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Robo-Advisors versus Traditional Investment Advisors: *An Unequal Game*

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Robo-advice has become a key buzzword in the financial and technology industries recently. Robo-advisors are digital wealth management platforms that provide automated financial planning services and investment solutions mostly based on passive and cost-efficient instruments, while efficiently managing these allocations by rebalancing mechanisms. In this study, we compare and estimate the costs between traditional investment advice and robo-advice solutions.

The authors compare robo-advice solutions with traditional investment advice on three key levels. First, robo-advisors provide mostly passive market access with strategic asset allocations (SAAs) versus traditional investment advisors offering active market calls.¹ Second, robo-advisors guarantee cost-efficient implementation with exchange-traded funds (ETFs) versus traditional investment advisors who invest mostly in actively managed funds. Third, the authors consider potential behavioral biases among investors with a robo-advisor solution versus a traditional investment advice solution.

The authors empirically show that robo-advice investors save over 4% a year in direct and indirect costs compared with traditional solutions, such as advisory fund solutions at banks or asset managers, because robo-advisors offer more efficient solutions on all three key levels.

The article is structured as follows: first, we will discuss the importance of passive investing with strategic asset allocations and advantages of robo-advice. Then, we describe how robo-advisors implement investment strategies in a cost-efficient way. The next section describes the behavioral gap that arises when not sticking to a long-term investment strategy, followed by an empirical section that quantifies the difference in costs between robo-advisors and traditional advisory solutions. The last section concludes.

ADVANTAGES OF ROBO-ADVICE

Active investment strategies are often expensive and do not, on average, deliver real added value for investors in the context of diversified market exposure. Today, about one-third of the share of outstanding equities is held by passive investors, and they are projected to control half of the U.S. stock market by 2021.² Robo-advisors might add to that development.

The strategic asset allocation—that is, the mix of asset classes that determines the investment strategy's exposure to systematic risk—is the most important investment decision of a long-term investor who seeks diversified market exposure. A key aspect of successful long-term investing is to define a robust and well-diversified asset allocation across a global universe of asset and sub-asset

classes. Furthermore, an investor should capture different risk premia, such as equity risk, interest rate risk, credit risk, small-cap risk, or emerging market risk. Brinson et al. [1986] or Ibbotson and Kaplan [2000], for instance, tried to determine the impact of the SAA on the long-term performance and found that the SAA explains between 80% and 100% of the variation in investment returns. The impact of market timing and security selection is negligible in this context.

In order to add value for long-term investors, it is important that the SAA is in line with the investor's investment goals and risk profile. Additionally, goal-based investing helps to find an SAA that maximizes the probability of reaching a specific investment goal over a certain investment horizon, as shown by Brunel [2006a]. Although financial profiling is a standard element of any investment process (also because it is required by regulators), most advisors do not take the client's emotional risk profile or investment personality into account. This is of great importance when it comes to staying rational during periods of market downturns. Investing according to an SAA that does not match the investor's risk profile makes investors more likely to deviate from the defined SAA, for example, by reducing the risk during a market downturn, which increases the probability of not achieving the goal at the end of the investment horizon.

Robo-advisors differ in the methodology they apply to construct SAAs, as Faloon and Scherer [2017] showed nicely in their examination of the current state of individualization of robo-advisors by defining a generic robo-advisor as a benchmark model in order to suggest improvements. These improvements range from human-based (qualitative) to fully quantitative approaches. Another differentiator is the degree of customization and flexibility to account for clients' individual goals and preferences. While traditional banks generally offer typically up to six risk profiles for retail, affluent, and high-net-worth individual (HNWI) clients, they offer further customization for ultra-high-net-worth individuals (UHNWIs). Robo-advisors can offer more customization for retail and affluent client segments due to their technology-based solutions at lower costs in general.

On another note, Brunel [2015] examined the importance of systematic asset management, which might be considered as an alternative to standardized robo-advice based on passive instruments for various

client segments, as it still provides a solution that offers operational leverage. In this regard, once the systematic nature of an asset management solution is coupled with tailored and/or human advice, it becomes systematically different from standardized robo-advice. In particular, when a client's wealth situation is more complex and the client thus has more demanding and holistic needs, the client's ability and willingness to pay advisory fees (as opposed to lower robo-advisor fees) will increase.

