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Asset Allocation within Swedish Mutual Funds

The Contribution to Portfolio Performance

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Abstract

The purpose of this paper is to follow in the tracks of the Brinson et al (1986, 1991) and the Ibbotson and Kaplan (2000) studies and investigate the importance of asset allocation to mutual fund performance and the variation of the same. We have chosen to study 46 Swedish balanced mutual funds over a five year period, the time period was chosen as to balance between a long enough time period and large enough sample. We avoid classical misconceptions by breaking the issue down into three distinct questions; i) How much of the variability of returns across time is explained by the asset allocation policy?, ii) How much of the variation in returns among funds is explained by differences in policy?, and iii) What portion of the return level is explained by policy returns? We find that more than 92 percent of the variation in returns over time of any one fund is explained by asset allocation policy, roughly 49 percent of the variation among funds and roughly 131 percent of the return level is explained, on average, by the policy return level or the return level of the corresponding asset allocation portfolio derived from return-based style analysis, developed by William F. Sharpe. These results are in line with previous research and thus confirm the importance of asset allocation. For private and institutional investors alike, this means that there should perhaps be even more focus on asset allocation when forming an investment portfolio given that the policy or strategic asset allocation is such a powerful determinant of performance and variation of the same.

Keywords: Asset allocation, return-based style analysis, mutual fund performance

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1.1 INTRODUCTION

In two landmark papers, Brinson et al. (1986, 1991) conclude that the primary determinant of a portfolio's return variability is its policy, or long-term, asset allocation. The discussion regarding asset allocation had by then already been fuelled by the Brinson-Fachler model, an additive performance attribution model introduced by Brinson and Fachler (1985). This model ascertain whether or not managers are performing superior or inferior relative their benchmarks by decomposing returns into security selection ('stock-picking'), asset allocation and a cross-product or interaction term. Brinson et al. (1986) introduced an alternative method of calculating performance attribution. The alternative methods provide identical results at the total-level, but not at the sector-level. It has been argued that the authors of Brinson et al. (1986) did not mean to specify an alternative method for calculating asset allocation at the sector level.

The fundamental justification for allocating funds across different asset classes builds upon the idea that the returns are not perfectly correlated and as a result the diversification reduce the overall risk for a given level of expected return. That there are benefits to diversification is fairly undisputed, however, to what degree returns are affected by allocation between asset classes has been an area of more discussion. By regressing fund returns on benchmark returns in a time-series regression, Brinson et al. (1991) examined ten years of quarterly performance data for 82 pension funds and found that asset allocation explains, on average, 91.5% of the variation in total fund returns over time. As a consequence, they concluded that asset allocation decisions play major roles for returns and variation of the same. This has become a well known fact and it is widely accepted among investment researchers and practitioners. However, there is a heated debate and disagreement about the exact implications of the empirical results. Jahnke (1997) published an article partly arguing that the use of quarterly data in the study lowers the effect of compound interest over time and that the Brinson et al. (1986, 1991) studies claimed originally to answer more questions than those actually tested in their work. Nuttall and Nuttall (1998) is another article along the same lines. In defense of Brinson et al. (1986, 1991), Ibbotson and Kaplan (2000) and Surz, Stevens, and Wimer (1999) argued that the Brinson et al. (1986, 1991) studies had been applied to questions they never intended to answer. They argued that the approach adopted by Brinson et al. (1986, 1991) measures the importance of asset allocation to explain the variability of returns *over time* and not *among funds*, nor the *level of return*. Surz, Stevens, and Wimer (1999) argue in their paper that neither a cross-sectional nor a time-series R-

squared could ever be a correct measure for the *level of return* because both relate to the variability of returns. Statman (2000), argue that the Brinson et al. (1986) results regarding variability in return over time is of less importance and has been overly used by financial advisors. However, he acknowledges that managers are, on average, found to detract 1.10% of the level of return in the Brinson et al. (1986) study, which he argues underlines the importance of choosing the right manager. Years later, Hood (2005) summarized and defended the original Brinson et al. studies, to which he had contributed, conveying the message that knowing more about the variation of returns could in fact tell the analyst something about the levels of return. Given the extensive debate, one has to be careful when interpreting the results in the Brinson et al. (1986, 1991) studies since the answer is utterly determined by the question asked.

The aim and purpose of this paper is to apply the methods suggested by Ibbotson and Kaplan (2000) and evaluate the importance of asset allocation policy, as outlined by three specific questions to avoid being caught in the debate that the Brinson et al. (1986, 1991) studies were caught in. To add to previous research, this study uses Swedish data with a sample made up of 46 balanced mutual funds. Mutual funds were chosen as reliable and frequent returns data is available and so as to make the study comparable to the Ibottson and Kaplan (2000) study.

1.2 The Questions to be Answered about Asset Allocation

The three distinct questions Ibbotson and Kaplan (2000) raise about the importance of asset allocation are:

i. How much of the variability of returns *across time* is explained by the asset allocation policy? Put differently, how much of a fund's ups and downs do its policy portfolio explain?

ii. How much of the variation in returns *among funds* is explained by differences in policy? Put differently, how much of the difference between two funds' performance is a result of their policy difference?

iii. What portion of the *return level* is explained by policy returns? Put differently, what is the ratio of the policy benchmark return to the fund's actual return?

In this paper, a specific analysis for each of the three questions above will be done, thus steering clear of the heated debate presented in the introduction that mainly stems from generalizing tests and

result from question one to apply to all three questions. Whether this common fault is a consequence of people misinterpreting Brinson et al. (1986, 1991) or whether Brinson et al. (1986, 1991) claimed to answer more than what is possible after analyzing the first question is something this paper does not aim to answer.

Ibbotson and Kaplan (2000) use 10 years of monthly returns for 94 U.S. balanced mutual funds and five years of quarterly returns for 58 pension funds. Using return-based style analysis for finding each funds policy, their study found that policy explains 90 percent of the variability of a fund's returns over time, about 40 percent of the variation of returns among funds and, on average, a little more than 100 percent of the level of returns. The aim of this paper is to apply their techniques and method to address the three questions using five years of monthly returns for 46 Swedish balanced mutual funds (January 2004 - December 2008). The method used for the first question is also covered in some detail in the Bodie et al. (2008) textbook.

By using Swedish data and compare the results to those of Ibbotson and Kaplan (2000) (and of course also to Brinson et al. (1986, 1991), this paper will add to existing research. Given that one would assume that there are at least slight differences between the US and the Nordic investment management industries, it will be interesting to see if such differences lead to other results

1.3 OUTLINE

The remainder of this paper is structured as follows:

The methodology section will go through the methods introduced by Brinson et al. (1986, 1991) and Ibbotson and Kaplan (2000). Specifically, the models, the chosen benchmarks and the return-based style analysis technique developed by Sharpe (1988, 1992) will be covered. Returns-based style analysis facilitates estimation of benchmarks or policy portfolios for each institutional investor without knowing the exact asset allocation, i.e. the holdings. In the data section, the data is presented and there is a discussion about possible pit falls regarding the data. In addition, a few tests will be performed in order to get more information regarding the usability of the data.

In the empirical results section, the results will be presented, i.e. the answers to the three questions regarding the importance of asset allocation and in the conclusion part the findings will be concluded in addition to a section on where there are potential for further research.

