



# Regulating Robo Advisors: Old Policy Goals, New Challenges

Tom Baker, JD and Benedict Dellaert, PhD

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In the popular press, a “robo advisor” is an automated investment service that competes with human financial advisors by claiming to offer better advice and service and, therefore, better investment returns, at a lower price.<sup>1</sup>

We use the term robo advisor more broadly to refer to any automated service that ranks, or matches consumers to, financial products on a personalized basis, sometimes in addition to providing related services such as educating consumers and selling products to them. The investment-focused robo advisors have drawn the most attention from regulators,<sup>2</sup> but the promises and regulatory concerns raised by investment robo advisors also apply to their insurance and banking counterparts.<sup>3</sup>

Because of the scale that automation makes possible, robo advisors have the potential to provide quality advice to more people at lower costs than humans, and to do so with greater transparency.<sup>4</sup> Yet the fact that this potential exists hardly guarantees that it will be realized. *People* design, model, program, implement, and market robo advisors, and many robo advisors operate behind the scenes, as they have done for many years, assisting people who interact with clients and customers. And the history of people taking advantage of consumers in the financial services industry is not a pretty one.<sup>5</sup>

Even setting fraud and other unsavory activities to the side, the riches to be won by those who succeed in “disrupting” the financial services industry provide

## SUMMARY

- Because of the scale that automation makes possible, “robo advisors” have the potential to provide quality advice on financial investments to more people at lower costs than humans can, and to do so with greater transparency. However, the systemic risks and potential for abuses are significant too.
- While regulators of course need to be vigilant, it also is important they not over-react to the deployment of robo advisors. For now, the standard against which robo advisors should be compared is that of humans, who are far from perfect.
- This issue brief lays out four core technical components of robo advisors that regulators need to understand and to develop procedures to assess. Because there is so little research available to guide the regulation of robo advisors today, and because the need for regulatory oversight will only escalate as the sophistication and scale of robo advice increases, the brief offers regulators a regulatory trajectory to follow.
- Robo advising could give rise to a fundamental shift in financial regulatory strategy: from regulating the content of consumer financial products to (a) facilitating access to the data that robo advisors need and (b) taking appropriate measures to verify the quality of the robo advisors and public accessibility to them.



more than enough incentive to rush technology to market. In addition, there are concerns that automation may entrench historical unfairness<sup>6</sup> and promote a financial services monoculture with new kinds of unfairness and a greater vulnerability to catastrophic failure than the less coordinated actions of humans working without automated advice.<sup>7</sup> Thus, robo advisors pose significant challenges for regulators seeking to preserve the integrity of financial markets.

At the same time, however, it is important not to over-react by setting a higher bar for robo advisors than for human advisors. For now, the standard against which robo advisors should be compared is that of humans, who are far from perfect. Although it may be appropriate to hold robo advisors to a super-human standard someday, their share of the roughly \$25 trillion U.S. personal investment market<sup>8</sup> is too small (see Figure 1), and regulators have too much to learn, to do so today. Yet financial services regulators do have substantial legal authority, well-developed economic and historical justifications to guide their actions, and a diversity of regulatory tools to employ right now. It is time to assess how they should respond to the automation of robo advisors, espe-

cially when that automation extends to helping consumers decide which products to buy.

