäkringar Pension 2030	Solidar Fonder Flex 70	Swedbank Robur Premium Balanserad	IKC Taktisk Allokering 0-40
Länsförsäkringar Pension 2035	Advisor Världen	Nordea Stratega 30	IKC Taktisk Allokering 0-80
Länsförsäkringar Pension 2040	Navigera Dynamica 90	Swedbank Robur Transfer 50	IKC Taktisk Allokering 0-100
Swedbank Robur Transfer 70	FBP Opportunities Flexible	Sparbanken Bas	IKC Tre Euro Balanserad
SEB Världenfond	FBP Pension Variabel	Enter Maximal	IKC Taktisk Allokering Opportunities
Danske Invest Horisont Balanserad	Cicero World 0-50	Fondservice Sverige/Världen	Aktie-Ansvar Saxxum Aktiv
Länsförsäkringar Pension 2045	Naventi Balanserad	Swedbank Robur Premium Försiktig	Solidar Fonder Flex 70 B
KPA Etisk Blandfond 1	Naventi Offensiv	Skandia Försiktig	Naventi Balanserad Strategi Movestic
DNB Stiftelsefond	Naventi Offensiv Tillväxt	Swedbank Robur Access Trygg	Naventi Offensiv Strategi Movestic
Handelsbanken Stiftelsefond	Solidar Fonder Flex 40 Plus	Nordea Stratega 10	Nordnet Offensiv
Nordea Donationsmedelsfond icke-utd	Solidar Fonder Flex 70 Plus	SEB Strategi Balanserad Global	Nordnet Balanserad
Länsförsäkringar Pension 2020	Swedbank Robur Transfer 90	Skandia Selected Global Försiktig	Simplicity Balans
Swedbank Robur Etik Stiftelse	Tellus Eqvator	Swedbank Robur Bas Solid	Multifond Balanserad
SPP Generation 70-tal	Granit Basfonden	Naventi Aktiv Förvaltning Offensiv	Multifond Försiktig
SPP Generation 80-tal	Allra Strategi Försiktig B	Fondservice Världen	Fondservice Balans Movestic
Strand Förmögenhetsfond	Navigera Balans 2	Mobilis Aktiv	Handelsbanken Potential 75
SEB Stiftelsefond Balanserad	Naventi Defensiv	Naventi Aktiv Förvaltning Balanserad	DNB Förmögenhetsförvaltning
Skandia Selected Strategi	Plain Capital BronX Acc	JRS Wealth	IKC Sunrise
Nordea Generationsfond 80-tal	SBAB Sparfond Medel	Nordnet Försiktig	ICA Banken Varlig
SPP Generation 60-tal	SBAB Sparfond Lång	Swedbank Robur Mixfond Pension	ICA Banken Måttlig
SEB Generation 50-tal	SBAB Sparfond Kort	Coeli Ekvator Total	Fond i Fond Avanza 50
Nordea Stratega 70	Fair Play		

Figure 9. Analyzed funds in this thesis

5.2 Secondary data

To gain further information relevant literature and electronic resources in the field of finance, investment strategies and asset allocation was used. Relevant literature and electronic resources was also used for assisting purposes such as writing methodology, doing a regression analysis and a hypothesis test.

6. RESULTS

The chapter in which the results is presented is divided into three parts. The first part is presenting the results of the hypothesis test on strategic asset allocation, the second part is presenting the results of the hypothesis test on the tactical asset allocation and the third part is a summary of the results.

Due to the previous definitions of strategic and tactical asset allocation the slope of the dotted line could be identified as the strategic asset allocation and the deviation from the line as the tactical asset allocation. To answer the first part of this thesis problem (*Are strategic and tactical asset allocation used within Swedish balanced funds)* a table is presented below.

	Equities	Bonds & Convertibles	Other Derivatives	Unit Trusts	Mean
Equation for trend line	y = -7E-06x + 1.164	y = -3E-06x + 0.1991	y = 5E-06x - 0.1613	y = 5E-06x - 0.2018	-
Slope	-0.000007	-0.000003	0.000005	0.000005	0.0000
R^2	0.1976	0.0865	0.7151	0.6064	0.4014

Figure 10. Table of compiled data of asset types over time

The table reveals that when compiling the data, there was a long term trend and a deviation from the long term trend, for all asset classes. This is shown by the fact that the coefficients of the slope and R^2 is different from zero.

6.1 Hypothesis test – Strategic Asset Allocation

In this chapter two hypothesis tests has been done to examine whether the implications regarding strategic asset allocation from the compiled data were significant or not. The first hypothesis test was testing if the mean of the first 21 observations were different from the mean of the last 21 observations. The null hypothesis was that the difference between the two means were equal to zero and there was no significant difference, meaning there was not a significant slope. Hence, there was no trend.

The second hypothesis test on strategic asset allocation were testing the relationship between allocation and time. This was done by a regression analysis where time was the independent variable (X-variable) and the amount of a specific asset class was the dependent variable (Y-variable). The null hypothesis was that there were no significant relation between time and allocation. The regression coefficient was then equal to zero.

6.1.1 Equities

Equities		
	First half	*Second half*
Mean	0.9041	0.8910
Variance	0.0002	0.0004
Observations	21	21
Pooled Variance	0.0003	
Hypothesized Mean Difference	0	
Degrees of Freedom	40	
Critical value, two tailed test	+-2.0211	
T statistics	2.4714	
P-value	0.0178	
Significantly different from 0	YES	
Rejection of H_0	YES	

Figure 11. Equities, outline for the hypothesis test on the slope

The table above is the hypothesis test on the difference between the mean of the allocation for equities in the first- and second half of all observations. The means tells that there were a difference, implicating there is a trend. The t-statistics was higher than the critical value meaning that the difference between the two means are significantly different from zero. There is a significant trend in the allocation of equities. The null hypothesis stating that there is no trend will therefore be rejected. This trend is illustrated in the diagram below.

