BRINGING TRANSPARENCY TO ROBO INVESTING

EDITION 10

The Robo Report™ Fourth Quarter 2018

We are proud to publish the 10th edition of *The Robo Report*™ covering the fourth quarter of 2018. This report is a continuation of an ongoing study that monitors the most well-known robo advisors. We strive to provide a reliable resource for both investors and professionals interested in the digital advice industry.

Highlights:

- Diversification helps robos through the fourth quarter downturn. (Performance Commentary, pg. 8)
- TD Ameritrade runs into tax-loss harvesting hiccup, leaving them heavily allocated to cash. (Trades Commentary, pg. 26)
- First publication of three-year returns on seven of the most prominent robos. (Taxable Returns, pg. 11)
- Fidelity Go continues to perform well in the one- and two-year time frame. (Taxable Returns, pg. 11)
- SEC reaches settlements with two robo advisors in first actions against robo advisors. (Robo News, pg. 4)

The Executive Summary

The fourth quarter was a tumultuous quarter, giving robo advisors plenty of opportunities to harvest tax losses. With the S&P 500 falling 13.52% in the quarter, we saw robos making more trades than we ever have before. One portfolio's activity was of particular interest. TD Ameritrade's SRI portfolio harvested tax losses three times in the fourth quarter, and to avoid running afoul of the wash sale rule, their third sale was not replaced with a similar fund, leaving 35% of the portfolio allocated to cash. This trade was done on December 24th. During the period between December 24th and the end of the year, the S&P returned more than 6%, therefore holding cash created significant drag on the portfolio. More details can be found in the Trades section on page 26. This portfolio aside, this quarter saw continued strong returns from Fidelity Go, who is emerging as a performance leader. The largest news for the quarter was surrounding the SEC reaching settlements with Wealthfront and Hedgeable. This quarter we also spoke with Wealthsimple in our robo interviews section. Details of the highlights can be found in their respective sections.

Robo Report Housekeeping

In the second half of 2018, we were busy expanding the number of robos we cover. This report has first returns data from US Bank and Interactive Brokers, while also adding a TD Ameritrade socially responsible investing (SRI) strategy and active strategies from Morgan Stanley and TIAA. Next quarter, we will be initiating coverage on 12 accounts, including offerings from BBVA Compass, Fifth Third Bank, Citizens Financial, Edelman Financial Engines, Goldman Sachs' Honest Dollar, qplum, John Hancock, and Prudential. Next quarter's report will also include portfolios that follow SRI and active strategies from E*Trade, a Merrill Edge SRI strategy, and a portfolio from SRI robo Swell Investing.

We have also made some changes to the Normalized Benchmark this quarter. We have made the benchmark dynamic, meaning the benchmark shifts its weights to match the portfolio's fixed income-to-equity ratio if we detect a strategy shift in the portfolio it is being measured against. Also, we have simulated a 0.30% management fee in the benchmark to represent the costs of a professionally managed robo portfolio.

Methodology

To get a first-hand understanding of how the different providers operate and invest clients' money, we opened, funded, and sought specific portfolios at various robo advisors. For the taxable accounts, we sought a moderate allocation of approximately 60% stocks and 40% bonds for an investor in a high tax bracket. As for the retirement accounts, our goal was to have the most aggressive (highest equity) allocation. Starting with a similar baseline allocation across the portfolios allows us to measure performance and compare how our funds are invested as equally as possible. For comparability between portfolios that have different target allocations, we track the equity-only and fixed income-only portions of the portfolios and encourage investors to look at differences in target allocations and compare asset class to asset class when appropriate. Additionally, in the second quarter of 2018, we introduced Normalized Benchmarking as an alternative way to compare robo portfolios with differing equity allocations.

Taxable Top Performers

1-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Fidelity Go	Zacks Advantage	TIAA
Equity	Zacks Advantage	Acorns	Fidelity Go
Fixed Income	SoFi	Wealthfront	Vanguard

2-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Fidelity Go	SigFig	Vanguard
Equity	SigFig	Fidelity Go	Vanguard
Fixed Income	Fidelity Go	Wealthfront	Schwab

3-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	SigFig	Schwab	WiseBanyan
Equity	SigFig	Schwab	WiseBanyan
Fixed Income	Schwab	SigFig	WiseBanyan

**Total Portfolio winners are based on the portfolio's return above/below the Normalized Benchmark.*

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Robo News

Catch up on what you missed in the digital advice industry over the last quarter. Below are highlights of the biggest news from the past quarter.

Digital Investing Landscape Evolving

In 2018, we saw a continued expansion of robo advice products across the country. While banks and traditional advice providers continued to launch digital advice products, new independent entrants to the marketplace significantly dropped off, and some smaller independent providers closed. Although independent robos will still face hurdles, digital advice as a whole will continue to cement its place in the investment advice landscape. According to a study commissioned by Charles Schwab, "The Rise of Robo: Americans' Perspectives and Predictions on the use of Digital Advice," almost 60% of Americans will be using a robo advisor to assist in their investment decisions by 2025. Regardless of what shape tomorrow's robo solutions will take, financial advisors are continuing to adopt robo advice. In a recent U.K. survey, 75% of advisors believed robo advice solutions can close the advice gap, while 49% of respondents said they planned on implementing some type of digital advice in the next 12 months. Meanwhile, banks adopting robo advice is a trend we have seen over the past two years and we expect to continue. This is evident, with 87% of private bank and trust companies responding in a recent Cerulli survey that digital advice platforms are the best way to engage younger investors. Cerulli data also shows that, as banks adjust to the realities of increasing client demands, 45% of private banks are considering adding a digital advice platform in the next three years.

Regulation

As robo advice grows rapidly and is achieving widespread adoption, the first SEC action against providers occurred at the end of 2018. The SEC announced in December that it reached a settlement agreement with two robo advice providers. The SEC order stated that Wealthfront claimed to be monitoring outside accounts for wash sales related to their tax-loss harvesting product when, in fact, they were not. The SEC announcement reported that 31% of accounts enrolled in tax-loss harvesting experienced a wash sale in the more than three years that Wealthfront made this claim. Other findings included re-tweeting prohibited client testimonials and paying bloggers for client referrals without the proper disclosures and documentation.

The SEC also reached an agreement with Hedgeable over the self-published performance of their direct-to-consumer robo advice product, which was discontinued in 2018. While the SEC took their first actions against robo advice providers, they also removed robo advisors from the published exam priorities in 2019.

Industry Adoption

As interest and adoption grows among banks and advisors, so does activity in B2B robo advice products. BlackRock, owner of FutureAdvisor, bought a minority stake in Envestnet, a major provider of technology to advisors. This transaction opens doors to increase exposure in the advisor community to FutureAdvisor's technology. On a similar note, technology provider and custodian Folio Financial introduced a robo advice platform for advisors named Digital Wealth. Financial institutions and technology startups can use the platform to develop client- and advisor-facing digital products, such as a standalone robo advisor, an advisor workstation, or a hybrid robo provider. AssetMark also launched a product for advisors looking to add a digital advice offering to their firm. Additionally, Empower Retirement, the second largest retirement plan recordkeeper in the U.S., teamed up with Canadian-based robo advisor Wealthsimple and custodian firm Apex Clearing to develop a digital wealth management platform for individual consumers. Also, Guideline, a robo advisor with growing popularity in the 401k space, just completed a $35M Series C round of funding.

While white-label options continue to increase, so do the number of banks offering a digital advice offering. HSBC began a pilot program of their direct-to-consumer robo advisor called Wealth Track. RBC announced the launch of their new robo product, InvestEase, in the Canadian market. Also, BBVA Compass launched a robo advice product. This quarter also saw Morgan Stanley recruit a Betterment executive to join the team running their existing digital advice offering.

Independent Robos

Independent robos continue to try and stay ahead of the incumbents by increasing features. This quarter, Wealthfront made their online financial planning tool, *Path*, available to the public at no charge. In the meantime, Betterment launched a cash management product that invests in a low-cost, low-risk, fixed income portfolio. This product is being paired with a "two-way sweep tool" that will move money in and out of a user's third-party bank account, taking funds when the algorithm determines there is spare cash, and returning funds when a low account balance is detected.

It has been a busy end to a busy year in the robo advice industry. We look forward to seeing what 2019 brings in the ever-changing digital advice landscape.

We recently spoke with Wealthsimple, a Canada-based robo that has expanded to the U.S. and U.K. markets. Dave Nugent, who is the current Head of Investments and was part of the founding team at Wealthsimple, provided us with great insight into who the Wealthsimple client is and where he sees the future of digital advice.

Wealthsimple has focused on providing a human component to their advice since they first launched in Canada in 2014. Over the past two years, we have seen a trend in the robo advice industry away from digital-only offerings toward offering access to live advisors at some level of service. Although many investors are comfortable handing over the investment management tasks to automated software, many still want the ability to pick up the phone and speak with someone when they have questions. Dave states, “We launched from day one with a human advice component. We believe that clients still want the ability to speak to a human if and when a life event happens.” Given the number of robo offerings that offer live advice, and the pivot of many early providers to add live advice components to their platform, Wealthsimple looks like they launched with a good advice model.

Wealthsimple also handles the client interaction with a focus on each client’s underlying behavior and feelings toward money. Dave says, “There is a focus in on the human elements of money and how that relates to someone’s life. You won’t see us talking about where U.S. interest rates are going or what we think the price of oil is going to do. It really goes back to first principles… what are [clients] actually trying to achieve?”

Although robo advisors are built on technologies that allow for more efficient portfolio management, the impact robo advisors are having on the client experience may be the most consequential for the financial advice industry. Customizing client communication based on data-driven insights into their behavior, like log-in and engagement rates, can help both robo advisors and traditional advisors demonstrate value and drive client engagement. A client having the ability to complete an account application, open, and fund an account in less than 10 minutes is a dramatic improvement in client experience compared to most traditional advisors. The ability to both personalize and mass communicate with clients is a powerful concept that robo advisors are working to achieve. These improvements may seem incremental, but they can have large impacts on efficiency, client engagement, and possibly the ability of an advisor to help modify investor behavior for the better.

