

Matching FinTech Advice to Participant Needs: Lessons and Challenges

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December 2018

PRC WP2018-20

Pension Research Council Working Paper

Pension Research Council

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Abstract

The financial services industry is changing rapidly with the arrival of new economies of scale and networking effects attributable to FinTech, particularly via online or ‘robo’ advice. This chapter reviews the ‘robo-experience:’ how does it differ, if at all, from more traditional advice, and what is likely to happen next? After reviewing the goals and objectives of robo-advice, evolving advice models, who uses robo-advice, and investor behavior, we conclude that first adopters tend to be more affluent Millennial investors, as well as others seeking fast, mobile, and easy access to their finances. Nevertheless, though robo-advice has promised much, evidence is thin on the actual effects of using advice, such as changes in asset allocation and long-term effects on financial security.

Keywords: Customer experience, robo-advice, Millennials, technology

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The provision of goods and services online is growing rapidly across a wide range of industries, including financial services. In financial services, online innovation has often focused on transforming the back and middle offices, assisting investment management (the front office) in order to realize economies of scale and/or networking effects. By contrast, now we are seeing the application of increased computing power, internet bandwidth, and cloud capacity to customer acquisition, service, education, and advice. In this vein, online financial robo-advice has garnered significant public attention and sizable venture capital funding based on the promise that, through digitization, advice offerings can deliver a quality experience to individual investors at lower cost, thereby disrupting the financial industry.

While robo-advice is arguably in its early days, some lessons and continuing challenges are already emerging, shaped by several identifiable forces that we consider from the perspective of both the investor and the advice provider. This chapter takes both perspectives by reviewing the goals and objectives of robo-advice, the evolving business models, and available evidence on the demographics of robo-advice, the advice ‘models,’ and investor behavior. We conclude that, on the customer side, robos are being used not only by affluent Millennial investors, but also by others who want fast, mobile, and easy access to their finances. On the business side, early proponents promised to upend or disrupt the financial advice industry. Yet in practice, robo-advice is used by both traditional and startup providers to replace entirely traditional ‘human touch’ advice delivery models, but also to reach new customers and serve current ones. Moreover, providing advice is not enough: to be successful, firms must also sell advice-driven investments fulfilled by passive exchange-traded funds (ETFs) and mutual funds.

For both investors and providers, the overall effect is to lower prices of individualized advice as well as to enable providers to offer and users to select from price and customization

points on the advice spectrum. Consequently, advice is coming in various flavors including ‘pure’ robo-advice, hybrid robo-advice supplemented by a ‘human touch,’ traditional face-to-face advising (sometimes supplemented by online tools), and advice embodied in low-cost products such as target date and other allocation funds.

It is too early to say which are strong or weak trends, and robo-advice models differ in terms of their underlying algorithms, the resulting advice offered, and ease of access. In rising markets, these differences may not be as discernable as they will be during a market downturn. We conclude by considering where the advice experience might be going, including what will happen during an industry shakeout. We also consider the potential for further evolution of investment offerings to include actively managed funds able to better manage market swings. Clearly robo-advice offers numerous promises, yet little evidence is available so far on the actual effects of using advice, such as changes in asset allocation and long-term effects on financial security.

Understanding the Robo-advice Experience

Many might think the robo-advice experience would be shaped entirely by the nature, quality, and presentation of information provided to investors via an automated tool. Accordingly, one could focus on the technical algorithms behind online advice, the details of the advice offered, and the look and feel of the interface. Yet in practice, the robo-experience is also powerfully shaped by the complexity of the financial problems that this advice is meant to address. This includes the prescriptiveness of the advice system, individual investor characteristics including goals, objectives, and behaviors, and the availability and suitability of different investment options. In turn, these are structured by the goals and organizational arrangements of advice provider firms.

As noted by Fisch et al. (2019), robo-advice tends to cover pre-tax and after-tax asset allocation and fund selection through time, as well as saving and spending; less often does it include estate and tax plans. As such, robo-advice stands at one end of a customization and regulatory oversight continuum. Financial education is at the other end, where firms and advisors provide information about the benefits of saving, investing, and asset allocation without reference to individuals' circumstances (see Figure 1).

Figure 1 here

Customization and complexity. *Guidance* tends to offer clients saving targets and broad asset allocation recommendations, but it generally does not recommend specific securities or investment products. By contrast, *advice* goes beyond education and guidance to cover specific recommendations for financial products suitable for individuals. As such, advice implies that the advisor has gathered necessary and sufficient information about the client and evaluated it to determine the suitability of investment recommendations.¹ Left for interpretation are the practical definitions of sufficient and suitable investment recommendations.

From an investor's perspective, the overall objective is to save, invest, and spend to meet his or her goals. From the advice provider's perspective, the objective is to adequately serve the investor, to meet fiduciary responsibilities, and to gather and/or retain assets. While the investor's and the provider's objectives are not identical, both the investor and the provider are interested in efficiency, balancing the costs of information gathering, evaluation, and advice delivery against the benefits of potential increases in lifetime consumption.