2 METHODOLOGY

2.1 DETERMINING POLICY WEIGHTS

The first step in the analysis is to determine the policy asset allocation, i.e. the policy weights for each fund. Since this information is hard to come by, one can overcome this shortage in information by applying a return-based style analysis; a method developed by Sharpe (1988, 1992). Return-based style analysis is a statistics-based method for obtaining a fund's asset allocation or policy portfolio by regressing the fund's returns on the returns of asset class benchmarks or indices. The regression identifies combinations of long positions in the passive indices that would most closely have replicated the actual fund over a specific period of time. The generic factor model for a specific fund i used by Sharpe (1992) is

$$(1) \qquad R_{it} = [b_{i1}F_{1t} + b_{i2}F_{2t} + \ldots + b_{in}F_{nt}] + e_{it}$$

where R_{it} denotes return on asset i in period t (i.e. the total return of the fund), F_{nt} represents the value of factor n at time t (i.e. the passive benchmark or index return), and e_{it} is the asset specific (non-factor) portion of the fund return. The remaining values, b_{in}, denote the sensitivities of R_{it} against factor n (i.e. the 'Sharpe style weights' or the estimated allocation weights). In addition, the regression is subject to the constraints that the weights sum to one and are non-negative (i.e. short selling of the indices is not allowed) as shown below

$$(2) \qquad \sum_{n=1}^{N} b_{in} = 1$$

and

$$(3) \qquad 0 \leq b_{in} \leq 1$$

When this is fulfilled, the return on asset i is modeled as the return on a portfolio (shown by the sum of the term in brackets) invested in the n asset classes plus a residual component, denoted as e_{it}. Sharpe (1992, p. 8) refers to the terms in brackets as 'style' or asset allocation and to the residual

component as 'selection' (including both timing and stock picking)[1]. This of course relies on the fact that fund's are restricted to having long-only mandates and that they can be assumed to be fully invested at all times. If hedge funds would have been studied instead, this would have been a very inadequate assumption. In accordance with Sharpe (1992), the vector of the asset allocation weights is found by minimizing the sum of the squared residuals such that the restrictions of full investment and non-zero weights are met. In order to perform this analysis of inequality constraints, it was required that a quadratic programming algorithm was implemented.

2.2 Determining Returns

Given the monthly total return data of each fund and the estimated policy returns, obtained through the return-based style analysis, the analysis proceeds to performance evaluation where the total [historical] return is divided into

i) *policy return* and

ii) *active return*.

Following Ibbotson and Kaplan (2000), the two are decomposed using

$$(4) \qquad TR_{it} = (1 + PR_{it})(1 + AR_{it}) - 1$$

where, TR_{it}, PR_{it} and AR_{it} are the total return, the policy return, and the active return of fund i in period t, respectively. The policy return, i.e. the fraction of the total return that can be attributed to the asset allocation policy, is calculated using the weights or estimates from the return-based style analysis covered above and the individual factor or index returns as illustrated in equation (5) below. In effect, policy return is the return the investor had received, had he or she invested passively in indices with weightings according to the regression model.

$$(5) \qquad PR_{it} = b_{i1}R_{1t} + b_{i2}R_{2t} + \ldots + b_{in}R_{nt}$$

where R_{nt} denotes the return on asset class n in period t, i.e. the returns on the benchmark indices.

2.3 METHODOLOGY USED TO ANSWER THE THREE QUESTIONS ABOUT ASSET ALLOCATION

2.3.1 VARIABILITY ACROSS TIME

The first question, the question about variability across time, i.e. how much of a fund's ups and downs its policy benchmarks can explain, is analyzed using the time-series regression used by the original Brinson et al. studies (1986, 1991). Five years of monthly data for each fund is regressed against the corresponding monthly returns of the policy benchmark estimated using the return-based style analysis. The factor model is evaluated on the basis of its ability to explain the variance of returns, i.e. on the basis of the coefficient of determination which is defined as

$$(6) \qquad R^2 = 1 - \frac{Var(e_i)}{Var(R_i)}$$

where the right hand side of this expression is one minus the proportion of variance 'unexplained' to the total variance of the fund return. Since four or five benchmarks, or explanatory variables, are used in this study, the adequacy is studied using an adjusted R-squared, which is calculated as

$$(7) \qquad \bar{R}^2 = 1 - (1 - R^2)\frac{n-1}{n-m-1}$$

where n is the sample size and m is the number of regressors.

The R-squared in the time-series regression will reveal how the asset managers of the funds adhere to the respective policy targets estimated in this study. The results will then be compared with results from previous studies in order to expose potential differences.

In addition, the active return, which can be extrapolated using the total fund returns and the estimated policy returns, will be evaluated and this measure mirrors the capability of the fund manager to select specific titles and/or to time the market

$$(8) \qquad AR_{it} = \frac{(1 + TR_{it})}{(1 + PR_{it})} - 1$$

2.3.2 VARIABILITY AMONG FUNDS

The second question, the question about variability among funds, i.e. how much of the difference between two funds' performance is a result of their policy difference, is analyzed by regressing the compounded annual return for each fund on the compounded annual policy return for each fund. These two return measurements, for each fund, are calculated using equations (9) and (10) below

$$(9) \qquad \overline{TR_i} = \sqrt[N]{(1+TR_{i1})(1+TR_{i2}). \ . \ .(1+TR_{it}). \ . \ .(1+TR_{iT})} - 1$$

Where $\overline{TR_i}$ is the geometric average total return of fund i. T denotes the number of periods (60 months), and N is the length of the sample in years (five years).

$$(10) \qquad \overline{PR_i} = \sqrt[N]{(1+PR_{i1})(1+PR_{i2}). \ . \ .(1+PR_{it}). \ . \ .(1+PR_{iT})} - 1$$

where $\overline{PR_i}$ is the geometric average policy return of fund i.

The intuition behind this is, as Ibbotson and Kaplan (2000) put forward in their paper, that if all funds followed the same passive asset allocation policy, there would be no variation among funds. However, if all funds invested passively but had a wide range of asset allocation policies, all of the variation in returns would be attributable to policy.

2.3.3 RETURN LEVEL

The third question, the question about return level, i.e. the ratio of the policy benchmark return in relation to the fund's actual return, is evaluated simply on the basis of taking the compounded annual policy return for each fund over the sample period, $\overline{\mathrm{PR_i}}$, divided by the compounded annual fund return over the whole period, $\overline{\mathrm{TR_i}}$. The return level explained by asset allocation for fund i is thus

$$(11) \qquad Return\ Level\ Ratio_i = \frac{\overline{PR_i}}{\overline{TR_i}}$$

The intuition behind the ratio is, as outlined in Ibbotson and Kaplan (2000), that if the managers have created value and outperformed its policy, the ratio will be less than 1.0 and consequently higher than 1.0 if the asset managers have destroyed value relative its policy benchmark.

A manager who has invested passively, i.e. have an asset mix which exactly mirrors the policy mix derived from the style analysis, the return level ratio will be exactly 1.0. Consequently, this is a mean to evaluate the fund managers and draw conclusions about whether or not they have added value through active management efforts. Sharpe (1991) have also argued that mutual funds, on average, should not be able to add value above their passive policy benchmarks due to market equilibrium considerations. If the funds constitute a considerable portion of the market, they will, on average, underperform the benchmark due to transaction costs and management fees. Debates like these are however outside the scope of this thesis.

3 DATA

3.1 INTRODUCTION TO THE DATA

As explained in the introduction, the three questions about the importance of asset allocation are addressed using five years of monthly returns for 46 Swedish balanced mutual funds (January 2004 - December 2008). Initially, the sample consisted of 85 funds but this figure was reduced to 46 in order to have funds with at least 60 months of data. For a full list of the 46 mutual funds in the sample, please refer to *Appendix 1*.