Wealthsimple is also helping create a new type of client relationship. Previously, most investors were faced with either self-directing their investments or paying for a full-service firm. Dave shared with us that Wealthsimple is having success attracting clients to a new model that fits in between full-service and self-directed. During our conversation, Dave shared that he believes many clients, especially in the aftermath of 2008, decided they did not need a full-service advisor and the costs that come with it. Many clients do not have a complex enough financial situation that they need advice frequently, but they still want to be able to access advice when they have a life event. “Maybe the digital platform is something in the middle that takes [investment management] off of [the investor’s] hands but also does not come with the full breadth of fees and service that, frankly, the [investor] does not really need,” says Dave. This is a powerful insight, as most investors need advice and planning at certain points in their life, but in between life changes and events, their financial picture is stable and does not need intervention or direction from a financial advice professional. An advice model that provides the ability to receive periodic advice but does not carry the fees of traditional advisors is understandably attractive to many investors.

Robo advisors are the champions of efficiency, in both client communication and operations. The efficiency of a robo advice offering is part of a larger trend on the pricing pressure experienced by traditional advice firms. The reality is many traditional firms are going to have to adapt to be able to serve more clients while continuing to provide a high-value service. Dave points out areas where many advisors spend too much time but add little value: the middle- and back-office tasks. Technologies championed and often packaged and sold by robo advisors can help automate middle- and back-office tasks. Wealthsimple has a white label product for advisors live in Canada that is finding a lot of success among firms with a focus on financial planning. Dave points out that, "as you continue to see pressures on margins and fees in the industry, you must manage more relationships in order to make the same amount of money in the go-forward future."

As far as the future of digital advice, Dave believes that we will continue to see more product offerings and expansion into other areas of financial services by digital advice providers. He identifies an underlying theme in fintech of innovating on the client experience and how financial services and products are being delivered. In the meantime, Wealthsimple is preparing to launch a no-fee trading platform in Canada as a next step for them in expanding their offering.

As far as what sets Wealthsimple apart from the crowded field of robo advisors, Dave believes that it comes down to the simplicity of advice and whether a platform is helping their clients achieve their long-term goals.

Funding and AUM Statistics

Robo	Raised to Date (Millions)	Last Funding Amount (Millions)	Last Funding Date	Post-Money Valuation at Last Funding Round (Millions)	AUM (in Millions)	Clients	Source of AUM and Clients Figures
Acorns	$152	$50	May, 2018	Unknown	$1,149	2,058,343	Recent ADV
Ally Invest Advisors	N/A	N/A	N/A	Acquired TradeKing for $294 Million June, 2016	$126	8,416	Recent ADV
Betterment	$275	$70	Jul, 2017	$800	$14,143	361,809	Recent ADV
Ellevest	$45	$35	Jul, 2017	$83	$192	15,670	Recent ADV
FutureAdvisor	N/A	N/A	N/A	Acquired by BlackRock for $152 Million August, 2015	$1,213	8,587	Recent ADV
Personal Capital	$275	$40	Aug, 2017	$540	$7,912	18,308	Recent ADV
Schwab Intelligent Portfolio Products	N/A	N/A	N/A	N/A	$33,300	223,000 Accounts (# of clients unavailable)	AUM from Q2 18' Earnings Report; # of Accounts from Q4 17' Earnings Report
SigFig	$118	$51	June, 2018	$471	$308	5,977	Recent ADV
SoFi Wealth	N/A	N/A	N/A	N/A	$43	9,163	Recent ADV
TD Ameritrade Selective, Essential, and Personalized Portfolios	N/A	N/A	N/A	N/A	$19,600	Unknown	Company Reports
T Rowe Price ActivePlus Portfolios	N/A	N/A	N/A	N/A	$355	Unknown	Company Representative
United Income	$15	$10	Aug, 2018	$65	$570	509	Recent ADV
Vanguard Personal Advisor Services	N/A	N/A	N/A	N/A	$112,000	Unknown	News Media/ Vanguard Spokesperson
Wealthfront	$205	$75	Jan, 2018	$500△	$11,454	221,142	Recent ADV
Wealthsimple	$115	$52	Feb, 2018	Unknown	$85 (U.S.)	10,596 (U.S.)	Recent ADV
WiseBanyan	N/A	N/A	N/A	Acquired by Axos Financial for undisclosed amount in Oct, 2018	$153	31,772	Recent ADV

**all funding and valuation amounts are estimates*
***sources: Crunchbase, Pitchbook, News Media*
△This valuation number has been disputed

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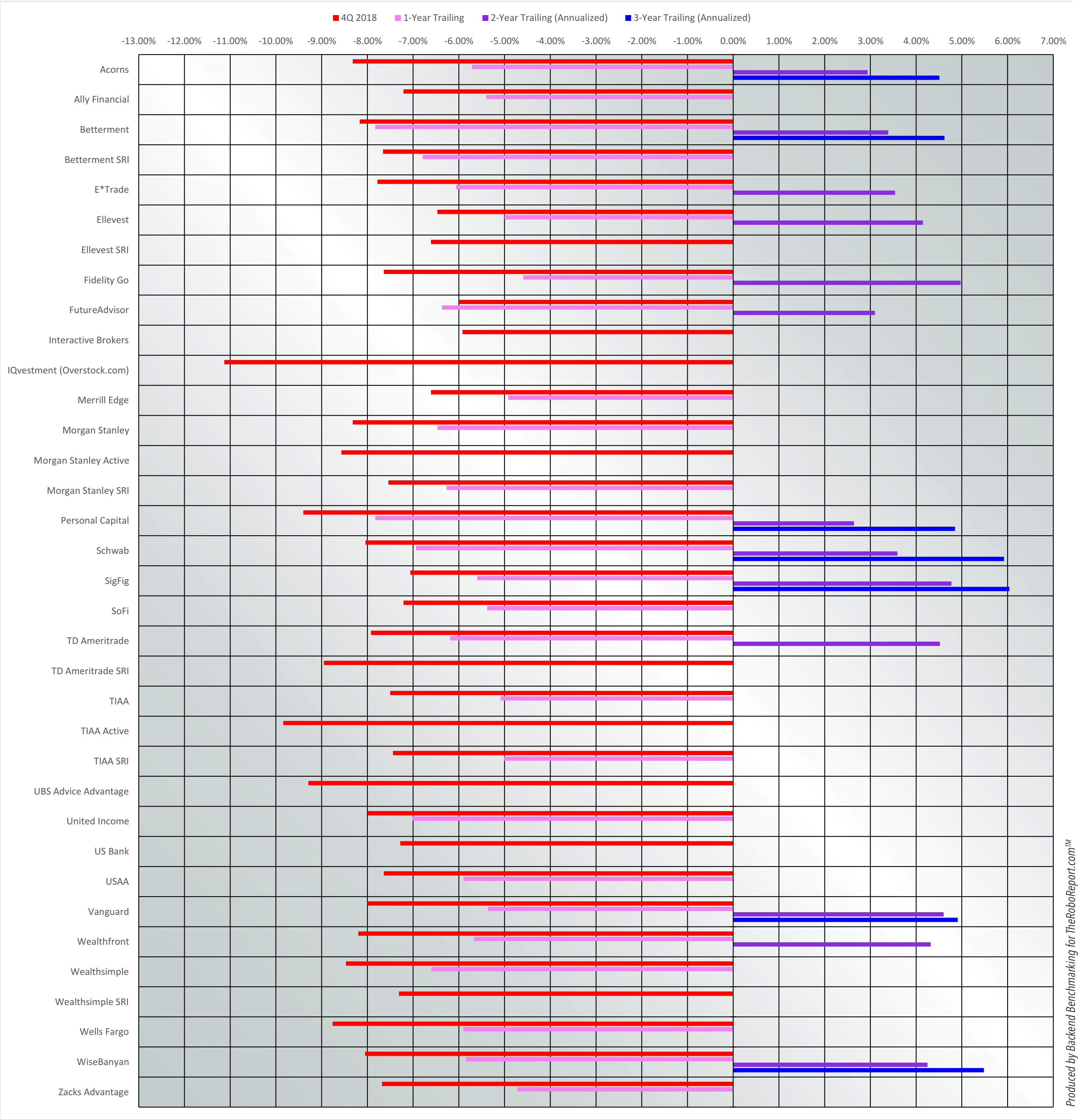
Taxable Account Performance



Performance Commentary

The final quarter of 2018 was tumultuous for equity markets. Investors had to deal with rising U.S. interest rates, a marked slowdown in Eurozone business confidence, and weaker Chinese growth. Escalating geopolitical headwinds, including Brexit, Italy's debt concerns, and the ongoing U.S.–China trade conflict have all contributed to the amplified market volatility as well. U.S. equity markets were negative across market capitalizations, styles, and sectors, save utilities, in the quarter. The fourth quarter saw the S&P 500 fall 13.52%, erasing all the gains from previous quarters in 2018 and finishing the year down 4.39%. The technology sector, where several esteemed technology companies had been market leaders earlier in the year, saw significant losses in the quarter and contributed to growth-oriented stocks underperforming value names more broadly. Large-cap stocks outperformed their mid-cap counterparts, with small-caps posting the worst performance on the quarter.

Through the Downturn

The robos' portfolios are typically broad based with highly diversified equity holdings and performed as such during the significant downward swing seen in the fourth quarter. One portfolio stood out as an outlier: IQvestment (formally known as tZERO Advisors). They had significant tech exposure and the lowest international exposure. Their equities returned -19.78%, more than 5% less than the next-worst performer. Excluding this outlier, our portfolios' equity performance ranged between -11.24% and -14.12%. With the Russell 3000 returning -14.31%, the robos for the most part outperformed the domestic markets. The FTSE All-World Index returned -12.61% over the period, which is closer to the average performance of the equity portions of the portfolios. When looking at performance above and below the Normalized Benchmark, most of the robos outperformed their benchmark, implying their asset allocation models and diversification benefited many of them through the downturn.