Theoretical research shows that when portfolio and/or financial advice is adopted early in consumers' lives, the certainty-equivalent consumption generated for clients can rise by 1.1 percent per year over the entire lifetime (Kim et al. 2016), and by 23 percent during retirement

(Blanchett and Kaplan 2013). Although those studies do not distinguish between traditional and robo-advice, they are particularly applicable to robo-advice since they apply robo-like systematic and rules-based approaches to financial behavior. As such, robo-advisors claim to offer some or most of the customization a financial advisor can provide, while they do it systematically and precisely via software algorithms that are documentable, replicable, and repeatable, and potentially at lower cost. What sets robots apart is their potential through digitization, automation, and ease of use, to systematize advice offering and lower its cost for current investors and new consumers (see Figure 2).

Figure 2 here

Many different organizational arrangements are associated with robo-advisors. In some cases, stand-alone robo-advisors offer advice online. In other cases, full-service financial services firms use automated asset allocation advice as one of many tools to assist financial advisors in working one-on-one with investors to construct and manage portfolios and make other financial planning decisions (see Table 1).

Table 1 here

Evolution, Not Revolution

The automated or digitized features of robo-advice did not spring forth fully-formed. Thus robo-advice started in 2008 with Betterment followed by Wealthfront, and in the early days the focus was on rebalancing across target date funds (Scott-Briggs 2016). In turn, this process was inspired by Mint, an online checking account aggregator, later sold to Intuit (Future Advisor 2015). Nevertheless, this Silicon Valley-centric view gives insufficient attention to the earlier antecedents of robo-advice such as Mpower and Financial Engines, which were startups offering services to

employers and their employees. For example, Financial Engines, Ibbotson, and other independent robo-advisors provided pre-tax asset allocation and savings advice through defined contribution (DC) plans, when employers sought to offer employees financial advice but were legally required to do so via an independent provider.

Adoption and takeup of such advice was initially disappointing, both in terms of numbers of individuals and amounts of revenue. Subsequently, Ibbotson was sold to Morningstar, and both Financial Engines and Morningstar offered to manage the assets on which they gave advice. As of 2018, Financial Engines had nearly one million advised and managed accounts inside employer plans at nearly 150 Fortune 500 firms, with a growing number of customers through the Wells Fargo-managed 401k platform (Toonkel and Randall 2015).

More recently, Financial Engines moved into managed income for 401k accounts and IRA rollovers. This advice plus asset management business model, pre- and/or post-tax, has now become the industry standard, for standalone firms and financial services conglomerates. In addition, traditional financial firms such as Fidelity, Vanguard, and TIAA also began to offer online advice as a way of retaining assets and gathering more through additional services.

The Robo-advice Process

Robo-advice processes and models differ not only in terms of what they cover, but also by the intensity of human involvement. Many investors learn about robo-advisors via online, radio, or television advertising; word of mouth; an employer pension plan; or, in some cases, a financial advisor's recommendation. One or more of these would prompt a visit to the robo-advisor's website. Overall, the advice process involves initial awareness, assessment, modeling, results and

recommendations and follow-up. Each of these steps may be conducted exclusively online, or via telephone or face-to-face interactions with a human advisor.

Assessment. Investment advice is often provided based on a web-based questionnaire used to assess the investor's goals, financial circumstances, and personal characteristics. As with other aspects of robo-advice, the purpose and quality of questionnaires varies across the industry. Such assessments are used to gauge investors' risk perceptions and risk tolerance, as well as risk capacity. These are usually summarized in a risk tolerance score or label, such as 'conservative,' 'moderately conservative,' 'moderate,' 'moderately aggressive,' or 'aggressive.' At a financial firm where an investor already has a relationship, some financial and personal information may be transported over from the investor's current accounts.

Some question this approach to measuring risk tolerance and risk perception-related responses since behavioral research has shown that people often behave in what appears to be non-rational ways. Examples in the literature include asymmetric risk aversion (prospect theory), anchoring, and the 'house money' effect (where 20% loss after a 20% gain is perceived differently from a 20% loss after a previous 20% loss). Additional behavioral factors include 'dual self' theory, where actual behavior differs from self-predicted behavior.

Nevertheless, the psychology literature lends support for the use of validated questionnaires. For instance, questions designed to assess loss aversion and the self-assessed risk of previous financial decisions are believed reliable when explaining variations in peoples' portfolio allocations and investment decisions (Guillemette et al. 2012). Moreover, clients' risk self-assessments and validated questionnaires have been shown to better determine risk tolerance than financial advisors' assessments (Roszkowski and Grable 2005; Elsayed and Martin 1998). On the other hand, risk questionnaires rarely are psychometrically tested for validity or reliability, and

many use poorly constructed questions, conflate risk tolerance versus risk capacity, and cannot identify highly risk-averse investors (Kitces 2016). Handling poor financial literacy is also difficult.

As an alternative to assessing an individual's risk characteristics, a different approach assigns risk to each of an investor's goals so that, for example, all investors saving for college would have a similar risk metric which differs from the risk metric assigned to saving for retirement or paying rent. Different goals can also be assigned relative importance weights, as implemented by Veritat and WealthBench (Weinrich 2012). While this tactic requires individuals to identify, schedule, and rank their financial goals, it does avoid the potential pitfalls of individual risk tolerance assessments.

