

ROBO-ADVISORY: A CLOSER LOOK AT THE ENGINE ROOM THROUGH TIME

June 2018



EXECUTIVE SUMMARY

Our previous chapter *Robo Advisory: A Closer Look at the Engine Room* studied the digital portfolios of three hypothetical investors - Bart S., Lisa S., Abraham S. – as recommended by a sample of German and US robo-advisors. This report is a follow-up to the November report and assesses how our three friends' portfolios have changed over time.

The paper presents five main findings that are summarized on the side. In addition, the paper introduces an updated version of a simulated multi-asset class model that was first developed in the November report, as a proxy for robo-advisors' performance through time.

The main conclusion of this follow up, *Robo-Advisory: A Closer Look at the Engine Room Through Time*, is that robo-advisors are constantly adapting their portfolios to reflect market changes, keep costs low, and maintain diversification.

Top 5 takes

Target portfolio weights assigned to specific risk profiles change from month to month

Robo-advisors keep fine-tuning their investment strategies with frequent ETF changes

Robo-advisors have shown delayed market reactions to the late-January rising market volatility

US robo-advisors continue to invest more aggressively than their German peers

Differences in terms of cost and home bias between German and US robo-advisors persist

OUR THREE INVESTORS

Bart S.

Bart is a young man in his twenties starting off his professional career in engineering. Bart is not afraid of risking his money, as according to him, *if you risk nothing, you risk everything*. Needless to say, Bart is performance-oriented and does not mind the ups and downs of the financial market.

Lisa S.

Lisa is in her mid-career and wants to start investing after finishing paying off her mortgage. She has some experience with capital markets but does not have time to manage her investments. Since a major expense awaits her, she can only afford moderate fluctuations in her portfolio.

Abraham S.

Abraham is in his late 60s, retired and taking pension income. He aspires to receive regular income streams to cover life expenses, and at the same time preserve his wealth for his children. As a retiree, he is highly concerned about potential losses, and thus tends to be more conservative.



WHAT HAVE BART S., LISA S., AND ABRAHAM S. EXPERIENCED WITH THEIR DIGITAL PORTFOLIOS OVER THE PAST MONTHS?

Target portfolio weights assigned to specific risk profiles change from month to month.

Robo-advisors are programmed to keep the target asset allocation close to predefined levels for each risk grade. For instance, a portfolio with a target level of 50 equity/50 fixed-income – the ideal portfolio for the balanced investor, Lisa in our case - will not see the actual percentages deviate much since portfolios are regularly rebalanced. However, target levels do change over time, as robo-advisors make adjustments in what they consider to be the best portfolio mix given current market conditions. And this is exactly what our three investors experienced over the past months: some slight adjustments in the optimal equity/fixed-income balance and rebalancing of actual portfolio levels back to target levels.

Robo-advisors keep fine-tuning their investment strategies with frequent ETF changes

Digital advisors are constantly adapting the investment strategy, seeking to keep costs low and regularly rebalancing portfolios. The most common adjustments that we have seen over the past months have involved: 1) changes in the sub-asset classes invested through either the expansion or

reduction in the number of ETFs representing them; 2) ETF replacements by substituting current ETFs with those provided by competing brand names mainly due to lower costs; 3) changes in the amount invested in the different ETFs and sub-asset classes i.e. increase in the amount allocated to US equity ETFs versus Emerging Markets ETFs.

Robo-advisors have shown delayed reactions to the late-January rising market volatility

Most changes reported by the sampled robo-advisors have occurred in March. These have included changes in both ETFs and asset allocations. The portfolio that has recorded the highest number of changes in terms of asset allocations is Abraham's - the conservative portfolio – and the portfolio that has recorded the least number of changes is Bart's – the growth-oriented portfolio. This finding brings evidence to the fact that robo-advisors might respond to market movements with a delay. An alternative explanation for the March changes could also be attributed to periodic end-of-quarter strategy revisions performed automatically by robo-advisors.