When looking at the equity performance, Interactive Brokers, FutureAdvisor, and SigFig were leaders in the fourth quarter. All three portfolios hold a larger than average allocation to emerging markets, which significantly outperformed domestic and developed international holdings in the quarter. FutureAdvisor additionally had a tilt towards value that benefited them. If the time period is zoomed out a little to the full 2018-year, emerging markets underperformed domestic ones and although tech fell sharply in the closing months of the year, the technology sector still performed well for all of 2018. So, what helped SigFig and FutureAdvisor (we do not have a full 2018 return for Interactive Brokers) in the fourth quarter held them back over the year.

Over the course of 2018, those portfolios that performed the best are at the lower end of the spectrum when it comes to international holdings. Zacks, Acorns, and Fidelity Go all hold less than a third of their equities abroad, and this helped them outperform their peers in 2018. Fidelity Go's portfolio made up of no-fee proprietary funds has had strong performance in the one- and two-year time frames. Their focus on domestic large-cap stocks and municipal bonds have helped them stay ahead of the group.

One portfolio of note, Merrill Edge, made an advantageous strategy shift in August to make their portfolio more conservative. When measuring by total performance, Merrill Edge finished in the top five portfolios for the one-year return, in part, due to this move.

Three-Year Results

This report is the first time we had a look at the three-year results of our oldest portfolios. Keep in mind most of our portfolios have yet to reach the three-year mark.

SigFig was the best performer over a three-year stretch, outperforming the Normalized Benchmark in this timeframe. SigFig was boosted by an overweight holding in emerging market equities. On the fixed income side, emerging markets sovereign debt added to their outperformance.

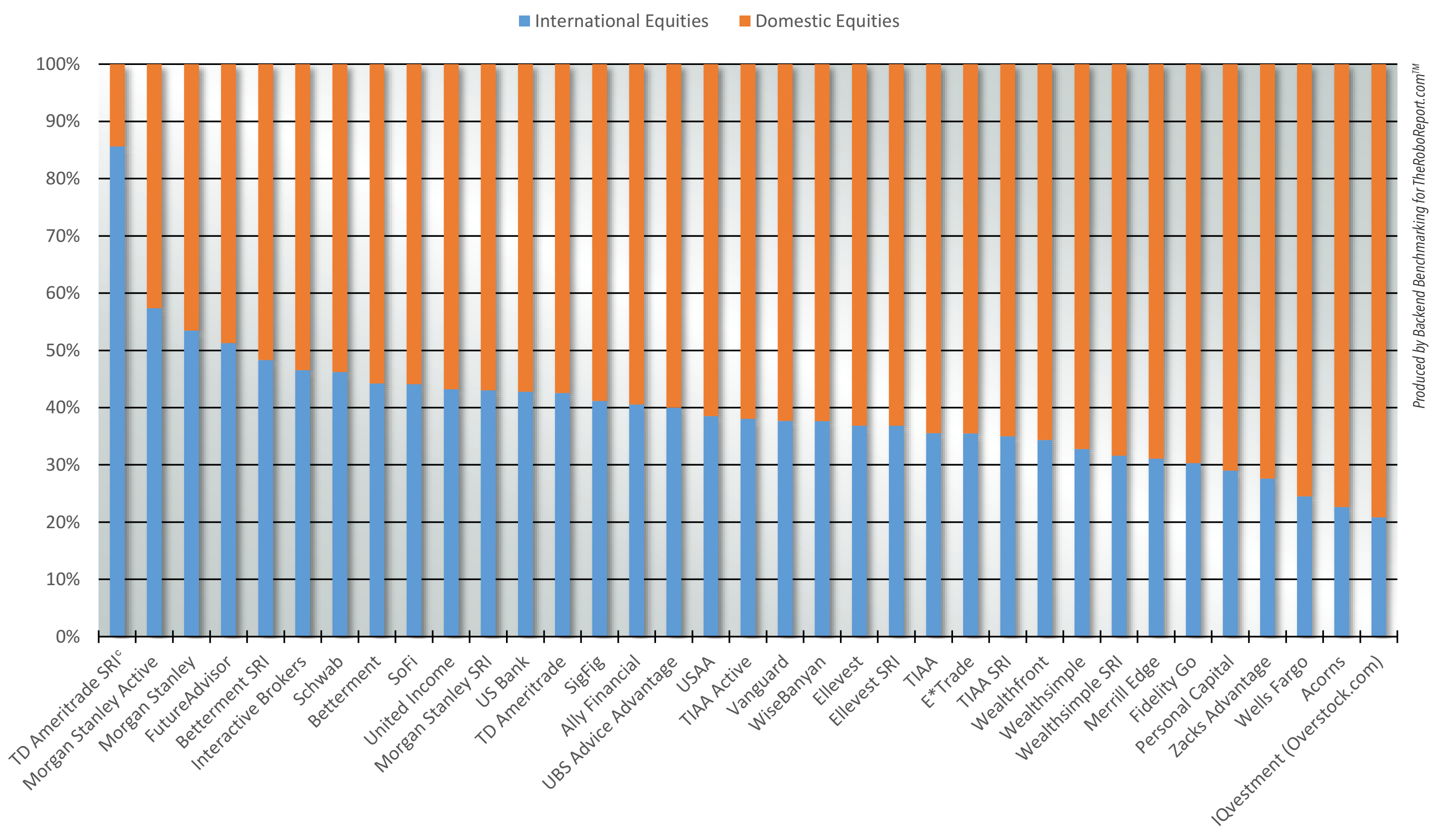
Schwab was the second-best performer of the robo accounts over the three-year time frame. Large-cap holdings and emerging market funds propelled their equity holdings. Schwab's fixed income portfolio takes a more risk-on approach and has propelled them to lead the group over the past three years. Exposure to US high-yield corporate bonds and international fixed income helped their outperformance.

Personal Capital has lagged the group over the three-year timeframe. Large allocations to small-cap funds and exposure to funds tracking underperforming sectors, like energy, led Personal Capital to leave a lot of potential gains on the table on the equity side. Personal Capital's fixed income portfolio fared better than their equities, which was helped by allocations to high-yield and foreign bonds.

WiseBanyan and Vanguard have simple broad-based holdings making up their portfolios, which led these robos to finish third and fourth, respectively. Both portfolios sit right around the average of our portfolios in international holdings, and both hold a single broad-based ETF for a vast majority of their domestic holdings. WiseBanyan has a small REIT holding that underperformed but had limited impact on the portfolio as a whole. Vanguard holds all municipal bonds, which helped it post modest gains but lagged other fixed income portfolios. WiseBanyan, on the other hand, relies more heavily on corporate debt, including a holding in a short-term high-yield fund that helped the relative outperformance of their fixed income portfolio.

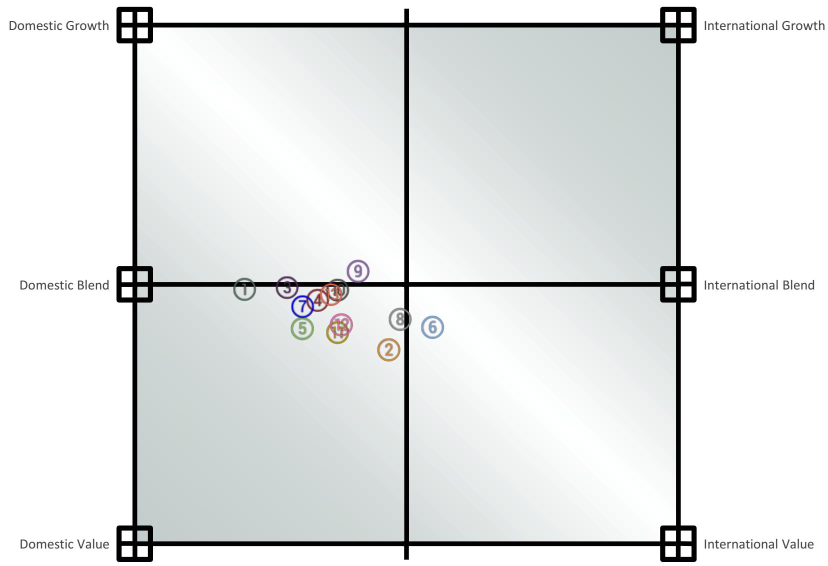
Acorns had some poorly timed trades in the early portion of the three-year performance period that held the portfolio back. Over the more recent time periods, Acorn's portfolio has fallen in line with the allocations of other portfolios and has performed better.