Asset allocation and fund selection calculators. Robo-advisors employ formal models to create investment and savings advice, many of which share a foundation in modern portfolio theory (MPT). Inputs to these models include investor risk aversion, age, current assets, and other information along with the provider's estimates of expected asset returns, volatilities, and correlations. Model capabilities range from fairly simple, offering advice on overall asset allocation and fund packages, to comprehensive, also recommending insurance, trusts, wills, and other financial planning products and services.

Not surprisingly, robo-advisor asset allocation and fund selection models generate different results depending on statistical assumptions about capital market processes. Analytic approaches use historical returns and volatilities, estimated expected inputs, and Bayesian approaches, all of which generate different predictions. They also can use different measurement periods as well as re-estimation and historical sampling frequencies. Unlike the mutual fund industry where fund benchmarks are required and ubiquitous, the advice industry has not yet established standards on

capital market assumptions, measurement periods, or ‘what to solve for.’ Additionally, models and inputs are rarely made public, making it impossible to compare methodologies and approaches. And, of course, historical evidence can mislead, as during the financial crisis when traditionally uncorrelated securities became highly correlated.

Advice delivery. In practice, a variety of robo-advice delivery systems has emerged. Some providers, such as Acorns, enable new customers to download an app to a mobile phone, input basic information, get an allocation and fund selection recommendation, transfer funds from a personal bank account, and be up and running within 10 minutes. Others work closely with advisors at independent firms or financial services conglomerates; in this case, advisors specialize in communications including the initial conversation, advice delivery, portfolio implementation, and additional follow-ups. An automated system takes care of receiving investor data inputs and producing recommendations, which in turn are conveyed by the advisor. Some firms such as Vanguard offer different levels of ‘human touch’ at different price points.

Investor receptivity. Based on industry surveys of higher net worth households (over \$100,000 in investable assets), it appears that many customers deem it important to have access to their portfolio information at all times (Cerulli Associates 2017). No matter what the channel (bank, wirehouse, financial advisor, direct investment provider, retirement plan provider) or size of assets, 20-30 percent of those investors used online tools and calculators, and 30-55 percent viewed their accounts or traded via online tools. Even for those who did not currently use robo-advisors, 20-45 percent of those under age 40 were ‘somewhat likely’ or ‘very likely’ to use a robo-advisor, with older and wealthier investors much less unlikely to do so.

Interestingly, when prompted, some 80 percent of those surveyed reported not having heard of most robo-advice providers, the exceptions being Vanguard and Charles Schwab. Of the 13

most prominent robo-providers, only 2-5 percent of respondents indicated that they used their robo-services (Cerulli Associates 2017). Those who did cited ease of use and cost as the main reasons for doing so. Among investors unlikely to use a digital advice provider, nearly 60 percent preferred human interaction to technology, and as many as 40 percent of those under age 40 said the same.

Though only a small percentage of the investor population has actually adopted robo-advice to date, it appears that Millennials and younger cohorts are more receptive than their predecessors. Among younger investors, robo-advice is most used by those with higher income and net worth, people who are online facile, and investors willing to take more risk (Cohen 2018; Cerulli 2017). Interestingly, investors using robo-advice did so using new assets rather than transferring assets away from current managers (Cerulli 2017). In other words, robo-advice at present is being used for incremental savings, tempering the likely growth of the sector.

Investor Behavior and Impact

Of ultimate interest is how robo-advice will shape investors' consumption, retirement incomes, and overall well-being. As noted above, theoretical studies predict improvements in these, but real-world evidence is sparse. Early research by Warshawsky and Ameriks (2000), Bodie (2003), Kotliff (2006), Dowd et al. (2008) and Turner (2010) evaluated the advice provided, and these studies found significant shortcomings. These included the fact that too little financial information was gathered, risk tolerance assumptions were not well-grounded, overall net worth was not examined, asset allocation models and advice were too simplistic, and the client interfaces were often confusing.

More recently, comparisons of robo-offerings have become popular and can be found on a variety of financial websites (e.g., Investor Junkie, Investopedia, Kiplinger, Motley Fool, and more). Still, while most compare features and ease of use, few examine results or impacts. A more systematic examination of advice was offered by Aon Hewitt Financial Engines (2014) which studied 14 large DC plans offering three types of ‘help’ or advice. The topics covered included target-date funds, managed accounts, and online advice based on data from 2006 to 2012. During that period, online or robo-advice was used by only 5.4 percent of all plan participants, compared to 17 percent for target date plans (TDF) and 12 percent for managed accounts, while the rest (a little less than 65%) were self-directed.² Target-date fund usage was driven primarily by an automatic enrollment (‘opt-out’) feature in some plans, while managed account and robo-advice usage was entirely ‘opt-in.’

Regarding returns, plan participants opting for any kind of ‘help’ or advice between 2006 and 2012 achieved over 3 percent better net annual returns compared to participants not opting for help. Those using a combination of TDFs and self-directed investing did better than fully self-directed participants by about 90 bps/year, but they did significantly worse than participants receiving any form of help or advice (by about 2% per year). Notably, the return differences between participants using different types of help or advice were negligible.

Prior research has confirmed that most influential contributor to long-term financial security is the individual’s contribution rate, followed by the length of the contribution period (Hammond and Richards 2010). Therefore, it is useful to note that the Aon Hewitt Financial Engines (2014) study found that online advisees had the highest contribution rates of any group, 9 percent on average, versus 4.4 percent for TDF participants, 7.5 percent for managed account participants, and 6.6 percent for self-directed participants. While managed account participants

were older than online advice users, online advice users had significantly higher average account balances than other plan participants.

