Robo-Advisors: Regulation and Design Features for Risk Mitigation

By Melvin Tjon Akon

Introduction

In the wake of the financial crisis of 2008, a new type of investment adviser emerged: the automated investment adviser or "robo-advisor." Robo-advisors provide investment advisory services at a lower price point than traditional investment advisers and are gaining market share. With hundreds of firms offering robo-advisory services and more and more assets under management, robo-advisory is a steadily growing branch of novel financial services collectively known as "Fintech."

As business activities in the financial services industry are subject to regulation, those rules play an important role in the development of technological innovations such as robo-advisory. The purpose of this article is to analyze whether robo-advisors could be designed to comply with existing financial services regulation and the fiduciary duties imposed by such regulation.

Robo-Advisors

Robo-advisors (and the companies offering them) vary widely in the type of investment algorithms they use, the business models under which they operate, the degree of human interaction involved, the methods used to collect information from clients, as well as the quality and quantity of information collected.[1]

All robo-advisors have in common that they are software applications, offered by firms (or natural persons) and designed to automate investment advisory and/or investment management decisions. To make those decisions, robo-advisors generally use asset allocation algorithms based on economic theories to invest the funds of investors, who have varying profiles and preferences. Those theories, which stem from the financial economics academic literature, often include Markowitz's modern portfolio theory,[2] asset pricing models[3] and some use insights from behavioral finance.[4] Robo-advisors are designed to maximize the expected return on a portfolio of investments by choosing from a set of possible investment options, which is limited by both the company offering the robo-advisor's choices and restrictions imposed by the investor's profile and preferences.

How does this work in practice? The client uses an interactive, digital platform (a website, mobile application or other graphical user interface ("GUI")) and provides personal information and other data, such as his or her financial background, age and risk preferences, generally by responding to a questionnaire.[5] Using decision-making control structures for flow control,[6] the software then processes that information and presents the customer with a recommended investment portfolio or trade. The firm offering the robo-advisor has pre-selected the set of financial instruments that can be recommended to the client, which tend to be liquid assets, such as shares, bonds, exchange–traded funds or index trackers (the investment universe).[7] The customer also sets up the investment account, either by granting the software permission to access an account held with a financial institution or by wiring the funds to a designated account. Once this information is provided and all necessary choices are made, the software configures the algorithm that will manage the client's account. Therefore, robo-advisors can be considered automated, because no human assistance or intervention from the firm offering the robo-advisor is required to configure the algorithms and ancillary software to manage the individual customer´s account and portfolio.

Firms use widely varying software architectures and data inputs to build their robo-advisors. Consequently, the GUI, the use of collected client data to generate model portfolios (including the degree of personalization), the algorithm (e.g., whether it uses machine learning to predict market data or uses hardcoded economic assumptions) and the security of the advisory system differ from robo-advisor to robo-advisor. For this reason, it is difficult to make general statements regarding robo-advisors. Instead, the hypothesis under exploration is whether a robo-advisor could be designed such that the regulatory requirements, as set out below, are met.

Business Models

Generally, we can distinguish two types of automated advisors that recommend portfolios, which differ with respect to the degree of automation. Excluded from the analysis are robo-advisors that combine a robo-advisor with a human financial adviser ("hybrid" robo-advisors).[8] The first type is the automated investment or portfolio manager. In this business model, the software recommends a portfolio, automatically makes the necessary trades to allocate the funds to the investments to create the portfolio, rebalances from time to time (as configured) to make sure that the portfolio remains consistent with the investor preferences, and wires any generated funds (returns) to the investor's account. Given that all investment actions are automated, it is considered a *fully automated* model.[9] A recent study suggests that human al-

MELVIN TJON AKON is an associate of the Luxembourg law firm of Bonn Steichen & Partners, specializing in financial services and capital markets law.

location decisions are still preferred over fully automated models.[10]

The second type is the automated investment adviser. This business model primarily differs from the former in that the software chooses and manages a *hypothetical* portfolio. It recommends to the investor how to construct and manage his or her portfolio, without doing so. Therefore, this is a *partly automated* model.[11] Both the automated investment manager and the automated investment adviser will be called robo-advisors, unless otherwise stated.