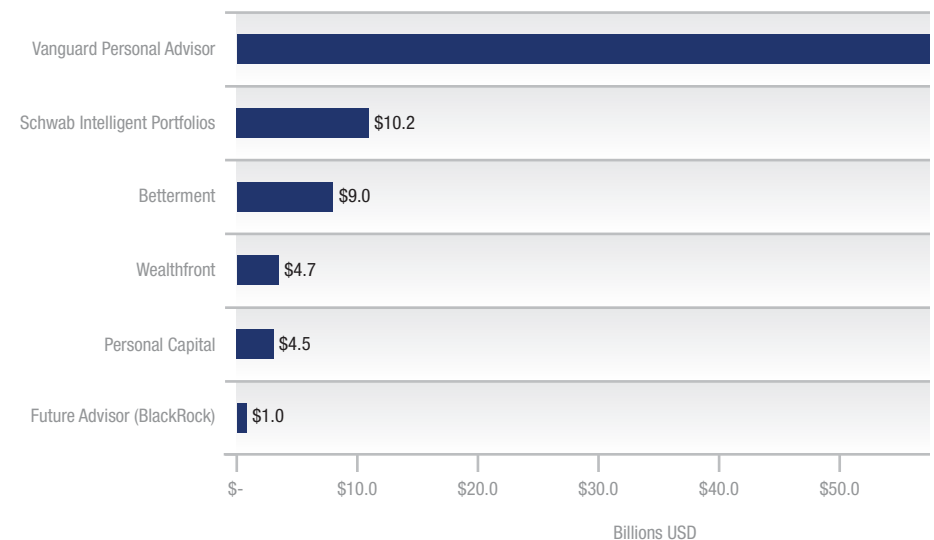
In this Issue Brief, we lay out the traditional goals that financial services regulation promotes: competence, honesty, and suitability.<sup>9</sup> Any well-designed robo advisor should meet those goals at least as well as (and most likely better than) a typical human advisor, with a strong emphasis placed on the caveat, “well-designed.” We then identify four core technical components of robo advisors that regulators need first to understand and then to develop procedures to assess.

Our objective is to sketch the early stages of a regulatory trajectory that regulators can follow as robo advisors develop in sophistication and scale.

## JUSTIFYING ROBO REGULATION

The aspects of financial services regulation most likely to apply to new robo advisors are those directed at current consumer product intermediaries. Intermediaries like securities brokers, mortgage brokers, and insurance agents and brokers have

FIGURE 1 LARGEST ROBO ADVISORS BY ASSETS, 2017 Q1



Source: RIABiz; Firm websites

## NOTES

- See, e.g., Rob Berger, “7 Robo Advisors That Make Investing Effortless,” *Forbes*, February 5, 2015; Arielle O’Shea, “Best Robo-Advisors: 2017 Top Picks,” *NerdWallet*, June 23, 2017.
- FINRA (March 2016), Report on Digital Investment Advice, available at: <http://www.finra.org/sites/default/files/digital-investment-advice-report.pdf>.
- Insurance robo advisors include Healthcare.gov (health insurance) and Coverhound.com (auto and homeowners insurance). We have not found any true robo advisors in the banking context, but Zillow’s mortgage tools and NerdWal-

let’s credit card tools are a step in that direction.

- Abhijeet Sinha (2016), “Increasing the Efficiency and Effectiveness of Financial Advice with Robo-Advisors,” *Infosys*.
- See, e.g., Neil Fligstein & Alexander F. Roehrkasse (2016), “The Causes of Fraud in the Financial Crisis of 2007 to 2009: Evidence from the Mortgage-Backed Securities Industry,” 81 *AM SOC. REV.* 617; Michael Corkery, “Wells Fargo Fined \$185 Million for Fraudulently Opening Accounts,” *New York Times*, Sept. 8, 2016.
- See, e.g., Kate Crawford, “Artificial Intelligence’s White Guy Problem,” *New York Times*, June 25, 2016.

- See, e.g., Cathy O’Neil (2016), *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. See also, Dario Amodei et al., “Concrete Problems in AI Safety,” *arXiv.org*: 1606.06565, July 25, 2016. For an effort by the tech industry to address some of these challenges, see [www.partnershiponai.org](http://www.partnershiponai.org).
- Investment Company Institute (2015), *Investment Company Fact Book*, available at: [https://www.ici.org/pdf/2015\\_fact-book.pdf](https://www.ici.org/pdf/2015_fact-book.pdf).
- Note that this description of the three goals is a conceptual one that does not map perfectly on the diversity of financial



the potential to help consumers make better sense of the financial services available to them and, accordingly, to ameliorate the information imbalance between consumers and the producers of financial products. But there are significant challenges to reaching this potential. Consumers are almost as poorly equipped to identify the quality of an intermediary as they are to evaluate the quality of the financial products. For example, because they need the help of the intermediary to evaluate those products, consumers cannot evaluate the quality of the intermediary by evaluating the quality of the intermediary's recommendations. Moreover, the prevailing commission-based compensation regime for intermediaries creates significant conflicts of interests that lead to biased advice.<sup>10</sup> The justification for regulating robo advisors, therefore, is rooted in the broad U.S. policy priority of protecting consumers from being taken advantage of due to their relative lack of knowledge about financial products.

