

## Executive Summary

### Problem

In the past years, there has been a substantial shift in the asset allocation of Swiss pension funds. These changes are a result of external pressure. The factors behind this external pressure include, but are not limited to, demography stated by UBS (2018) and the changes in the interest rate according to Antolin et al. (2011). Now, even though the asset allocation policy is so important for pension funds the literature does not find a consensus on this important topic. There is no unity of opinion because of the complexity of this decision. There is no comprehensive model which determines the perfect asset allocation for pension funds. To find out how the asset allocation will progress in the future, the factors behind the allocation shifts have to be identified and it is important to find out if these driving forces still remain. Now, if the focus is not on all the pension funds but on individual ones, there are certain key characteristics which seem to influence their asset allocation.

### Method

This thesis runs a time series regression with the demographic variable as well as the interest rate as the independent variables, with the allocation of each individual asset class being the dependent variable. This method runs five separate multiple regressions. After these regressions are run, the impact that each independent variable has on the allocation in each asset class is assessed. The steps mentioned above are accomplished by using the data from the pension fund survey provided by the Swiss federal statistical office. This analysis is done exclusively on Swiss pension funds.

The second part of the analysis concentrates on the future development of the asset allocation of Swiss pension funds. To determine the future asset allocation for the next five years, the Arima forecast method is used on the independent variables as well as on each individual dependent variable. The reasoning behind using the Arima model on the independent variables is that after the computation of the demographic variable as well as the interest rate, these estimated future values can be put into the regression models to determine each individual allocation of the asset classes. After running the Arima method on each dependent variable, the values from the regression model

with estimated values and the values from the Arima model can be compared. This increases the plausibility of the insights gained from the forecast.

After predicting the asset allocation for the next five years, there is an individual analysis of Swiss pension funds, which uses data received from the pension funds themselves. In this part of the thesis, the impact of the legal form as well as of the demographic variable is analyzed. To evaluate if these have an impact on the asset allocation, a two sample welch t-test is used. This t-test indicates if these factors have a significant influence on the respective asset class.

To determine which changes in asset allocation have helped pension funds with their performance and which changes have prevented them from performing better, the changes in the asset allocation are compared to the changes in the coverage ratio of the pension fund. The coverage ratio is used to assess the performance of the pension funds because it is a comprehensive metric, which includes both the asset side as well as the liability side of the balance sheet. Even though, this measure is not a perfect way to measure the performance of pension funds, it fulfils the two most important criteria. These two criteria are comprehensiveness and there being a clear link between the success of investments of the pension fund and the coverage ratio.

## Results

The interest rate, as well as the demographic variable, have a significant influence on several asset classes. The demographic variable has a significant influence on how much cash is held in the allocation. The demographic variable also has a significant influence on how much is allocated in alternative assets. The interest rate has a significant influence on how much is allocated in bonds and in real estate. Following this, the future development of these independent variables was measured with an Arima model. The results from this Arima forecast are that according to the best guess of the model the interest rate will remain on the same level and the demographic variable will decline even more, meaning that there are fewer insured people per retiree. Now, even though the capital funding applies to the second pillar of the pension fund system, there has been a lot of cross-subsidisation because of the demographic development. Therefore paired with the results from the regression, demography seems to affect pension funds in their asset allocation.

The results of the individual analysis of the pension fund are that the demographic variable has a significant influence on the changes in equity. Legal form does not show any significant influence on the allocation changes in assets. The comparison of the asset allocation changes with the coverage ratio progression from 2009-2017 shows that there is more disparity in changes in the privately managed pension fund categories on most asset classes. What is also notable is, that all pension funds have decreased their allocation in bonds. To investigate this more thoroughly, a performance attribution with construction of an artificial benchmark through cash flow matching would have to be made. This is outside of the scope of this thesis.

The results indicate that there is a significant influence of both the interest rate as well as the demographic variable on asset allocation. This influence can only be significantly seen on certain asset classes. Even though, there is no significant influence on every asset class, what has to be addressed is that the asset allocation decision is a dynamic process in which the allocation in one asset class will influence the allocation in the other asset classes. Therefore, the influence of the independent variables does not need to have a significant influence on every single asset class to have a real impact on the allocation.