Product Delivery Models

It is useful to consider the variety in robo-advisory delivery models. Currently, three different delivery models are prevalent. We specifically exclude B2B delivery models from our analysis.

First, a firm can choose to develop and manage the software (in-house development) and offer it directly to its customers, who hold accounts with the firm or have appointed the firm to manage accounts elsewhere for them ("integrated model").[12]

Second, firms can choose to use robo-advisory software under a license granted by a third-party software developer, who normally also manages and updates the software (white label solution). Instead of licensing, firms can also choose to subcontract the development, deployment and management of the software to a third party. In both cases, the end user of the robo-advisor holds an account with the firm, not the third party ("third party contracting model").[13]

In the third model, the firm enters contractual arrangements with an entity which sponsors individual retirement accounts (IRAs) or 401(k) accounts (a plan sponsor). Pursuant to those arrangements, the firm makes the robo-adviser available to the account holders, who can subsequently opt-in and use the robo-advisor ("plan sponsor model").

As the analysis of the regulatory framework set out below shows, the latter two product delivery models involve additional obligations, next to the rules applicable to all product delivery models.

Client-Adviser Relationship Models

A third vector of differentiation between the *business practices* of robo-advisors is the range of offered services and associated representations as set out in the investment agreement with the client. Without considering the enforceability of these provisions, some robo-advisors are said to use agreements waiving fiduciary duties, limiting fiduciary responsibilities and narrowly qualifying the investment advisor's role in the client-adviser relationship.[14] Other robo-advisors clearly declare to be an investment adviser.[15]

It is important to separate the technical aspects of, and the agreements entered by, robo-advisors. The hypothesis under exploration, whether robo-advisors can be designed in a way that ensures compliance with existing regulations, is ultimately a technical matter pertaining to design features.[16]

Regulatory Law; Investment Adviser

Robo-advisors are engaged in the business of providing advice regarding securities and are therefore "advisers" in the sense of the Investment Advisers Act of 1940.[17] Therefore, they must meet the substantive and fiduciary obligations of the 1940 Act.[18] In addition, robo-advisors must comply with the rules of the Securities and Exchange Commission (SEC) issued under the 1940 Act and can benefit from new guidance published by the SEC in February for the purpose thereof.[19]

Pursuant to the 1940 Act, investment advisers have fiduciary duties,[20] which require them to disclose information to their clients. They must, *inter alia*, fully disclose all facts material to the engagement of the adviser, disclose material facts regarding any conflicts of interest and employ reasonable care to avoid misleading clients.[21] The information must also be sufficiently specific so that the client can understand the adviser's business practices and conflicts of interest, presented in a manner likely to be read and understood,[22] and not "buried."[23] Clients are advised to consider this information.[24]

As a fiduciary, the investment advisor also has the duty to only provide investment advice that is suitable for the client based on the client's financial situation and investment objectives.[25] Moreover, the SEC takes the view that if a robo-advisor allows a client to select a portfolio other than that recommended by the robo-advisor, the obligation to act in the client's best interests implies that the robo-advisor should provide commentary if the selected portfolio is unsuitable.[26] In that cases, design features could be "useful to alert the client."

Pursuant to the SEC rules under the 1940 Act, investment advisers are obliged to have a compliance program in place and to appoint a chief compliance officer.[27] Any compliance program promulgated under Rule 206(4)-7 of the 1940 Act must include written policies and procedures that are reviewed annually and reasonably designed to prevent violations of the 1940 Act.

Any compliance program must also take into consideration the nature of the firm's operations and the risk exposures created by such operations.[28] Based on this obligation, robo-advisors may have to consider policies and procedures addressing the development, testing and post-implementation monitoring of the algorithmic code, disclosures of any changes to the algorithmic code that may have an impact on a client's portfolio, as well as appropriate oversight of any third party developer and the protection of key advisory systems.[29] The latter obligation

is particularly relevant for firms using the third party contracting model to offer the robo-adviser.

Robo-advisors generally register with the SEC. If robo-advisors provide investment advice exclusively through an interactive website, they fall within the exemption from prohibition on SEC registration in section 203A of the 1940 Act regarding Internet investment advisers, pursuant to SEC Rule 203A-2(e).[30] If the robo-advisor combines automated advice with human advice, which does not exclusively take place over the internet, and the robo-advisor is not registered with the SEC as a large investment adviser or a multi-state adviser, registration and compliance with the New York Investment Advisory Act[31] is required.