International Allocation of Total Equity for Taxable Robos



Trailing 2-Year Style Maps for Taxable Robos

Equity Style Map



① Acorns
② Betterment
③ E*Trade
④ Ellevest
⑤ Fidelity Go
⑥ FutureAdvisor
⑦ Personal Capital
⑧ Schwab
⑨ SigFig
⑩ TD Ameritrade
⑪ Vanguard
⑫ Wealthfront
⑬ WiseBanyan

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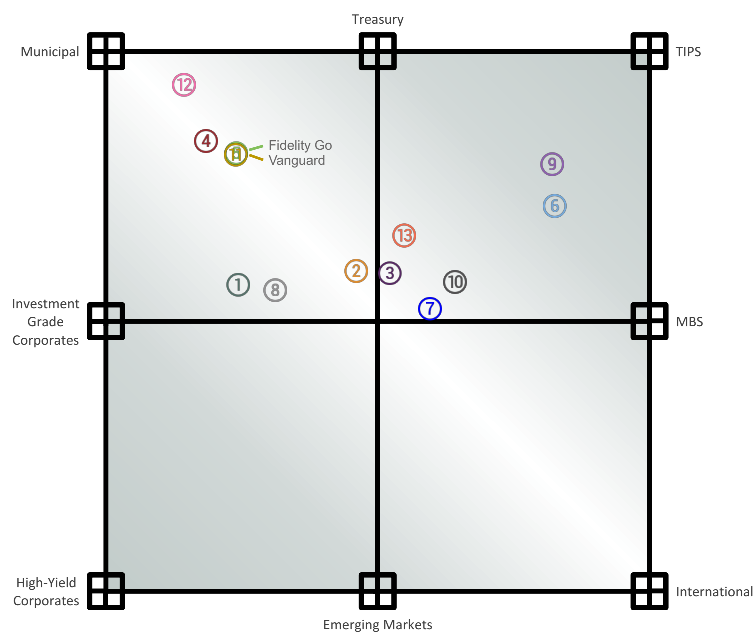
Fixed Income Style Map



① Acorns
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⑦ Personal Capital
⑧ Schwab
⑨ SigFig
⑩ TD Ameritrade
⑪ Vanguard
⑫ Wealthfront
⑬ WiseBanyan

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Taxable Returns

	Total							
	4Q 2018	4Q 2018 Return Above/Below Benchmark	1-Year Trailing	1-Year Trailing Return Above/Below Benchmark	2-Year Trailing (Annualized)	2-Year Trailing Return Above/Below Benchmark (Annualized)	3-Year Trailing (Annualized)	3-Year Trailing Return Above/Below Benchmark (Annualized)
Acorns[1]	-8.32%	-0.56%	-5.71%	-0.30%	2.94%	-1.76%	4.51%	-0.96%
Ally Financial[9]	-7.21%	0.42%	-5.40%	-0.18%	-	-	-	-
Betterment[15]	-8.17%	0.29%	-7.83%	-2.00%	3.39%	-1.25%	4.62%	-0.90%
Betterment SRI[15]	-7.66%	0.10%	-6.79%	-1.38%	-	-	-	-
E*Trade (ETF)[21]	-7.78%	-0.02%	-6.06%	-0.65%	3.54%	-0.90%	-	-
Ellevest[15]	-6.47%	0.72%	-5.00%	0.08%	4.15%	-0.56%	-	-
Ellevest SRI[15]	-6.61%	0.58%	-	-	-	-	-	-
Fidelity Go[7]	-7.64%	0.26%	-4.59%	0.91%	4.97%	0.49%	-	-
FutureAdvisor[3]	-6.00%	1.05%	-6.37%	-1.39%	3.10%	-1.32%	-	-
Interactive Brokers[24]	-5.92%	1.13%	-	-	-	-	-	-
IQvestment (Overstock.com)[19]	-11.13%	-3.80%	-	-	-	-	-	-
Merrill Edge[7]	-6.61%	0.30%	-4.92%	-0.12%	-	-	-	-
Morgan Stanley[12]	-8.32%	0.14%	-6.47%	-0.64%	-	-	-	-
Morgan Stanley Active[3]	-8.57%	-0.25%	-	-	-	-	-	-
Morgan Stanley SRI[7]	-7.54%	0.36%	-6.27%	-0.75%	-	-	-	-
Personal Capital[4]	-9.40%	0.32%	-7.83%	-1.23%	2.64%	-2.35%	4.85%	-1.12%
Schwab[5]	-8.04%	0.14%	-6.94%	-1.32%	3.59%	-1.25%	5.92%	0.24%
SigFig[6]	-7.06%	0.98%	-5.60%	-0.02%	4.77%	0.25%	6.04%	0.67%
SoFi[17]	-7.21%	0.55%	-5.38%	-0.08%	-	-	-	-
TD Ameritrade[10]	-7.92%	0.96%	-6.19%	-0.10%	4.52%	-0.12%	-	-
TD Ameritrade SRI[10, C]	-8.95%	-0.27%	-	-	-	-	-	-
TIAA[7]	-7.50%	0.40%	-5.09%	0.41%	-	-	-	-
TIAA Active[7]	-9.84%	-0.26%	-	-	-	-	-	-
TIAA SRI[7]	-7.44%	0.32%	-5.01%	0.40%	-	-	-	-
UBS Advice Advantage[7]	-9.29%	-0.41%	-	-	-	-	-	-
United Income[16]	-7.99%	-0.37%	-7.02%	-1.69%	-	-	-	-
US Bank[23]	-7.28%	0.48%	-	-	-	-	-	-
USAA[7]	-7.64%	0.26%	-5.90%	-0.38%	-	-	-	-
Vanguard[4,A]	-8.00%	-0.24%	-5.36%	0.05%	4.60%	0.16%	4.91%	-0.36%
Wealthfront[22,B]	-8.20%	0.26%	-5.67%	0.16%	4.32%	-0.32%	-	-
Wealthsimple[11]	-8.47%	-0.71%	-6.60%	-1.19%	-	-	-	-
Wealthsimple SRI[11]	-7.31%	0.45%	-	-	-	-	-	-
Wells Fargo[14]	-8.76%	-0.58%	-5.90%	-0.24%	-	-	-	-
WiseBanyan[8]	-8.05%	0.27%	-5.84%	-0.09%	4.25%	-0.35%	5.48%	0.01%
Zacks Advantage[4]	-7.68%	-0.35%	-4.72%	0.44%	-	-	-	-

**Some accounts have not been open long enough for 1-year, 2-year, or 3-year trailing returns*

***SRI indicates the account is invested in a Socially Responsible Investing portfolio, also known as "Impact Investing"*

****Active indicates the account is invested in an active strategy with either actively managed funds or its own active manager. For these providers, the active strategy is distinct from their passive and/or SRI strategies. Other accounts may use actively managed products within their portfolios.*

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Taxable Returns

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	Equity				Fixed Income			
	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)
Acorns[1]	-13.27%	-8.15%	4.25%	6.61%	0.11%	-1.93%	0.34%	0.85%
Ally Financial[9]	-13.61%	-10.28%	-	-	2.03%	0.99%	-	-
Betterment[15]	-12.80%	-11.95%	3.76%	5.71%	0.45%	-0.33%	1.93%	2.03%
Betterment SRI[15]	-13.05%	-11.21%	-	-	0.57%	-0.26%	-	-
E*Trade (ETF)[21]	-13.56%	-9.74%	4.48%	-	1.09%	-1.08%	1.53%	-
Ellevest[15]	-12.55%	-9.59%	4.77%	-	1.38%	0.50%	2.31%	-
Ellevest SRI[15]	-12.54%	-	-	-	1.33%	-	-	-
Fidelity Go[7]	-13.51%	-8.25%	6.08%	-	1.46%	0.67%	3.04%	-
FutureAdvisor[3]	-11.24%	-11.11%	3.92%	-	0.69%	-0.44%	1.41%	-
Interactive Brokers[24]	-11.69%	-	-	-	1.31%	-	-	-
IQvestment (Overstock.com)[19]	-19.78%	-	-	-	0.52%	-	-	-
Merrill Edge[7]	-13.04%	-9.37%	-	-	1.35%	0.12%	-	-
Morgan Stanley[12]	-13.32%	-10.24%	-	-	1.56%	0.47%	-	-
Morgan Stanley Active[3]	-13.97%	-	-	-	0.96%	-	-	-
Morgan Stanley SRI[7]	-12.90%	-10.23%	-	-	1.45%	0.04%	-	-
Personal Capital[4]	-12.62%	-9.99%	3.20%	5.77%	0.37%	-1.70%	0.89%	2.21%
Schwab[5]	-12.85%	-10.80%	3.88%	7.20%	0.65%	-0.67%	2.86%	4.24%
SigFig[6]	-12.08%	-9.03%	6.34%	7.74%	1.04%	-0.56%	1.94%	3.20%
SoFi[17]	-12.62%	-10.24%	-	-	1.21%	2.00%	-	-
TD Ameritrade[10]	-12.81%	-9.66%	5.57%	-	1.75%	-0.44%	1.40%	-
TD Ameritrade SRI[10, C]	-12.44%	-	-	-	1.78%	-	-	-
TIAA[7]	-13.08%	-8.84%	-	-	1.73%	0.26%	-	-
TIAA Active[7]	-13.42%	-	-	-	-0.01%	-	-	-
TIAA SRI[7]	-12.91%	-8.49%	-	-	1.36%	0.27%	-	-
UBS Advice Advantage[7]	-13.77%	-	-	-	1.04%	-	-	-
United Income[16]	-14.03%	-11.42%	-	-	0.88%	-0.98%	-	-
US Bank[23]	-11.97%	-	-	-	-0.45%	-	-	-
USAA[7]	-13.21%	-9.53%	-	-	1.72%	-0.43%	-	-
Vanguard[4,A]	-13.37%	-9.16%	5.81%	6.96%	1.48%	1.01%	2.55%	1.71%
Wealthfront[22,B]	-13.41%	-9.48%	4.69%	-	2.35%	1.20%	2.92%	-
Wealthsimple[11]	-14.12%	-10.67%	-	-	0.76%	-0.35%	-	-
Wealthsimple SRI[11]	-13.21%	-	-	-	2.28%	-	-	-
Wells Fargo[14]	-13.64%	-8.37%	-	-	-0.10%	-1.99%	-	-
WiseBanyan[8]	-12.51%	-8.73%	5.73%	6.98%	0.14%	-0.96%	1.35%	2.48%
Zacks Advantage[4]	-13.23%	-7.88%	-	-	0.93%	-0.15%	-	-

*Some accounts have not been open long enough for 1-year, 2-year, or 3-year trailing returns

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**SRI indicates the account is invested in a Socially Responsible Investing portfolio, also known as "Impact Investing"

***Active indicates the account is invested in an active strategy with either actively managed funds or its own active manager. For these providers, the active strategy is distinct from their passive and/or SRI strategies. Other accounts may use actively managed products within their portfolios.