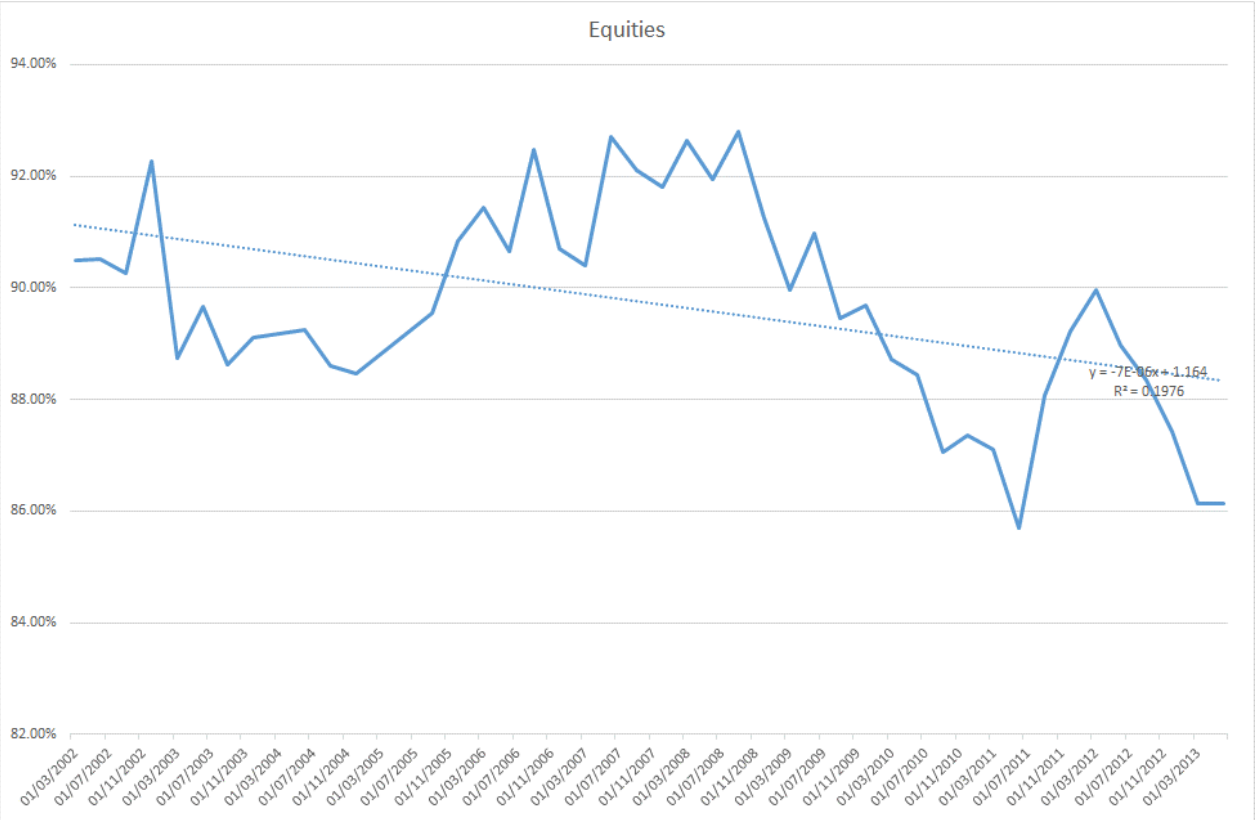

Figure 12. Percentage of equities in Swedish balanced funds from 2002Q1 to 2013Q2, with trend line.

The second hypothesis test on the regression coefficient of time was also rejected. Below is a summary of the results of the second hypothesis test on strategic asset allocation. The null hypothesis stating there is no relationship between time and the amount of equities of total allocation, is rejected. There is a negative relationship, showing if time (defined 1-46) is increased by one unit, equities is lowered by 0.0006 units.

Equities	
Significance level	5%
Degrees of Freedom	41
Critical value	+-2.0195
Coefficients	-0.0006
Standard Error	0.0002
T statistics	-3.1781
P-value	0.0028
Significantly different from 0	YES
Rejection of H_0	YES

Figure 13. Equities, outline for the hypothesis test on time

6.1.2 Bonds and Convertibles

Bonds & Convertibles		
	First half	*Second half*
Mean	0.0753	0.0681
Variance	0.0002	0.0001
Observations	21	21
Pooled Variance	0.0002	
Hypothesized Mean Difference	0	
Degrees of Freedom	40	
Critical value, two tailed test	+-2.0211	
T statistics	1.7387	
P-value	0.0898	
Significantly different from 0	NO	
Rejection of H_0	NO	

Figure 14. Bonds and Convertibles, outline for the hypothesis test on the slope

The t-statistics for bonds and convertibles was lower than the critical value meaning that the null hypothesis was not rejected. There is no significant trend for bonds and convertibles. In the illustration below, it is clear that the trend is not as strong as it was in the illustration on equities. Although there might be a weak trend, it is not significant enough to be defined as a trend.

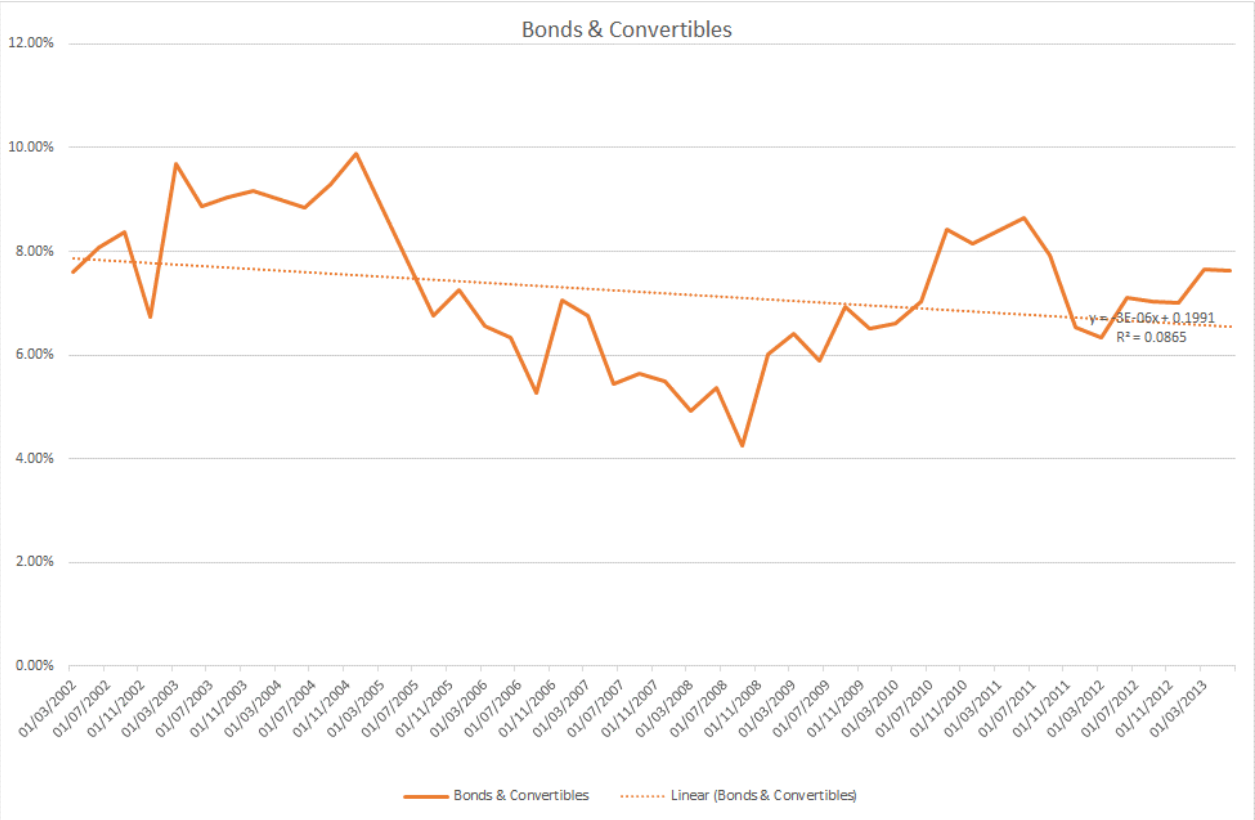

Figure 15. Percentage of bonds and convertibles in Swedish balanced funds from 2002Q1 to 2013Q2, with trend line.

In the second hypothesis test for bonds and convertibles the affection of time was tested. Again, the hypothesis test was not rejected meaning the null hypothesis is true and there is no significant relationship between time and the percentage of bonds and convertibles.