COST-EFFICIENT IMPLEMENTATION

Costs are a key aspect that determine long-term performance. In general, there are two layers of costs: one is the fee the investment advisor charges and the other is the cost of the investment product. The total expense ratio (TER) expresses the total costs associated with managing and operating an investment product (or fund). The TER usually includes management, trading, legal, and audit fees as well as other operational expenses. For ETFs, TERs generally range between a few basis points and up to 0.4%. The TERs of active funds can be many times higher than those for ETFs. Although ETFs just replicate a benchmark index, most active funds base their investment decisions on views created by large (and costly) research departments.

There are several ways to implement SAAs, but clients basically need to decide between passive or active implementation. A passive investment strategy replicates the SAA, whereas an active strategy tries to outperform the SAA by means of market timing as well as security selection. Is active management able to consistently outperform a passive benchmark, and if so, is this outperformance large enough to cover its costs?

There are two aspects to this question. First, most active managers are not able to outperform their benchmark. Active management is a zero-sum game, on average.³ Taking the costs of active management into account, active funds underperform their benchmark on average, as numerous studies have shown.⁴ Also, performance persistence of active funds is low. This means that if a fund had an outperformance over the benchmark (i.e., positive alpha) in one year, there is a high probability that the alpha is negative in the succeeding year (i.e., the fund will experience an underperformance to the benchmark). Therefore, in many cases, positive alpha is the result of luck rather than skill.⁵

Second, it is difficult to select the few successful active managers from a universe of thousands of active investment funds. In the United States alone, there are over 12,000 registered investment advisors (RIAs).⁶ Picking the best-performing stock from around 14,000 listed companies worldwide is difficult;⁷ identifying the best fund manager is even more challenging. Most investors select active funds based on their past performance. However, it is well documented that past performance is not a reliable predictor of future performance and should not be used as a selection criterion, as Goyal and Wahal [2008] showed. Jenkinson et al. [2016] made clear that even investment consultants specialized in manager selection are prone to this fallacy and thus often not successful.

That most active funds charge high management fees, do not beat their benchmark, and the few that do are very difficult to identify in advance suggest that active management, on average, does not pay off in the context of diversified investing, in particular when considered on an after-tax basis (Brunel [1999, 1998]). Through the effect of compound interest, the high fees of an active implementation—and the resulting penalty on performance—increase exponentially with the length of the investment horizon. Robo-advisors take advantage of this fact and implement their investment strategies with passive, cost-efficient investment vehicles.

Furthermore, while there are different principles of taxation in different jurisdictions, capital gains taxes in general tend to be higher with active security selection as opposed to robo-advisors that invest in passive instruments and apply rebalancing techniques. Brunel [1998] showed that an optimization process in terms of tax status is quite complex. Additionally, Brunel [1999] found that making a market timing error is costlier after taxes than before taxes. Therefore, when considering taxes as well, the case is even stronger for passive robo-advisors over active managers.

BEHAVIORAL BIASES ARE COSTLY

Timing markets is difficult in general and in particular for the average investor, as pointed out earlier. Although it is relatively easy to limit losses and exit the market after a drawdown has occurred, it is difficult to find the right point in time to re-enter the market and increase the exposure to risky assets again; typically,

investors are misguided by their emotions at that time. Most investors who reduce risk during a crisis miss the first weeks or even months of the rebound, which can be costly. A behavioral study reveals that investors do not have market timing skills.⁸ This study identifies the so-called behavioral gap, which is the difference between the performance of equity or bond indexes and the realized performance of average equity or bond investors. With this analysis, it is shown that investment results are more dependent on investor behavior than on fund performance. The behavioral gap is estimated with data from mutual fund sales, redemptions, and exchanges, which should reflect the “average investor.” In 2016, for example, the behavioral gap of an equity mutual fund investor was at 4.7%, meaning that the average equity investor underperformed the S&P 500 equity index by that margin.⁹

There are several reasons why a behavioral gap among investors exists, which are rooted in behavioral biases. For instance, investors are prone to a multitude of behavioral biases when investing, most notably loss aversion, narrow framing, anchoring, mental accounting, lack of diversification, herding, regret, media response, or overconfidence.¹⁰ All of these biases have been shown to be misleading (and therefore costly) when making investment decisions.