Retirement Returns

	Total					
	4Q 2018	4Q 2018 Return Above/Below Benchmark	1-Year Trailing	1-Year Trailing Return Above/Below Benchmark	2-Year Trailing (Annualized)	2-Year Trailing Return Above/Below Benchmark (Annualized)
Ally Financial IRA[9]	-12.64%	-0.29%	-9.35%	-1.05%	-	-
Betterment IRA[15]	-11.18%	0.36%	-9.64%	-1.89%	4.12%	-1.28%
E*Trade IRA[21]	-13.41%	-0.39%	-9.77%	-1.01%	4.32%	-1.53%
Fidelity Go IRA[7]	-11.37%	-0.10%	-6.98%	0.58%	5.39%	0.07%
Merrill Edge IRA[7]	-11.18%	0.63%	-8.85%	-0.92%	-	-
Morgan Stanley IRA[7]	-10.34%	0.11%	-7.97%	-0.95%	-	-
Personal Capital IRA[4]	-12.18%	0.57%	-9.48%	-0.90%	3.48%	-2.29%
Schwab IRA[20]	-12.91%	-0.42%	-10.45%	-2.06%	3.42%	-2.27%
SigFig IRA[6]	-10.33%	1.75%	-9.46%	-1.35%	5.40%	-0.16%
SoFi IRA[18]	-12.61%	0.68%	-9.51%	-0.56%	-	-
T Rowe Price IRA[13]	-12.71%	0.58%	-8.35%	0.60%	-	-
TD Ameritrade IRA[10]	-10.82%	0.31%	-8.23%	-0.76%	4.89%	-0.34%
TIAA IRA[7]	-11.19%	0.48%	-7.44%	0.40%	-	-
United Income IRA[16]	-14.40%	-1.24%	-11.61%	-2.75%	-	-
USAA IRA[7]	-13.04%	0.12%	-9.30%	-0.44%	-	-
Wealthsimple IRA[2]	-11.04%	-0.45%	-8.40%	-1.29%	-	-
Wells Fargo IRA[14]	-12.83%	-0.75%	-9.32%	-1.21%	-	-
WiseBanyan IRA[25]	-11.81%	0.41%	-8.24%	-0.03%	5.73%	0.12%
Zacks Advantage IRA[4]	-12.48%	-0.13%	-9.08%	-0.78%	-	-

**Some accounts have not been open long enough for 1-year or 2-year returns, others have no fixed income holdings thus no fixed income returns*

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Retirement Returns

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	Equity			Fixed Income		
	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)
Ally Financial IRA[9]	-13.74%	-10.18%	-	1.99%	1.26%	-
Betterment IRA[15]	-12.90%	-10.99%	4.43%	0.26%	-0.97%	1.57%
E*Trade IRA[21]	-13.53%	-9.83%	4.49%	-	-	-
Fidelity Go IRA[7]	-13.53%	-8.21%	6.04%	1.56%	-0.35%	1.44%
Merrill Edge IRA[7]	-12.73%	-9.84%	-	0.43%	-2.59%	-
Morgan Stanley IRA[7]	-13.21%	-10.06%	-	1.59%	0.26%	-
Personal Capital IRA[4]	-12.62%	-9.79%	3.55%	0.73%	-2.87%	0.59%
Schwab IRA[20]	-13.75%	-11.15%	3.61%	-	-	-
SigFig IRA[6]	-11.47%	-10.07%	5.82%	-0.13%	-4.37%	1.49%
SoFi IRA[18]	-12.60%	-9.88%	-	-	-	-
T Rowe Price IRA[13]	-12.71%	-8.35%	-	-	-	-
TD Ameritrade IRA[10]	-12.76%	-9.38%	5.75%	1.78%	-1.32%	0.98%
TIAA IRA[7]	-13.15%	-8.83%	-	1.73%	-0.18%	-
United Income IRA[16]	-14.53%	-11.73%	-	-	-	-
USAA IRA[7]	-13.22%	-9.48%	-	-	-	-
Wealthsimple IRA[2]	-13.98%	-10.57%	-	1.57%	0.39%	-
Wells Fargo IRA[14]	-13.97%	-10.03%	-	-0.58%	-2.55%	-
WiseBanyan IRA[25]	-12.87%	-8.95%	6.07%	0.00%	-1.07%	1.64%
Zacks Advantage IRA[4]	-13.12%	-9.38%	-	-	-	-

**Some accounts have not been open long enough for 1-year or 2-year returns, others have no fixed income holdings thus no fixed income returns*

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Taxable Account Facts

Portfolio	Account Minimum	Advisory Fee	Average Weighted Expense Ratio	Initial Target Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Current Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Initial Domestic/ International Equity Split	Current Domestic/ International Equity Split	Tax Efficiency Ratio (% Muni Bonds of Overall Fixed Income)
Acorns	No minimum	$1/month for Acorns Core; $2/month when adding Acorns Later for Retirement accounts. For balances above $1 million, $100/month per $1 million in AUM	0.10%	61%/39%/0%/0%	60%/40%/0%/0%	84%/16%	77%/23%	0%
Ally Financial	$2,500	0.30% annually	0.08%	59%/39%/0%/2%	59%/39%/0%/2%	59%/41%	59%/41%	0%
Betterment	Digital: No minimum; Premium: $100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor)	0.09%	65%/35%/0%/0%	62%/38%/0%/0%	49%/51%	56%/44%	37%
Betterment SRI	Digital: No minimum; Premium: $100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor)	0.13%	60%/40%/0%/0%	57%/43%/0%/0%	50%/50%	52%/48%	60%
E*Trade (ETF)	$5,000	0.30% (promo – fee waived for first year)	0.10%	60%/39%/0%/1%	56%/42%/0%/2%	75%/25%	65%/35%	0%
Ellevest	Digital: No minimum; Premium: $50,000	Digital: 0.25%; Premium: 0.50% (access to live advisors and executive coaches)	0.11%	62%/36%/0%/2%	52%/45%/0%/3%	71%/29%	63%/37%	94%
Ellevest SRI	Digital: No minimum; Premium: $50,000	Digital: 0.25%; Premium: 0.50% (access to live advisors and executive coaches)	0.20%	56%/43%/0%/1%	52%/45%/0%/3%	63%/37%	63%/37%	81%
Fidelity Go	No Minimum	0.35% annually; no expense ratios on underlying funds	0.00%	61%/39%/0%/0%	60%/40%/0%/1%	71%/29%	70%/30%	100%
FutureAdvisor	$10,000	0.50% annually	0.14%	58%/41%/0%/1%	54%/44%/0%/1%	49%/51%	49%/51%	0%
Interactive Brokers[24]	$5,000	Asset Allocation: 0.12% annually Other Portfolio types range from 0.08% to 1.5% annually	0.14%	55%/44%/0%/0%	52%/47%/0%/1%	55%/45%	53%/47%	31%
IQvestment (Overstock.com)	$1,000	$9.95 per month (promo –fee waived for first year if Overstock Club O member)	0.05%	57%/38%/0%/5%	52%/43%/0%/6%	90%/10%	79%/21%	0%
Merrill Edge	$5,000	0.45% annually	0.08%	60%/39%/0%/1%	51%/44%/0%/6%	66%/34%	69%/31%	94%
Morgan Stanley	$5,000	0.35% annually	0.07%	65%/30%/0%/5%	63%/36%/0%/1%	45%/55%	47%/53%	0%
Morgan Stanley Active	$5,000	0.35% annually	0.24%	64%/35%/0%/1%	61%/39%/0%/1%	44%/56%	43%/57%	0%
Morgan Stanley SRI	$5,000	0.35% annually	0.50%	64%/35%/0%/1%	60%/39%/0%/1%	56%/44%	57%/43%	13%
Personal Capital	$100,000	0.89% annually for the first $1 million; lower at different tiers over $1 million	0.12%	69%/25%/5%/1%	67%/26%/4%/2%	70%/30%	71%/29%	0%
Schwab	Intelligent Portfolio: $5,000; Intelligent Advisory: $25,000	Intelligent Portfolio: No fee (digital only) Intelligent Advisory: 0.28% (Access to live advisors) capped at $3,600 per year	0.21%	61%/23%/5%/10%	59%/28%/2%/11%	51%/49%	54%/46%	56%

