Robo Advisors for Canadian Pension Participants

FINAL REPORT

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Abstract. Portfolio management has evolved. Robo advisors provide financial advice to clients who previously did not have access to such assistance because they lacked sufficient amounts of investible assets, and because they could not afford the fees charged by financial advisors. Robo advisors are automated online services that use computer programs to provide financial advice about investments and to manage clients' investment portfolios. Investing is inherently complex, but robo advisors are easy for people with basic computer skills to use, which simplifies investment decisions. In this paper, we focus on the use of robo advisors to assist Canadian pension participants in defined contribution plans. In Canada, robo advisors have been available since 2014 and they are growing in popularity. Robo advisors reduce the need for pension participants to have advanced levels of financial literacy, which is generally necessary to construct a low-fee, well-diversified portfolio that is aligned to the individual's risk tolerance.

Robo Advisors for Canadian Pension Participants

1 Introduction

Portfolio management has evolved. As defined contribution plans have become more prominent, pension participants have had increased responsibility for making investment choices that lead to adequate retirement income. However, many, if not most, participants lack the financial literacy needed to make informed choices concerning their pension portfolios.

This paper evaluates whether robo advisors might serve as a new approach to help pension participants access personalized financial advice.[1] Robo advisors provide automated financial advice through online computer programs. They also manage clients' investment portfolios. The use of robo advisors has become more widespread. At the end of 2020, Canadian robo advisors held $11.4 billion in assets (Almazora 2021), up from about $8 billion at the beginning of the year (Carrick 2020).

Robo advisors promote financial inclusion by making investing and financial advice available to nearly everyone. Pension participants must pay expensive fees to obtain this type of advice from human advisors. In contrast, robo advisors provide a relatively low-fee alternative (Fisch, Labouré, and Turner 2019), including to people who lack sufficient levels of investible assets to qualify for the services of human advisors. Robo advisors are software designed to simplify financial questions related to portfolio construction.

[1] The word *robo* is short for *robot*, referring to the involvement of a computer program--the brains of a robot—rather than a mechanical robot.

This paper explores—from a scientific and a practical perspective—the potential role of robo advisors to assist Canadians who participate in defined contribution plans. It fills two gaps in the literature. First, while an academic literature is developing on robo advisors, not much has been written about how they might help pension participants and pension plan sponsors. Second, although some papers have been written about robo advisors in the US, not many have been written about robo advisors in Canada.

The first section of this paper evaluates the potential for robo advisors to provide low-cost, individualized assistance to pension participants. The second section evaluates the robo advisors in Canada, comparing them with financial advisors. The third and fourth sections make predictions about the future of robo advisors in Canada and suggestions for how they can be improved. The final section provides concluding comments.[2]

Striving to improve the financial literacy of pension participants is one way to help them achieve well-diversified, low-fee portfolios that are aligned with their levels of risk tolerance. Pension participants benefit, for example, from understanding why portfolio diversification is important. However, we argue that robo advisors are a more promising approach. It is an unreasonable goal to provide widespread financial literacy at a level that enables pension participants to make wise investment decisions when faced with complicated pension investment menus. Financial education

[2] All prices or monetary amounts in this report related to Canadian robo advisors are presented in Canadian dollars when discussing Canadian robo advisors and in US dollars when discussing US robo advisors.

is expensive and has had limited success, as evidenced by the levels of financial literacy (Turner and McCarthy 2000, Turner and Korczyk 2004, Mitchell and Lusardi 2014).

2 Investing Complexity: A Problem for Most DC Plan Participants

Most defined contribution plans require participants to make portfolio investment decisions. Most pension participants, however, do not have the financial knowledge to construct a low-fee, well-diversified investment portfolio that matches their risk preferences (Turner and Muir 2012). A substantial fraction of the Canadian population (and elsewhere) lacks basic financial literacy (Lusardi and Mitchell 2014). This factor increases the complexity of making investment decisions. Investors with low financial literacy are particularly likely to make poor financial decisions, which can affect their retirement outcomes (Turner 2003, Fisch et al. 2016, Bianchi and Brière 2021b). One source of complexity is the effects of the individual's labor market risks on their optimal pension portfolios (Mitchell and Turner 2010).

Pension participants also might not understand how fees can affect investment selections (Muller and Turner 2016, 2021). They may need help to decide how much to contribute (Dominguez et al. 2020). As people approach retirement, they frequently need advice when they choose the methods of pension account withdrawals (Turner 2014).

Predating robo advisors, online retirement income calculators provide pension participants automated assistance in determining how much they need to save for retirement. These calculators, however, do not provide investment recommendations (Rappaport and Turner 2010, Turner and Witte 2010, Turner 2014).

3 Robo Advisors

Introduction to Robo Advisors. For years, human advisors have used computer programs to help them advise clients. Robo advisors make those types of computer programs available directly to pension participants and other investors. They particularly benefit middle- and lower-income pension participants who otherwise would not have access to affordable financial advice.