Though hardly definitive, this evidence suggests that advice - including robo-advice – has been associated with better outcomes, at least in the short-to-medium time frame. While we cannot know whether advice seekers would have done better in the absence of advice than non-advice seekers, it is safe to conclude that advice, including robo-advice is not harmful and may be helpful.

In a related chapter (Fisch et al. 2019), the authors survey in some detail the nature of these models and the quality of the actual advice offered by robo-advisors. That study noted that, while an individual investor would receive the same advice with repeated visits to a single provider's website, he or she could be provided with different advice from different providers due to different ways of assessing risk tolerance and financial circumstances, the underlying model, and the model's inputs. Some models have been validated by the experience of their recommended portfolios through a full business cycle, while others have yet to experience a full cycle. It is also important to note that many studies suffer from self-selection or the tendency for people who use advisors (versus those who do not) to be more likely to take steps that positively affect their wealth and lifetime consumption, regardless of what the advisor recommends.

Research by Marsden et al. (2011) that controlled for self-selection showed that some types of activities increased when working with a financial advisor (e.g., goal setting, calculating retirement needs, portfolio diversification), yet there were no significant effects on saving rates and short-term asset values. Other evidence comes from comparing advisors with brokers, as the latter are not required to act in clients' best interest. In an experiment (Guillemette and Jurgensen 2017) and also in a comparative study (Martin and Finke 2012), advice from a certified financial planner resulted in higher investor account balances than did broker advice. A comparative study

by Chalmers and Reuter (2012) concluded that investment outcomes associated with broker advice were considerably worse than from self-directed portfolios and target date funds. Work by Hoeschle et al. (2017) that accounted for self-selection found that bank customers who followed bank advisor recommendations did worse than had they followed a broad stock benchmark. Yet on the whole, these studies did not focus on robo-advisors.

An Ongoing Case Study

An interesting ongoing analysis sponsored by Condor Capital (2018) is focusing on the effects of robo-advice by establishing both taxable and tax-deferred accounts at 20 prominent robo-advisors, some standalone while others form part of a broader financial services firm.³ The taxable accounts established used an investor profile appropriate to a long-term investor with a moderate risk tolerance, while the tax-deferred account used the profile of a long-term investor with a high risk tolerance. In analyzing the findings, it is important to keep in mind that this analysis is limited by the short time frame (two years or fewer) and the effects of many unknown variables including the specific funds used to build portfolios, and when the providers changed asset allocations.

Several outcomes from the Condor Capital report on taxable account experience are worth highlighting; findings and relative comparisons were roughly similar for tax-deferred accounts. First, robo-advisor fees vary across firms and within firms by size of assets. In some cases, they also differ by whether the account holder uses only the digital platform or supplements it with a human advisor. As seen in Table 2, robo-only taxable account fees vary from zero bps (per year) on the account assets, to about 90 bps, with most fees in the 25 to 30 bps range. Minimum investment amounts also vary, from none to \$100,000.

Table 2 here

Presumably, low fee and low minimum robo-offerings are cross-subsidized by investment management and other charges. When ‘premium’ or ‘selective’ service is offered (i.e., the ability to work with a human advisor), fees are 15-25 bps higher over digital-only service, for totals in the 40-50 bps range. This may be compared to managed accounts, where fees are typically at least twice that. Note that for many premium robo offerings, account minimums are higher as well.

Second, we compare outcomes regarding asset allocation and fund selection. The classic rule-of-thumb for a medium-risk tolerant, long-term investor is a 60/40 portfolio (60% equities and 40% bonds, with an expected annual volatility of about 10%). In Table 3, we see that 11 of the 20 robo-advisor equity allocations were within 2 percentage points of the classic allocation (60%) for a similar investor profile.

Table 3 here

Overall, allocations ranged from 56 to 71 percent equity and from 22 to 41 percent fixed income, with between 0 and 15 percent in ‘miscellaneous’ investments and cash. Within equities, the allocation to domestic equities (versus international equities) ranged from 45 to 75 percent.

It is worth noting that many robo-advisors are active allocators and manage their portfolios dynamically or even tactically, both in terms of the equity/fixed income split and the domestic equity/international equity split. For example, while Betterment did not change its allocations during the last two years, TD Ameritrade raised its equity allocation from 65 to 71 percent and lowered its domestic equity allocation from 65 to 60 percent. For the funds in the Condor Capital study (2018), we see that robo-advisors generally used index funds, particularly on the equity side. Unsurprisingly, then, the equity allocations all showed similar large-cap blend behavior, with a pronounced tilt toward large-cap stocks and a slight tilt toward growth stocks. Fixed income holdings were more diverse across providers, with some favoring municipal bonds, treasury

inflation protected securities (TIPS), and Treasuries, while others tilted toward emerging markets; still others were closer to 'neutral.' Nearly all of the fixed income allocations were neutral to negative on corporate, high-yield, and mortgage-backed securities.