Broker-Dealers[32]

A robo-advisor (acting as an automated investment manager), or a company that manages portfolios for clients recommended by robo-advisors, is engaged in the business of effecting transactions in securities for the account of others and can be considered a broker-dealer in the sense of the 1934 Exchange Act[33] (the "1934 Act"). Therefore, it must meet the substantial obligations of the 1934 Act.[34]

Brokers must respect the duty of fair dealing derived from the antifraud provisions of the act, pursuant to which they must deal fairly with customers.[35] Derived from this duty are, *inter alia,* the duties to disclose certain material information, charge prices reasonably related to the prevailing market, and fully disclose any conflicts of interest.[36] Brokers also have the obligation to recommend only specific investments that are suitable for their customers. The concept of suitability involves both reasonable basis suitability and customer-specific suitability.[37]

FINRA has also begun to investigate internal controls implemented by robo-advisors, including how robo-advisors assess customers' risk tolerance.[38] The agency is believed to also be focusing on how robo-advisors record data, the suitability of the advice, and how and when customers can access and alter their investment profiles.

A third relevant duty is the duty of best execution. This duty, which partly stems from the common-law agency duty of loyalty, requires a broker-dealer to obtain the most favorable terms available under the circumstances for its customer orders.[39]

Plan Fiduciary

Under the Employee Retirement Income Security Act of 1974[40] (ERISA), a robo-advisor may be considered a "fiduciary" with respect to a plan, to the extent (i) he or she exercises any discretionary authority or discretionary control respecting management of such plan or exercises any authority or control respecting management or disposition of its assets, (ii) he or she renders investment advice for a fee or other compensation, direct or indirect, with respect to any moneys or other property of such plan, or has any authority or responsibility to do so, or (iii) he or she has any discretionary authority or discretionary responsibility in the administration of such plan.[41] A company can be a fiduciary either by exercising managerial authority or by possessing administrative authority.[42] This rule particularly affects robo-advisors offered under a plan-sponsor model.

The fees charged in connection with robo-advice are contentious.[43] In *Rosen v. Prudential Retirement Insurance and Annuity Co. et al.,* U.S. District Judge Bolden decided that Prudential (which operated the automated investment adviser program *GoalMaker*) could not be considered a fiduciary based on the initial selection of available investment options (it was up to the plan sponsor to enter into the service agreement), but that Prudential could still be considered a fiduciary if the agreement allowed some discretionary authority to modify the menu of available investment options. The judge also considered that a service provider to an ERISA plan may have fiduciary status if it retains contractual authority to adjust its own compensation and the compensation is not concretely defined in the terms of the plan, which was not the case. The judge concluded that the relevant details of the GoalMaker program were disclosed and that the investment selection was ultimately made by the plan sponsor, dismissing the complaint of the plaintiffs that the GoalMaker program steered assets into proprietary funds and higher-cost investment options without full disclosure. Therefore, Prudential was not considered a fiduciary under ERISA. Note that if considered a plan fiduciary, the robo-advisor must satisfy the fiduciary obligations as set-out in ERISA § 1104 and the rules of the U.S. Department of Labor (DOL).

In April 2016, the DOL introduced the Fiduciary Rule.[44] Under that rule, digital advisers are explicitly recognized as fiduciaries and held responsible for providing investment advice to retirement plans and retirement plan participants consistent with the obligations of a "fiduciary" under the Employee Retirement Income Security Act of 1974.[45] The rule makes clear that a recommendation is fiduciary investment advice when the adviser receives direct or indirect compensation for the advice.[46] A party that provides fiduciary investment advice to plan participants is not permitted to receive payments creating conflicts of interest, such as a commission, unless it falls under a prohibited transaction exemption.[47] This newly introduced Best Interest Contract Exemption contains certain conditions to the advice and applies to fiduciaries receiving level fees.[48] While contested and under review, the Fiduciary Rule is still set to apply as of June 2017.[49]

Comparative Perspective on the U.S. Regulatory Approach

The U.S. regulatory approach taken by the SEC and the DOL, namely to apply existing regulation to robo-advisors, is similar to the approach of European regulators. It

is noteworthy that in addition to applying existing regulation, the European regulators also place special emphasis on the policy objectives to stimulate innovation and make robo-advisors available to more consumer segments and not just the most affluent.[50]

Regulatory Risk Mitigation

Given the regulatory directives set out above, what are some design features which robo-advisors could implement to mitigate the associated regulatory risks?