US robo-advisors continue to invest more aggressively than their German peers

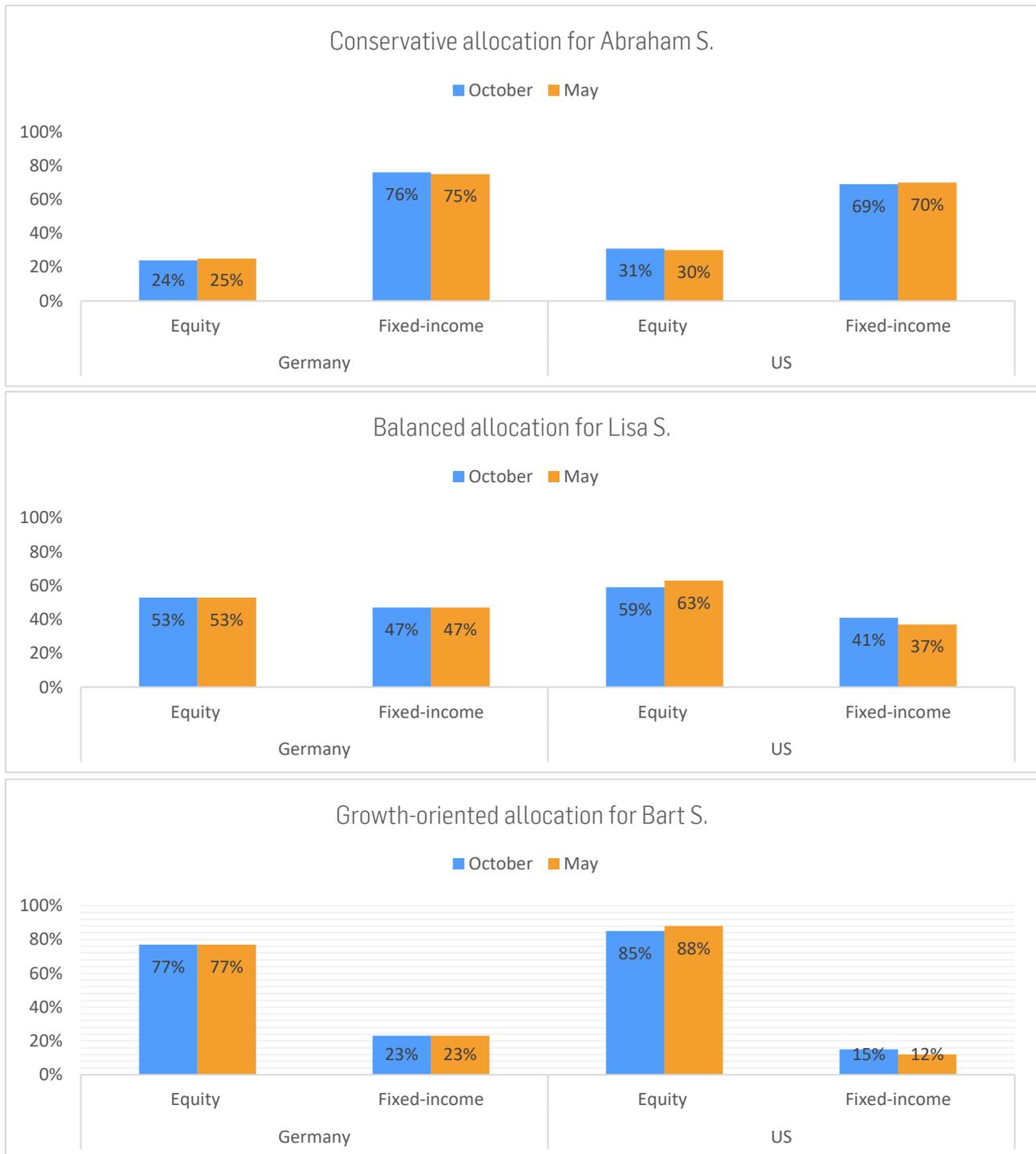
On average, US robo-advisors have maintained their higher equity allocation over German robo-advisors in all portfolios (Figure 1). What is more, the equity gap between US and German robo-advisors has become larger (exception made for the



conservative profile). The average equity gap between US and German robo-advisors found in this report is 11% for the growth investor, 10% for the

balanced investor, and 5% for the conservative investor, compared to 8%, 6%, and 7% in October, respectively.