Bonds & Convetibles	
Significance level	5%
Degrees of Freedom	41
Critical value	+-2.0195
Coefficients	-0.0003
Standard Error	0.0001
T statistics	-1.9697
P-value	0.0557
Significantly different from 0	NO
Rejection of H_0	NO

Figure 16. Bonds and Convertibles, outline for the hypothesis test on time

6.1.3 Other Derivatives

Other Derivatives		
	First half	*Second half*
Mean	0.0144	0.0232
Variance	0.0000	0.0000
Observations	21	21
Pooled Variance	0.0000	
Hypothesized Mean Difference	0	
Degrees of Freedom	40	
Critical value, two tailed test	+-2.0211	
T statistics	-5.8397	
P-value	0.0000	
Significantly different from 0	YES	
Rejection of H_0	YES	

Figure 17. Other Derivatives, outline for the hypothesis test on the slope

There was a strong rejection of the null hypothesis when testing other derivatives. This was confirmed by the P-value being zero, meaning the probability that the null hypothesis is true is zero. The implication of this is that there are a significant trend, which is confirmed by the illustration below.

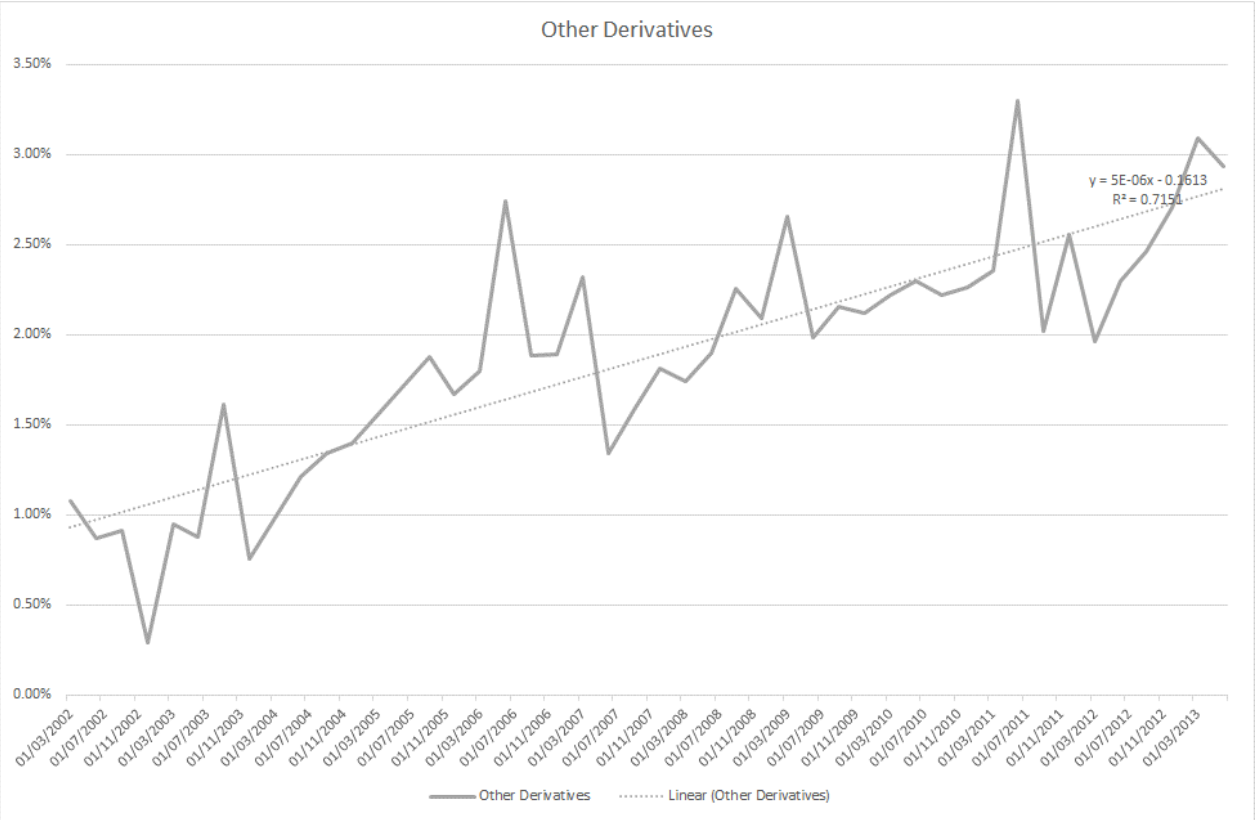

Figure 18. Percentage of other derivatives in Swedish balanced funds from 2002Q1 to 2013Q2, with trend line.

The hypothesis test testing the regression coefficient of time was also strongly rejected. It is significantly different from zero meaning there is a relationship between time and the amount of other derivatives. If time is increased by one unit, the amount of other derivatives will increase by 0.0004 units.

Other Derivatives	
Significance level	5%
Degrees of Freedom	41
Critical value	+-2.0195
Coefficients	0.0004
Standard Error	0.0000
T statistics	10.1457
P-value	0.0000
Significantly different from 0	YES
Rejection of H_0	YES

Figure 19. Other Derivatives, outline for the hypothesis test on time

6.1.4 Unit Trusts

Unit Trusts		
	First half	*Second half*
Mean	0.0062	0.0176
Variance	0.0000	0.0001
Observations	21	21
Pooled Variance	0.0000	
Hypothesized Mean Difference	0	
Degrees of Freedom	40	
Critical value, two tailed test	+-2.0211	
T statistics	-6.5221	
P-value	0.0000	
Significantly different from 0	YES	
Rejection of H_0	YES	

Figure 20. Unit Trusts, outline for the hypothesis test on the slope

The null hypothesis was rejected when measuring the difference between the mean of the first and second half of all observations. Hence, there is a positive trend for the amount of unit trusts.