**ESTABLISHED OBJECTIVES:  
COMPETENCE, HONESTY,  
AND SUITABILITY**

At least for mass-market consumer financial products, a well-designed

robo advisor should outperform most humans in matching consumers to financial products, while being as honest as the most honest humans.

For a robo advisor, the assessment of competence and suitability go hand in hand. By definition, a competent robo advisor will only recommend suitable products. Indeed, using difficult test cases to evaluate whether a robo advisor consistently recommends suitable products is one of the ways to evaluate whether the robo advisor is well-designed. Humans are different: even competent humans make mistakes, and even competent humans can be biased or dishonest.<sup>11</sup> It is for this reason that financial services regulators developed suitability and other conduct standards that permit an after-the-fact assessment of whether intermediaries gave good advice.<sup>12</sup>

In terms of honesty, there are different potential standards. At a minimum, honesty means making only true statements about the products, the advisor's compensation, and anything else that is relevant to the products, the advice, and the purchase process. Honesty also should include accurately describing the basis for any recommendations, making any commonsense disclosures that might be needed to correct a misimpression

that the advisor is considering all of the products in the market if the advisor is not doing so, disclosing the existence of any compensation or other arrangements that might have the potential to bias the advice in a way that is not consistent with consumer's interests, and providing advice that is not biased in that manner.

A robo advisor will always provide the advice that it is programmed to provide, and it can be programmed in a way that meets a demanding standard of honesty: making only true statements, disclosing the methods for providing the advice, and providing advice that considers only factors that are consistent with the consumer's interests (insofar as it is possible to know those interests). This more demanding honesty standard should be one important aspect of what it means to be well-designed.

As existing investments robo advisors demonstrate, the product matching function can easily be automated for investors who are prepared to adopt the passive investing strategy recommended by disinterested finance researchers, as can some other aspects of investing, such as rebalancing.<sup>13</sup> Relationship management and other, more difficult to model aspects of the work of financial advisors are harder

**NOTES**

services regulations. Cf. Howell E. Jackson, "The Trilateral Dilemma in Financial Regulation," in Anna Maria Lusardi, ed. (2008), *Improving the Effectiveness of Financial Education and Savings Programs*.

<sup>10</sup> See, e.g., Council of Economic Advisors (February 2015), *The Effects of Conflicted Investment Advice on Retirement Savings*, available at: <https://obamawhitehouse.archives.gov/blog/2015/02/23/effects-conflicted-investment-advice-retirement-savings>.

<sup>11</sup> Sendhil Mullainathan et al. (2012), "The Market for Financial Advice: An Audit Study," NBER, Working Paper No.

17929 (noting that financial advisors tend not to de-bias their clients and instead often reinforce biases that are in their interests).

<sup>12</sup> Robert H. Mundheim (1965), "Professional Responsibilities of Broker-Dealers: The Suitability Doctrine," Duke. L. J. 445, 44X (noting that the suitability standard developed because educational, credentialing, and disclosure requirements were not adequate by themselves).

<sup>13</sup> Passive investing refers to investing in funds that attempt simply to match the performance of the class of securities to which the fund is indexed. Robo advisors typically em-

ploy algorithms to match consumers to a mix of exchange traded (index) funds based on the consumers' age, risk tolerance, and time horizon, among other factors. Rebalancing is the process of periodically adjusting the mix of investments so that differences in the relative performance of the investments do not lead the investor's portfolio to shift away from the preferred mix.

<sup>14</sup> Alex Padalka, "Vanguard and Schwab Hybrids Trump Pure Robos in Assets," *Financial Advisor IQ*, March 29, 2012.