The 46 funds was broken down into two sub-categories, one including the classic kind of mixed funds that allocate across stocks, bonds and bills and one that also includes hedge fund investments, labeled absolute return in *Table 1* below. The latter category consists mainly of the fund-of-fund type of mixed funds in the sample. In this category, the fund allocate across a set of other funds to diversify and offer a certain risk-return profile. In the sample, such funds often do not charge a separate management fee. The management fee attributable to the work regarding putting the fund composition together and re-allocating from time to time is found elsewhere. In the case where the fund manager is part of one of the Swedish big-four banks, it can be noted, that often, the fund-of-funds have invested mainly in the bank's own funds thus serving as a distribution channel for those funds solving the issue. By looking through the actual holdings of the funds, the funds that had invested into one or more hedge funds were separated from the set of classical mixed funds. When running the return-based style analysis regression, those funds that had invested into hedge funds were regressed using the full set of five explanatory variables whereas the other were only analyzed using the other four asset classes; bills, bonds, Swedish and foreign equity. Thus, only those explanatory variables that were adequate to the actual fund were used in the return-based style analysis that estimates the policy weights.

The benchmarks used to perform the return-based style analysis, in accordance with Sharpe (1988, 1992), are summarized in *Table 1* below.

Table 1: Overview of benchmarks used in the style analysis

This table is intended to give an overview of the benchmarks used in the style analysis performed in accordance with Sharpe (1988, 1992).

Factor	Asset Class	Benchmark
F_{1t}	Cash	Swedish Krona 3-Month Euro Deposit - Local Currency
F_{2t}	Bonds	Swedish Government Bond Index, All maturities - Local Currency
F_{3t}	Domestic Equity	MSCI Sweden Net - Local Currency
F_{4t}	Foreign Equity	MSCI The World Index Net (USD) - Manually Converted to SEK
F_{5t}	Absolute Return	HFRI Fund of Funds Composite Index (USD) - Manually Converted to SEK
F_{6t}	Private Equity	LPX50TR Index (EUR) - Manually Converted to SEK *(dropped, see 3.2)*

The indices are chosen simply on the basis that they are well-known and that they were suggested to be used in this study by practitioners. To mitigate currency fluctuations, index data in SEK has been collected where possible and where this was not possible, the respective indices have been converted manually into SEK. These conversions could potentially affect the data and the results of the regressions run. However, the analysis regarding the return level, i.e. the third question, could potentially have been fully misleading had this correction not been done. The returns reported by the funds in the sample are reported in SEK, thus comparing these returns to benchmarks denominated in other currencies would be inappropriate. In addition, total return data has been obtained (i.e. returns including dividends) for comparability reasons. It should also be noted that the fund returns are net of fees.

3.2 STRENGTHS AND WEAKNESSES OF RETURN-BASED STYLE ANALYSIS

Return-based style analysis has an obvious strength in that it requires only reliable return data of the funds studied and not the actual allocation at every point in time. This makes the analyst's work much less tedious as pointed out earlier in this paper, since the analyst can avoid collecting holdings data for every mutual fund in the sample, data that is perhaps not always available on a monthly basis or unreliable. In addition, the problems pointed out by diBartolomeo and Witkowski (1997) and Kim, Shukla and Thomas (2000), who conclude that a large portion of funds are misclassified, are as a consequence circumvented. As for the article by diBartolomeo and Witkowski (1997), 40 percent of the funds in their sample were, according to the authors, sorted into the wrong category. Kim, Shukla and Thomas (2000) presented similar results; 54 percent of the funds in their sample of 1,043 funds were misclassified. Thus, in choosing return-based style analysis, any potential problems with categorizing holdings and funds incorrectly are avoided, which is a positive characteristic of the method.

Another area that can be of concern is the chosen benchmarks and potential multicollinearity. In their paper, Lobosco and DiBartolomeo (1997), stress that analysts using the return-based style analysis method must be aware of the issue of multicollinearity when using this method and take measures in order to avoid producing biased results. As with any multiple regression analysis, it is important to choose appropriate explaining variables in order to get meaningful results. The benchmarks chosen in this study are believed to be justifiable in terms of economic reasoning since they are broad commonly known indices and since the hedge funds variable is used only when the fund has or has had investments into hedge funds. In terms of multicollinearity, there is a certain correlation between the explanatory variables that is inherent in what they are. There will of course be a high correlation between for instance Swedish and International equities. Nonetheless, in order for this study to effectively mirror the reality, both indices have to be included as they are important asset classes for the funds in the sample. Remedying these problems by looking for alternative indices to the MSCI indices, that perhaps have lower correlation, would be data mining. Regarding choosing benchmarks, Lucas and Riepe (1996) state that indices should be chosen in order to be comprehensive and yet mutually exclusive, which is of course a difficult task. However, looking at *Table 2* below one can see that the bivariate correlations, although substantial, are not high enough to indicate perfect linearity between any two of them.

Table 2: Bivariate correlations between explanatory variables

This table gives an overview of the bivariate correlation coefficients between the benchmark indices used in the style analysis.

Asset Class	Cash	Fixed Income	Domestic Equity	Foreign Equity	Absolute Return	Private Equity
Cash	**100%**	29.9%	-44.3%	-39.3%	-48.6%	-54.4%
Bonds	29.9	**100**	-23.9	-19.4	-48.0	-30.8
Domestic Equity	-44.3	-23.9	**100**	76.0	68.0	71.9
Foreign Equity	-39.3	-19.4	76.0	**100**	55.1	80.5
Absolute Return	-48.6	-48.0	68.0	55.1	**100**	66.1
Private Equity	-54.4	-30.8	71.9	80.5	66.1	**100**

One inherent issue in the methodology is that the policy allocation weights found using the return-based style analysis are static. Thus, if the manager has deviated from the benchmark laid out in the fund's documentation, but held his deviation constant, the method employed in this paper may take that as a sign of passive management. This is a result of that the policy obtained by return-based style analysis will assume that the composition after deviating from the benchmark is the true policy.

However, this is only severe in the case when the manager has deviated from his benchmark in a constant fashion throughout the five year period. Choosing a longer time series could have mitigated parts of these problems, since managers are unlikely to deviate in a constant fashion from their policy as outlined in the fund's documentation over long periods of time. However, had we increased the time series, the number of funds in the sample would have decreased significantly. Having a model that allows for dynamic coefficients, in other words policy allocation weights outlined by return-based style analysis could have been another way to mitigate this.

As for the assumptions and constraints in the model that all weights or estimates are positive and that they sum to one, a paper by de Roon et al. (2003) labels this method "strong return-based style analysis" and finds that constraining estimates to be positive and sum to one increases the efficiency of the model and lowers the confidence intervals for the estimates or weights considerably, given that the funds studied are actually constrained to invest on a long-only basis, i.e. that the assumptions are valid.

Generally, the debate regarding whether to use a return-based or holdings-based methodology has established that the return-based method serves a good enough proxy for a full holdings based approach (Lieberman 1996). Some studies, such as the study of Buetow and Ratner (2000) prefer the portfolio based approach whereas other such as Cummisford and Lummer (1996) suggests that the data problems inherent in the portfolio based approach could render it less reliable than the return-based method. This study thus employs the return-based style analysis based on the notion that it serves a good enough alternative for the holdings-based method, is much easier to employ and build upon previous similar studies.

3.3 MITIGATING POTENTIAL DATA PROBLEMS

As noted earlier, there is high bivariate correlation between some of the explanatory variables, i.e. the passive indices. This brings about the question of whether multicollinearity is distorting the results of the regressions. Multicollinearity, i.e. that one or more explanatory variables are highly correlated in a multiple regression model, potentially biases the results of the regression. The explanatory power of the model as a whole is not necessarily affected by multicollinearity. However, the individual coefficients may well be affected if the model has a hard time distinguishing between the explanatory variables due to multicollinearity. If this is the case, the regression will struggle to allocate weights, i.e.

the coefficients of the different explanatory variables. This is of course a serious issue to take into account since these coefficients are used as weights in the respective policy or benchmarks portfolios for each fund and conclusions are drawn based on this information in this study.

The ultimate multiple regression model has explanatory variables that are highly correlated with the dependant variable but not with each other. This is of course hard to come by in this case. As noted earlier, equity indices will most likely be highly correlated, even though they cover different geographic areas. Nevertheless, in order to make this paper reliable, some indices that are correlated to a certain degree have to be included in order to feel comfortable with the choice of indices from an economic perspective. However, one has to test whether the correlations are high enough to warrant further action.