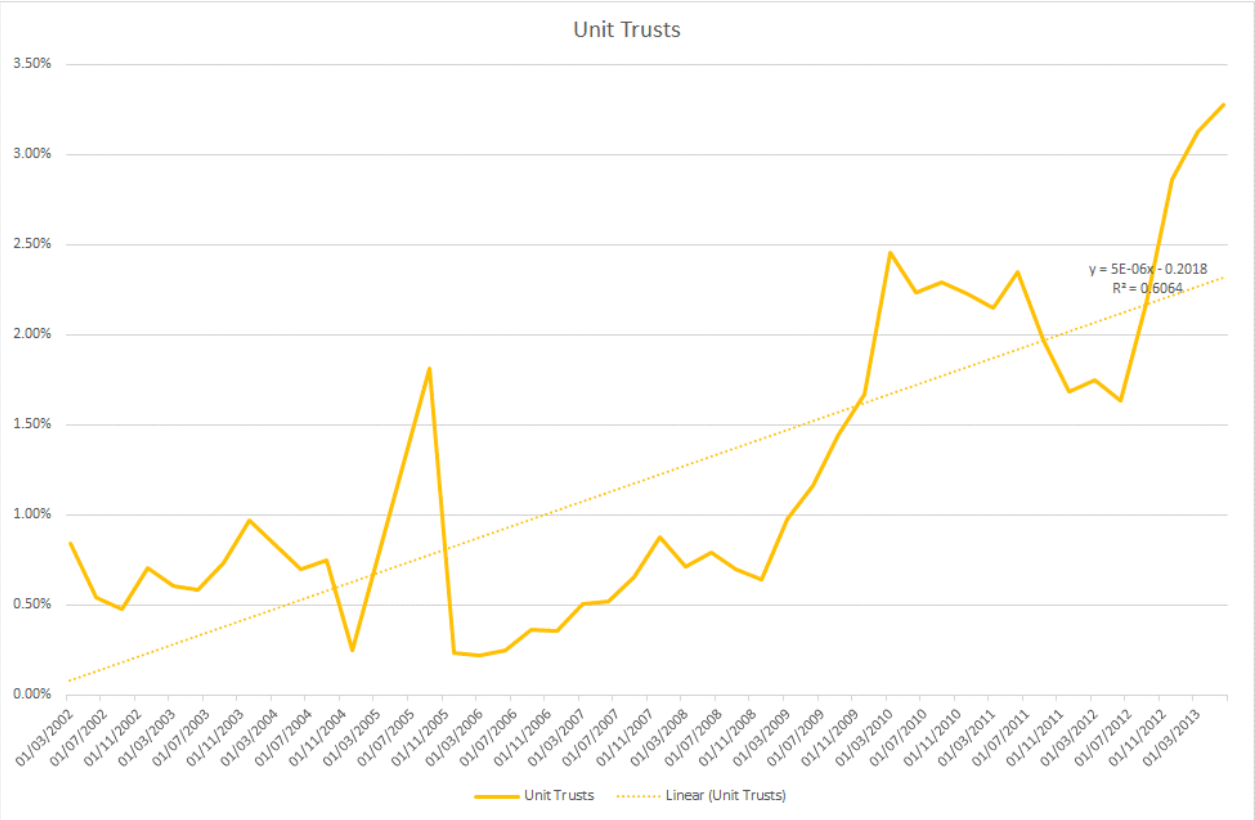

Figure 21. Percentage of unit trusts in Swedish balanced funds from 2002Q1 to 2013Q2, with trend line.

When measuring the affection of time on the amount of unit trusts the null hypothesis was also rejected. If time is increased by one unit, the amount of unit trusts will increase by 0.0005 units.

Unit Trusts	
Significance level	5%
Degrees of Freedom	41
Critical value	+-2.0195
Coefficients	0.0005
Standard Error	0.0001
T statistics	7.9492
P-value	0.0000
Significantly different from 0	YES
Rejection of H_0	YES

Figure 22. Unit Trusts, outline for the hypothesis test on time

6.2 Hypothesis test – Tactical Asset Allocation

The hypothesis test with null hypothesis $\beta = 0$, was testing if stock index, conjunction indicator or interest rate had any significant impact on the short term allocation defined as tactical asset allocation. In other words, the null hypothesis stated that the indices did not have any effect on the way fund managers allocated assets. The results of the hypothesis test is presented below, categorized by asset type.

6.2.1 Equities

Equities	OMX Stockholm 30 index	Swedbank PMI	Stockholm Interbank Rate 3M
Significance level	0.05	0.05	0.05
Degress of Freedom	39	39	39
Critical value	+-2.0227	+-2.0227	+-2.0227
Coefficients	-0.0038	0.0096	0.0397
Standard Error	0.0102	0.0230	0.0088
T statistics	-0.3753	0.4166	4.4999
P-value	0.7094	0.6793	0.0001
Significantly different from 0	NO	NO	YES
Rejection of H_0	NO	NO	YES

Figure 23. Equities, outline for the hypothesis test on stock index, conjunction indicator and interest rates

According to the hypothesis test equities were not significantly different from zero when testing stock index and conjunction indicator. Only the interest rate had a significant impact over time on the amount of equities as a percentage of total assets. The regression coefficient for Stockholm Interbank Rate 3M, is significantly different from 0, since the T-statistics is above the critical value. The relationship between the variables is illustrated below, where one could see that the line for equities are in a similar way as the line for Stockholm Interbank Rate 3M, but in a dissimilar way from OMX Stockholm 30 Index and Swedbank PMI.

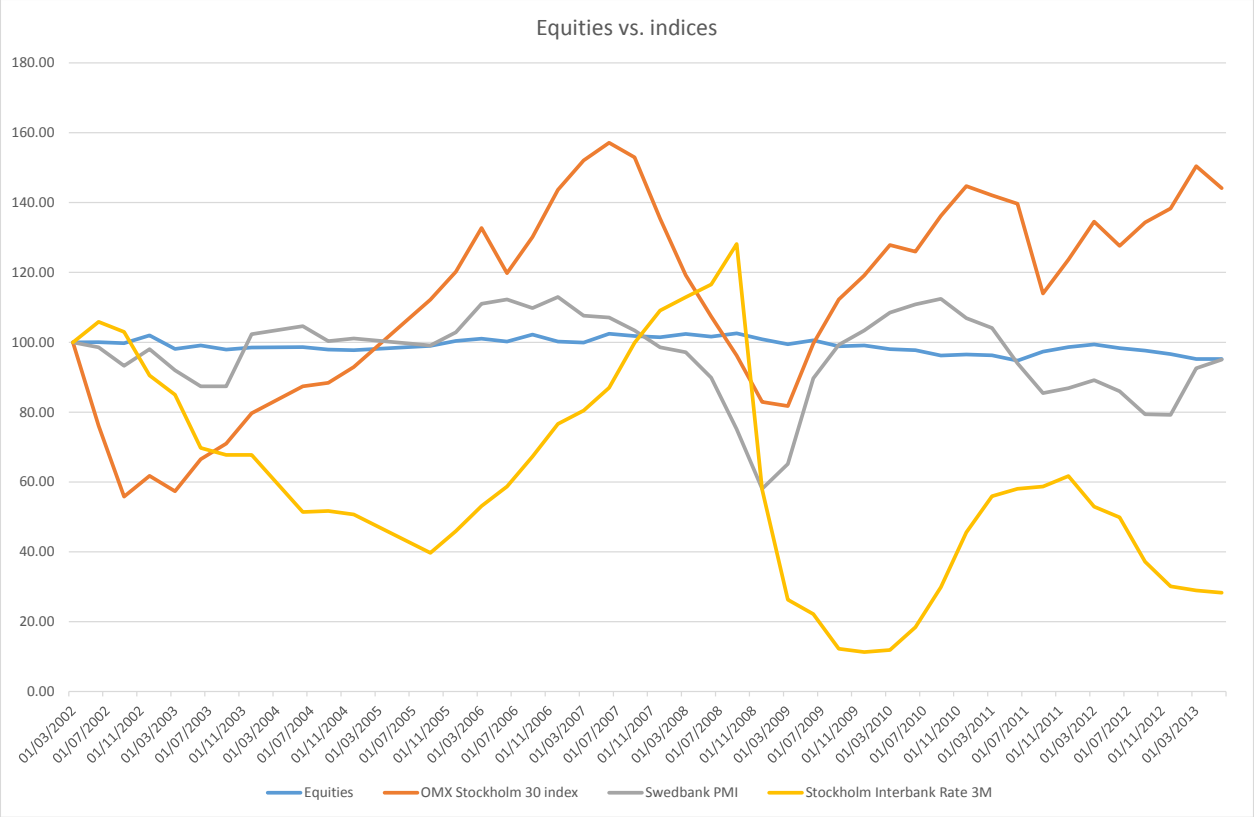

Figure 24. Development of the allocation of equities, OMX Stockholm 30 Index, Swedbank PMI and Stockholm Interbank Rate 3M

6.2.2 Bonds and Convertibles

Bonds & Convertibles	OMX Stockholm 30 index	Swedbank PMI	Stockholm Interbank Rate 3M
Significance level	0.05	0.05	0.05
Degress of Freedom	39	39	39
Critical value	+-2.0227	+-2.0227	+-2.0227
Coefficients	-0.3511	0.4626	-0.2008
Standard Error	0.0896	0.2024	0.0778
T statistics	-3.9186	2.2858	-2.5815
P-value	0.0003	0.0278	0.0137
Significantly different from 0	YES	YES	YES
Rejection of H0	YES	YES	YES

Figure 25. Bonds and Convertibles, outline for the hypothesis test on stock index, conjunction indicator and interest rates

For bonds and convertibles all variables were significantly different from zero. Although, OMX Stockholm 30 Index and Stockholm Interbank Rate 3M had a negative regression coefficient, meaning a negative relation. We could interpret the coefficient for OMX Stockholm 30 Index as an increased by one unit, would lower the amount of equities with 0.3511 units. The relationship between all variables is illustrated below.