In order to avoid the behavioral gap, there are two possibilities: first, investors can stop acting with emotions or, second, find a solution that prevents them from acting on behavioral biases. The first option is, in practice and even in theory, rather unrealistic, as this would require intense and timely training. Therefore, the second option deserves prominence. This can be achieved with a passive solution that applies a strict rebalancing regime as opposed to trying to time the market or (not) following the recommendations of one’s advisor. Rebalancing re-adjusts the current allocation of the portfolio back to its strategic weights. In doing so, the investor engages in a counter-cyclical investment behavior by selling the winning asset classes and buying the asset classes with the lowest returns. A strict rebalancing regime not only assures that the predefined risk–return profile is met but also helps to avoid the behavioral gap. Most robo-advisors rebalance their SAAs automatically, hence offering to avoid a potential behavioral gap.

QUANTIFYING THE OPPORTUNITY COSTS OF TRADITIONAL INVESTMENT SOLUTIONS

In order to quantify the impact of management and product fees and of the behavioral gap on long-term investment performance, we analyze returns of different implementation variants of average investors. Exhibit 1 shows annual returns over 20 years from 1987 to 2016 of several assets. Annual equity index returns (S&P 500 equity index) over that period were 7.7% and annual bond index returns (Bloomberg Barclays Aggregate Bond Index) were 5.3%. Based on results in the DALBAR [2017] study, the average balanced asset allocation investor (with a balanced asset allocation consisting of around 60% equities and 40% bonds) only realized annual returns over that 20-year period of 2.3%.

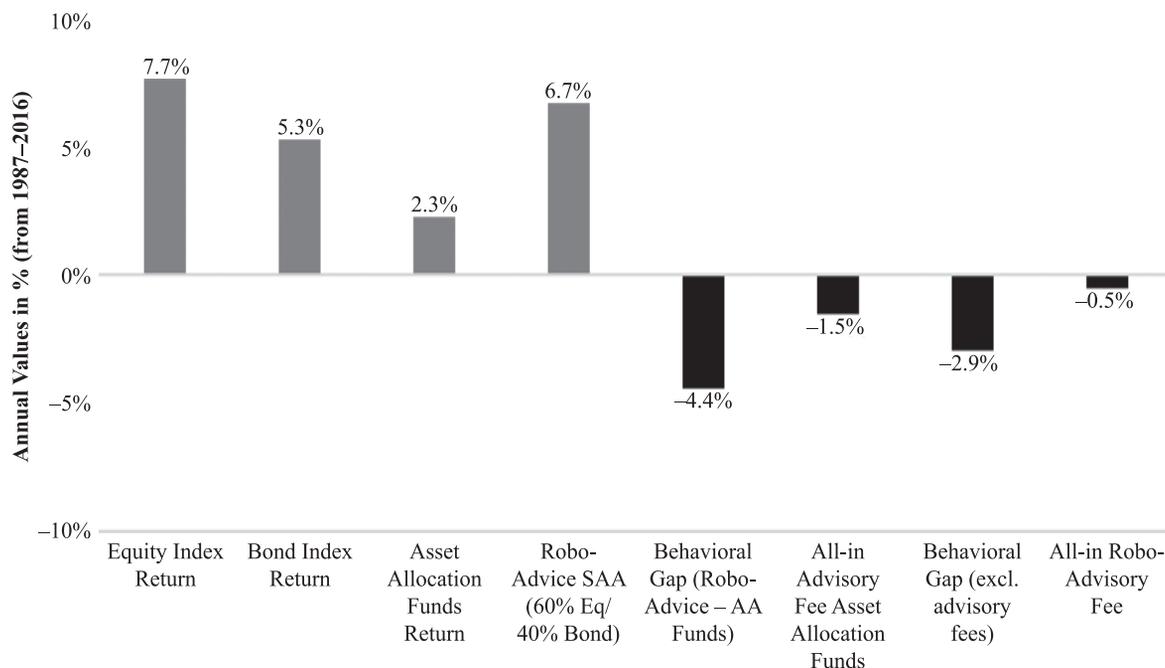
As an example, a robo-advice strategy implements a sample balanced SAA that invests 60% in equities and 40% in bonds in a passive and cost-efficient way with monthly rebalancing. From the performance of the sample SAA, we deduct TERs of a passive

implementation with ETFs (proxied with 0.2% per annum) as well as the management fee for the robo-advisor solution (proxied with 0.3% per annum and as described previously), amounting to an approximate all-in cost for a robo-advisor solution of 0.5% per annum.¹¹ The average annual return of such an investor over the same time period was 6.7%, an outperformance over the average asset allocation fund investor. The resulting behavioral gap between an average investor in traditional asset allocation funds and a robo-advice solution investor is thus 4.4% per year.