Disclosing Information

Information required to be disclosed must be presented in a manner likely to be read and understood. Given the amount of facts robo-advisers are required to disclose, the design features must be properly tailored to highlight certain facts, for example, if they are new (such as a change in contractual terms) or of relatively greater importance to the customer (a conflict of interest or specific fees). For example, rather than displaying the information in plain text, the GUI can display different icons and colors for different categories of information, with links to more extensive information within those categories, use a conversational interface to interact with the user, or feature a pop–up, as suggested by the SEC in its guidance.[51]

Analyzing Customer Data for Portfolio and Algorithm Configuration

To assess the suitability of a portfolio or to allow the client to adjust a recommended portfolio, sufficient customer data must be collected and analyzed. A robo-advisor could adopt a conversational interface, for example, a "chatbot," to assure that sufficient information is collected. The benefit of conversational interfaces over questionnaires is that they can "learn" from interacting with the client, which enables that interface to capture more and richer information from the client by tailoring successive questions to the client's background, communication habits and prior answers.

Subsequently, the firm can extract relevant information from the collected data using natural language processing algorithms and automate decisions based on that information. This can be achieved, for example, by means of decision trees and control structures that automatically verify if the portfolio parameters satisfy the necessary conditions, and display the information via the GUI. These design features could be applied to the suitability assessment, the selection of the right client accounts (ERISA or non-ERISA covered) and any other regulatory risk management decision involving the assessment of individual customer data.

Monitoring Performance

Many factors, such as the increased use of algorithmic trading, may make it hard to predict market prices of cer-

tain liquid securities and amplify systemic risk.[52] At the same time, reliance on assumptions and the absence of continuous monitoring by human analysts may increase the risk of losses due to automated investment management in case of certain events (e.g., "flash crashes").[53] Robo-advisors, both those merely advising customers and those placing orders, should incorporate mechanisms in their algorithms (or supervisory algorithms) to detect and timely respond to such events as well as to minimize the negative impact of those events on clients' accounts (e.g., financial and regulatory risk controls).[54] These design features allow robo-advisers to comply with the duty of reasonable care.

Conclusion

Unlike what some commentators have previously concluded, there is a view that robo-advisors could be designed to comply with the duties imposed by existing regulatory regimes governing human investment advisers. The key to effective compliance is the use of design features that enable the robo-advisor to process the necessary information and perform the necessary actions to meet the regulatory standards. To the extent that the implementation of the necessary design features is not attainable, the robo-advisory software must be designed in a way that enables effective intervention and controls by the firm's compliance personnel.

Endnotes

1. *See, e.g.,* Melanie L. Fein, *Robo-advisors: A Closer Look* (Jun. 30, 2015), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2658701.

2. H. Markowitz, *Portfolio Selection*, The Journal of Finance, Vol. 7, No. 1, March 1952, 77-91.

3. *See, e.g.,* E. Fama and K. French, *Common risk factors in the returns on stocks and bonds*, JOURNAL OF FINANCIAL ECONOMICS, 1993, 33, 3–56.

4. *See e.g.,* R. Shiller, *From Efficient Markets Theory to Behavioral Finance*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol.17, No. 1, 2003, 83-104.

5. This process description is based on the author's personal experience with a number of major robo-advisors.

6. *See, e.g.,* Microsoft's Visual Basic Concepts, accessed via https://msdn.microsoft.com/en-us/ on 7 June 2017.

7. *See Report on Digital Investment Advice*, FINRA 1, 7 (March 2016). Some robo-advisors consider financial instruments (ultimately) issued by a great number of issuers, while other robo-advisors consider a set of proprietary products from a more limited set of issuers.

8. *See, e.g.,* Vanguard Personal Advisor Services, https://investor.vanguard.com, accessed on 7 June 2017.

9. *See, e.g.,* the services offered by Betterment LLC, https://www.betterment.com, accessed on 7 June 2017.