Dziubinski (2021) discusses changes in financial markets that have made them more accessible to people with low and moderate income. Jack Bogle and the development of low-fee index funds at Vanguard made low-fee investments available to most people. Charles Schwab made low-fee stock market trading services available to most people. Joe Mansueto, the founder of Morningstar, made in-depth, independent information about mutual funds available to most investors. In this paper, we argue that robo advisors continue this trend, making low-fee investing advice available to individual investors with small amounts to invest.

A 2020 survey of Canadians finds that 71 percent are not using a human financial advisor (FP Canada 2020). According to the UK Government's Chief Scientific Advisor, robo advisors can increase the accessibility of financial advice to previously underserved populations. Robo advisors increase access because of "lower cost structures, greater customer reach, or superior ability to monitor or score risk" (OECD 2017). Robo advisors worldwide were estimated to be managing US$440 billion in assets as of June 30, 2019 (Backend Benchmarking 2019).

Robo advisors make it easier for new investors to start investing. They are an automated innovation that goes beyond retirement planning calculators and address issues in investing (Fisch, Labouré, and Turner 2019). By using computer algorithms, robo advisors can provide pension participants with individualized assistance and financial advice, and they can manage investment portfolios.

Asset-allocation advice is generally straightforward because investors should typically buy broadly diversified indexes. The remaining issues are determining the appropriate level of risk and picking a low-fee portfolio. To accomplish these and other tasks with a robo advisor, the client usually fills out an online questionnaire that asks about his or her attitude toward risk and capacity to bear risk. The questions are related to the investor's age, expected retirement date, and savings goals. The questionnaire may also ask about other investments. Robo advisors use quantifiable factors such as wealth, income, tax situation, investment goals, and risk tolerance to analyze a client's financial status. Based on that information, the robo advisor provides portfolio recommendations tailored to each client's needs.

The Covid-19 pandemic could continue to increase the popularity of robo advisors (Snel 2020, Rockerman 2020). During the pandemic, more people have shifted to online transactions and have increasingly used robo advisors, presumably to avoid the health risks involved with in-person meetings. Wealthsimple (2020), the largest robo advisor in Canada, reports that it had nearly twice as many sign-ups for new accounts in March 2020 as it did in March 2019.

Robo advice can be provided to pension participants in various forms. It could be integrated with a program that manages other financial market assets owned by a participant, or it could be focused solely on the pension plan's investments. Robo advice could be part of a program that considers other financial goals, such as savings for college or non-pension retirement savings. It could be part of a program that addresses financial wellness, including issues of debt and insurance. It could be delivered through a stand-alone program, or it could involve an investment advisor. It is also possible for a financial advisor to use a robo advisor to provide advice to a client (Fisch, Labouré, and Turner 2017, 2019).

The first robo advisors that were designed to help individual investors—Wealthfront and Betterment—began providing financial advice to US investors in 2010. The first robo advisors in Canada—Wealthbar and Wealthsimple—began in 2014. In 2020, CI Financial Corporation took full ownership of Wealthbar and rebranded the company as CI Direct Investing. Robo advisors have evolved to provide other financial services, sometimes as part of a financial services company.

Robo Advisor Services. Robo investments typically include low-cost mutual funds and exchange traded funds (ETFs). However, robo advisors offered by mutual fund companies generally only offer funds provided by their company. Robo advisors manage their clients' portfolios, providing services that include automatically rebalancing the portfolios to maintain the desired asset allocation, and reinvesting dividends and interest payments. Robo advisors can help investors understand whether their retirement savings plans are on track to meet retirement goals. To contribute to a robo advisor, the clients can connect their bank accounts to a robo advisor's software and automatically transfer money. Participants in an employer-provided defined contribution pension can arrange for their employer to withhold contributions from their wages and transmit them to the robo advisor.

Robo advisors offer their clients increased convenience. Robo advisors are available to clients at any time and from any location when the client has access to a computer or smartphone. These features could be particularly appealing to younger people who are comfortable with technology and who prefer the freedom of handling financial affairs at a time and location that is convenient for them.

In addition to increased accessibility, robo advice is cheaper than human advice. This factor could be especially useful for participants in defined contribution plans whose pension savings are relatively small.

An advantage robo advisors have over target date funds is that they help clients choose investments that are appropriate for each person's level of risk tolerance, not just their ages (Fisch and Turner 2018). Breen (2019) speculates that robo advisors could eventually replace most target date funds because robo advisors provide greater personalization at a relatively low price.

4 The Growth of Canadian Robo Advisors

Canadian robo advisors offer a range of registered and non-registered accounts, including Tax-Free Savings Accounts (TFSAs), Registered Retirement Savings Plans (RRSPs), Registered Retirement Income Fund (RRIFs), Registered Education Savings Plans (RESPs), and personal and corporate non-registered accounts (Goldman and MacColl 2020). They offer portfolios based on risk profiles. Table 1 shows the portfolios of four major Canadian robo advisors. They have in common a limited number of portfolios where the allocation to fixed income and equities varies with the risk profile.