In order to compute the “net” behavioral gap between the average traditional investor and a robo-advice solution investor, we approximate the traditional all-in advisory fee to be 1.5%, consisting of a 1% advisory management fee and a 0.5% fee for investment funds used to realize the investment advice, as shown in Exhibit 1.¹² Therefore, the resulting net behavioral gap amounts to 2.9% per year.

Exhibit 2 shows what a historical price development between three potential investors would have

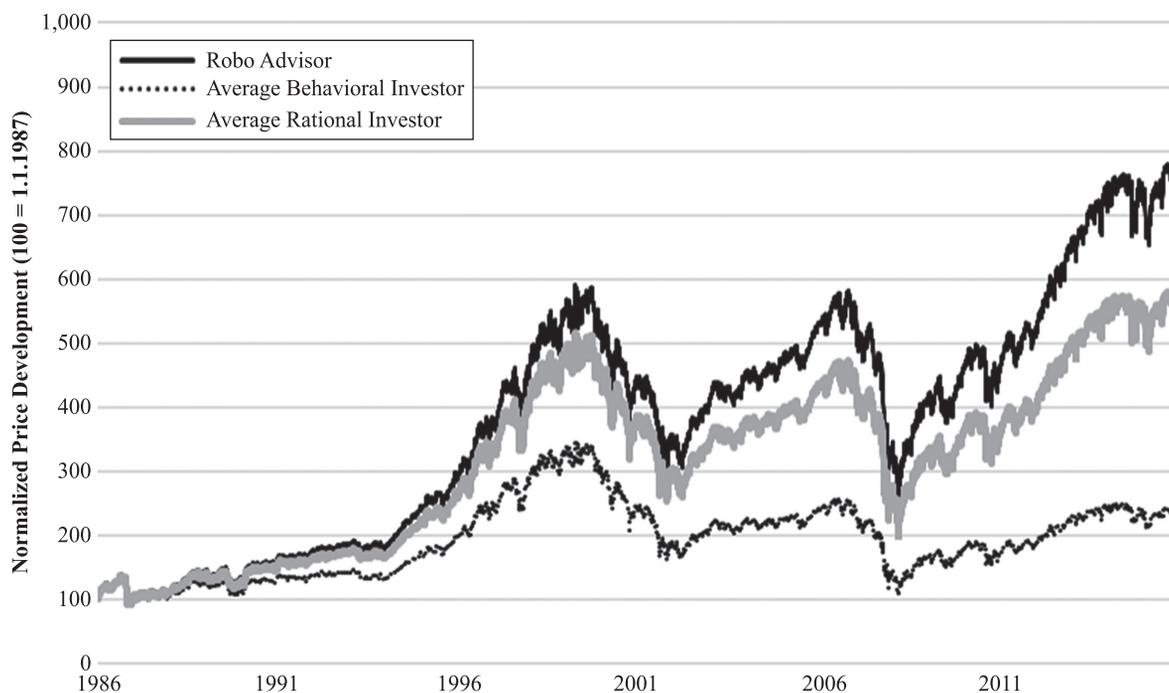
EXHIBIT 1
Annual Returns, 1987–2016



Notes: This exhibit shows the annual returns of several benchmark indexes, such as equity and bond index returns as well as returns for an average asset allocation funds investor who tried to time the market, and a robo-advice investor. The average annual return of a robo-advice investor is almost three times as high as that of an average asset allocation fund investor. The difference between these two is called the “behavioral gap.” The behavioral gap is made up of two main components: the all-in advisory fee and the behavioral gap of an average asset allocation fund investor.

EXHIBIT 2

Historical Price Development of the Various Solutions, 1987–2016



Notes: This exhibit shows the historical development of three investment possibilities. The robo-advisor solution invests in a balanced SAA (60% equity, 40% bonds) with an all-in fee of 0.5%. The historical development is shown of an average rational investor, who invests in a balanced SAA (60% equity, 40% bonds) with an all-in fee of 1.5%. The bottom line shows an average behavioral investor investing in a traditional asset allocation solution and trying to time the market. This investor clearly underperforms vs. the other two investors.

looked like over that 20-year time horizon. An average robo-advisor solution investor would have increased capital with a factor of 8. An average rational investor who has a behavioral gap of 0% to the robo-advice investor, but a 1%-point difference in fees per year would have increased capital with a factor of 6. The average behavioral investor who has a behavioral gap of 2.9% and a 1.5% all-in advisory fee would have only doubled initial capital over the time period examined.