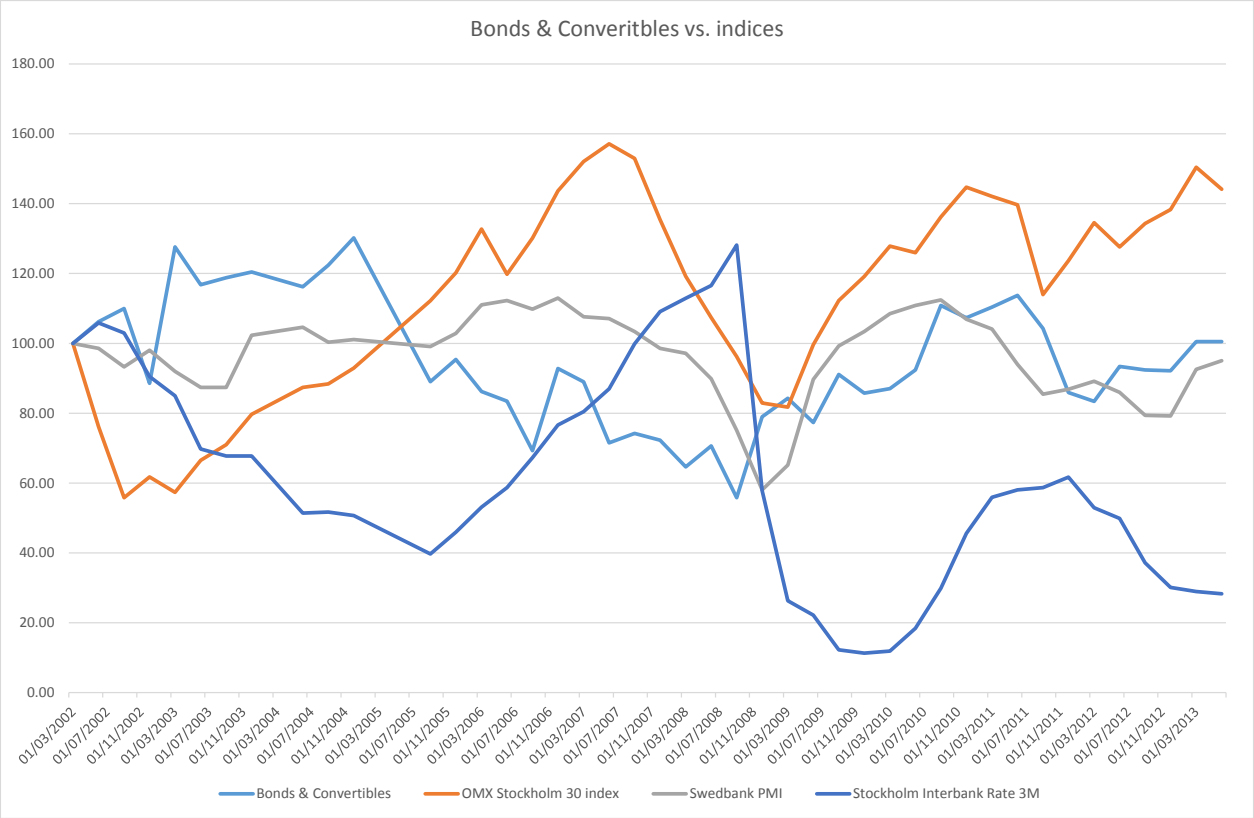

Figure 26. Development of the allocation of bonds and convertibles, OMX Stockholm 30 Index, Swedbank PMI and Stockholm Interbank Rate 3M

6.2.3 Other Derivatives

Other Derivatives	OMX Stockholm 30 index	Swedbank PMI	Stockholm Interbank Rate 3M
Significance level	0.05	0.05	0.05
Degress of Freedom	39	39	39
Critical value	+-2.0227	+-2.0227	+-2.0227
Coefficients	1.5787	-2.2300	-0.6536
Standard Error	0.2040	0.4608	0.1771
T statistics	7.7381	-4.8397	-3.6901
P-value	0.0000	0.0000	0.0007
Significantly different from 0	YES	YES	YES
Rejection of H0	YES	YES	YES

Figure 27. Other Derivatives, outline for the hypothesis test on stock index, conjunction indicator and interest rates

The null hypothesis, stating that there is no relation between the amount of other derivatives over time and the independent variables, were rejected in all three tests. Furthermore, the t-statistics for the category other derivatives was one of the more extreme ones.