Figure 1. Average U.S. vs. German robo-portfolio allocations for our three investors*



Source: Solactive calculation, May 31 2018

*For simplicity, equity also includes real estate and commodities; Fixed-income also includes cash



These findings strengthen previous evidence showing that US-based providers tend to be more equity-oriented. This difference can be explained by the different investment culture in the two countries, which is also reflected in the way local robo-advisors construct portfolios.

Differences in terms of cost and home bias between German and US robo advisors persist

US robo-advisors maintain their status quo as cost leaders in the digital advisory space. On average, the fund expense ratio for the sampled US robo-advisors is 14.9 BPS, while for the German ones is 28.4 BPS¹, compared to 17.9 and 28.5 in October, respectively². In addition, in both cases, robo-advisors show a certain degree of home bias, with US providers and fixed-income ETFs being more affected. On average, for the sampled German robo-advisors, 27% of equity ETFs and 43% of fixed-income ETFs cover the European region. On the other hand, for the sampled US robo-advisors, 50% of equity ETFs and 80% of fixed-income ETFs cover the North American region.

HOW HAS OUR SIMULATED SAMPLE MODEL PERFORMED OVER THE COURSE OF THE PAST MONTHS?

In order to reference robo-advisors' performance through time, we developed three multi-asset class models corresponding to the risk preferences of Bart S., Lisa S., and Abraham S. Each

portfolio targets different volatility levels (figure 2) and is based on mean-variance optimization.

Figure 2. Target volatility

Risk Profile	Target Volatility
Growth-oriented	10%
Balanced	7.5%
Conservative	5%

As can be seen in figure 3³, the optimal asset allocation only changed for the balanced investor over the past months. In addition, the model presented changes in terms of the underlying indices and geographic allocation. More specifically, the model has moved away from Emerging Market indices to US and European indices in all three cases. A potential explanation for this is the fact that Emerging Markets have experienced more volatility compared to the US and Europe, and therefore the model has replaced riskier assets with safer ones to maintain the desired level of risk.

The performance of the sample model is illustrated in figure 4³. The graph can give an idea of robo-advisors' performance through time. As shown, there has been a set-back in performance at the end of January due to higher volatility in the markets. The largest drawdown was experienced by the growth investor, followed closely by the balanced investor. The conservative investor experienced more moderate fluctuations, with only a slight decrease in performance at the end of January, which is consistent with the expectations for the low volatility portfolio.



Figure 3. Comparison of dynamic asset allocations October 31 2017 and May 31 2018