**Due to rounding, may not add to 100%*

***Average weighted expense ratio calculations exclude cash holdings from the portfolio*

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Taxable Account Facts

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Portfolio	Account Minimum	Advisory Fee	Average Weighted Expense Ratio	Initial Target Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Current Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Initial Domestic/ International Equity Split	Current Domestic/ International Equity Split	Tax Efficiency Ratio (% Muni Bonds of Overall Fixed Income)
SigFig	$2,000	No fee for the first $10k;0.25% annually for balance over $10k	0.08%	62%/37%/0%/1%	59%/41%/0%/1%	58%/42%	59%/41%	0%
SoFi	$100 (or a $20/month recurring deposit)	No management fee	0.07%	52%/48%/0%/0%	60%/40%/0%/0%	67%/33%	56%/44%	65%
TD Ameritrade	Essential Portfolios: $5,000; Selective Portfolios: $25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.06%	65%/33%/0%/1%	64%/33%/0%/3%	65%/35%	57%/43%	0%
TD Ameritrade SRI[C]	Essential Portfolios: $5,000; Selective Portfolios: $25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.15%	67%/29%/0%/3%	35%/30%/0%/35%	59%/41%	14%/86%	0%
TIAA	$5,000	0.30% annually	0.12%	61%/37%/0%/2%	58%/39%/0%/2%	71%/29%	64%/36%	0%
TIAA Active	$5,000	0.30% annually	0.63%	73%/26%/0%/1%	72%/26%/0%/1%	66%/34%	62%/38%	0%
TIAA SRI	$5,000	0.30% annually	0.29%	60%/39%/0%/1%	60%/39%/0%/1%	71%/29%	65%/35%	10%
UBS Advice Advantage	$10,000	0.75% annually	0.08%	68%/27%/0%/5%	67%/28%/0%/5%	59%/41%	60%/40%	79%
United Income	Self Service: $10,000; Full Service: $300,000	Self Service: 0.50% annually; Full Service (Access to live advisors): 0.80% to 0.45% depending on account balances	0.19%	59%/40%/0%/1%	60%/39%/0%/1%	51%/49%	57%/43%	0%
US Bank	$5,000	0.50% annually (promo– fee waived for first 3 months)	0.23%	60%/39%/0%/1%	59%/39%/0%/2%	59%/41%	57%/43%	30%
USAA	$2,000	0.50% annually	0.05%	66%/32%/0%/1%	59%/40%/0%/1%	63%/37%	61%/39%	0%
Vanguard[A]	$50,000	0.30% annually for the first $5 million; lower at different tiers over $5 million	0.08%	60%/40%/0%/0%	60%/40%/0%/0%	60%/40%	62%/38%	100%
Wealthfront[B]	$500	0.25% annually	0.11%	65%/35%/0%/0%	63%/36%/0%/1%	67%/33%	66%/34%	100%
Wealthsimple	Basic: No minimum; Black: $100,000	Basic: 0.50% fee on accounts less than $100k; Black: 0.40% on accounts greater than $100k	0.11%	60%/40%/0%/0%	58%/42%/0%/0%	66%/34%	67%/33%	56%
Wealthsimple SRI	Basic: No minimum; Black: $100,000	Basic: 0.50% fee on accounts less than $100k; Black: 0.40% on accounts greater than $100k	0.24%	60%/40%/0%/0%	58%/42%/0%/1%	69%/31%	68%/32%	0%
Wells Fargo	$10,000	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products	0.17%	63%/34%/0%/3%	60%/36%/0%/4%	77%/23%	75%/25%	0%
WiseBanyan	No minimum	No Fee for basic package; add-on packages, such as tax-loss harvesting, come at additional cost	0.10%	64%/36%/0%/0%	64%/36%/0%/0%	62%/38%	62%/38%	0%
Zacks Advantage	$25,000	0.70% on accounts less than $100K; 0.50% on accounts between $100K and $250K; 0.35% on accounts $250K and above	0.10%	57%/34%/0%/9%	57%/33%/0%/10%	72%/28%	72%/28%	40%

**Due to rounding, may not add to 100%*

***Average weighted expense ratio calculations exclude cash holdings from the portfolio*

Retirement Account Facts

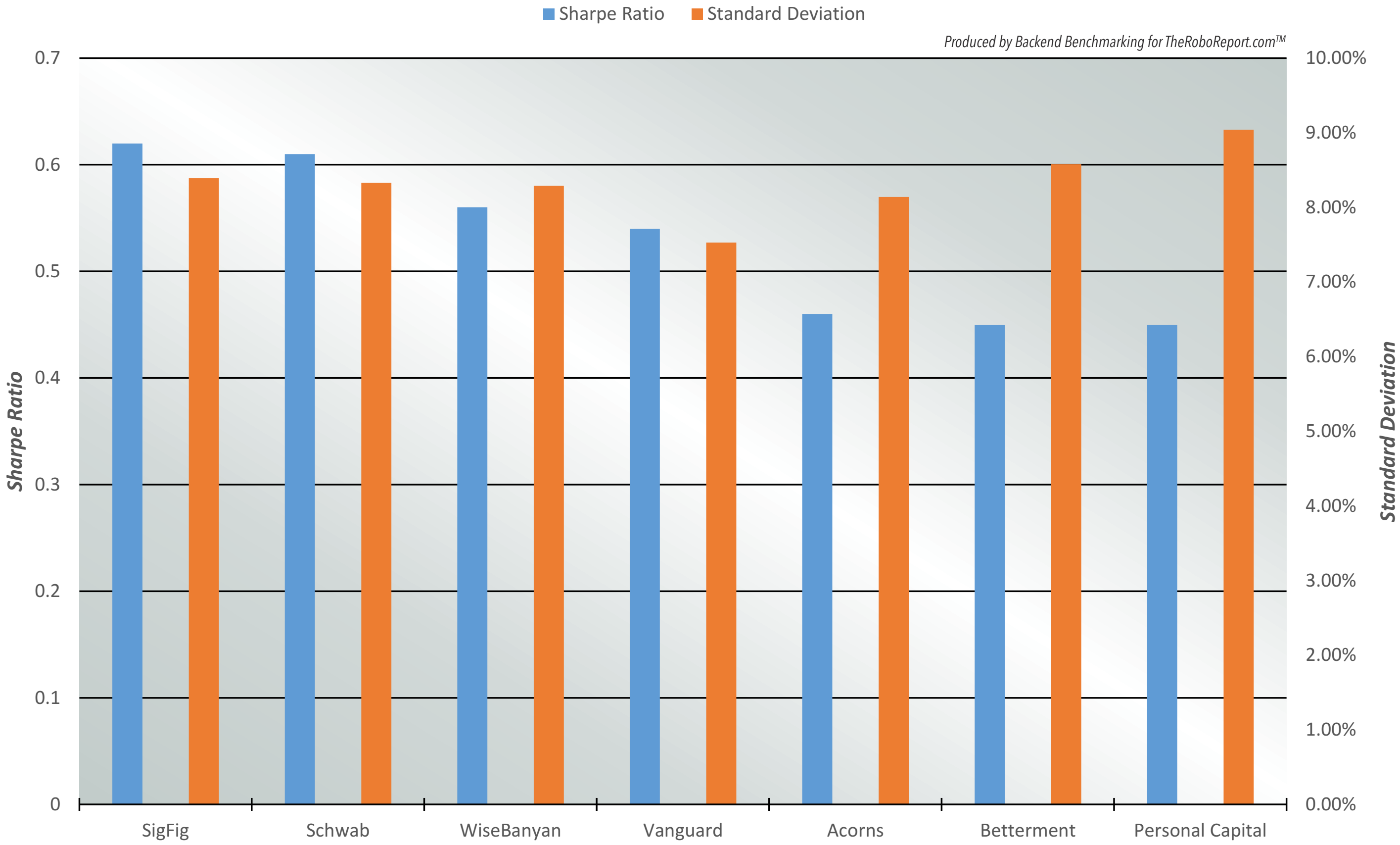
Portfolio	Account Minimum	Advisory Fee	Average Weighted Expense Rati	Initial Target Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Current Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Initial Domestic/ International Equity Split	Current Domestic/ International Equity Split
Ally Financial IRA	$2,500	0.30% annually	0.07%	93%/5%/0%/2%	93%/5%/0%/2%	60%/40%	60%/40%
Betterment IRA	Digital: No minimum; Premium: $100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor)	0.08%	87%/13%/0%/0%	85%/15%/0%/0%	47%/53%	55%/45%
E*Trade IRA	$5,000	0.30% (promo – fee waived for first year)	0.14%	98%/0%/0%/2%	99%/0%/0%/1%	75%/25%	64%/36%
Fidelity Go IRA	No Minimum	0.35% annually; no expense ratios on underlying funds	0.00%	85%/14%/0%/1%	84%/16%/0%/1%	71%/29%	71%/29%
Merrill Edge IRA	$5,000	0.45% annually	0.06%	89%/9%/0%/2%	86%/10%/0%/4%	64%/36%	65%/35%
Morgan Stanley IRA	$5,000	0.35% annually	0.07%	79%/15%/0%/6%	78%/21%/0%/1%	47%/53%	47%/53%
Personal Capital IRA	$100,000	0.89% annually for the first $1 million; lower at different tiers over $1 million	0.09%	91%/3%/2%/4%	92%/3%/3%/1%	69%/31%	69%/31%
Schwab IRA	Intelligent Portfolio: $5,000; Intelligent Advisory: $25,000	Intelligent Portfolio: No fee (digital only) Intelligent Advisory: 0.28% (Access to live advisors) capped at $3,600 per year	0.19%	94%/0%/0%/6%	93%/0%/0%/7%	54%/46%	53%/47%
SigFig IRA	$2,000	No fee for the first $10k; 0.25% annually for balance over $10k	0.09%	91%/9%/0%/0%	88%/11%/0%/1%	45%/55%	46%/54%
SoFi IRA	$100 (or a $20/month recurring deposit)	No management fee	0.06%	100%/0%/0%/0%	99%/0%/0%/1%	66%/34%	56%/44%
T Rowe Price IRA[13]	$50,000	No Advisory Fee	0.81%	100%/0%/0%/0%	100%/0%/0%/0%	63%/37%	63%/37%
TD Ameritrade IRA	Essential Portfolios: $5,000; Selective Portfolios: $25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.06%	83%/15%/0%/1%	84%/13%/0%/3%	65%/35%	62%/38%
TIAA IRA	$5,000	0.30% annually	0.15%	88%/11%/0%/1%	85%/13%/0%/2%	72%/28%	65%/35%
United Income IRA	Self Service: $10,000; Full Service $300,000	Self Service: 0.50% annually; Full Service (Access to live advisors): 0.80% to 0.45% depending on account balances	0.26%	99%/0%/0%/1%	98%/0%/0%/2%	51%/49%	51%/49%
USAA IRA	$2,000	0.50% annually	0.06%	99%/0%/0%/1%	97%/0%/0%/3%	59%/41%	61%/39%
Wealthsimple IRA	Basic: No minimum; Black: $100,000	Basic: 0.50% fee on accounts less than $100k; Black: 0.40% on accounts greater than $100k	0.09%	80%/20%/0%/0%	78%/21%/0%/0%	66%/34%	68%/32%
Wells Fargo IRA	$10,000	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products	0.14%	91%/7%/0%/2%	91%/7%/0%/2%	67%/33%	67%/33%
WiseBanyan IRA	No minimum	No Fee for basic package; add-on packages, such as tax-loss harvesting, come at additional cost	0.07%	92%/8%/0%/0%	92%/8%/0%/0%	60%/40%	60%/40%
Zacks Advantage IRA	$25,000	0.70% on accounts less than $100K; 0.50% on accounts between $100K and $250K; 0.35% on accounts $250K and above	0.10%	93%/0%/0%/7%	94%/0%/0%/6%	62%/38%	63%/37%