Table 1. Canadian Robo Advisors Portfolio Options, 2020

	Equity (%)	Fixed Income (%)	Real Estate (%)
	CI Direct Investing		
Aggressive	64.5	25.5	10
Growth	55.5	37	7.5
Balanced	47	46	7.5
Conservative	33	62	5
Safety	20	75	5
	Questwealth Portfolios		
Aggressive	98	2	-
Growth	80	20	-
Balanced	60	40	-
Income	40	60	-
Conservative	20	80	-
	RBC InvestEase		
Aggressive Growth	100	-	-
Growth	70	30	-
Balanced	55	45	-
Conservative	35	65	
Very Conservative	20	80	-
	Wealthsimple		

Growth	75-90	10-25	-
Balanced	50-65	35-50	-
Conservative	30-40	60-70	-

Sources: Borzykowski 2020, Broverman 2020, Brown 2020, Goldman and MacColl 2020, Muller 2020, Murphy 2020

Wealthsimple is the largest robo advisor in Canada. It has 230 employees and more than 175,000 global clients (Muller 2020). Additional financing in 2021 increased the firm's market value to $5 billion (Silcoff and O'Hara 2021), making it one of Canada's most valuable privately held companies.

Wealthsimple has no minimum account balance, but big investors qualify for upper-tier investing packages with a lower management fee and added perks, including:

- $100,000+ Wealthsimple Black offers potential tax savings from automated tax-loss harvesting and personalized financial planning with a human advisor.
- $500,000+ Wealthsimple Generation offers in-depth financial planning with human advisors and custom portfolios.

Questrade users gain access to discount brokerage services. These services include a discount brokerage for individual stock picking. It also offers Halal investing and low-fee ETFs.

5 Investments and the Investment Decision Process

A study indicates that robo advice differs considerably across advisors, which suggests that the quality of the advice may also vary considerably. That study compares the advice of seven robo advisors for a hypothetical 27-year-old. It finds that the portfolio allocation to equities varied from 51 percent to 90 percent (FINRA 2016). Stein (2016) also finds that different robo advisors gave different advice even when the input is the same. Rappaport and Turner (2010) found a similar result for online retirement planning software.

Investors who use Wealthsimple have some optional portfolios, including socially responsible investments (SRI), also called ESG. CI Direct Investing invests part of its portfolios in real estate. It also offers an option for private investment portfolios. Designed to reduce volatility and improve risk-adjusted returns over time, these private investment portfolios include private equity, real estate, mortgages, public equity, and bonds.

The trend toward increased personalization extends to clients' other investment goals. For example, global climate change has led many investors to consider climate risks when making investment choices. This investment trend has become a major asset class that has proven to provide a competitive rate of return (Jagannathan et al. 2021). However, few Canadian robo advisors, Wealthsimple being an exception, provide a portfolio that considers environmental, social, and governance (ESG) investments (Vasil 2021).

RBC InvestEase offers a wide selection of ETF portfolios. This company teamed up with BlackRock Canada to create RBC iShares. CI Direct Investing combines the passive investing of a robo advisor with unlimited financial advice, regardless of the account balance. Clients are assigned a dedicated financial advisor, and they can build a financial plan (Borzykowski 2020, Broverman 2020, Brown 2020, Goldman and MacColl 2020, Muller 2020, Murphy 2020).

Portfolio Selection. The remainder of this section discusses issues pertaining to the way robo advisors select portfolios for clients.

People can make better investment choices when using robo advisors because the technology can provide guard rails that help investors avoid excessive conservatism. Robo advisors can also help people avoid excessive risk-taking in their portfolios. In other words, robo advisors can help investors to avoid choosing extremes when building their portfolios.

While robo advisors help protect against extremes in portfolio allocation, Bianchi and Brière (2021a) show that clients who use robo advisors generally increase their risk exposure and their risk-adjusted returns. The increase in risk exposure is larger for investors with smaller portfolios and lower equity exposure, and the increase in returns is larger for smaller investors and investors with lower returns.

Robo advisors also deal with the complexity and variation in clients' needs. The US Financial Industry Regulatory Authority (FINRA 2016: 8) asked, "What information is necessary to build a customer profile with sufficient information to make a sound investment recommendation?" FINRA concluded that most robo advisors have between five and eight investor profiles, though some have considerably more. It found that "client-facing digital advice tools rely on a discrete set of . . . between four and twelve questions, generally falling into five broad categories: personal information, financial information, investment objective, time horizon and risk tolerance" (FINRA 2016: 9).

However, automated approaches have possible weaknesses that robo advisors may need to address. First, standard questionnaires used by robo advisors to elicit risk preferences could be biased. Kitces (2017a) finds that individuals who self-report being wealthy have a high capacity for bearing risk, but they might also be highly risk averse. These individuals are often placed in moderately risky portfolios. The clients' unwillingness to bear risk is often overlooked because of their ability to bear risk.

Second, robo advisors should not necessarily assume that the investors' risk preferences revealed on questionnaires are constants. Risk preferences can change as investors gain financial knowledge.

Third, evaluations of risk preferences focus mostly on investor responses to short-term volatility. Retirement assets, however, are invested for the long term. It is unclear whether investors understand how choices to minimize short-term volatility can adversely affect their future account balances and standards of living during retirement.

6 Fees

Robo advisors charge lower fees than human advisors because they benefit from economies of scale. A single computer algorithm can advise thousands of clients. A human advisor, by contrast, might have 75 or at most 100 clients (Kitces 2017b).

