

Portfolio Management with Market Signals

In the second method, you can see the effect if you are responsive to large-scale fluctuations of the market instead of following a buy-and-hold strategy: You will further reduce the loss probability at a certain stock proportion and, at the same time, increase your return on investment. In our modeling of the stock market, we focus on early recognition, and therefore avoidance, of long-lasting bear markets. If bear market phases of the total stock market history are eliminated, the statistical properties of the remaining market data changes: the average volatility decreases and the average return increases. Therefore, in our modeling, we focus on early recognition and avoidance of long-lasting bear markets.

Analogous to the buy-and-hold strategy, we demonstrate the impact of market signals on your risk-return analysis for the scenario with average conditions (3% annual interest for the risk-free assets during an investment period of 5 years). We show the results for two different strategies, a “conservative” strategy and a “more aggressive” strategy. With the conservative strategy you are invested in the market whenever the trend (determined by Kalman filtering) lies above a certain threshold. An exit signal occurs when the trend falls below the threshold. With the more aggressive strategy, which goes along with higher portfolio fluctuations, the exit signal is identical with the conservative strategy, but there is a temporary market entry signal whenever the market has fallen substantially.

The parameters for the average yield of stock and stock volatility are now the return and volatility values of the “controlled” S&P 500 market index, where the market signals determine the market entry and market exit. For the conservative strategy, these are 7.7% for the yearly rate of return and 12.5 for the yearly volatility, and 9.1% and 15.0%, respectively, for the more aggressive strategy.

Two points can be highlighted:

- The active adjustment of the stock proportion to the large-scale fluctuations of the market allows even risk-averse people to run a higher stock proportion in their total portfolio. Therefore they can achieve a higher total return without substantially increasing the loss probability.
- In principle, this risk-return analysis can be generalized for any market-based investment strategy, as long as you can determine the average stock yield and volatility of the historical market time series that is generated by the application of your strategy.

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Scenario: Average Conditions

Time period of investment: 5 years

Average annual return for risk-free assets: 3%

Return Expectation and Loss Probability:

- With a buy-and-hold strategy and a stock proportion of 25% it is possible to achieve a most probable total return of 20.3%. There is a loss probability of 1.5%.
- If you had actively controlled your stock proportion of 25% with the help of the market signals and a conservative strategy the loss probability would have been just 0.05% with a total return of 23.3%. If the loss probability is kept constant at 1.5%, the stock proportion could be increased to 48%. At this percentage, the most probable total return would be 28.8% compared to only 20.3% with a buy-and-hold strategy.
- If you had used the more aggressive strategy, the total return could have been further increased to 34.1%, at the same loss probability of 1.5% and the same stock proportion of 48%.

Most probable return for the total portfolio and the corresponding stock proportion as a function of loss probability for three strategies