*Due to rounding, may not add to 100%

**Average weighted expense ratio calculations exclude cash holdings from the portfolio

Taxable Risk/Returns

Risk/Return: Taxable Robos with 3-Year History (Sharpe Ratio and Standard Deviation)



Trailing 3-Year Risk/Return Statistics of Taxable Robos

	Acorns	Betterment	Personal Capital	Schwab	SigFig	Vanguard	WiseBanyan
Annualized StdDev, %	8.14%	8.58%	9.04%	8.33%	8.39%	7.53%	8.29%
Sharpe Ratio	0.46	0.45	0.45	0.61	0.62	0.54	0.56

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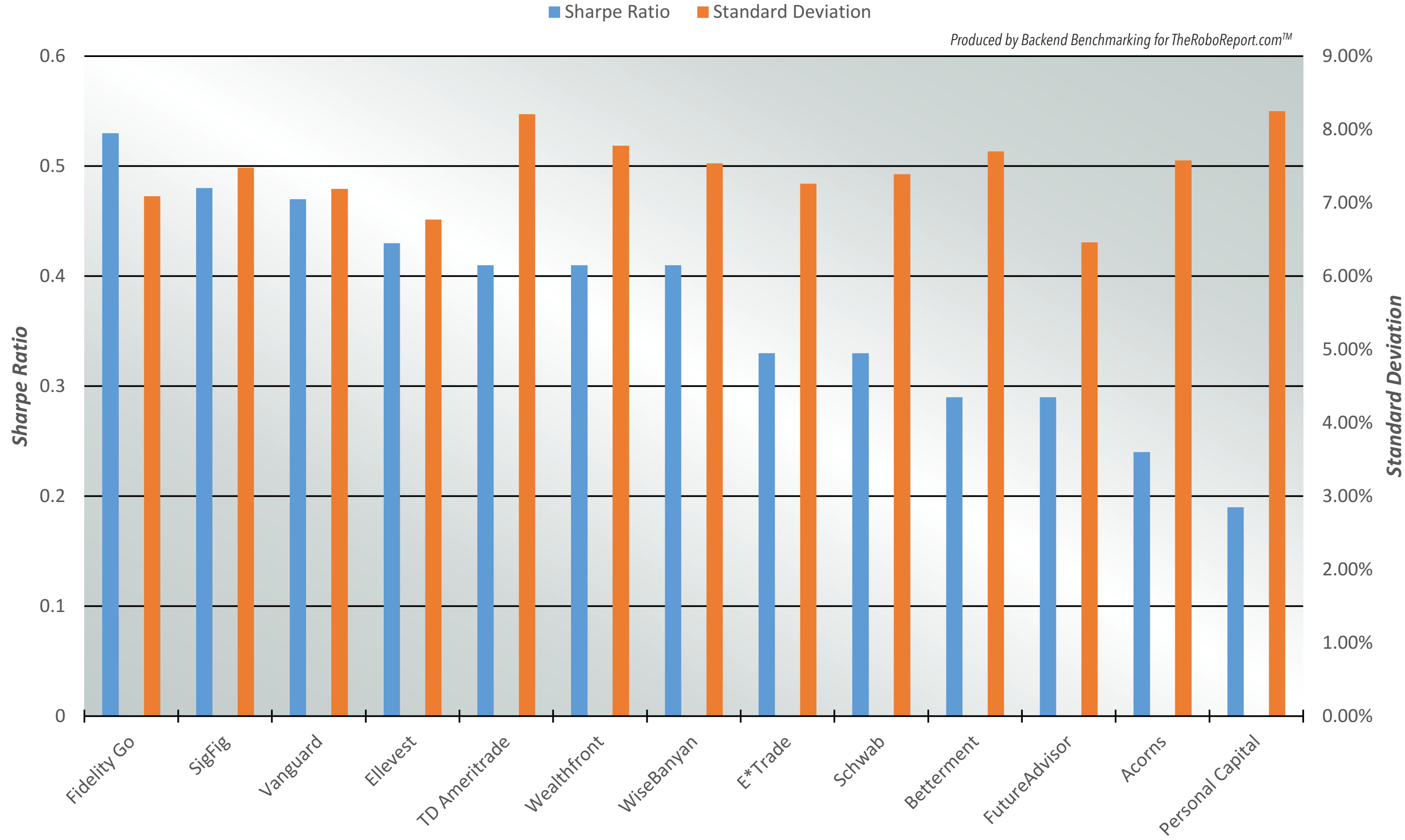
Risk/Return: Taxable Robos with 2-Year History (Sharpe Ratio and Standard Deviation)



Trailing 2-Year Risk/Return Statistics of Taxable Robos

	Acorns	Betterment	E*Trade	Ellevest	Fidelity Go	FutureAdvisor	Personal Capital
Annualized StdDev, %	7.58%	7.70%	7.26%	6.77%	7.09%	6.46%	8.25%
Sharpe Ratio	0.24	0.29	0.33	0.43	0.53	0.29	0.19

	Schwab	SigFig	TD Ameritrade	Vanguard	Wealthfront	WiseBanyan
Annualized StdDev, %	7.39%	7.48%	8.21%	7.19%	7.78%	7.54%
Sharpe Ratio	0.33	0.48	0.41	0.47	0.41	0.41

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Trailing 1-Year Risk/Return Statistics of Taxable Robos

	Acorns	Ally Financial	Betterment	Betterment SRI	E*Trade	Ellevest	Fidelity Go
Annualized StdDev, %	9.43%	8.89%	9.79%	9.17%	9.22%	8.50%	9.18%
Sharpe Ratio	-0.77	-0.78	-0.97	-0.92	-0.83	-0.77	-0.66

	FutureAdvisor	Merrill Edge	Morgan Stanley	Morgan Stanley SRI	Personal Capital	Schwab	SigFig
Annualized StdDev, %	7.96%	8.20%	10.04%	8.74%	10.53%	9.20%	9.49%
Sharpe Ratio	-1.01	-0.80	-0.80	-0.90	-0.89	-0.93	-0.75

	SoFi	TD Ameritrade	TIAA	TIAA SRI	United Income	USAA	Vanguard
Annualized StdDev, %	9.05%	10.60%	9.25%	10.65%	8.75%	9.66%	9.33%
Sharpe Ratio	-0.77	-0.72	-0.71	-0.60	-0.99	-0.77	-0.74

	Wealthfront	Wealthsimple	Wells Fargo	WiseBanyan	Zacks Advantage
Annualized StdDev, %	10.05%	9.52%	9.96%	9.68%	9.16%
Sharpe Ratio	-0.71	-0.86	-0.74	-0.76	-0.68

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Retirement Risk/Returns

Trailing 2-Year Risk/Return Statistics of Retirement Robos

	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Personal Capital IRA	Schwab IRA	SigFig IRA	TD Ameritrade IRA	WiseBanyan IRA
Annualized StdDev, %	10.37%	12.01%	9.96%	10.82%	10.73%	11.00%	10.37%	10.97%
Sharpe Ratio	0.31	0.30	0.44	0.24	0.24	0.41	0.38	0.44

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Trailing 1-Year Risk/Return Statistics of Retirement Robos

	Ally Financial IRA	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Merrill Edge IRA	Morgan Stanley IRA	Personal Capital IRA	Schwab IRA
Annualized StdDev, %	14.16%	13.25%	15.38%	12.95%	13.54%	12.23%	13.86%	13.47%
Sharpe Ratio	-0.75	-0.83	-0.71	-0.63	-0.75	-0.77	-0.78	-0.88

	SigFig IRA	SoFi IRA	T Rowe Price IRA	TD Ameritrade IRA	TIAA IRA	United Income IRA	USAA IRA	Wealthsimple IRA
Annualized StdDev, %	13.98%	15.70%	17.06%	13.43%	13.56%	15.30%	15.36%	12.42%
Sharpe Ratio	-0.77	-0.67	-0.53	-0.71	-0.64	-0.85	-0.68	-0.79

	Wells Fargo IRA	WiseBanyan IRA	Zacks Advantage IRA
Annualized StdDev, %	14.01%	14.14%	14.41%
Sharpe Ratio	-0.76	-0.66	-0.71