Robo advisors generally charge fees at two or three different levels, based on the amount invested by the participant and the level of services provided by the robo advisor. At the basic level of service, robo advisors typically charge substantially less than human advisors. Canadian robo advisors generally charge at least 40 basis points, though some charge less (Borzykowski 2020). In Canada, for a portfolio with less than $500,000, the fees charged by human advisors for an actively managed portfolio would be in the range of 2 to 2.5 percent (Grouni 2020).

Canadian regulations require human advisors to have greater involvement in robo advisors than in the US. This raises the cost of Canadian robo advisors. However, human advisors in Canada charge substantially more on average than human advisors in the US. As a result of the relative cost savings, it can be more appealing for Canadians to choose robo advisors.

In addition, robo advisors generally invest in ETFs, which charge substantially lower fees than Canadian mutual funds. A 2017 study finds that the median asset-weighted expense ratio for Canadian equity funds was 2.23 percent. In 2021, the fees for equity mutual funds dropped to 1.98 percent, which was still relatively high (Omololu 2021) compared to the pooled funds in Canadian retirement plans, which charge lower fees (Morningstar 2017).

Wealthsimple charges advisory fees of 0.5 percent for clients with investments of $100,000 or less, which would be most clients, and 0.4 percent for clients with larger accounts. By contrast, Questwealth charges fees of 0.2 to 0.25 percent. Nestwealth charges a fee of $20 to $80 a month (Borzykowski 2020). Including the fees associated with the ETF investments, Questwealth would charge clients 0.38 percent. This figure compares to an average mutual fund fee in Canada of 2.16 percent (Questrade 2020).

Table 2. Robo Advisors for Individual Account Pensions in Canada, 2020

Robo Advisor	**Minimum Opening Account Balance in Canadian dollars**	**Annual Management Fee**	**Annual Average Management Expense Ratio for Investments**
BMO SmartFolio is a hybrid,	$1,000	0.4 – 0.7%	0.2 – 0.35%
CI Direct Investing, formerly WealthBar	$1,000	0.35 – 0.60%	0.26 – 0.34%
Idema	$25,000 recommended	0.3 – 0.5%	
Invisor	No minimum	0.5%	0.2%
Justwealth	$5,000 for all pension accounts	4.99/month up to 12,000, then 0.4 – 0.5%	0.2%

ModernAdvisor	$1,000 min for investing	0.35 -0.50%	0.2%
Nest Wealth	No minimum	$20.00 – $80.00/month	Average for a balanced portfolio of 0.13%, plus up to $100 per year in trading fees and up to $100 per year in account balance fee
Portfolio IQ		0.35 – 0.70%	
Questrade – Questwealth Portfolios	$1,000	0.2 -0.25%	0.13%
RBC InvestEase	$100	0.5%	0.11 – 0.22%
Responsive Capital Management—hybrid		0.5 – 0.8%	0.14 – 0.19%
Smart Money Capital Management -- hybrid	$5,000	0.8%	0.27%
Virtual Wealth	No minimum	0.35 – 0.60%	Typically less than 0.15%
Wealthsimple	No minimum	0.4– 0.5%	0.2%

Sources: Borzykowski (2020), Liew (2020), Advisorsavvy (2020), Sridhar (2020), Ratehub (2020)

Smart Money Capital Management (2020), which charges annual fees of 0.8 percent, uses a robo advisor to select and manage investment portfolios. However, the initial meeting is with a financial advisor.

7 Do You Get What You Pay For? Robo Advisors vs. Human Advisors

The saying “you get what you pay for” implies that price is an indicator of quality. This statement is probably true for products and services where price and quality are readily discernible. However, we argue that the saying does not apply when quality and price are difficult to discern. That is the case when people choose a financial advisor or consider using a robo advisor.

Access to Advice. Financial advisors tend serve higher-wealth people because the advisors often have requirements for minimum asset levels, and their fees tend to be expensive (Turner 2018). Human advisors may require clients to have minimum investable assets of $100,000 or more (Ludwig 2017), whereas robo advisors are generally willing to help clients with very low balances (Braunstein and Labouré 2018).

Fees. People might know the fees they are paying for financial advice and know that robo advisors charge lower fees than human advisors, but they might not know how the fees will affect their account balances at retirement. Muller and Turner (2021) find that most people in their sample underestimated the effect of fees on future account balances.

Extensive research has shown that exchange traded funds (ETFs) that are passively managed consistently outperform actively managed funds, largely due to the higher mutual fund fees of actively managed funds (Borzykowski 2020). Since 2012, the asset-weighted management expense ratios for Vanguard ETFs in Canada have declined from 0.27 percent to 0.14 percent, compared to the overall ETF asset-weighted industry average of 0.31 percent (Vanguard 2019). Thus, robo advisors using ETFs would have particularly low fees.

Most robo advisors use passive index funds (Lam 2016). By contrast, human advisors tend to recommend higher-fee, actively managed approaches (Kramer 2016). As a result, robo advisors have lower advisory fees and lower fund expense ratios, and they spend less on trades.