10. *See Bank Customers Don't Want Robo-Advisers Making Financial Decisions for Them,* FORTUNE (May 30, 2017), available at http://www.fortune.com/2017/05/30/bank-customers-robo-advisers/.

11. *See, e.g.,* capitalize recommends investment strategies, which investors can subsequently run. See http://capitali.se, accessed on 7 June 2017.

12. *See, e.g.,* Betterment LLC, *supra* note 9.

13. *See, e.g.*, KeyPrivate, a robo–advisor offered by KeyTrade Bank which uses algorithms designed by Gambit Financial Solutions, https://www.keytradebank.be, accessed on 7 June 2017.

14. *See generally*, Fein, *supra* note 1.

15. *See e.g.,* SigFig Terms of Service, available via sigfig.com, accessed on 7 June 2017.

16. *See also* SEC Guidance No. 2017-02, *infra* note 19.

17. 15 U.S.C. § 80b-1 *et seq.* These rules apply to each product delivery model.

18. Section 202 (a) (11) 1940 Act. SEC Guidance No. 2017-02.

19. SEC Guidance No. 2017-02, February 2017, Robo-advisers, p. 7-15. This Guidance comes a month after the SEC Office of Compliance Inspections and Examinations released a "priorities letter" listing the robo-advisory industry as a primary focus of the SEC's current examination program. *See* https://www.sec.gov/about/offices/ocie/national-examination-program-priorities-2017.pdf.

20. The fiduciary duties are embodied in the 1940 Act. *See also SEC v. Capital Gains Research Bureau, Inc., et al.*, 375 U.S. 180, 186, 194 (1963). SEC Guidance No. 2017-02.

21. *SEC v. Capital Gains Research Bureau, Inc., et al.*, 375 U.S. 180, 186, 194 (1963). *See also In re T. Rowe Price and Associates, Inc., Advisers Act* (Release No. 658 (Jan. 16, 1979).

22. *Amendments to Form ADV*, Advisers Act Release No. 3060 (July 28, 2010); *see also,* SEC Guidance No. 2017-02, *supra* note 19.

23. *Commission Guidance on the Use of Company Web Sites*, Investment Company Act Release No. 28351 (Aug. 1 2008) at 68, in SEC Guidance No. 2017-02.

24. *See e.g., Investor Alert: Automated Investment Tools*, Sec. Exchange Comm, (May 8, 2015); *see also Investor Bulletin: Robo-Advisers*, Sec. Exchange Comm. (Feb. 23, 2017).

25. *See Suitability of Investment Advice Provided by Investment Advisers*, Investment Advisers Act Release No. 1406 (Mar. 16, 1994); *See also* SEC Guidance No. 2017-02, *supra* note 19, at 6. This duty is enforceable under the antifraud provisions of the 1940 Act.

26. *See SEC v. Capital Gains Research Bureau; see also,* SEC Guidance No. 2017-02, *supra* note 19.

27. 17 CFR 275.206(4)-7.

28. *See* SEC Guidance No. 2017-02, *supra* note 19, at 7-15.

29. *Id*.

30. 17 CFR 275.203A-2(e).

31. Chapter 961 of the Laws of 1960.

32. *See* 1940 Act and 1934 Act.

33. 15 U.S.C. §§ 78a *et seq*.

34. *See* Section 3(a)(4)(A) of the 1934 Exchange Act; *see also* Section 15(a)(1) 1934 Act.

35. *See* §§ 9(a), 10(b), 15(c)(1) and 15(c)(2) of the 1934 Act.

36. *See Guide to Broker-Dealer Registration*, Sec. Exchange Comm., (Oct. 6, 2009); *see also, Report on Digital Investment Advice*, FINRA (Mar. 2016) 1, 7 (stressing that broker-dealers should disclose if the digital advice tool favors certain securities and, if so, explain the reason for the selectivity).

37. *See id.*

38. *See Offering Robo Advice? Prepare for FINRA Scrutiny, On Wall Street*, NASDAQ.com (Jan. 27, 2016), available at: http://www.nasdaq.com/article/offering-robo-advice-prepare-for-finra-scrutiny-cm570897.