<sup>15</sup> For example, our research and that of our collaborator Eric Johnson demonstrate how simple choice architecture



to automate. The fact that so many people who call themselves financial advisors focus on selling financial products that generate commissions and fees, rather than on planning and coaching, helps explain why regulators have focused on the incentives that can distort the matching function of financial advisors. Yet these other services can be more important than matching customers to products. For this reason, the robo advisors with the largest and fastest growing market shares sell their services through or to human financial advisors.<sup>14</sup> As robo advisors gradually replace the product matching function and other functions that are easily automated, it is possible that in the retail consumer market, financial advisors will largely replace stock brokers and will compete based on their ability to plan and coach.

Our sense is that the product matching function is a bigger part of what insurance and mortgage brokers do, so it seems more likely to us that they will be more completely replaced by automated services. If not, however, that will be because they also provide additional, harder to automate services.

## NEW REGULATORY CHALLENGES

Although robo advisors can be designed to ignore the misaligned incentives that have historically affected financial product intermediaries, most robo advisors are developed or purchased by these traditional intermediaries. It would therefore be naïve to simply assume that intermediaries will always choose the algorithms and choice architecture that are best for consumers, rather than those that are best for the intermediaries.<sup>15</sup>

Because there is so little research and analysis available to guide the regulation of robo advisors today and because the need for and corresponding returns to regulatory oversight will increase as the scale of robo advice increases, we propose a regulatory trajectory that starts by building the necessary human capital. (The 2016 FINRA report cited in footnote 2 indicates that FINRA has begun to do this, but they may benefit significantly from collaborating with their counterparts in the banking and insurance sectors.) Only then will regulators be able to develop a strategy that adapts to the scale and consequences of robo advice in the market in a manner that promotes both effective innovation, on

the one hand, and honest and competent robo advisors in the market, on the other.

Regulators can start developing the necessary capacities now, when the stakes are smaller, and when consumers are still sufficiently uncertain about robo advisors.<sup>16</sup> Some firms may actually welcome the legitimization that could accompany independent certification of the quality of robo advice. At least some powerful actors in the financial services sector likely will decide to support such regulatory initiatives, if only to be in a position to shape those initiatives, as we think BlackRock—the largest asset management company in the world—has already signaled that it is prepared to do.<sup>17</sup>

We have identified four core components of robo advisors that require distinct capacities to assess: (1) the ranking or matching algorithms and related processes, (2) the customer and financial product data to which the algorithms or other matching processes are applied, (3) the choice architecture through which the advice is delivered, and (4) the information technology infrastructure.

### 1. RANKING OR MATCHING ALGORITHMS

For robo advisors, the key algorithms

## NOTES

techniques can be used to mislead consumers, especially when combined with a biased or inaccurate ranking algorithm.

<sup>16</sup> The regulators in the three key areas of financial services—for example, NAIC (insurance), FINRA and SEC (securities), and CFPB (banking)—may find it highly beneficial to work together to achieve this level of expertise.

<sup>17</sup> BlackRock (September 2016), *Digital Investment Advice: Robo Advisors Come of Age*, available at: <http://www.blackrock.com/corporate/en-lm/literature/whitepaper/viewpoint-digital-investment-advice-september-2016.pdf>.

<sup>18</sup> Third parties may not maintain the information in a format that is accessible or they may not be willing to provide the information, whether because of concerns about fraud, legal constraints on providing the data, or other reasons.

<sup>19</sup> Hauser, John R., Glen L. Urban, Guilherme Liberali, and Michael Braun (2009), "Website Morphing," *Marketing Science*, Vol. 28, No. 2, pp. 202-223.

<sup>20</sup> See, e.g., several October 2016 *New York Times* stories about annuities in teacher pension plans.





are those that rank the financial products for eventual selection by consumers or, if the robo advisor makes the selection, matches consumers with products. For example, an investment robo advisor might be programmed to recommend that the mix of bond and stock funds in a consumer's retirement savings portfolio gradually shift over time so that the portfolio becomes more heavily weighted with bond funds as the consumer ages.