An extreme example of costly human advice, studied by Turner et al. (2016), involves a case in which financial advisors recommended that US federal government retirees leave the extremely low-fee (five basis points) Thrift Savings Plan. The retirees were advised to roll over their accounts to investments with substantially higher fees—up to forty times higher when including the advisory fee.

Quality of Advice. Many people find it difficult to determine the quality of financial advice. In these situations, the asymmetry of information between financial advisors and clients provides the advisors with an incentive to charge a higher fee, which sends a message that the quality of the advice is better.

Financial advisors generally have conflicts of interest. These conflicts occur on the intensive margin in selecting a portfolio when they receive compensation based on what assets they choose. Conflicts of interest also occur on the extensive margin when their advice affects the amount of assets they manage (Turner, Klein, and Stein 2016). Examples include advising a conservative spend-down of assets, advising against large expenses, advising against large gifts to children, and not advising to annuitize (Turner and Giordano 2020).

Algorithms, however, are not necessarily bias-free or exempt from conflicts of interest. In particular, they could favor a financial institution's own funds or products. Robo advisors are programmed by humans and thus are potentially subject to biases. However, the business model of robo advisors is to provide low-fee advice to many clients at relatively low fees, while human advisors are limited in their number of clients due to the amount of time required per client. Thus, it is reasonable to conclude that robo advisors could be less susceptible to providing bad advice than human advisors. In addition, robo advisors often do not offer in-house mutual funds or ETFs. That means they have fewer incentives to sell their own funds, which are often not the funds with the lowest fees. However, some robo advisors do offer investment funds that charge higher fees.

Advice offered by robo advisors is more transparent to regulators than financial advice provided by human advisors. It is not possible to monitor financial advisors' conversations with their clients, but it is simple to evaluate the advice provided by computer models (GAO 2011). Greater transparency may lead robo advisors to adhere more closely to regulatory requirements than some human advisors.

Human advisors might be affected by emotions or fatigue, and they could be prone to inconsistent decisions. Humans may have demographic biases based on their clients' age, gender, race, or ethnicity. Robo advisors would not likely have any of these weaknesses.

Gender differences can also play a role in human financial advice. One study finds that female advisors encourage men to invest in riskier portfolios more often than when male advisors provide men with advice. Likewise, the study finds that male advisors encourage women to invest in less risky portfolios more often than when female advisors provide advice to women. Thus, opposite-gender advisors tend to exaggerate gender differences in risk aversion (Monne, Ruterford, and Sotiropoulos 2021). This bias presumably would not occur with robo advisors. However, the question remains as to whether financial advice *should* differ between men and women. The US robo advisor Ellevest bases its advice on the premise that advice should differ between women and men. Women's earnings tend to peak earlier than men's, and women are more likely to have their labor supply reduced due to family care responsibilities.

Human advisors are potentially able to offer clients a more personalized approach. Face-to-face discussion can enable the advisor to evaluate the intensity of the client's preferences and to adjust accordingly. How much this happens, however, is unclear. A Canadian study finds that financial advisors tended to ignore differences in their clients' risk preferences and instead recommend the same portfolio for everyone (Linnainmaa et al. 2015, Foerster et al. 2017). That study reports that an advisor's portfolio was a good predictor of his or her clients' portfolios. It analyzes the trading and portfolio decisions of approximately 10,000 financial advisors and 800,000 clients in four

Canadian financial institutions. Clients' observable characteristics—risk tolerance, age, income, wealth, occupation, and financial knowledge—explain only 12 percent of the cross-sectional variation in their risk exposure. This suggests that, just as for robo advisors, portfolios vary considerably due to the heterogeneity in human advice across advisors.

One question is whether robo advisors perform better or worse than financial advisors in preventing clients from acting on impulses, such as selling low and buying high. The US robo advisor Betterment has found that it helps to contact actively engaged clients during market downturns, to encourage them not to sell. However, that approach can backfire when clients are not actively engaged with market changes, because some want to sell when they learn about a market downturn (Egan 2017).

In 2015, MarketWatch asked four robo advisors and four human advisors to recommend a portfolio for a hypothetical person. In this small sample, the two types of advisors provided similar recommendations (Buchwald 2021). The fees charged by robo advisors are generally about a quarter of the fees charged by human advisors. However, human advisors provide advice about a broader range of financial planning and management issues, such as debt and estate issues.

Summarizing studies, Deschenes and Hammond (2019) find that investment results are not necessarily superior for people who use financial advisors. However, people who use robo advisors may have better outcomes, mainly because of the lower fees charged by robo advisors. Bhattacharya et al. (2012) find that clients who follow unbiased computer-generated advice enjoy better portfolio efficiency. However, broker-sold funds and broker-constructed portfolios tend to underperform benchmarks (Bergstresser et al. 2009, Chalmers and Reuter 2015). Human advisors do not always address their clients' behavioral biases and misconceptions (Bergstresser et al. 2009 Mullainathan et al. 2012). Human advisors sometimes recommend unsuitable products and cater to uninformed clients (Anagol et al. 2013).

Trust is a key element in the willingness of clients to use financial services. Because many human advisors have conflicts of interest, some people may not trust them. Tubadji, Denney, and Webber (2021) find that people who do not trust human advisors are more likely to use robo advisors. Trust in robo advisors similarly plays a role. However, clients who value a relationship with a human advisor are unlikely to use a robo advisor (Rossi and Utkus 2020).