To measure the level of multicollinearity, the Variance Inflation Factor (VIF) has been calculated which is a well-known computation that measures the severity of multicollinearity. It is performed by running a regression where the explanatory variables are used as dependant variables, one at a time, with the rest being explanatory variables.

After having run as many regressions as there are explanatory variables, one is able to see whether any of these variables are highly linear in the rest of the variables combined. If so, that explanatory variable is redundant and should be dropped.

The VIF factor is calculated as

$$(11) \qquad VIF = \frac{1}{1 - R^2}$$

The results of this test are presented in *Table 3* below

Table 3: Regressions with different independent variables

This table illustrates regressions made with shifting dependent variables regressed on the other variables. It is intended to give us an idea of the VIF for each variable and thus hint whether or not any of the variables should be dropped.

Dependent Variable	R-Squared	Tolerance	Variance Inflation Factor (VIF)	
Cash	34.05%	65.95%	1.52	
Bonds	34.80	65.20	1.53	
Domestic Equity	72.23	27.77	3.60	
Foreign Equity	74.50	25.50	3.92	
Absolute Return	68.59	31.41	3.18	
Private Equity	85.76	14.24	7.02	*(dropped)*

The exact cut-off value for the VIF is something practitioners and academia debate. Some say that four or five is a reasonable factor whereas others suggest seven or even ten. If the factor is greater than the cut-off value one should either drop the explanatory variable or obtain more data and see if the problem persists. Unfortunately, as the tradeoff between a large sample of funds and a long time series have been already been balanced, the option to obtain more data is not seen as a viable one.

Originally, the intention was to use also Private Equity returns as an explanatory variable for those funds that had mandates allowing them to invest in securities not listed on stock exchanges. The VIF that stands out is *Table 3* above is however the one for private equity. When running the regression with private equity returns as the dependent variable and the other five as explanatory variables, a VIF factor of 7.02 is obtained. Based on this, it was decided that this variable would be dropped altogether, even though the least stringent cut-off value is ten and thus above 7.02. Looking at the respective funds we see that many of the mutual funds in the sample have mandates that do not allow them to invest into the private equity sector which limits the merit of this variable. In addition, many of the funds in our sample that have a mandate that allows them to invest in securities that aren't listed haven't used that option. Thus, the loss is not that severe.

4 EMPIRICAL RESULTS

4.1 VARIABILITY OVER TIME

The first of the three questions this paper aims to answer is: How much of the variability of returns across time is explained by policy returns, i.e. by asset allocation? As explained earlier, the policy returns were obtained using return-based style analysis developed by Sharpe (1988, 1992). When using broad, commonly used indices as opposed to indices containing securities of a certain type, for instance small-cap, value or growth stocks, this paper deviate from those studies that have used return-based style analysis to replicate fund managers whose strategy is otherwise hard to understand and replicate, for instance the Agarwal and Naik (2000) study of hedge funds.

The reported R-squared from the time-series regression is broadly in line with the results from the Ibbotson and Kaplan (2000) as well as Brinson et al (1986 and 1991) studies. In the sample studied herein, the policy returns explains above 90 percent of the variability of returns across time, with an average R-squared of 92.43 percent and a median of 94.57 percent, as shown in *Table 4* below. The average and median adjusted R-squared are 91.41 and 93.84 percent respectively. In other words, given that the return-based style analysis has been effective in determining the asset allocation, it can be concluded that the variability of the funds' policy benchmark explains more than 90 percent of the monthly variability of fund returns across time. This is a slightly higher R-squared than the Ibbotson and Kaplan study (2000) as well as the Brinson et al. (1991) study and more or less directly in line with the original Brinson et al. (1986) study. Ibbotson and Kaplan (2000) found support for the idea that mutual funds tend to be more active in rebalancing their portfolios than pension funds, which was studied in the Brinson et al. (1986 and 1991) studies. Thus, since this paper studied mutual funds, one could conclude that by comparing like for like the results of this paper have a higher R-squared than the previous studies, i.e. indicating higher explanatory power of the model.

Although the vast majority of the funds in this study have a rather high R-squared, there are however a few funds where the variability of the policy returns have a hard time explaining the variability of the returns of the fund. As is imbedded in the way the linear regressions works, one line is fitted to all of the observations in order to minimize the sum of the squared deviations. In a sense, it is a sort of average policy weight obtained when looking at the respective coefficients for the indices. Thus, a fund

that has been very active and changed their portfolio mix considerably during the sample period will have a lower R-squared. A low R-squared may be the result of other things as well such as poorly chosen benchmarks or multicollinearity problems, ideas pointed out in Lucas and Riepe (1996), which has been covered earlier. However, given that the model in this paper is sound, funds that have taken the opportunity, given by a less constraining mandate, to rotate between assets will tend to have a lower R-squared.

Table 4: Comparison of R-squared and active return for different studies

This table is intended to highlight the results of our findings, with regards to R-squared and active return, and compare them to previous studies.

Measure	Brinson et al. (1986)	Brinson et al. (1991)	Ibbotson Kaplan (2000)[b]	Ibbotson Kaplan (2000)[c]	This study Mutual Funds
R^2					
Mean	93.6%	91.5%	81.4%	88.0%	92.43%
Median	NA[a]	NA	87.6	90.7	94.57
Active Return[d]					
Mean	-1.10%	-0.08%	-0.27%	-0.44%	-0.78%
Median	NA	NA	0.00	0.18	-0.67

[a] Not Available
[b] Mutual Funds
[c] Pension Funds
[d] Active return is expressed in annual terms

In addition to the figures for R-squared, the average and median active yearly returns are included in *Table 4* above. The active returns have been obtained by using the methods laid out in the methodology section, disentangling total returns into a policy (passive) return part and an active return part. The results in this study are broadly in line with earlier studies; the active yearly return is, on average, a negative 0.78 percent. Common for all studies, and also for this paper, is that the sign is negative. Consequently, this indicates that investors would have been better off investing passively in the respective fund's policy benchmark outlined by return-based style analysis than investing in the average fund. Also here, there are of course funds that perform considerably better and are able to generate a positive active return over time.

As seen in *Table 5* below, the R-squared values are quite homogenous, even the fifth percentile shows a rather high value of R-squared. The values are generally a bit higher than the Ibbotson and Kaplan (2000) study on mutual funds. The higher percentiles are however fairly in line with Ibbotson and Kaplan (2000) results.

Table 5: Range of time-series regression R-squared values

The table below is intended to give the reader a feeling for the distribution of R-squared values for the time series regressions

Percentile	Ibbotson and Kaplan (2000)[a]	Ibbotson and Kaplan (2000)[b]	This study Mutual Funds
5	46.9%	66.2%	80.53%
25	79.8	94.1	91.22
50	87.6	90.7	94.60
75	91.4	94.7	96.14
95	94.1	97.2	97.31