To assess the competence of these algorithms, some of the information that regulators could require from the robo advisors include: explanations of their models, the underlying data, and the propriety of that data; explanations of the intended outcomes; and evidence that the algorithms in fact perform as designed (e.g., by requiring the robo advisor to respond to difficult test cases), among other things.

Regulators then will need to exercise good judgment based on this evidence, informed by domain-specific expertise. They will require demonstrations that the algorithms do not consider—directly or indirectly—factors that would bias the outcomes in a way that is harmful for consumers. For example, it would be improper for a matching algorithm to consider either the size of the commission paid to the financial product intermediary or a proxy for that commission. The capability to test the competence and honesty of robo advisors represents a significant improvement over a human-based system, as it has been notoriously difficult to police the practice of steering clients and customers to the products that provide the best benefits to the intermediaries, not to the customers.

## 2. CUSTOMER AND PRODUCT DATA

Robo advisors' only source of financial product data is from product suppliers (or their agents), and there are valid business reasons why suppliers may be reluctant to provide data, absent robust legal reporting requirements. The easy access to comprehensive, public securities data may be the chief reason that investment robo advisors are more developed than other types of robo advisors.

Customer data, on the other hand, can of course be collected directly from customers as part of providing the robo advice to consumers. But that can be burdensome for the customers, and they may not in fact possess, or have easy access to, the data that the robo advisor needs (e.g., detailed asset/investment records for investment robo advisors and claim records for insurance robo advisors). The more efficient and accurate approach in many cases would be to collect consumer data from third parties, but this approach has its own limitations.<sup>18</sup>

With regard to data access, regulators should be asking three kinds of questions.

1. Has the robo advisor obtained access to reasonable sources of data, and are there any concerns that an inability to obtain data, particularly regarding products, will bias the rankings and matching in a way that disadvantages consumers in relation to intermediaries and sellers?
2. Where there are gaps in data, what are the strategies that the robo advisor considered to address those gaps, why did the robo advisor choose the strategies that it employed, and were those choices reasonable?
3. Does the regulator have the author-

ity, whether formal or informal, to increase access to data and thereby improve the quality of the robo advice?

Even assuming the data are available, there will be significant problems regarding the completeness and accuracy of the data (i.e., quality), particularly in the early stages of the development of robo advisors. Regulators will need to develop the capacity to ask hard, domain-specific questions about data quality and to evaluate the responses.

## 3. CHOICE ARCHITECTURE

Behavioral science research demonstrates the very large effects that choice architecture—the organization of the context in which people make decisions—can have on decisions. For example, the order in which options are presented, the number of options that are presented, the attributes of the options that are presented (and in which order), the framing of options (e.g., gain versus loss), all have major impacts. This means the way that robo advice is presented can have a profound effect on whether and how consumers use that advice.

The most important best practice in this arena is to employ rigorous experimental testing. That testing provides a record that could be made available for regulators to review in order to assess whether the robo advisors have engaged in a meaningful and empirically informed choice architecture effort. Experimental testing (and verification that the testing occurred) is easiest to do when the choice environment is fully automated.<sup>19</sup> Testing and verification is a more difficult exercise the context of hybrid robo



advisors, in which customers interact with a person who operates the robo advisor behind the scenes, and in the many insurance contexts in which customers do some of their shopping online but then talk to a human insurance agent who closes the sale.

#### 4. INFORMATION TECHNOLOGY INFRASTRUCTURE

Assessing the security and stability of information technology architecture is an increasingly important aspect of financial services regulation that extends well beyond robo advisors. Financial services regulators already appear to recognize the need to enhance their capacities in this area. Accordingly, we will not address this topic further, other than to offer two related observations. First, IT infrastructure requirements that are too demanding could serve as barriers to entry for innovative new enterprises. Second, regulators could address this concern by developing a strategy for new market entrants that increases the level of scrutiny along with the scale of the enterprise, and they might consider forgoing such scrutiny altogether for early stage robo advisors, and those with small market share, that only sell their services to businesses that have significant incentive to ensure that the IT infrastructure will be adequate.

#### LOOKING TO THE FUTURE

Both robo advisor technology and the regulatory environment have a long way to go before robo advisors begin to reach their potential of delivering high quality advice to a mass consumer market across the broad range of financial services. But if we assume basic com-

petence and honesty for the moment, we can look ahead to other regulatory challenges and opportunities.