CONCLUSION

The authors have empirically examined the opportunity costs of traditional investment solutions versus newly emerging robo-advice solutions. The analysis conducted considered three levels of differences: 1) passive versus active market access, 2) cost-efficiency, and 3) eventual behavioral investor biases.

The authors conclude that robo-advice offers superior solutions on all three levels by providing passive

market access with strategic asset allocations and cost-efficient implementation with ETFs and by avoiding behavioral biases. It is empirically shown that the combination of these three levels saves robo-advice investors about 4.4% a year in direct and indirect costs compared with traditional solutions, such as advisory fund solutions at banks or asset managers.

Therefore, passive, cost-efficient, and disciplined advice as naturally offered by robo-advisors helps to avoid behavioral biases as well as high management and product fees, resulting in significantly higher net investment performance for clients. In the future, robo-advisors can improve their own processes by further strengthening the use of technology, addressing tax-efficiency more rigorously, and decreasing opportunity costs even further versus traditional investment solutions. Robo-advisors might not only become preferred investment solutions across client segments due to growing cost sensitivity in today's low-interest rate environment, but they might also become an increasingly

important element for traditional banks and wealth managers through acquisition or co-operations.

ENDNOTES

¹Although not all robo-advisors operate in the passive sphere, we want to specifically focus on the passive side of robo-advising, as most active advisors do not typically add value after fees and taxes. This has been extensively documented in the literature. See, for example, Sharpe [1991], Brunel [2006b], or Jones and Wermers [2011].

²A. Sampson, "Passive Investing Set to Claim Half of Equity and Bond Markets," *Financial Times*, February 3, 2017: <https://www.ft.com/content/d3ed66da-e967-11e6-967b-c88452263daf>.

³Based on traditional finance theory, active management is a zero-sum game before costs, and a negative-sum game after costs see, for example, Sharpe [1991]. However, non-traditional finance theory would disagree with this view.

⁴See, for example, Wermers [2000] or the Standard & Poor's Indexes versus Active Funds Scorecard (SPIVA®), which documents relative performance of active funds in different segments.

⁵Mauboussin [2010] used the concept of "reversion to the mean" to separate skill from luck. If persistence is high, winners stay winners and the reversion to the mean is low. He found that performance persistence is much higher, for example, in such sports as tennis than in active investment management, where reversion to the mean is very pronounced.

⁶See the report from the Investment Advisor Association (IAA), "2017 Evolution Revolution: A Profile of the Investment Adviser Profession" (2017). Available online at <https://www.investmentadviser.org/publications/evolution-revolution>.

⁷The MSCI ACWI All Cap Index contains 14,356 listed companies across 23 developed and 24 emerging markets countries, covering about 99% of the global equity opportunity set, as of September 2017.

⁸See DALBAR [2017].

⁹In 2016, the performance of the S&P 500 was 11.96% whereas the average equity investor earned only 7.26%, resulting in a behavioral gap of 4.7% according to DALBAR.

¹⁰For more information, see DALBAR [2017].

¹¹Based on survey of 31 robo-advisors in My Private Banking research, "Global Robo-Advisor Benchmarking 2017" (2017): <https://store.myprivatebanking.com/collections/all/products/global-robo-advisor-benchmarking-2017-mostly-a-one-trick-pony>.

¹²Advisory fee models typically depend on assets under management. We draw on several studies that have looked at

average advisory fees and average all-in advisory fees, such as SEI, "Fees at a Crossroads," (January 14, 2016): <https://seic.com/knowledge-center/fees-crossroads>; RIA in a Box, "RIA Industry Study" (December 8, 2016): www.riainabox.com/blog/2016-ria-industry-study-average-investment-advisory-fee-is-0-99-percent; AdvisoryHQ, "Average Financial Advisor Fees & Costs" (2017): www.advisoryhq.com/articles/financial-advisor-fees-wealth-managers-planners-and-fee-only-advisors.

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