8 Institutional Context and Regulations

Concentration of the Canadian financial services industry and the stability of the banking system could impede the adoption of financial technologies (fintech). In Canada, the adoption of fintech tends to favor existing financial institutions. Only advisors registered with the Canadian Securities Administrators are allowed to conduct business (McCarthy Tétrault 2019).

Canadian regulations do not allow completely automated online advisors with no human interaction to operate. Robo advisors must function with a "hybrid" model. The online program adds efficiency, but human advisors make the final decisions (McCarthy Tétrault 2018). Robo advisors register as portfolio managers and are held to the same standards as traditional advisors. They're bound by fiduciary standards that require them to provide the best financial advice to their clients and to put clients' interests ahead of their own. The Canadian Securities Administrators

(CSA) issued a notice entitled “Guidance for Portfolio Managers Regarding Online Advice.” It says, “There is no ‘online advice’ exemption from the normal conditions of registration for a portfolio manager (PM)” (CSA 2015).

The CSA explains that to implement an investment advisory service, the firm operating the online advisor must file substantial documentation. The agent representative for the online advisor then needs to ensure that the portfolio proposed by the software for the client is suitable. Once the portfolio is selected, a portfolio manager needs to ensure that the client’s investments are aligned with the approved model portfolio. This could include manually rebalancing the client’s portfolio when appropriate. These guidelines suggest that Canadian securities regulators tend to classify online advisors as online platforms through which portfolio managers can provide investment services, not as standalone wealth management services. Robo advisors are not “order execution only” (OEO) services that allow firms to trade in securities independently without any recommendations or suitability assessments from the firm. The Investment Industry Regulatory Organization of Canada (IIROC) prohibits OEO firms from providing recommendations to clients (McCarthy Tétrault 2018).

Robo advisors must register with IIROC and follow suitability obligations, such as disclosing investing risks to clients. These industry self-regulations from IIROC concerning “suitability” and “know-your-client” recommendations can be difficult to obtain in the context of robo advisor services (Competition Bureau 2017). Many robo advisors are also members of the Canadian Investor Protection Fund (CIPF), which protects account assets for up to a million dollars against insolvency (Goldman and MacColl 2020, Murphy 2020).

Canada has an integrated regulatory approach, with a central financial regulator (Office of the Superintendent of Financial Institutions OSFI) for federal financial institutions, including banks, which is where a significant share of financial transactions take place. Financial institutions other than banks may be regulated at the federal or provincial level. The regulatory framework is not as clear for non-bank startups. Robo advisors may also be subject to harmonized guidance through the CSA. They must comply with a diverse range of provincial and federal regulations: federal criminal law, anti-money laundering and fraud rules, federal and provincial consumer protection legislation, and governance.

9 Robo Advisors and Corporate Strategies: Four Case Studies

This section highlights actions taken by major Canadian financial corporations that have developed robo advisors and examines how these actions fit within a broader corporate strategy. We develop four case studies that cover four important financial groups or financial institutions that own some of the largest robo advisors in Canada. First, Power Corporation owns Wealthsimple. Second, CI Financial owns CI Direct Investing (WealthBar). Third, Royal Bank of Canada owns RBC InvestEase/RBC iShares. Fourth, Questrade owns Questwealth Portfolios (formerly called Portfolio IQ).

Power Corporation: Wealthsimple

Power Corporation is an international management and holding company that focuses on financial services in North America, Europe, and Asia. Its core holdings are insurance,

retirement, wealth management, and investment businesses, including a portfolio of alternative asset investment platforms.

Wealthsimple operates Canada's largest digital investment services company. Founded in 2014, it initially focused on serving millennials. Wealthsimple continues to expand its market presence and diversify its offerings of investment, saving, and tax products. As of October 15, 2020, Wealthsimple had over 1.5 million clients with assets under management of $8.4 billion (Finextra 2020). It has grown rapidly, and in 2021, it had more than two million Canadian clients (Tattersall 2021). Clients can choose from various investment portfolios called Conservative, Balanced, Growth, Socially Responsible (SRI), and Halal. Each portfolio in its makeup typically draws from eight to ten ETFs that are weighted according to the needs of each portfolio. Wealthsimple was primarily owned by Power Corporation, at close to 90 percent, via investments made through the firm's holdings in Power Financial, IGM Financial, and Portag3. However, after receiving additional financing in 2021, Power Corporation's ownership dropped to about 42 percent (Simpson 2021). Wealthsimple has plans to expand into banking, insurance, and mortgage products so that it can be the primary financial services provider for its clients.

Wealthsimple (2020) provides online educational material designed to improve investment knowledge. This includes access to a glossary of common terms in the industry and a broad selection of FAQ questions answered. In addition, the company provides articles and blog posts about aspects of their services and the wider industry. It offers an ETF that is compliant with Halal principles of the Islamic faith (Wealthprofessional 2021).

CI Financial is an investment management firm that principally offers mutual funds and investment products targeted to retail investors. It also offers other financial products and services, such as ETFs and wealth management.

