Summary of Bachelor Thesis:

Are Robo Advisories the successor of Traditional Investment Funds?

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studies "Economic Sciences (FB1)" of the
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1. Introduction

The development of automated investment managers, so-called Robo Advisors, has revolutionized the investment landscape. These online financial advisors use algorithms to automatically create, optimize and manage an investors investment portfolio according to their individual investment preferences. Robo Advisors try to avoid human error by selecting investments strictly according to the investor's criteria. Therefore, emotionally driven buying and selling actions do not take place. Traditional investment companies analyze the markets with great effort and try to beat the market with focused portfolios. Thus, these investment companies take on higher risks.

Since the number of Robo Advisors has increased steadily in recent years, the question must be answered whether Robo Advisors are the successors of traditional investment banking. The thesis focuses on the German market. The foundations and definitions of active and passive management and the concretisation of the scientific concepts on which Robo Advice is based are discussed in the thesis. In the later course of the paper, the functionality of the Robo Advisor is described, afterwards the advantages and disadvantages and the future of this technology are shown in order to answer the question of this thesis.

2. Portfolio Management

In 1960, two investment techniques existed: active management and passive management. Active management attempts to outperform a selected index/benchmark and achieve above-average returns. Passive management attempts to reconstruct a selected benchmark. In contrast to active management, passive management involves lower costs and return expectations on the level of the index which they replicate, as less time and expertise is required for the analysis of prices, arbitrage and the valuation of individual stocks (Prucker 2016).

3. The academic concept behind Robo Advice

The academic concepts behind Robo Advice are the following:

1. Modern Portfolio Theory by Harry Markowitz
2. Capital Allocation Line by James Tobin
3. Capital Asset Pricing Model (CAPM) by William F. Sharpe
4. Efficient Market Hypothesis by Eugene Fama

Markowitz's Modern Portfolio Theory (MPT) assumes that the primary goal of any investor is to maximize returns at any level of risk. This theory allows investors to visualize risk tolerance and return expectations using the Efficient Frontier graph to determine an ideal portfolio. Portfolios outside and below the "Efficient Frontier" are considered less ideal because they either carry too high risks or do not generate sufficient returns (Bodie et al. 2017: 163-168). James Tobin's portfolio theory analysis extends this theory by adding a risk-free interest rate. This leads to the creation of the Capital Market Line (CML). The CML is a tangent to the Efficient Frontier curve, which ends at the risk-free interest rate on the y-axis (expected return). The portfolio that lies at the intersection of the tangent, starting from the risk-free interest rate, with the "Efficient Frontier", is the Efficient Portfolio (Sharpe 1964: 425-427). The "Efficient Frontier" graph is modified by the CAPM model. The CML becomes the Security Market Line (SML). The expected risk on the x-axis is replaced by beta to reflect the volatility of securities. If the beta value rises, the expected return rises as well. This allows investors to revalue their portfolios and make changes to improve returns (Bodie et al. 2017: 198-199). Fama's Efficient Market Hypothesis is based on the thesis that shares are always traded at market value and all information is reflected in the market. This would make it impossible for investors to buy undervalued shares or sell shares at inflated prices. The only way to achieve excess returns is to buy riskier assets. Investors who spend time and money on obtaining and analyzing profit-maximizing information expect to be rewarded with higher returns (Bodie et al. 2017: 232-235).

4. Markowitz' Modern Portfolio Management: Limitations, Extensions, Alternatives

In the application of the scientific models, in particular the MVO, limitations and extension possibilities have been identified. The following approaches exist: The Approximation and Estimation Error has an influence on possible expected values and the composition of a portfolio, which is why a distinction should be made between asset classes (Swensen 2009: 104-106). With Static Input, the portfolio structure is defined once and then recorded continuously. Applying Dynamic Asset Allocation, the portfolio is continuously adjusted to the overall market development. Current market conditions and the performance of the individual asset classes are evaluated (Corporatefinanceinstitute.com n/s). In contrast to the usually recommended 1-year period, the Time Horizon includes

the consideration that investors should spread their investments over a longer period of time (Swensen 2009: 104-106). Full-Scale Optimization, an alternative to Approximation Error, takes every type of return distribution and investor preferences into account (Adler, Kritzman 2006: 305-306). The Fama-French Five-Factor, Carhart Four-Factor, Black-Litterman and Gordon Growth models were named as extensions of the MVO model. These models evaluate equities in terms of profitability, total asset accumulation (Fama, French 2015: 1-3), performance (Carhart, 1997: 60-61), portfolio weighting (Black, Litterman 1992: 28-29), and dividends (Benninga, Czaczkes 2008, 40).