[a] Mutual Funds
[b] Pension Funds

4.2 VARIABILITY AMONG FUNDS

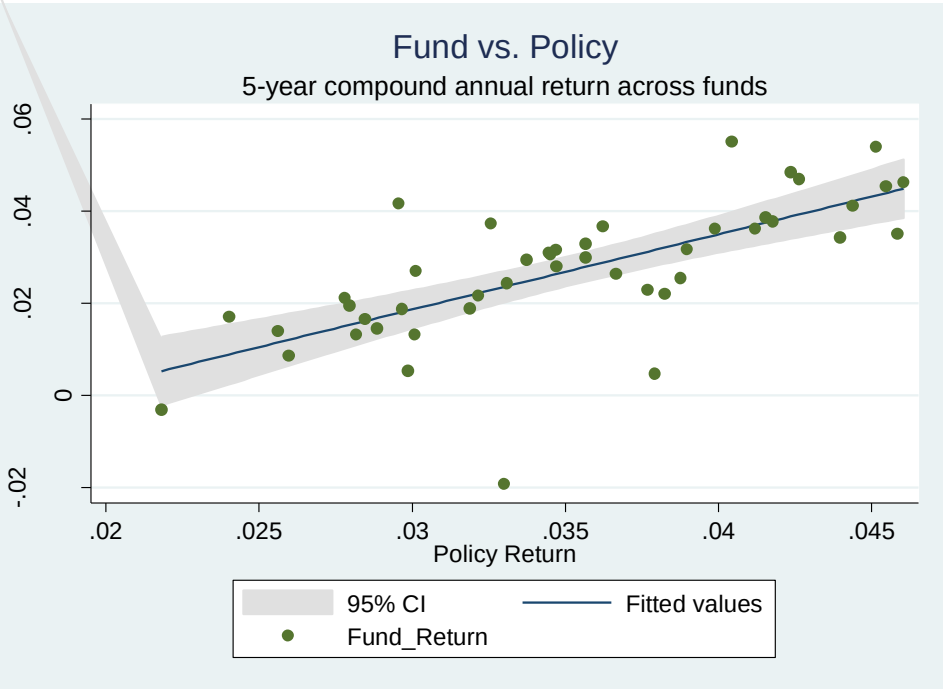
The second of the three questions this paper aims to answer is: How much of the variation in returns among funds is explained by differences in policy? As explained earlier, the results were obtained using a cross-sectional regression where the compounded annual return for each fund is regressed on the compounded annual policy return for each other fund.

The R-squared statistic of the cross-sectional regression showed that 49.22 percent of the variation among funds is explained by differences in policy. Consequently, 50.78 percent of the variation among funds was explained by factors other than policy differences. The main factors this variation is attributable to are, as Ibbotson and Kaplan (2000) suggest, asset class timing, style within asset classes, security selection, and possibly fees. The possible breakdown within these factors is outside the scope of this paper. The adjusted R-square of the regression was 48.07%.

Figure 1 visually illustrates the relationship between fund and policy returns. The graph plots five years of compounded annual return for each fund against the respective five year compounded policy return.

Figure 1: Fund vs. Policy: 5-year compound annual return across funds

The graph plots 5-year compound annual fund return against 5-year compound annual policy return for the mutual funds in the sample from January 2004 to December 2008.



There are two factors driving the R-squared obtained from this cross-sectional regression; the differences between the funds' asset allocation and the differences in the degree of market timing and/or stock picking efforts. The variation in policy weights among all funds in the sample is illustrated in *Table 6* below where the average allocation, standard deviation, and various percentiles are reported on asset class group level. Fixed Income corresponds to Cash and Bonds, Equities to Domestic and Foreign Equity and Alternative Assets to the Absolute Return or hedge fund asset class. The large standard deviations and the spread of the percentiles indicate that there are large variations in policy weights among the funds in the sample. This trend conforms to the findings of Ibbotson and Kaplan (2000). In their sample of 94 U.S. balanced mutual funds, they found that the cross-sectional R-squared was 40 percent which is a bit lower than what is found in this paper.

Table 6: Cross-sectional distribution of balanced mutual fund policy weights

This table is intended to give an overview of the variation in policy weights among all funds in the sample.

Measure	Cash	Bonds	Domestic Equity	Foreign Equity	Absolute Return
Average	24.7%	15.5%	29.5%	27.5%	2.7%
Standard Dev.	14.8	14.3	16.9	16.9	6.9
Percentile					
5	0.0	0.0	10.1	0.6	0.0
25	14.8	1.3	17.5	13.6	0.0
50	25.9	13.3	27.6	32.0	0.0
75	37.0	25.9	38.5	37.6	0.0
95	46.8	41.9	59.7	51.0	21.3

4.3 RETURN LEVEL

The third of the three questions this paper aims to answer is: What portion of the return level is explained by policy returns, i.e. return attributable to asset allocation policy which has been obtained using the return-based style analysis developed by Sharpe (1988, 1992). The portion or level of return that can be attributed to asset allocation is perhaps the most interesting. Ever since the Brinson et al. (1986, 1991) studies, people have from time to time mistakenly used their result regarding the time series regression to answer this question.

Table 7: Percentage of total return level explained by policy return

The table below holds the results regarding return level and comparable results from previous studies

Study	Mean	Median
Brinson et al.		
1986	112%	NA
1991	101	NA
Ibbotson and Kaplan (2000)		
Mutual Funds	104	100%
Pension Funds	99	99
This study		
Mutual Funds	131	121

In order to do these calculations, the total returns of the balanced mutual funds have been disentangled into two components; policy returns and active returns using the method described in the methodology section. This ratio is of course a very simple performance measure, but still it conveys some information. A fund that have adhered to their benchmark closely will have a ratio close to 100 percent, a fund that have deviated from their benchmark and created positive active returns will have a ratio below 100 percent and those that have deviated from the benchmark and created negative

active returns will have a ratio above 100 percent. The mean ratio in this paper's sample of 46 Swedish balanced mutual funds is 131 percent and the median is 121 percent, as illustrated in *Table 7* above, indicating that on average the active returns have been negative. This implies that on average, investors would have been better off investing passively in the strategic asset allocation obtained by performing the returns based style analysis. Yet again, it is concluded that it is utterly important to choose the right manager if the investor is looking for superior returns, or at least returns in line with what is obtained by investing passively. The negative active return found in this study can stem from either asset class rotations ("timing") that have proven to be negative or negative effects from security selection, for instance unsuccessful stock-picking. It should be noted that the data in this study has returns net of management fees; if one had looked at returns before fees the picture would of course be brighter.

The fifth, 25th and 50th percentiles are fairly in line with the sample of mutual funds covered in Ibbotson and Kaplan (2000), whereas the 75th to the 95th percentiles are substantially higher. This indicates that there are fund managers in this sample that perform a lot worse than their respective passive benchmark compared to the Ibbotson and Kaplan (2000) samples and a few that outperform their benchmark strongly; the funds in the fifth percentile. The differences in study periods may, however, explain a portion of the deviation between the studies.

Table 8: Range of total return level explained by policy return
This table is intended to give a cross-sectional distribution of the active returns in the sample.

Percentile	Ibbotson and Kaplan (2000)[a]	Ibbotson and Kaplan (2000)[b]	This study Mutual Funds
5	82%	86%	71%
25	94	96	108
50	100	99	123
75	112	102	158
95	132	113	300

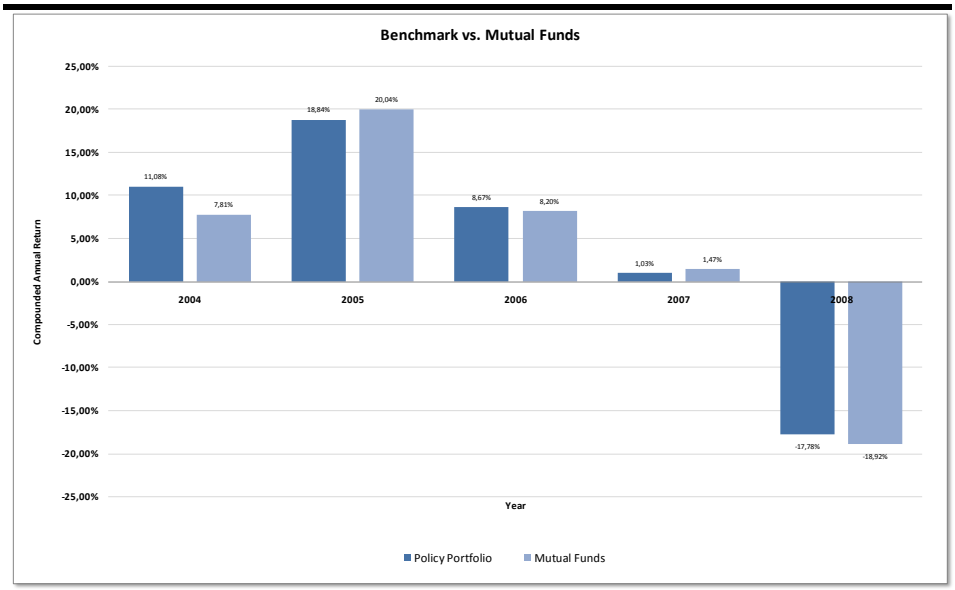
[a] Mutual Funds
[b] Pension Funds

It is noted in *Figure 2* that the largest parts of the aggregated underperformance in this paper's sample stem from the performance during 2004. However, the full explanation as to what caused this underperformance is harder to explain. To do this, one would have to obtain the actual allocation to different asset classes in 2003 and 2004, data which was not accessible when writing this paper. Based on the data available in this paper, an explanation to this phenomenon would merely be speculation. It is however clear that if the data from 2004 was excluded, the results would have been more in line