CI Direct Investing was first established as WealthBar and then known as the robo advisor company that combined financial planning and money management by assigning a dedicated financial advisor to each client and allowing clients to build a financial plan. Funds were constructed by human portfolio managers, mostly based on ETFs, and still managed by algorithms. Wealthbar was bought by CI Financial and formally rebranded as CI Direct Investing in August 2020.

The acquisition of WealthBar by CI Financial highlights CI's objective to reinforce its digital hybrid offerings so as to expand wealth management activities. A company statement says, "The addition of this technology and expertise will accelerate the development of CI's comprehensive digital strategy, which is focused on innovation, operational efficiency, advisor productivity and client experience across all of our businesses in asset management and wealth management. . . . We see great potential in providing advisors with the option of a digital platform to serve their clients" (CI Financial 2018).

The firm intends to combine the robo advisor platform with Virtual Brokers, CI's discount broker, to create an integrated online investment platform. CI Direct Investing will offer a diverse menu of services, including online brokerage, wealth management, and financial planning. Its hybrid model enables clients to invest in professionally managed investment portfolios while having access to personal financial advice. “We believe that professional advice is as critical as ever and our online platforms are important complements to our traditional advisory businesses. We are using technology to enhance our advisory offerings and to provide an even wider range of clients with access to investing tools and advice" (CI Financial 2020).

Royal Bank of Canada: RBC InvestEase and RBC iShares

The **Royal Bank of Canada** is a Canadian multinational financial services company and the largest bank in Canada, as measured by market capitalization. The bank serves over 16 million clients and has more than 86,000 employees worldwide.

RBC’s robo advisor, called **RBC InvestEase,** started nationwide in 2018, but it got a major update the following year when RBC Global Asset Management Inc. and BlackRock Asset Management Canada Limited brought their ETF families together under one new banner called **RBC iShares.** This combined entity manages the most ETFs in Canada (approximately 190).

RBC invests in digital and innovation strategies to deliver insights and advice for its clients. The bank’s technology platform and data foundation are supporting business growth and operational efficiencies. RBC’s next-generation delivery platform should accelerate its ability to bring products and services to market, scale up across their businesses, and leverage artificial intelligence (AI) and analytics to deliver improved business outcomes.

RBC developed its robo advisor platform in response to a segment of clients who wanted online investment advice. “Up until a few years ago, the only option to do everything online was to do it yourself. And not everyone is comfortable doing that." RBC InvestEase fits between the bank's full service (yet expensive) line up of mutual funds and its self-directed RBC Direct Investing platform for do-it-yourself investors. Backed by the security of a big bank, RBC InvestEase is an option for RBC clients to save on fees (Robb 2020).

Questrade: Questwealth Portfolios (Portfolio IQ)

Launched in 1999, **Questrade** is "using technology to create innovative products and services that help Canadians keep their costs down while maximizing their investment returns" (Questrade 2020a). They are now the country's largest independent online brokerage. To stimulate growth, they push on two fronts: self-directed investing through discount brokerage Questrade Inc., and managed money through Questrade Wealth Management Inc. The company currently manages assets in excess of $9 billion (Sagar 2020). Keeping fees low and building efficient trading platforms are at the heart of Questrade's strategy.

Questwealth Portfolios is the robo advisor under the umbrella of Questrade Wealth Management. Launched in 2014, it was originally called Portfolio IQ. It was relaunched in 2018 as Questwealth Portfolios. The company's management fees are among the lowest in the industry, ranging from 0.20 percent to 0.25 percent based on the amount invested. Most robo advisors have passively managed portfolios, but Questwealth Portfolios are actively managed.

The emergence of robo advisors has created downward pressure on the cost of fund management and advisory services. ETF providers have reacted. Vanguard Investments Canada Inc. unveiled in 2018 three low-cost asset allocation ETFs that give investors one-stop shopping to the firm's globally diversified strategies. It created a low-fee, all-in-one portfolio that competitively challenges the rise of robo advisors (Chevreau 2018).

Later in 2018, Questrade, Canada's largest online discount brokerage firm, introduced a new version of its robo advisor, which was initially called Portfolio IQ. At that time, the average asset-weighted administration fee was 0.63 percent. Questwealth Portfolios reduced the fee to either 0.20 or 0.25 percent, with the lower rate of 0.20 percent applying to accounts with at least $100,000. This fee reduction made them competitive with the 0.22 percent fee that Vanguard Canada charges for its ETFs.[3] Although it has low fees that are normally associated with passive index investing, the Questwealth Portfolios are actively managed. Its five portfolios "are built and managed by experts who watch the market and adjust the portfolios when needed" (MoneySense 2018).

10 Robo Advisors and Pensions

Robo advisors were first developed for the retail market, in which financial institutions directly offer services to clients. Nonetheless, such services for participants in employer-provided group pension plans are growing. Robo advisors could be well-suited for pension participants, particularly new participants who are often first-time investors with relatively small accounts. Robo advisors can help participants in individual account pensions who use defaults for investment portfolios, such as target date funds (Turner and Klein 2021). When there is a high degree of unexplained heterogeneity among participants, which is the case for risk aversion, defaults do a poor job of approximating the preferences of participants. Robo advisors can help

[3] These portfolios use underlying ETFs from four ETF manufacturers: iShares, Wisdom Tree, SPDR, and First Trust.

participants choose target date funds or other investments that are appropriate for their levels of risk aversion.