Third, we compare the investment performance for a moderately risk tolerant investor in Figures 3 and 4. For the seven providers with two-year results, total returns varied from 21 to 27 percent (10 to 13% on an annualized basis). For these same providers, Sharpe Ratios were impressive, ranging from 1.5 (Acorns) to 2.2 (Schwab) percent. Of course, these results are indicative of recent robust equity markets. A better test of what robo-advisors can deliver will come during market downturns, as may be gleaned from a glance at the upside and downside capture ratios of the accounts having two-year histories. Figure 5 shows that the providers with better downside capture ratios (i.e., capture less of any market decline) are to the left, and those with better upside capture (i.e., capture more of any market increase) are higher, so providers that are up and to the left have better upside/downside capture ratios.

Figures 3, 4, and 5 here

Two providers (Vanguard and Betterment) appear right at the center, both of which had identical 65/35 asset allocations that did not change over the two years. Interestingly, Schwab had a nearly identical allocation to equities (64%), but a lower allocation to fixed income and a significant allocation to cash (10 to 11%), which presumably provided downside protection while preserving equity exposure. On the other end, while Acorns had a slightly lower equity allocation (62%), it had the highest allocation to domestic equities of any provider; the recent outperformance of international equities thus lowered returns and limited the allocation's downside protection.

In the years to come, the Condor Capital project will generate a longer-term view of the impact and characteristics of robo-advice offerings. Only then can we draw firmer conclusions about the long-term impact of robo-advice on investor wellbeing.

Conclusions

To date, robo-advice has been concentrated among younger and more affluent investors, so changes in usage may be gradual and cohort-driven. These investors seem drawn to robo-advice by its ease of access and usage, compared to the time, number of forms, signatures, and face-to-face meetings required in most traditional advice and investment offerings. There is also promising early evidence that investors who used online advice save more and improve returns compared to investors who did not.

While robo-advice is apparently not producing a major disruption in the types of firms offering advice, the industry is changing. There is a proliferation of standalone robo-advice firms where the early firms moved from charging for advice without direct asset management, to charging for advice embedded along with managed accounts. Moreover, traditional investment firms and advisors are buying startup robo-advice firms, licensing technology, and creating new tiered advice models. These traditional firms are also adopting so-called ‘cyborg solutions’ – part-human, part-computer, in the way face-to-face banking with tellers evolved to include on-line banking as an option). As with other services, firms are likely to use robo-advice to attract and retain customers attracted to its ease of use along with their assets.

The next big test will be a market downturn. Some standalone startups have already survived at least one major market shakeout (for instance, Financial Engines and others established

before the global financial crisis). We can expect that differences in allocations and advice delivery will be made evident in the next shakeout.

Nevertheless, more remains to be learned about how robo-advice content and models, as well as industry organization and delivery, affect behavior. A related question is whether robo-advice obviates the need for improved financial literacy. And crucially, although beyond the scope of the present chapter, legal and regulatory concerns are raised by advice generally and robo-advice in particular. Some of these are addressed elsewhere in this volume by Baker and Delleart (2019), Fisch et al. (2019), and Polansky et al. (2019).

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Endnotes

¹ Financial education, guidance, and advice all have specific regulatory definitions. For example, a discussion of what financial advice covers in the UK is reported in HM Treasury (2017).

² To count, a participant had to have at least 95 percent of her assets in the TDF.

³ Sponsored and reported by Condor Capital, this ongoing study is being conducted by Backend Benchmarking. Not that some prominent firms were not included in this study, most notably Financial Engines, which is one of the oldest and most successful robo-advisors.