with the results from the Ibbotson and Kaplan (2000) study that presents ratios at or very close to 100%, depending on sample; i.e. that all of the performance in terms of level is explained by asset allocation and that managers, on average, are able to create enough value to offset their fees but not more than that.

Figure 2: Policy returns vs. mutual funds

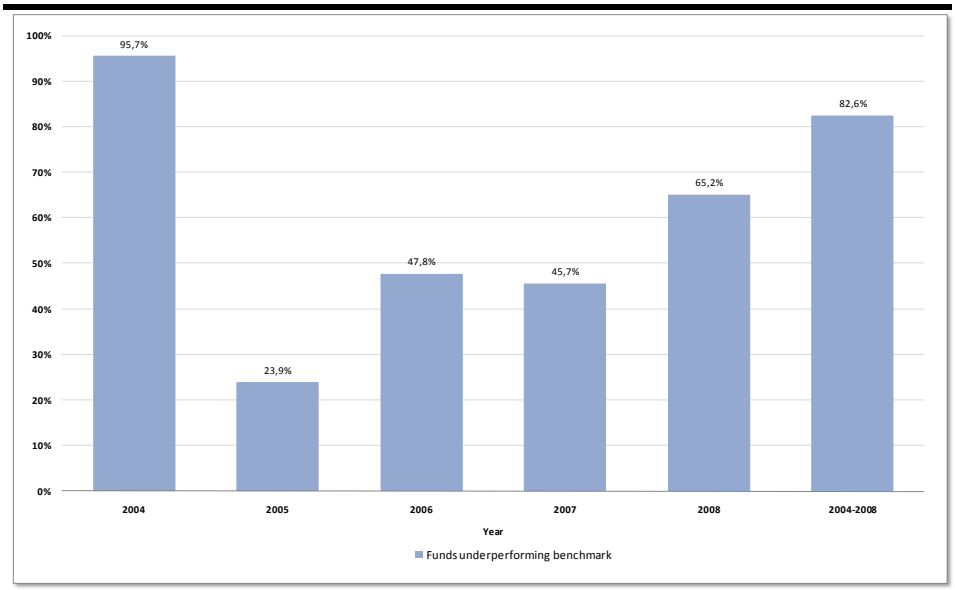
This figure is intended to give an overview how the funds have performed relative their policy on a year by year basis.



Although active management can create significant performance variation and value, the degree of skill required to justify active management is very high as outlined by Kritzman and Page (2003). As illustrated in *Figure 3* below, the choice of manager is utterly important since many funds underperform their respective benchmarks; i.e. the policy determined by the return-based style analysis. The percentage of funds that underperform their benchmark varies from year to year, which is only natural. However, looking at the 5-year figure, four mutual funds out of five underperform their respective benchmarks; a disappointing figure given that it is over a period of five years. One would assume that although funds may well underperform their benchmark in a single year, one could hope that they are able to at least match the returns of their benchmark over time.

Figure 3: Percentage of funds underperforming their policy benchmarks

This figure is intended to give a overview of how many funds have underperformed their respective policies on a year by year basis.



The result, that mutual funds on average have a hard time earning positive active returns, is in line with Sharpe (1991). His argument was that if the sample you are studying constitutes a fair share of the market, the performance of the funds must on average be similar to the market performance as all investors combined constitute the market. Because of management fees and transaction costs, the average investor must be underperforming the market on a cost-adjusted basis. This would lead to that policy returns explain more than 100 percent of fund performance, which is one of the conclusions of this paper. However, this does, of course, not imply that active management is useless. As there is a variation in performance among funds, with some outperforming their benchmark, in this study roughly one fifth of the funds in the sample period, the individual investor that can select managers that are able to outperform their benchmark will reap above average returns. However, as a large portion of the funds in this paper's sample underperform their benchmarks, the individual investor must believe in his or her manager selection skills or seek the aid of someone that has a strong track record in this field to feel confident with the investment decision. The question is then what strategies to follow when evaluating managers before committing funds; this is however a question that is beyond this study.

5 CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 CONCLUSIONS

This paper has investigated the importance of asset allocation for a set of 46 Swedish balanced mutual funds in the time period between January 2004 and December 2008, in total 60 months. The data was chosen as to balance between a large enough sample and a long enough time series. The methodology and process used in the Brinson et al (1986, 1991) and Ibbotson and Kaplan (2000) studies have been applied to this dataset in addition to the return-based style analysis outlined by Sharpe (1988, 1992) where the latter was used to form the asset allocation or policy of each individual fund. The results are in line with previous research which further strengthens the notion that asset allocation is a significant determinant of performance and variation of the same.

In order to avoid the debate that the Brinson et al studies (1986, 1991) got caught in, this paper has broken down the issue into three distinct questions that can be tested individually. The three questions were

i) How much of the variation of returns across time is explained by the asset allocation policy? Put differently, how much of a fund's ups and downs do its policy benchmark explains?

ii) How much of the variation in returns among funds is explained by differences in policy? Put differently, how much of the difference between two funds' performance is a result of their policy difference?

iii) What portion of the return level is explained by policy returns? Put differently, what is the ratio of the policy benchmark return to the fund's actual return?

The results for the first question were similar to previous research concluding that policy is to a very high degree able to explain the variation in returns across time; the average R-squared of the regressions was 92.43 percent and the median 94.57 percent. These R-squared values are slightly higher than those Ibbotson and Kaplan (2000) found in their study of mutual funds indicating that policy is able to explain even more in the sample used in this paper. Looking at the percentiles, one can see that these results are quite homogenous across the funds in the sample, to a higher degree than

what was found in Ibbotson and Kaplan (2000). In addition, the active return component is found to be negative, which is in line with previous research.

Looking at the second question, variation of returns across funds, it was found that 49.22 percent of the variation among funds is explained by differences in policy. This number is slightly higher than the comparable 40 percent from the Ibbotson and Kaplan (2000) paper which indicates that asset allocation has a slightly higher explanatory power in the dataset presented in this paper. Thus other factors such as asset class timing, style within asset classes, security selection explains a majority of the variation across funds.

The results for the third question, the level of return, are also in line with previous research. On average, the mutual funds report negative active returns that can stem from either asset class rotation ("timing") that have proven to be negative or negative effects from security selection, for instance unsuccessful stock-picking. As in questions one and two, this study indicates an even higher importance of asset allocation compared to previous studies. On average, 131 percent of performance of the funds used in this sample can be explained by the passive policy or asset allocation portfolio. The median value is slightly lower, 121 percent, implying that there is variability across the funds. By looking at the percentiles it can be noted that the results for 75^{th} and 95^{th} percentiles deviate quite heavily from previous findings. A possible explanation to this is the strong underperformance in 2004 presented in *Figure 2*. Thus, a longer time period or the exclusion of 2004 may have generated results more similar to those presented in previous research. Taking a longer time period was unfortunately not possible since this would have reduced the number of funds in the sample considerably. Nonetheless, looking at the performance year by year, it can be concluded that investors would have been better off investing passively in the strategic asset allocation or policy obtained through the return-based style analysis than in the average or median fund.