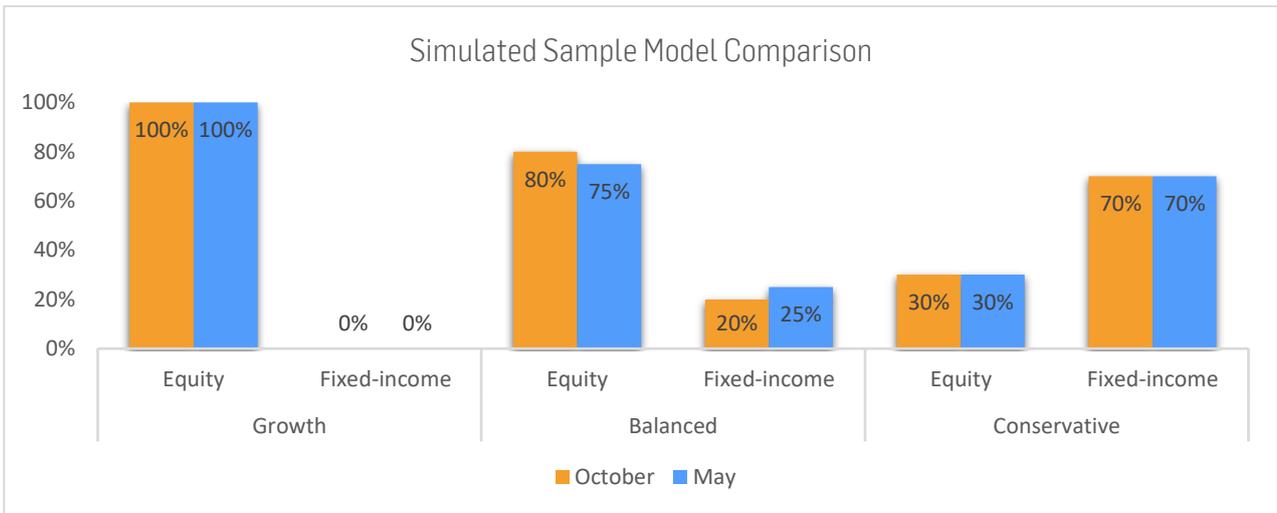
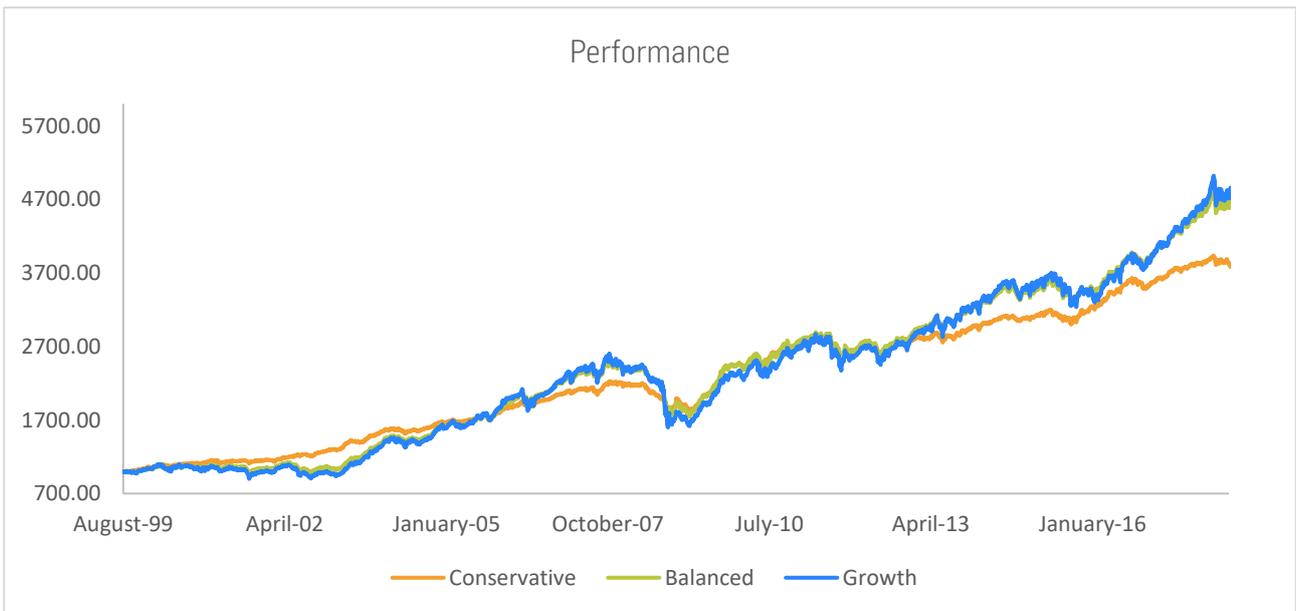


Figure 4. Simulated performance of the sample model (1999 – 2018)



¹As of May 31, 2018

²As of October 31 2017

³As of May 31, 2018



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All numbers are calculated by Solactive as of Q2 2018

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