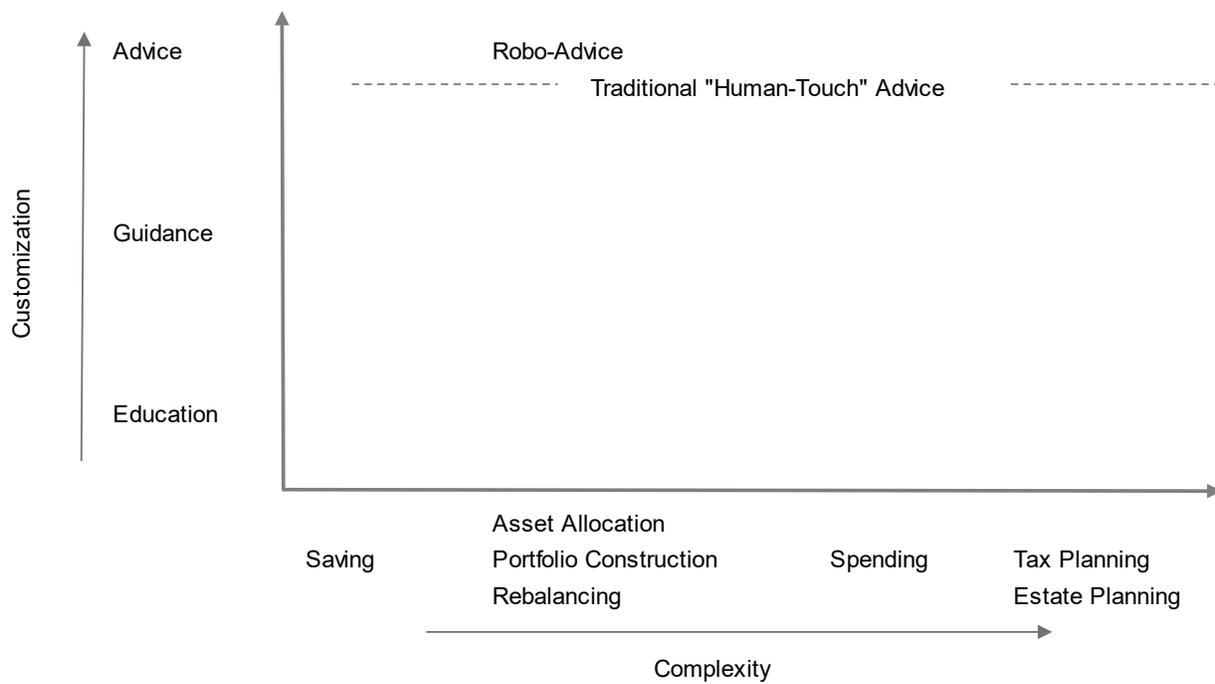


Figure 10.1. Customization and complexity in the advice space

Note: Currently, robo-advice offerings largely focus on asset allocation, fund selection and rebalancing

Source: Author's analysis.