Thus, given that this paper finds that asset allocation is a significant determinant of performance and variation of the same, it is concluded that it is utterly important to think about asset allocation before forming an investment portfolio. For many private investors, it is common that the strategic asset allocation is undertaken by the individual. The results in this study indicate that unless the investor is very comfortable with his or her skills in this area, he or she should think about acquiring help in forming the portfolio, at least if the individual is looking for superior returns or returns in line with what is obtained by investing passively in a policy portfolio obtained by return-based style analysis.

5.2 SUGGESTIONS FOR FUTURE RESEARCH

Three questions are suggested for future research in this area

1) A similar study on Nordic data could perhaps achieve the necessary sample size with a longer time period, which should add to the robustness of findings. Thus, such a study would be interesting to see.

2) A study on individual savings instead of balanced mutual funds, for instance the investments made by Swedish citizens in the PPM system.

3) A study looking at equity funds and applying the return-based style analysis technique to study the relationship between performance and sector allocation instead of performance and asset allocation.

The first suggestion relates to the differences in results found in this paper compared to earlier studies, especially on the question regarding the level of return. An explanation put forward in this paper is that the difference is mainly attributed to the severe underperformance in 2004. Thus, results should be more similar to earlier studies and perhaps more robust had the times series been longer. The data was chosen as to balance between the length of the time series and the size of the sample. Analyzing a Nordic dataset, as opposed to a Swedish one, could mitigate those problems.

Regarding the second suggestion, it would be very interesting to see how individual investors have fared, i.e. the importance of asset allocation to the performance and the variation of the same for private investors. This paper has highlighted the importance of asset allocation by examining mutual funds, which serves as a decent study object in order to draw general conclusions about the importance of asset allocation in general. However, the paper would perhaps attract more attention from a general public, had the study object been individuals and their savings.

The third suggestion relate to a generalization of the application of return-based style analysis. It would definitely be interesting to see a study that applies the methodology of return-based style analysis to sector allocation for equity funds. The hypothesis could be that sector allocation is a decent explanatory factor for equity fund performance.

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APPENDIX 1

Table A1: List of funds in sample

The table below contains the 46 balanced mutual funds used in this study

Funds	Funds
Banco Försiktig	Länsförsäkringar Fond-i-Fond Normal
Danske Invest Försiktig	Länsförsäkringar Trygghetsfond
Länsförsäkringar Fond-i-Fond Försiktig	Lärarfond 45-58 år
Lärarfond 59+	Nordea Avtals Pensionspar Midi
Nordea Stratega 10	Nordea Donationsmedelfond
SEB Strategi Balanserad Global	Nordea Futura
SEB Trygg Placeringsfond	Nordea Optima SEK
Skandia Allt i Ett Försiktig	Nordea Private Banking Internationella Portfölj
AMF Pension Balansfond	Nordea Stratega 50
Banco Balanserad	Nordea Stratega 70
Carlson Stiftelsefond Sverige	SEB International Mixed1
Danske Aktiv Förmögenhetsförvaltning	SEB Trygghetsfond Ekorren
Danske Invest Balanserad	SEB Världenfond
Eldsjäl Biståndsfond	SEB Världenfond - Lux UL
Folksams Förvaltningsfond	Skandia Allt i Ett Balanserad
Handelsbanken Flermarknadsfond	Skandia Paraply
Handelsbanken SBC Bofonden	Swedbank Robur Access 50 - Balanserad
Handelsbanken Värdefond	Swedbank Robur Access 75 - Modig
Handelsbanken Stiftelsefond	Swedbank Robur Mix Indexfond Sverige
HQ Total A/Total B	Swedbank Robur Mixfond
KPA Etisk Blandfond 1	Swedbank Robur Mixfond MEGA
KPA Etisk Blandfond 2	Swedbank Robur Mixfond Pension
Lannebo Mixfond	Swedbank Robur Norrmix

APPENDIX 2

Table A2: Cross sectional distribution of mutual fund policy weights

The table below contains cross sectional distribution of the policy weights for the 46 balanced mutual funds in the sample given by the return-based style analysis and the policy each fund compare themselves with. Absolute return has only been included in the respective regression if it is indicated in their own policy that they have mandate for this.

Funds	Cash		Bonds		Domestic Equity		Foreign Equity		Absolute Return	
	Analysis	Actual	Analysis	Actual	Analysis	Actual	Analysis	Actual	Analysis	Actual
Banco Försiktig	**43.4%**	18.8%	**23.6%**	18.8%	**16.9%**	31.3%	**16.1%**	31.3%	**0.0%**	0.0%
Danske Invest Försiktig	**38.9**	0.0	**27.5**	70.0	**16.0**	12.0	**17.5**	18.0	**0.0**	0.0
Länsförsäkringar Fond-i-Fond Försiktig	**34.4**	0.0	**9.5**	40.0	**10.1**	10.0	**45.9**	50.0	**0.0**	0.0
Lärarfond 59+	**25.9**	0.0	**40.2**	70.0	**19.9**	20.0	**11.4**	10.0	**2.6**	0.0
Nordea Stratega 10	**29.8**	45.0	**47.0**	45.0	**2.7**	2.0	**7.3**	8.0	**13.2**	0.0
SEB Strategi Balanserad Global	**11.6**	25.0	**14.7**	25.0	**1.0**	0.0	**46.4**	50.0	**26.4**	0.0
SEB Trygg Placeringsfond	**42.3**	30.0	**15.9**	30.0	**18.1**	20.0	**20.2**	20.0	**3.5**	0.0
Skandia Allt i Ett Försiktig	**44.9**	42.5	**33.0**	42.5	**11.2**	7.5	**10.8**	7.5	**0.0**	0.0
AMF Pension Balansfond	**18.6**	20.0	**21.2**	20.0	**40.7**	30.0	**19.5**	30.0	**0.0**	0.0
Banco Balanserad	**34.3**	16.5	**0.0**	16.5	**33.2**	33.5	**32.5**	33.5	**0.0**	0.0
Carlson Stiftelsefond Sverige	**31.1**	0.0	**20.8**	50.0	**46.8**	50.0	**1.3**	0.0	**0.0**	0.0
Danske Aktiv Förmögenhetsförvaltning	**19.0**	35.0	**24.4**	15.0	**54.1**	25.0	**2.5**	25.0	**0.0**	0.0
Danske Invest Balanserad	**0.4**	25.0	**27.2**	25.0	**20.7**	25.0	**29.8**	25.0	**21.9**	0.0
Eldsjäl Biståndsfond	**14.8**	0.0	**0.0**	20.0	**62.4**	80.0	**22.9**	0.0	**0.0**	0.0
Folksams Förvaltningsfond	**18.0**	0.0	**13.3**	33.3	**32.7**	33.3	**36.0**	33.3	**0.0**	0.0
Handelsbanken Flermarknadsfond	**46.8**	0.0	**1.3**	50.0	**21.0**	25.0	**30.9**	25.0	**0.0**	0.0
Handelsbanken SBC Bofonden	**0.0**	10.0	**0.0**	40.0	**90.5**	25.0	**9.5**	25.0	**0.0**	0.0
Handelsbanken Värdefond	**33.1**	6.7	**0.0**	26.7	**26.7**	33.3	**40.2**	33.3	**0.0**	0.0
Handelsbanken Stiftelsefond	**39.3**	6.7	**0.0**	26.7	**28.9**	33.3	**31.9**	33.3	**0.0**	0.0
HQ Total A/Total B	**27.7**	0.0	**0.0**	100.0	**41.6**	0.0	**36.7**	0.0	**0.0**	0.0
KPA Etisk Blandfond 1	**21.0**	0.0	**34.9**	55.0	**30.5**	35.0	**13.6**	10.0	**0.0**	0.0
KPA Etisk Blandfond 2	**16.1**	0.0	**18.2**	33.3	**28.2**	33.3	**37.6**	33.3	**0.0**	0.0