5. Robo Advisory – The Fundamentals

As part of the FinTech phenomenon, Robo Advisory first appeared between 2008 and 2010. These automated investment solutions use algorithms to offer the initiation and management of client portfolios. Robo Advisors require a license from BaFin or Deutsche Bundesbank in Germany and must be transparent with regard to their costs, possible risks and limitations of their services (BaFin 2009). Although the interaction with the customer takes place via online platforms, the users of Robo Advisor are not only "millenials". According to Deutsche Bank, German users/clients are about 40 years old academics with a net household income of 4000 Euros (Kaya 2017: 9-10). Robo Advisors use questionnaires to determine their clients' investment preferences. Among other things, statements are made about the size of the investment, the investment horizon and risk tolerance (Bahlinger 2016: 3-4). Robo Advisor use often MVO and the "Efficient Frontier" to select portfolios with the maximum expected return for each level of risk. While some providers use MVO as a stand-alone model, others combine it with models such as CAPM, Black-Litterman, Gordon-Growth and Fama-French Five-Factor to capture the inability to capture loss aversion (Benninga, Czaczkes 2008, 40; Black, Litterman 1992: 28-29). Due to their automated nature, Robo Advisors are well suited for performing portfolio rebalancing. Rebalancing is the process of repeatedly buying and selling over- or under-represented assets in a portfolio that occured as a result of different developments in the bond and equity markets. It is carried out 1 to 3 times a year if needed It also allows the investor to return to an optimal portfolio while benefiting from short-term gains. This is also an effective way to buy low and sell high. Rebalancing is also carried out when changes are made to the risk preference (Jaconetti et al., 2015). Robo Advisors typically charge an annual management fee based on the client's investment volume. These fees vary by provider and can range from 0.15 to 1.2 percent of

the portfolio volume. However, not all costs are always included in the management fee. Therefore, Robo Advisors have average additional costs for the administration of ETFs of between 0.20 and 0.40 percent annually for the management of the funds (Deutschefxbroker.de 2019). Like any capital investment, capital gains and returns from the use of Robo Advisers are also subject to withholding tax and capital gains tax. However these profits must only be taxed when the profit Is realized, in contrast to accounting profits which are not taxed (Geldanlage.de n/s). In the course of rebalancing, Robo Advisor also pays attention to tax efficiency. Therefore, it is the goal of tax-loss harvesting to maximize investors' after-tax returns. Capital gains and capital losses are offset to minimize back tax payments (Kaya 2017: 7-8).

6. Advantages and Limitations of Robo Advice

Although Robo Advisor have become a popular trend, their biggest drawback is that its investment recommendations are not personalized. Although they take many financial goals and preferences into account, factors such as the desire to have children, job changes and retirement are only taken into account to a limited extent. The desire for a personal consultation cannot be fulfilled either (Equities 2016). On the other hand, there are the low costs in combination with a superior return, which were supported by the graphical performance analysis of the UniGlobal and the MSCI World Index and the LIQID Global 50 versus the average performance of a number of asset managers, and the easy use of the Robo Advisor (Onvista n/s; LIQID Asset Management 2019; UniGlobal Investment Privatfonds GmbH 2019).

7. The Future of Robo Advice

The authors Gupta and Tham predict that Robo Advisor providers will consistently offer better financial advisory and asset management services (Gupta, Tham 2019: 340). This thesis was supported by statistics on Robo Advisors assets under management, the continuous increase in investment volume and their users (Statista 2019). It remains to be seen, whether further asset classes will be added to the Robo Advisor product portfolio in the future (Gupta, Tham 2019: 340-342).

8. Conclusion

Traditional investment funds usually perform worse than Robo Advisor portfolios. This is reflected in a performance comparison of the UniGlobal fund with the MSCI World Index and the LIQID Global 50 compared to the portfolios managed by asset managers in Germany. As the Robo Advisor investment concept is still in its infancy, a long-term valuation of the Robo Advisor portfolio is not yet possible. It remains to be seen when Robo Advisor will replace the human financial advisor. However, it should be noted that Robo models are developed by specialists. The human influence is reflected individually in the Robo models. With this in mind, Robo Advisors are predicted to have a successful future. Essential for the success is the cost advantage of the Robo Advisor and the easy handling via Internet, as well as the small budget required for such an investment form.

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