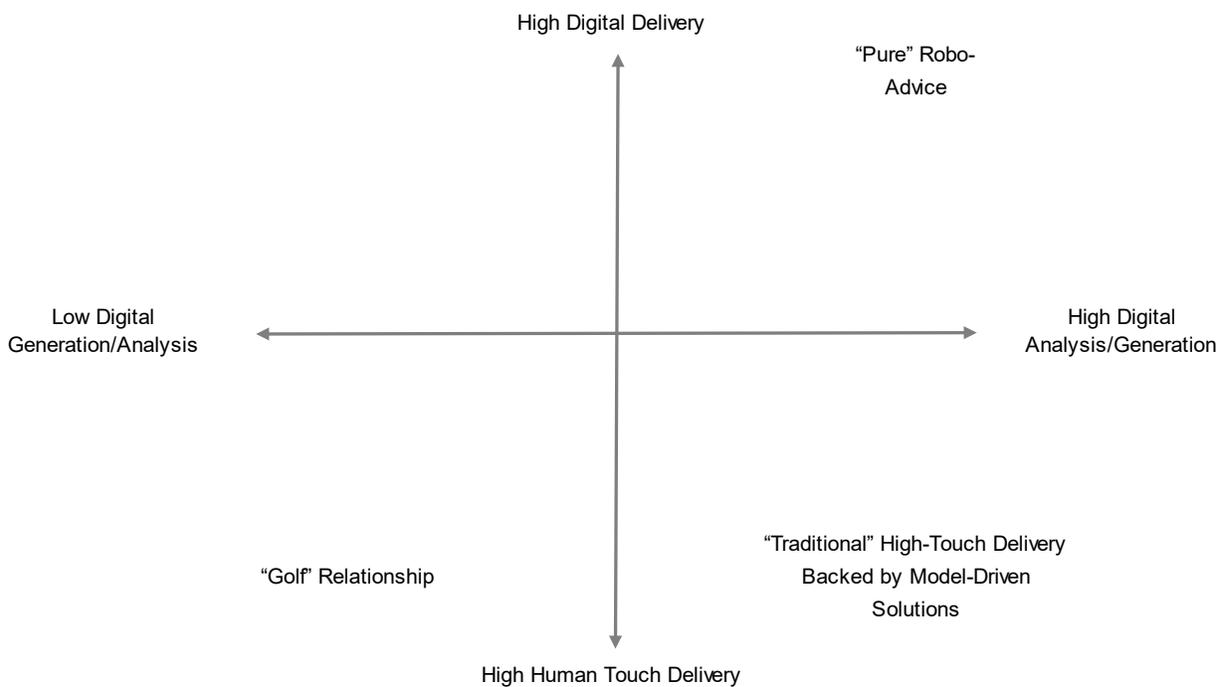


Figure 10.2. Digitization of advice generation and delivery

Source: Authors' analysis

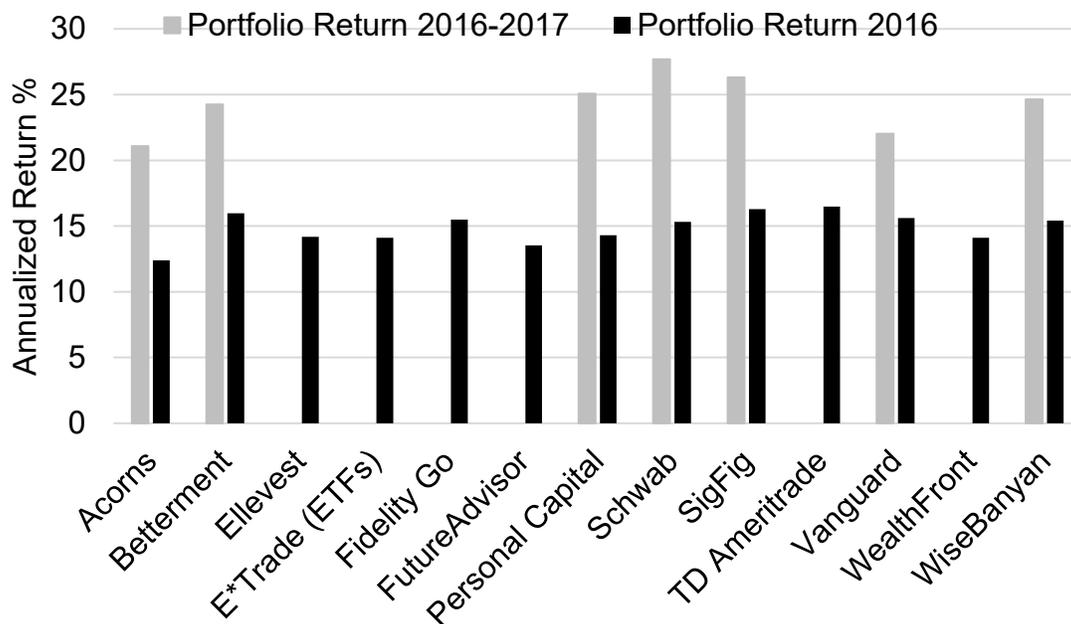


Figure 10.3. Taxable Account Portfolio and Asset Returns (%) for 20 Robo Advisors "Moderate Risk" Investor

Source: Condor Capital (2018).

Note: Condor Capital and Backend Benchmarking report that they established accounts at 20 robo-advisors, 7 at the beginning of 2016 and an additional 14 at the beginning of 2017.

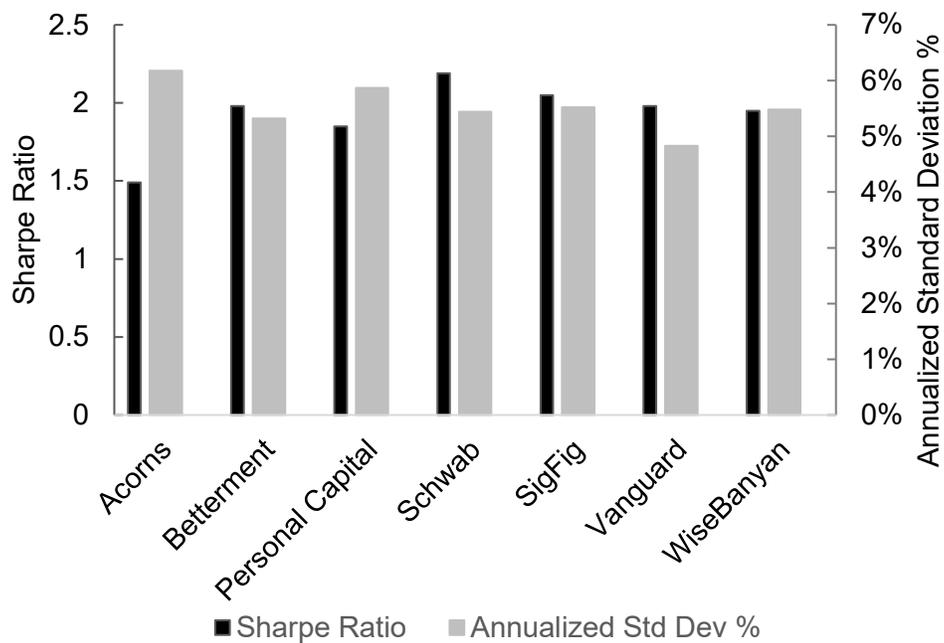


Figure 10.4. Taxable account annualized risk/return statistics for seven robo-advisors with two years of returns (as of the end of 2017)

Source: Condor Capital (2018).

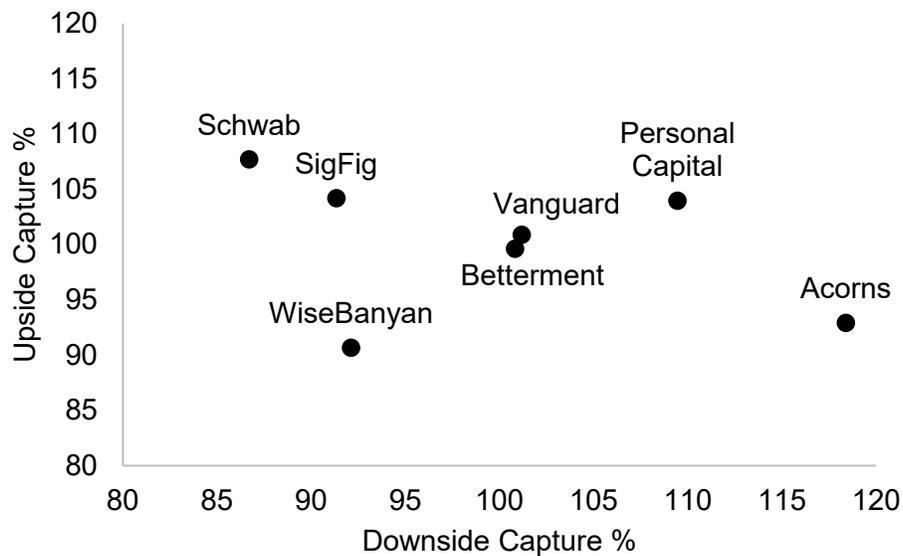


Figure 10.5. Upside/downside capture ratio for seven robo-advice providers with two years of returns (as of the end of 2017)

Source: Condor Capital (2018).