Lannebo Mixfond	**52.7**	0.0	**0.0**	0.0	**47.3**	100.0	**0.0**	0.0	**0.0**	0.0
Länsförsäkringar Fond-i-Fond Normal	**15.1**	0.0	**0.0**	25.0	**19.7**	15.0	**65.3**	60.0	**0.0**	0.0
Länsförsäkringar Trygghetsfond	**29.2**	0.0	**4.9**	33.3	**34.0**	33.3	**32.0**	33.3	**0.0**	0.0
Lärarfond 45-58 år	**19.0**	0.0	**7.9**	30.0	**38.5**	35.0	**34.6**	35.0	**0.0**	0.0
Nordea Avtals Pensionspar Midi	**18.3**	0.0	**9.9**	33.3	**20.8**	13.3	**51.0**	53.3	**0.0**	0.0
Nordea Donationsmedelfond	**40.1**	30.0	**6.8**	20.0	**35.9**	35.0	**17.3**	15.0	**0.0**	0.0
Nordea Futura	**14.4**	19.0	**30.5**	31.0	**21.1**	22.5	**34.0**	27.5	**0.0**	0.0
Nordea Optima SEK	**12.5**	12.6	**15.3**	20.7	**30.8**	30.0	**41.4**	36.7	**0.0**	0.0
Nordea Private Banking Int. Portfölj	**0.0**	0.0	**9.8**	25.0	**13.3**	10.0	**59.2**	65.0	**17.8**	0.0
Nordea Stratega 50	**0.0**	15.0	**33.7**	35.0	**12.2**	10.0	**34.8**	40.0	**19.3**	0.0
Nordea Stratega 70	**0.0**	15.0	**13.8**	25.0	**17.2**	14.0	**47.7**	56.0	**21.3**	0.0
SEB International Mixed1	**49.4**	0.0	**0.0**	30.0	**50.6**	0.0	**0.0**	0.0	**0.0**	0.0
SEB Trygghetsfond Ekorren	**28.3**	0.0	**25.9**	50.0	**45.1**	50.0	**0.7**	50.0	**0.0**	0.0
SEB Världenfond	**23.2**	0.0	**4.8**	30.0	**32.4**	35.0	**39.5**	35.0	**0.0**	0.0
SEB Världenfond - Lux UL	**23.2**	0.0	**4.8**	30.0	**32.4**	35.0	**39.5**	35.0	**0.0**	0.0
Skandia Allt i Ett Balanserad	**29.5**	25.0	**2.5**	25.0	**27.8**	25.0	**40.3**	25.0	**0.0**	0.0
Skandia Paraply	**37.0**	25.0	**10.4**	25.0	**27.4**	25.0	**25.2**	25.0	**0.0**	0.0
Swedbank Robur Access 50-Balanserad	**35.6**	10.0	**12.1**	40.0	**17.7**	12.5	**34.5**	12.5	**0.0**	0.0
Swedbank Robur Access 75 – Modig	**22.3**	12.5	**0.0**	12.5	**26.9**	15.0	**50.8**	15.0	**0.0**	0.0
Swedbank Robur Mix Indexfond Sv.	**33.9**	12.5	**17.1**	37.5	**45.6**	50.0	**3.4**	50.0	**0.0**	0.0
Swedbank Robur Mixfond	**4.0**	12.5	**41.9**	37.5	**17.3**	25.0	**36.8**	25.0	**0.0**	0.0
Swedbank Robur Mixfond MEGA	**6.7**	12.5	**40.7**	37.5	**16.7**	25.0	**35.9**	25.0	**0.0**	0.0
Swedbank Robur Mixfond Pension	**2.2**	12.5	**44.0**	37.5	**17.5**	25.0	**36.3**	25.0	**0.0**	0.0
Swedbank Robur Norrmix	**39.7**	12.5	**0.0**	37.5	**59.7**	25.0	**0.6**	25.0	**0.0**	0.0

APPENDIX 3

Table A3: Total, policy and active returns

The table below contains the total fund return in addition to the policy and active returns for the 46 balanced mutual funds used in this study.

Funds	Total Return (yearly compounded)	Policy Return (yearly compounded)	Active Return (yearly compounded)
Banco Försiktig	3.17%	3.90%	-0.70%
Danske Invest Försiktig	3.62	3.99	-0.35
Länsförsäkringar Fond-i-Fond Försiktig	1.32	2.82	-1.46
Lärarfond 59+	4.53	4.55	-0.01
Nordea Stratega 10	3.44	4.40	-0.92
SEB Strategi Balanserad Global	0.87	2.60	-1.69
SEB Trygg Placeringsfond	3.30	3.57	-0.26
Skandia Allt i Ett Försiktig	3.78	4.18	-0.38
AMF Pension Balansfond	5.51	4.04	1.41
Banco Balanserad	1.32	3.01	-1.64
Carlson Stiftelsefond Sverige	4.12	4.44	-0.30
Danske Aktiv Förmögenhetsförvaltning	3.51	4.58	-1.03
Danske Invest Balanserad	3.67	3.62	0.04
Eldsjäl Biståndsfond	-1.92	3.30	-5.06
Folksams Förvaltningsfond	2.95	3.37	-0.41
Handelsbanken Flermarknadsfond	1.88	2.97	-1.06
Handelsbanken SBC Bofonden	2.80	3.47	-0.64
Handelsbanken Värdefond	1.96	2.79	-0.81
Handelsbanken Stiftelsefond	0.53	3.47	-2.38
HQ Total A/Total B	4.17	2.96	1.18
KPA Etisk Blandfond 1	5.40	4.52	0.85
KPA Etisk Blandfond 2	3.16	3.47	-0.30
Lannebo Mixfond	2.29	3.77	-1.43
Länsförsäkringar Fond-i-Fond Normal	-0.30	2.18	-2.43
Länsförsäkringar Trygghetsfond	1.89	3.19	-1.26
Lärarfond 45-58 år	3.73	3.26	0.46
Nordea Avtals Pensionspar Midi	1.66	2.84	-1.15
Nordea Donationsmedelfond	2.99	3.56	-0.55
Nordea Futura	2.55	3.88	-1.28
Nordea Optima SEK	2.44	3.31	-0.84
Nordea Private Banking Int. Portfölj	1.70	2.40	-0.69
Nordea Stratega 50	2.64	3.66	-0.99
Nordea Stratega 70	2.11	2.78	-0.65
SEB International Mixed1	0.48	3.79	-3.19

SEB Trygghetsfond Ekorren	4.62	4.60	0.02
SEB Världenfond	2.70	3.01	-0.31
SEB Världenfond - Lux UL	1.45	2.88	-1.39
Skandia Allt i Ett Balanserad	3.10	3.45	-0.33
Skandia Paraply	3.06	3.45	-0.37
Swedbank Robur Access 50-Balanserad	2.16	3.22	-1.02
Swedbank Robur Access 75 – Modig	1.40	2.56	-1.14
Swedbank Robur Mix Indexfond Sv.	4.70	4.26	0.42
Swedbank Robur Mixfond	3.86	4.15	-0.28
Swedbank Robur Mixfond MEGA	3.62	4.12	-0.48
Swedbank Robur Mixfond Pension	4.84	4.24	0.58
Swedbank Robur Norrmix	2.20	3.82	-1.56