The US robo advisor Personal Capital examines a person's 401(k) portfolio and determines whether clients would be better off investing in lower fee options available from the plan. It also provides an online retirement planner to help determine if the person is on track to meet his or her retirement goals. In addition, Personal Capital provides an investment check-up that aggregates all of the person's investment accounts and then makes recommendations related to his or her overall portfolio (DoughRoller 2021).

11 The Future of Robo Financial Advice

Artificial intelligence (AI) is improving robo advisors' financial recommendations. These improvements are accomplished by incorporating data from a wider range of sources. One company has a machine-learning product that reviews a person's tax returns, credit reports, and bank account to provide customized financial planning advice (Pah 2019). With machine learning, which is a type of artificial intelligence, computers use algorithms and statistical models to perform a task or make a decision without using explicit instructions. They rely instead on patterns and make inferences based on data. Machine learning algorithms build a mathematical model based on sample data in order to make predictions or decisions without being explicitly programmed to perform the task (Wikipedia 2019).

Bianchi and Brière (2021b) report recent advances in XAI, which is the acronym for "explainable artificial intelligence." This means that artificial intelligence can be easily explained to the clients of robo advisors. They argue that there are potential problems with the increased personalization of robo advice. These problems are related to measurement errors of relevant individual characteristics and uncertainties about model parameters.

Baker and Dellaert (2017) identify four core components of robo advisors: (1) the investment algorithms, (2) the client and financial product data to which the algorithms are applied, (3) the choice architecture through which the advice is delivered, and (4) the information technology infrastructure. It is likely that robo advisors will increase in sophistication in each of these areas.

12 Suggestions for Improving Robo Advisors

In this section, we suggest ways to improve robo advisors. First, robo advisors could consider factors that affect life expectancy, such as gender and education, when considering a client's time horizon.

Second, robo advisor portfolios could be constructed like target date funds, so that they automatically adjust risk levels as people age.

Third, robo advisors could consider aspects of a person's labor market risk. For example, if the person works in the travel industry, the robo advisor could underweight travel industry stocks so that the person's labor market and financial market risks wouldn't be correlated.

Fourth, robo advisors could provide tax preparation software and link that software to the investment software so that the two would share information. For example, the robo advisor could use information from client tax returns, such as the volatility of the person's labor market income or information on the person's investments that are not managed by the robo advisor.

Fifth, robo advisors could provide a more holistic view of a person's finances by including a broader range of investments and assets, including housing and social security pensions. Wealthfront recently featured direct integrations with digital investment platforms (Venmo, Redfin, Coinbase), lending (Lending Club), and tax calculation (TurboTax).

Sixth, robo advisors connected with employer-provided individual account pension plans could use data that employers have about their employees, such as age, income, sick leave usage, and family status to provide more personalized recommendations.

Seventh, robo advisors could provide advice related to options for benefit payouts during the retirement period. One innovative approach could be for robo advisors to create mutual groups of retirees with similar characteristics, a new version of traditional tontines. In these cases, the payouts are not guaranteed like an annuity. Instead, the payouts vary depending on the investment and mortality experience of the plan (Turner, Fullmer, and Forman 2021).

Eighth, robo advisors could include units of deferred annuities in their pension portfolios to help people during their retirement disbursement period. These could be annuities available at retirement or longevity annuities deferred to an advanced age, such as age 82 (Iwry and Turner 2009, Turner and McCarthy 2013).

Ninth, robo advisors could include a green, socially conscious option.

Tenth, steps could be taken to make it easier for people to compare robo advisors. For example, government could require robo advisors to provide a standardized risk measure for their portfolios, such as for a person age 40 with an average income and an average risk aversion.

Eleventh, robo advisor funds could be offered as the default for pension participants. This change could reduce fees in some circumstances and result in more personalized advice.

Twelfth, robo advisors could help investors see if they are on-track to meet their income replacement rate goals.

Thirteenth, robo advisors could provide online investing seminars.

Fourteenth, Canadian regulations could be changed to make it possible to provide non-hybrid robo advisors with less human intervention.

13 Conclusions

Portfolio management has evolved. Robo advisors are a major innovation in helping people prepare for retirement. They provide automated advice that helps people choose and manage their financial investment portfolios. They charge lower fees and have lower minimum account balances than human advisors. They provide automatic rebalancing.

Robo advisors provide financial advice to clients who, in the past, generally did not receive financial advice because they did not have sufficient amounts of investible assets and because they felt they could not afford the fees of financial advisors. Investing is inherently complex, but robo advisors are easy to use and make investing relatively simple. Robo advisors can reduce the need for advanced financial literacy, which is often needed to construct a low-fee, well-diversified portfolio that is aligned with a person's level of risk aversion. Robo advisors accomplish this because they provide reliable financial advice at relatively low cost.

Finally, robo advisors are a logical application of artificial intelligence, which will certainly change the way financial advice will be provided in the future.

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