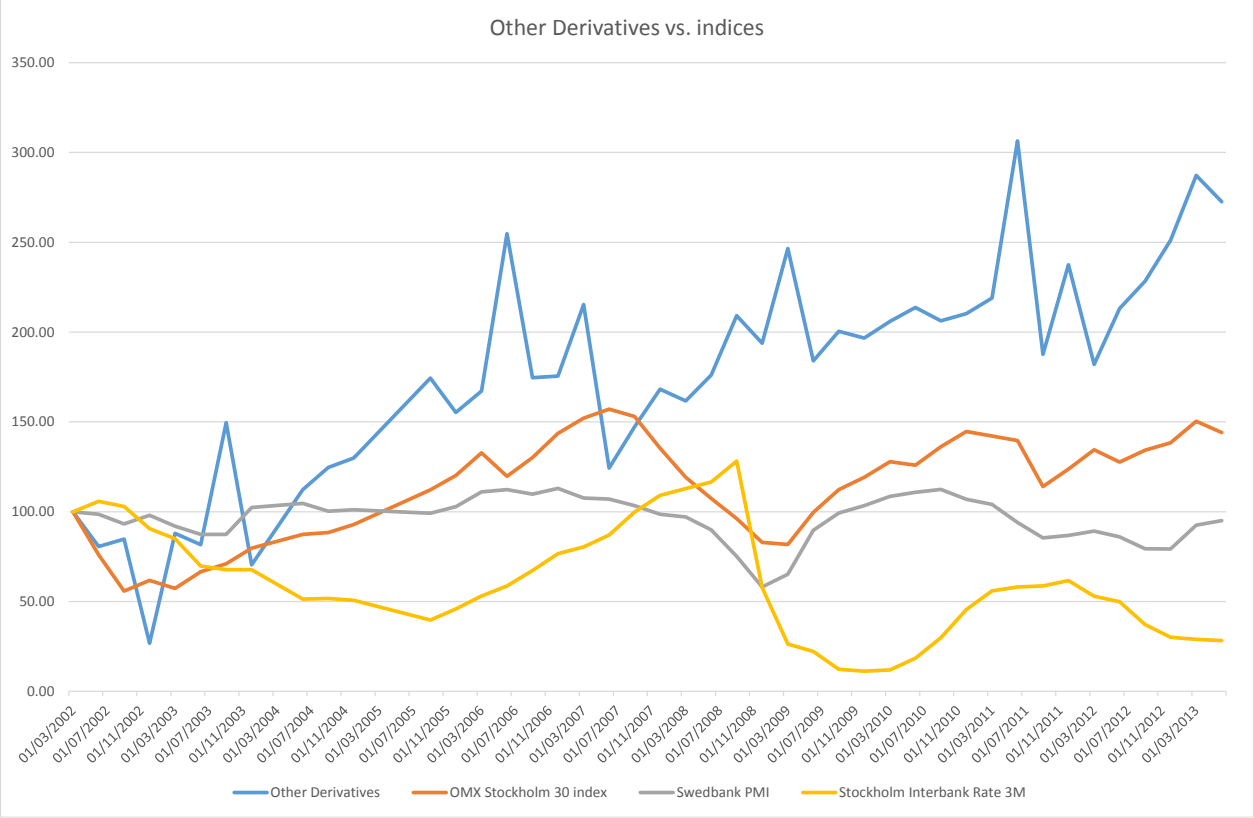

Figure 28. Development of the allocation of other derivatives, OMX Stockholm 30 Index, Swedbank PMI and Stockholm Interbank Rate 3M

6.2.4 Unit Trusts

Unit Trusts	OMX Stockholm 30 index	Swedbank PMI	Stockholm Interbank Rate 3M
Significance level	0.05	0.05	0.05
Degress of Freedom	39	39	39
Critical value	+-2.0227	+-2.0227	+-2.0227
Coefficients	1.5675	-2.3623	-1.6284
Standard Error	0.4384	0.9902	0.3806
T statistics	3.5752	-2.3857	-4.2783
P-value	0.0010	0.0220	0.0001
Significantly different from 0	YES	YES	YES
Rejection of H0	YES	YES	YES

Figure 29. Unit Trusts, outline for the hypothesis test on stock index, conjunction indicator and interest rates

All variables tested in the category unit trust was significantly different from the null hypothesis. The t-statistics for OMX Stockholm 30 index were positive, whereas the t-statistics for Swedbank PMI and Stockholm Interbank Rate 3M were negative.

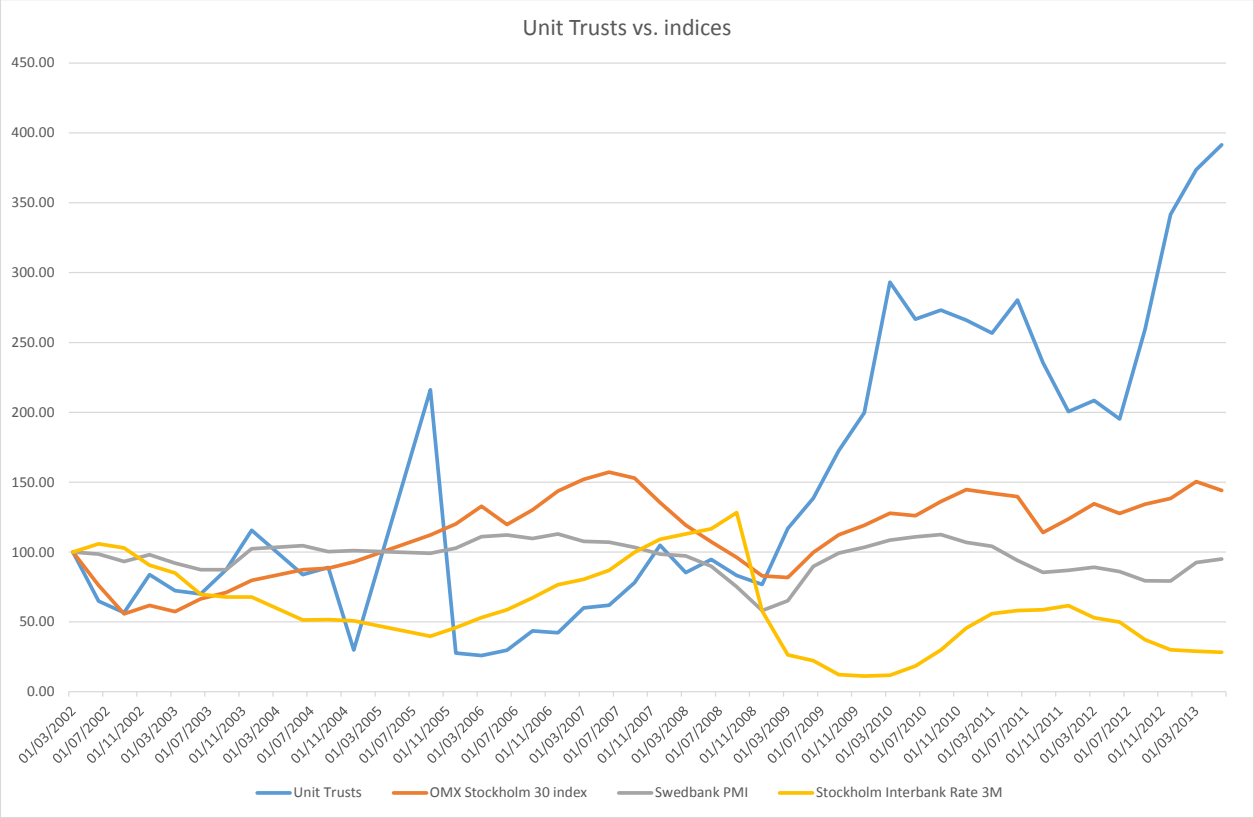

Figure 30. Development of the allocation of unit trusts, OMX Stockholm 30 Index, Swedbank PMI and Stockholm Interbank Rate 3M

6.3 Summary of results

	Equities	Bonds & Convetibles	Other Derivatives	Unit Trusts
Strategic Asset Allocation				
Slope	YES	NO	YES	YES
Time	YES	NO	YES	YES
Tactical Asset Allocation				
OMX Stockholm 30 index	NO	YES	YES	YES
Swedbank PMI	NO	YES	YES	YES
Stockholm Interbank Rate 3M	YES	YES	YES	YES

Figure 31. Summary of all hypothesis tests, if they are rejected or not

Bond and convertibles were the only asset type where the null hypothesis was not rejected when testing the long term trend - slope and time. Other derivatives and units trusts had a stronger significant difference from zero, but even though equities did not have a strong trend, it was still strong enough to be significantly different from zero.

When testing the stock index, conjunction indicator and interest rate, equities were the only asset type where not all three trend-indicators were significantly different from zero. For all other asset types the asset allocation and the indicators were following the same trend.

7. ANALYSIS

In this chapter an analysis of the results will be presented. The initial problem will be accounted for.

The most unexpected result from all the hypothesis tests done, were the fact that the hypothesis test on tactical asset allocation showed that equities were not affected by the development of the stock index. To recall the information from the results, that diagram presented in Chapter 6.2.1 is presented again.