Automation presents two great opportunities for regulators, namely (1) a leap forward in the ability to hold consumer financial product intermediaries accountable for providing misleading, incomplete or otherwise inadequate advice and (2) a new approach to consumer financial product regulation that supports more diversity in the forms and features of consumer financial products to better match the heterogeneity of consumers.

Consumer product intermediaries have long used complexity and choice to take advantage of consumers, particularly those who are less sophisticated.<sup>20</sup> In response, consumer protection advocates have called for a return to “plain vanilla” financial products. This is not because they believe that vanilla is best for everyone, but rather because the evidence shows that choice and complexity lead to exploitation and regressive cross subsidies. Once consumers have easy access to robo advisors (and use them), however, that analysis could change. A good robo advisor—one that has access to the data necessary for adequate innovation—gives an unsophisticated consumer more processing power than even the most sophisticated consumer working on her own. That could lead to a fundamental shift in regulatory strategy: from regulating the content of consumer financial products to (a) facilitating access to the data that robo advisors need and to (b) taking appropriate measures to verify the quality of the robo advisors and the public access to them.

The main challenge is fostering a

market in which an evolving diversity of robo advisors and consumer financial product intermediaries compete based on the measurable quality of their advice and related services for consumers. As regulators develop preferences about robo advisor design, and as regulated entities come to understand those preferences, oversight may lead to a convergence of models, increasing the risk of catastrophic failure. This risk may be further exacerbated by new fiduciary rules. As the U.S. moves closer to a uniform fiduciary standard for human advisors, it is possible, perhaps likely, that this will greatly accelerate the use of automated investment advice, as human advisors tether themselves to the safe harbor of the largest robo advisor algorithms.

#### CONCLUSION

Regulators should take a more active role in assessing robo advisors, increasingly so as they grow in scale. As the demand for robo advice increases, protecting the integrity of financial markets will require the kind of cross disciplinary cooperation that regularly occurs in the domains of health and environmental regulation. The lawyers, economists, and behavioral scientists already involved in financial services regulation will need to understand enough about computer and data science to craft and apply new regulatory strategies, and the computer and data scientists at the forefront of robo advisor innovation will need to understand enough about legal structures and ways of thinking to help make the new regulatory strategies sensible.



**ABOUT THE AUTHORS**

**TOM BAKER, JD**

Professor, University of Pennsylvania Law School

Tom Baker is the William Maul Measey Professor of Law and Health Sciences at Penn Law, and a member of the Health Care Management Department and Business Economics and Public Policy Department at the Wharton School. He is a preeminent scholar in insurance law, explores insurance, risk, and responsibility using methods and perspectives drawn from economics, sociology, psychology, and history. His research on health insurance exchanges is informing the development of decision tools to improve consumer choice.

He is the co-director of the Health Insurance Exchanges (HIX) Research Group at the Penn Leonard Davis Institute of Health Economics. In addition to research, the group hosts the annual Penn-LDI Health Insurance Marketplace Conference, which brings together academic researchers and health care exchange officials to discuss ways to align research findings with implementation efforts. In August 2013, Professor Baker received the Robert B. McKay award, a lifetime scholarly achievement award given by the Tort Trial and Insurance Practice Section of the American Bar Association.

**BENEDICT DELLAERT, PhD**

Professor of Marketing, Erasmus University

Professor Dellaert's focus in research and education is on consumer decision-making and consumer-firm interaction. His research findings have important implications in e-commerce, financial services, healthcare, and travel. He regularly works with financial services firms on projects to support consumer decision making with online (risk) communication and personalized recommendations.

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**CONTACT THE PENN WHARTON  
PUBLIC POLICY INITIATIVE**

**At Penn**

Steinberg Hall-Dietrich Hall, Room 201  
Philadelphia, PA 19104-6302  
+1.215.898.1197

**In Washington, DC**

440 First Street, NW, Suite 810  
Washington, DC 20001  
+1.202.503.3773

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