Table 10.1. Types of robo-advice and firms in the US marketplace

Type	Description	Level of Discretion	Clients	Examples
Guidance	Portfolio assessment which determines a recommended allocation	Nondiscretionary, nonadvisory	All clients	E*Trade's Online Advisor
Financial planning	One time full review of portfolios which determines potential to meet financial goals. Makes recommendations on savings rates, withdrawal rates, optimized allocation, and investments for meeting goals.	Nondiscretionary, advisory	Complimentary for clients meeting asset threshold. Available for fee to other clients	Vanguard's financial planning group
Managed accounts	Provider determines appropriate allocation and investments and provides ongoing portfolio management.	Usually discretionary, advisory	Clients pay asset-based fee. Account minimums vary, start as low as \$20K.	Fidelity's Portfolio Advisory Service®
Private client	Provider determines appropriate allocation and investments and provides ongoing portfolio management. Client receives other services as necessary such as tax, estate, and financial planning.	Discretionary, advisory	Clients pay an asset-based fee, minimums usually around \$500K.	Schwab's Private Client
RIA referral	Provider refers a client seeking advice to an local RIA who custodies assets with the direct provider.	N/A	Clients with more complex financial needs	TD Ameritrades' AdvisorDirect™

Source: Analysis based on authors' survey of advisor offerings.

Note: RIA refers to Registered Investment Advisor.

Table 10.2. Taxable account fees and investment minimums for 20 robo-advisors

Advisor	Fees	Account Minimums
Acorns	\$1/mo <\$5K; 25 bps/yr >\$5K	None
Ally Financial	30 bps/yr	\$2,500
Betterment	25 bps/yr digital only; 40 bps "Plus" (unlimited chat, 1 call/yr w/advisor); 50 bps "Premium" (unlimited calls and chat); no fee if assets >\$2M	None digital only; \$100K "Plus" and "Premium"
Ellevest	25 bps digital only; 50 bps "Premium" (access to live advisor)	None digital only; \$50K premium
E*Trade (ETFs)	30 bps/yr	\$5,000
Fidelity Go	35 bps/yr	\$5,000
FutureAdvisor	50 bps/yr	\$10,000
Hedgeable	75 bps/yr <\$50K; decreasing to 30 bps/yr to \$1M and above	None
Merrill Edge	45 bps/yr	\$5,000
Personal Capital	89 bps/yr <\$1M; decreasing above \$1M	\$100,000
Schwab	No fee digital only; 28 bps/yr for access to live advisor	\$5,000
SigFig	No fee <\$10K; 25 bps/yr >\$10K	\$2,000
SoFi	No fee <\$10K; 25 bps/yr >\$10K; no fee if client has a SoFi loan	\$100
TD Ameritrade	30 bps/yr "Essential"; higher fee tiering depending on asset size and portfolio "Selective"	\$5,000 "Essential"; \$25,000 "Selective"
TIAA	30 bps/yr	\$5,000
Vanguard	30 bps yr <\$5M; decreasing above \$5M	\$50,000
WealthFront	No fee <\$10K; 25 bps/yr >\$10K	\$500
WealthSimple	50 bps/yr <\$100K; 40 bps/yr >\$100K	None
WiseBanyan	No fee	None
Zack's Advantage	50 bps/yr <\$100K; 35 bps/yr >\$100K	\$5,000

Source: Derived from Condor Capital (2018)

Table 10.3. Taxable account asset allocations and equity splits for 20 robo-advisors

Advisor	Allocation %								Equity Split %			
	2017				2018				2017		2018	
	Equities	Fixed Income	Misc	Cash	Equities	Fixed Income	Misc	Cash	Domestic	International	Domestic	International
Acorns	62	38	0	0	62	38	0	0	84	16	75	25
Ally Financial	59	38	2	1	61	37	0	3	69	31	59	41
Betterment	65	35	0	0	65	35	0	0	49	51	49	51
Ellevest	62	36	0	2	56	41	0	2	71	29	63	73
E*Trade (ETFs)	60	39	0	1	61	36	0	2	75	25	76	24
Fidelity Go	61	39	0	0	60	40	0	1	71	29	70	30
FutureAdvisor	59	41	0	0	59	39	0	1	49	51	45	55
Hedgeable	56	34	8	2	59	32	8	2	79	21	79	21
Merrill Edge	60	39	0	1	60	36	0	4	66	34	64	36
Personal Capital	68	25	5	2	71	24	4	11	70	30	69	31
Schwab	62	23	5	10	64	22	4	11	51	49	51	49
SigFig	61	37	0	2	63	35	0	2	59	41	60	40
SoFi	60	40	0	0	60	40	0	0	67	33	66	34
TD Ameritrade	65	33	0	2	71	28	0	2	65	35	60	40
TIAA	61	37	0	3	62	36	0	2	61	29	71	29
Vanguard	59	41	0	0	62	38	0	0	61	29	60	40
WealthFront	58	41	0	1	63	35	0	2	69	31	70	30
WealthSimple	62	38	0	0	62	38	0	0	66	34	66	34
WiseBanyan	65	35	0	0	65	35	0	0	62	38	63	37
Zack's Advantage	58	32	0	9	58	32	0	9	72	38	72	28

Source: Derived from Condor Capital (2018)