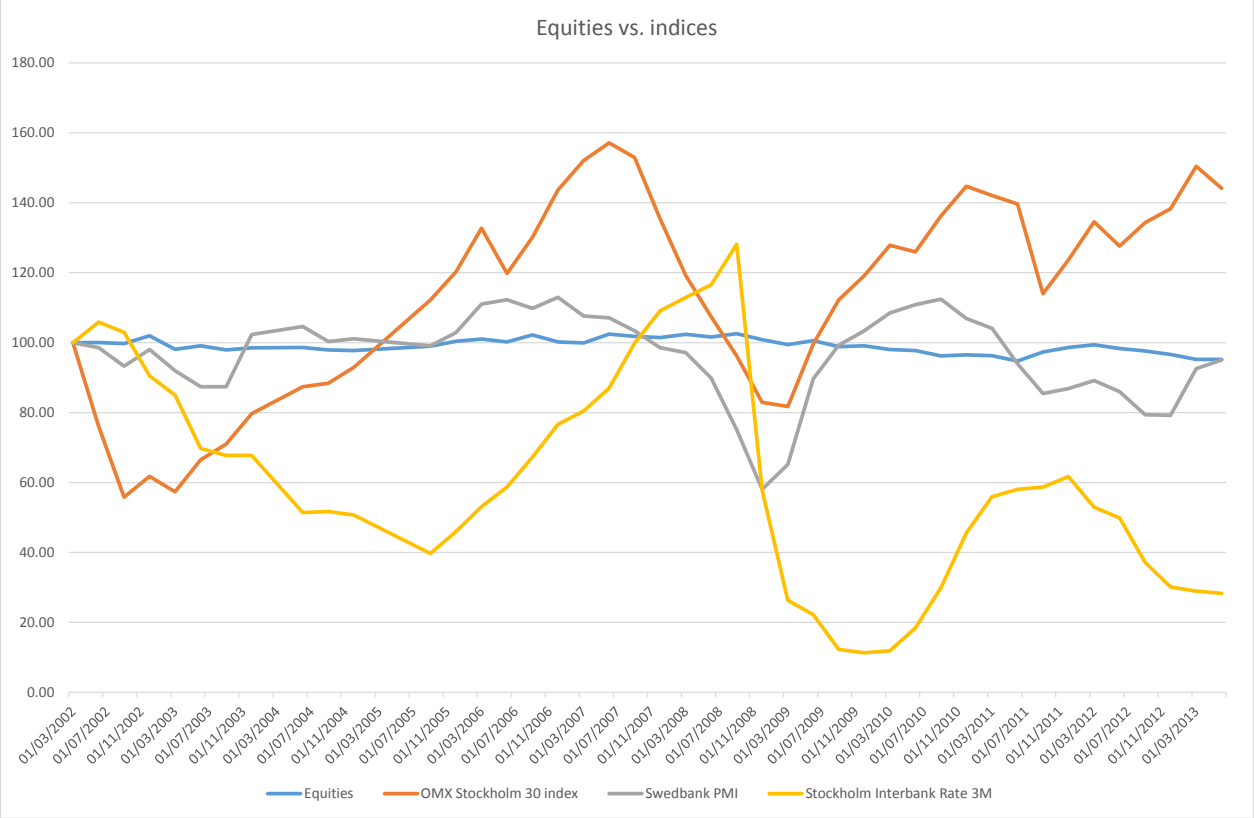

Figure 32. Development of the allocation of equities, OMX Stockholm 30 Index, Swedbank PMI and Stockholm Interbank Rate 3M

When analyzing this diagram, one could see that although the movement of equities (blue line) is rather weak, it does follows the movement of OMX Stockholm 30 Index (red line) with a certain lag. It would be reasonable to introduce a lag, because fund managers might not respond immediately on occurrences in the market. Although, if a lag would have been introduced, there would be an uncertainly in the time of the lag. While it is easy to identify a lag of equities from OMX Stockholm 30 Index, it is also easy to identify another lag for the equities and Stockholm Interbank Rate 3M. Therefore, if a shorter lag would have been chosen it would have benefited the Stockholm Interbank Rate 3M and if a longer lag would have been chosen it would have benefited the OMX Stockholm 30 Index. Not having any lag makes the thesis more neutral, but in this case it also affected the results negatively.

By looking at the diagrams over the compiled data of asset allocation, it was rather obvious the majority of the null hypothesis would be rejected. For many of the asset types, except for bonds and convertibles, there was a strong trend in the allocation.

The real issue of this essay was not whether the hypothesis tests were rejected or not, it was rather how to interpret the output and results. Before compiling the data, a definition of strategic and tactical asset allocation was done. The strategic asset allocation was defined as the long term trend and the tactical asset allocation as the deviation from this trend.

When bonds and convertibles did not have a significant trend and was not significantly affected by time, there was according to the initial definition no strategic asset allocation, since there was no long term trend. Despite this, one should take into consideration that an interpretation of the results as without strategic asset allocation, might be misleading because the strategic asset allocation might have been fixed for bonds and convertibles.

8. CONCLUSION

In this chapter the initial problem will be answered by a summary of the results and the analysis.

The initial problem of this thesis was as followed:

Are strategic and tactical asset allocation used within Swedish balanced funds in a way that trends could be identified?

The short answer to the question is yes, it is.

In this thesis we have seen that the strategic allocation changes over time and there are significant long term trends for three out of four asset classes. Over time, the amount of equities has decreased and the amount of other derivatives and unit trusts have increased.

According to the definition of tactical asset allocation as a deviation from the long term trend, it is concluded that tactical asset allocation has been used within Swedish balanced funds. The tactical asset allocation is a function of stock index, conjunction indicator and interest rates for almost all asset types. Although, for equities, there is a certain lag in the allocation.

In the analysis a discussion about the definition of strategic and tactical asset allocation was also presented, in order to highlight the implications of defining quantitative data.

9. FURTHER RESEARCH

Suggestions for further research is presented in this chapter.

This thesis was done on a quantitative methodological approach which has given a general view, based on facts and not opinions. Although, a suggestion to further research will be a qualitative analysis. A comparison of the results is encouraged in order to get a full picture of the usage of strategic and tactical asset allocation within Swedish balanced funds.

This thesis did not analyze specific occurrences and their affection of the asset allocation, for example how the amount of equities was affected by the finical crisis in 2008. A research on the markets affections of investment strategies will also be encouraged.

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11. APPENDIX

11.1 Regression analysis – strategic asset allocation

11.1.1 Equities

t-Test: Two-Sample Assuming Equal Variances		
Equities		
	Variabel 1	*Variabel 2*
Mean	0.9041	0.8910
Variance	0.0002	0.0004
Observations	21	21
Pooled Variance	0.0003	
Hypothesized Mean Difference	0	
df	40	
t Stat	2.4714	
P(T<=t) one-tail	0.0089	
t Critical one-tail	1.6839	
P(T<=t) two-tail	0.0178	
t Critical two-tail	2.0211	

Equities, regression analysis on the difference on the slope

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.4446							
R Square	0.1977							
Adjusted R Square	0.1781							
Standard Error	0.0171							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1.0000	0.0029	0.0029	10.1006	0.0028			
Residual	41.0000	0.0119	0.0003					
Total	42.0000	0.0149						
	Coefficier	*Standard*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	0.9118	0.0054	168.8841	0.0000	0.9009	0.9227	0.9009	0.9227
t	-0.0006	0.0002	-3.1781	0.0028	-0.0010	-0.0002	-0.0010	-0.0002