39. *See* Securities Exchange Act Release No. 34902 (October 27, 1994), 59 FR 55006, 55007 at n.15 (Nov. 2, 1994); *see also, Newton v. Merrill, Lynch, Pierce, Fenner & Smith*, 135 F.3d 266, 270 (3d Cir. 1998); *and see Best Execution Guidance on Best Execution Obligations in Equity,*

Options and Fixed Income Markets*, Regulatory Notice 15-46 FINRA (Nov. 2015).

40. 29 U.S.C. ch. 18 §§ 1001 *et seq*.

41. 29 U.S.C. §1002(21) (A); *see also U.S. District Court of Connecticut, Rosen v. Prudential Retirement Insurance and Annuity Company, et al.*, Case 3:15-cv-01839-VAB (D.C.T. 2016).

42. 29 U.S.C. §1002(21) (A)(i) and 29 U.S.C. §1002(21) (A)(iii).

43. *See Robo-Advisers Steer 401(k) Plan Litigation Trend*, Bloomberg.com, available at https://www.bna.com/roboadvisers-steer-401k-n57982083440/. A number of other lawsuits have been filed targeting plan fees.

44. 29 CFR 2510.31-2.

45. *See* Definition of the Term "Fiduciary"; Conflict of Interest Rule – Retirement Investment Advice, 81 Fed. Reg. 20,946 (Apr. 8, 2016). *See also* Morgan Lewis & Bockius—Evolution of Advice—Digital Investment Advisers as Fiduciaries, https://www.morganlewis.com.

46. *See* DOL FAQs January 2017.

47. *See* DOL FAQs October 2016.

48. A level fee is a fee or compensation that is provided based on a fixed percentage of the value of the assets or a set fee that does not vary with the investment recommended. See DOL FAQs October 2016.

49. Two courts have upheld the rule, *U.S District Court of Kansas, Market Synergy Group, Inc. v. U.S. Department of Labor, et al.*, Case No. 16-CV-4083-DDC-KGS (S.D.K.A. 2016). *U.S. District Court of Dallas, Chamber of Commerce of the United States of America, et al. v Hugler and U.S. Department of Labor*, Case 3:16-cv-01476-M (N.D.T.X. 2017). Furthermore, pursuant to a Presidential Memorandum dated February 3, 2017, the DOL is reviewing the rule.

50. European Supervisory Authorities, *Report on automation in financial advice*, p. 11, accessed via https://esas-joint-committee.europa.eu/; European Commission, *Fintech: a more competitive and innovative European financial sector*, consultation document, 23 March 2017, accessed via https://ec.europa.eu/info/finance-consultations-2017-fintech_en. *See also* the Financial Services Action Plan, http://europa.eu/rapid/press-release_IP-17-609_en.htm; European Parliament, Resolution of 17 May 2017 on Fintech: the influence of technology on the future of the financial sector (2016/2243(INI)), P8_TA-PROV(2017)0211, accessed via http://www.europarl.europa.eu/.

51. SEC Guidance No. 2017-02, 7-15. Currently, chatbots are introduced as software applications which combine computer logic, artificial intelligence and natural language processing to mimic human conversation, enabling users to provide or receive information, or use the services of the adviser. *See* S. Brewster, *Do Your Banking with a Chatbot*, MIT Technology Review (May 2016) available at https://www.technologyreview.com/.

52. *See Algorithmic Trading Briefing Note*, Senior Supervisors Group, (Apr. 2015), available at https://www.newyorkfed.org/.

53. *See, e.g., Understanding the Flash Crash: What Happened, Why ETFs Were Affected, and How to Reduce the Risk of Another*, Blackrock Viewpoint (Nov. 2010), available at https://www.blackrock.com/corporate/en-br/literature/whitepaper/understanding-the-flash-crash-nov-2010.pdf; *see also, Findings Regarding the Market Events of May 6, 2010*, Sec. Exchange Comm., (Sept. 30, 2010), available at https://www.sec.gov/news/studies/2010/marketevents-report.pdf.

54. *See, e.g.,* SEC Market Access Rule 15c3–5, codified at 17 CFR 240.15c3-5, which only applies to brokers and dealers with market access. *See also Equity Trading Initiatives: Supervision and Control Practices for Algorithmic Trading Strategies*, FINRA Regulatory Notice 15–09.