Equities, regression analysis on time

11.1.2 Bonds and Convertibles

t-Test: Two-Sample Assuming Equal Variances		
Bonds & Convertibles		
	Variabel 1	*Variabel 2*
Mean	0.0753	0.0681
Variance	0.0002	0.0001
Observations	21	21
Pooled Variance	0.0002	
Hypothesized Mean Difference	0	
df	40	
t Stat	1.7387	
P(T<=t) one-tail	0.0449	
t Critical one-tail	1.6839	
P(T<=t) two-tail	0.0898	
t Critical two-tail	2.0211	

Bonds and Convertibles, regression analysis on the difference on the slope

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.2940							
R Square	0.0864							
Adjusted R Square	0.0642							
Standard Error	0.0131							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1.0000	0.0007	0.0007	3.8798	0.0557			
Residual	41.0000	0.0070	0.0002					
Total	42.0000	0.0077						
	Coefficien	*Standard*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95*	*Lower 95.*	*Upper 95.0%*
Intercept	0.0790	0.0041	19.0479	0.0000	0.0706	0.0874	0.0706	0.0874
t	-0.0003	0.0001	-1.9697	0.0557	-0.0006	0.0000	-0.0006	0.0000

Bonds and Convertibles, regression analysis on time

11.1.3 Other derivatives

t-Test: Two-Sample Assuming Equal Variances		
Other Derivatives		
	Variabel 1	*Variabel 2*
Mean	0.0144	0.0232
Variance	0.0000	0.0000
Observations	21	21
Pooled Variance	0.0000	
Hypothesized Mean Difference	0	
df	40	
t Stat	-5.8397	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6839	
P(T<=t) two-tail	0.0000	
t Critical two-tail	2.0211	

Other Derivatives, regression analysis on the difference on the slope

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.8457							
R Square	0.7151							
Adjusted R Square	0.7082							
Standard Error	0.0036							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1.0000	0.0013	0.0013	102.9351	0.0000			
Residual	41.0000	0.0005	0.0000					
Total	42.0000	0.0019						
	Coefficier	*Standard*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	0.0089	0.0011	7.7898	0.0000	0.0066	0.0112	0.0066	0.0112
t	0.0004	0.0000	10.1457	0.0000	0.0003	0.0005	0.0003	0.0005

Other Derivatives, regression analysis on time

11.1.4 Unit trusts

t-Test: Two-Sample Assuming Equal Variances		
Unit Trusts		
	Variabel 1	*Variabel 2*
Mean	0.0062	0.0176
Variance	0.0000	0.0001
Observations	21	21
Pooled Variance	0.0000	
Hypothesized Mean Difference	0	
df	40	
t Stat	-6.5221	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6839	
P(T<=t) two-tail	0.0000	
t Critical two-tail	2.0211	

Unit Trusts, regression analysis on the difference on the slope

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.7788							
R Square	0.6065							
Adjusted R Square	0.5969							
Standard Error	0.0055							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1.0000	0.0019	0.0019	63.1898	0.0000			
Residual	41.0000	0.0012	0.0000					
Total	42.0000	0.0031						
	Coefficier	*Standard*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	0.0003	0.0017	0.1913	0.8492	-0.0032	0.0038	-0.0032	0.0038
t	0.0005	0.0001	7.9492	0.0000	0.0004	0.0006	0.0004	0.0006

Unit Trusts, regression analysis on time

11.2 Regression analysis – tactical asset allocation

11.2.1 Equities

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.6052							
R Square	0.3663							
Adjusted R Square	0.3176							
Standard Error	1.7170							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3.0000	66.4665	22.1555	7.5148	0.0004			
Residual	39.0000	114.9816	2.9482					
Total	42.0000	181.4481						
	Coefficients	*Standard*	*t Stat*	*P-value*	*Lower 95*	*Upper 95%*	*Lower 95*	*Upper 95.*
Intercept	96.2039	2.2239	43.2590	0.0000	91.7056	100.7021	91.7056	100.7021
OMX Stockholm 30 index	-0.0038	0.0102	-0.3753	0.7094	-0.0244	0.0168	-0.0244	0.0168
Swedbank PMI	0.0096	0.0230	0.4166	0.6793	-0.0369	0.0560	-0.0369	0.0560
Stockholm Interbank Rate 3M	0.0397	0.0088	4.4999	0.0001	0.0219	0.0576	0.0219	0.0576

Equities, regression analysis on stock index, conjunction indicator and interest rates

11.2.2 Bonds and Convertibles

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.5746							
R Square	0.3302							
Adjusted R Square	0.2787							
Standard Error	15.1246							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3.0000	4398.4679	1466.1560	6.4093	0.0012			
Residual	39.0000	8921.3868	228.7535					
Total	42.0000	13319.8547						
	Coefficier	*Standard E*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	102.1678	19.5893	5.2155	0.0000	62.5448	141.7908	62.5448	141.7908
OMX Stockholm 30 index	-0.3511	0.0896	-3.9186	0.0003	-0.5323	-0.1699	-0.5323	-0.1699
Swedbank PMI	0.4626	0.2024	2.2858	0.0278	0.0533	0.8719	0.0533	0.8719
Stockholm Interbank Rate 3M	-0.2008	0.0778	-2.5815	0.0137	-0.3581	-0.0435	-0.3581	-0.0435

Bonds and convertibles, regression analysis on stock index, conjunction indicator and interest rates

11.2.3 Other derivatives

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.8442							
R Square	0.7126							
Adjusted R Square	0.6905							
Standard Error	34.4380							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3.0000	114709.0520	38236.3507	32.2404	0.0000			
Residual	39.0000	46253.0417	1185.9754					
Total	42.0000	160962.0937						
	Coefficier	*Standard Er*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	251.2668	44.6038	5.6333	0.0000	161.0471	341.4865	161.0471	341.4865
OMX Stockholm 30 index	1.5787	0.2040	7.7381	0.0000	1.1660	1.9914	1.1660	1.9914
Swedbank PMI	-2.2300	0.4608	-4.8397	0.0000	-3.1620	-1.2980	-3.1620	-1.2980
Stockholm Interbank Rate 3M	-0.6536	0.1771	-3.6901	0.0007	-1.0118	-0.2953	-1.0118	-0.2953

Other derivatives, regression analysis on stock index, conjunction indicator and interest rates

11.2.4 Unit trusts

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.7194							
R Square	0.5175							
Adjusted R Square	0.4804							
Standard Error	74.0065							
Observations	43.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3.0000	229124.3891	76374.7964	13.9447	0.0000			
Residual	39.0000	213601.6923	5476.9665					
Total	42.0000	442726.0814						
	Coefficier	*Standard Er*	*t Stat*	*P-value*	*Lower 95*	*Upper 95*	*Lower 95*	*Upper 95.*
Intercept	295.6958	95.8527	3.0849	0.0037	101.8155	489.5761	101.8155	489.5761
OMX Stockholm 30 index	1.5675	0.4384	3.5752	0.0010	0.6807	2.4543	0.6807	2.4543
Swedbank PMI	-2.3623	0.9902	-2.3857	0.0220	-4.3652	-0.3595	-4.3652	-0.3595
Stockholm Interbank Rate 3M	-1.6284	0.3806	-4.2783	0.0001	-2.3983	-0.8585	-2.3983	-0.8585

Unit trusts, regression analysis on stock index, conjunction indicator and interest rates