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Risk/Return Commentary

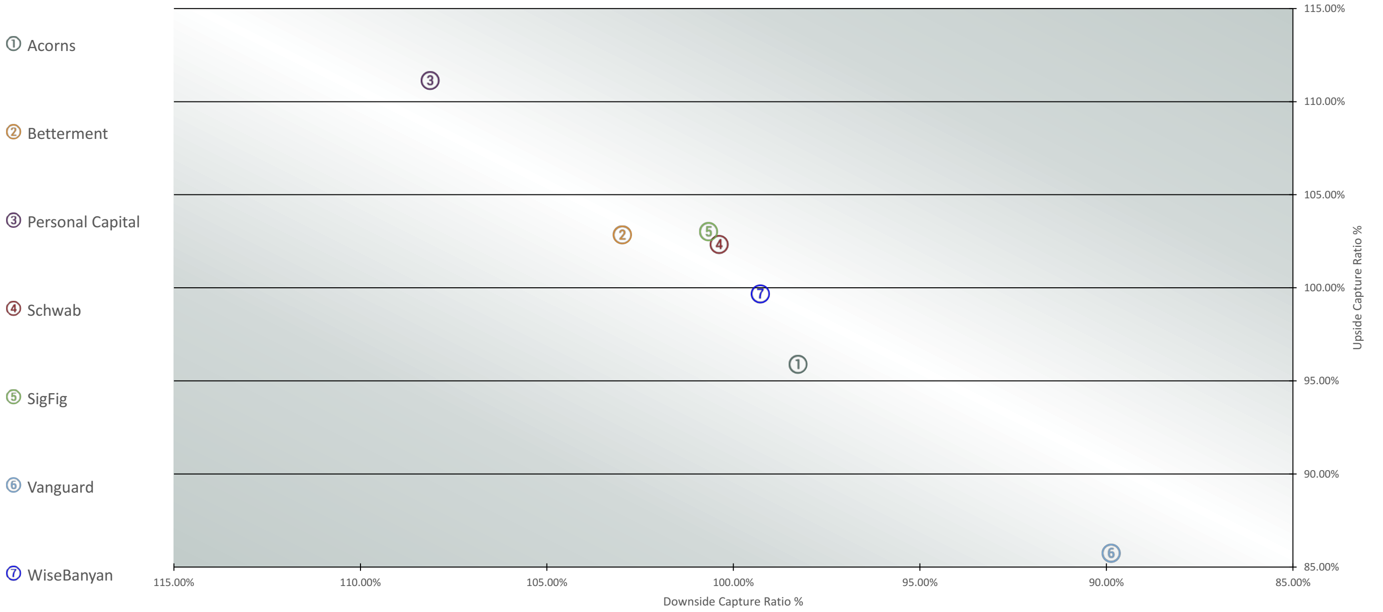
The return of volatile markets in 2018 can be clearly seen when looking at the Sharpe ratios of the portfolios. Negative returns in 2018 drove Sharpe ratios negative, as cash would have outperformed the portfolios. Those with high allocations in international holdings had some of the lowest one-year Sharpe ratios, as trade negotiations and Brexit helped drive volatility in both emerging and developed international markets. FutureAdvisor, Schwab, Betterment, and Morgan Stanley all suffered from this trend.

Looking at the three-year time period, Schwab and SigFig have taken the top two spots for the three-year Sharpe ratio. Schwab's fixed income portfolio has been a contributor to their outperformance, while relatively steady debt markets have kept their fixed income volatility low. Both accounts' large allocations abroad have helped their portfolios as a whole achieve higher than average risk-adjusted returns because frequently over these periods, domestic markets have been up while international was down and vice versa.

Vanguard has continued to keep their portfolio steady and achieved the lowest standard deviation over the three-year mark and second lowest over the trailing two years. Their reliance on just two broad-based equity funds and three municipal bond funds has kept the volatility on their portfolio low. This phenomenon can also be seen when looking at the three-year upside/downside numbers for Vanguard.

Taxable Upside/Downside Capture Ratios

Upside/Downside Capture Ratio 3-Year History of Taxable Robos



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3-Year Trailing Upside/Downside Capture Ratio for Taxable Robos

	Acorns	Betterment	Personal Capital	Schwab	SigFig	Vanguard	WiseBanyan
Up Market Capture Ratio, %	95.89%	102.85%	111.14%	102.32%	103.02%	85.74%	99.67%
Down Market Capture Ratio, %	98.27%	102.98%	108.13%	100.38%	100.67%	89.87%	99.28%

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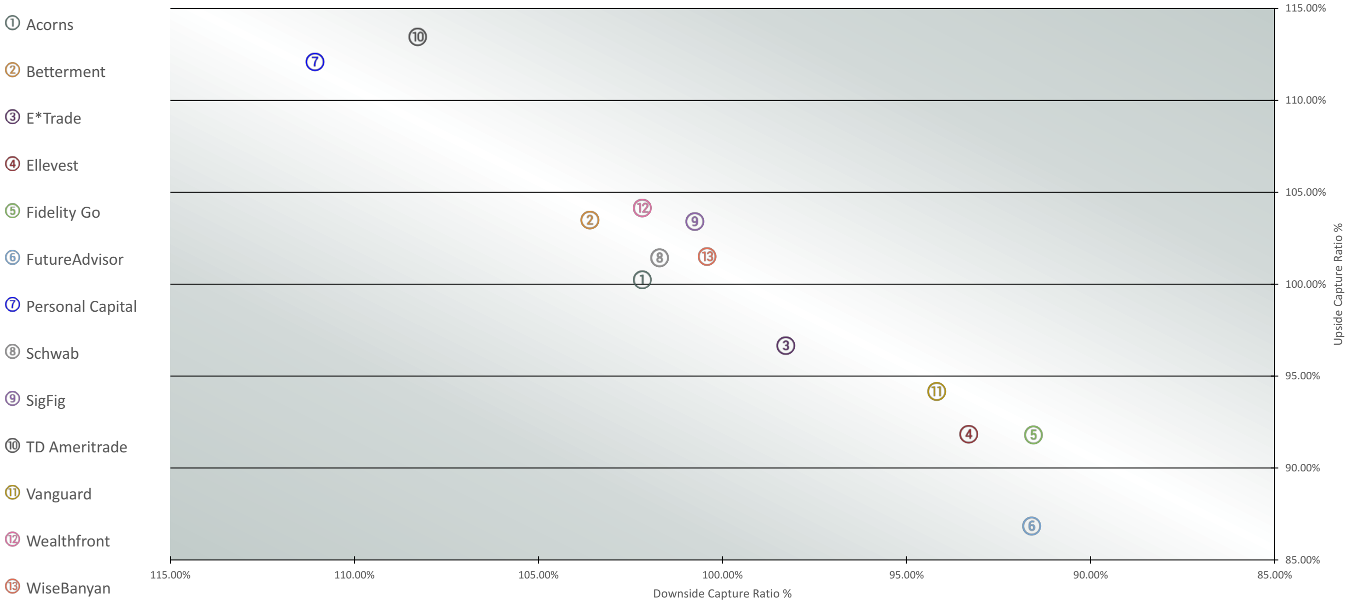
Upside/Downside Capture Ratio 2-Year History of Taxable Robos



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2-Year Trailing Upside/Downside Capture Ratio for Taxable Robos

	Acorns	Betterment	E*Trade	Ellevest	Fidelity Go	FutureAdvisor	Personal Capital
Up Market Capture Ratio, %	100.25%	103.49%	96.66%	91.84%	91.80%	86.84%	112.10%
Down Market Capture Ratio, %	102.18%	103.60%	98.28%	93.31%	91.55%	91.60%	111.07%

	Schwab	SigFig	TD Ameritrade	Vanguard	Wealthfront	WiseBanyan
Up Market Capture Ratio, %	101.43%	103.41%	113.46%	94.16%	104.15%	101.51%
Down Market Capture Ratio, %	101.71%	100.75%	108.28%	94.18%	102.18%	100.42%

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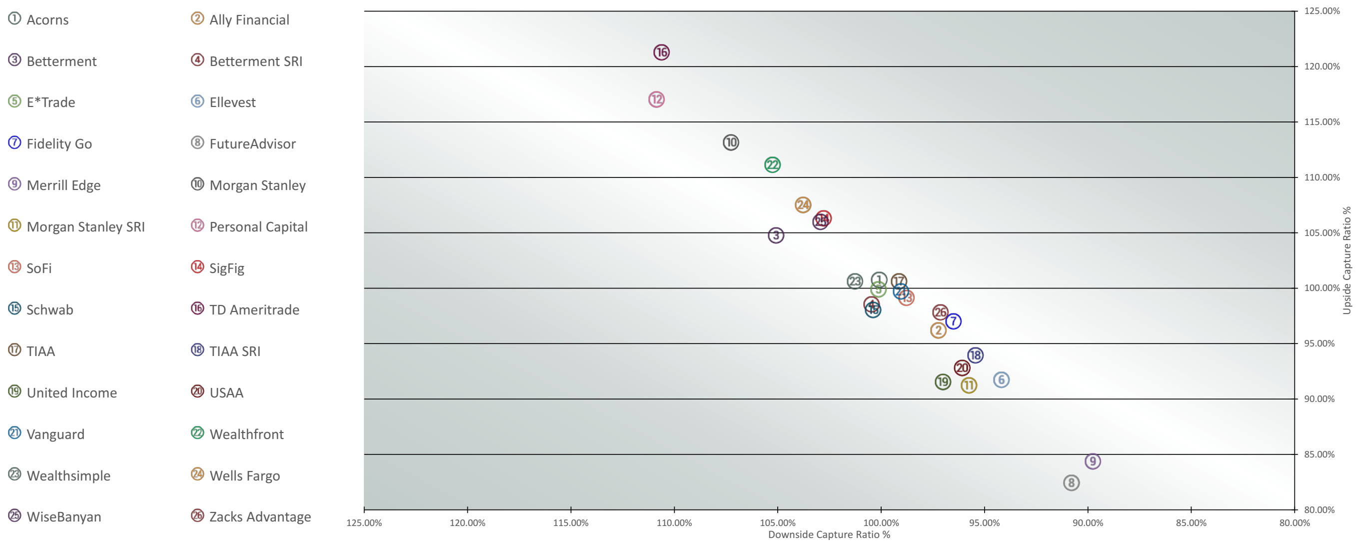
Upside/Downside Capture Ratio 1-Year History of Taxable Robos



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1-Year Trailing Upside/Downside Capture Ratio for Taxable Robos

	Acorns	Ally Financial	Betterment	Betterment SRI	E*Trade	Ellevest	Fidelity Go
Up Market Capture Ratio, %	100.76%	96.20%	104.77%	98.56%	99.90%	91.74%	97.02%
Down Market Capture Ratio, %	100.09%	97.23%	105.08%	100.46%	100.13%	94.18%	96.51%

	FutureAdvisor	Merrill Edge	Morgan Stanley	Morgan Stanley SRI	Personal Capital	Schwab	SigFig
Up Market Capture Ratio, %	82.44%	84.38%	113.15%	91.24%	117.04%	98.04%	106.32%
Down Market Capture Ratio, %	90.79%	89.77%	107.27%	95.75%	110.87%	100.39%	102.78%

	SoFi	TD Ameritrade	TIAA	TIAA SRI	United Income	USAA	Vanguard
Up Market Capture Ratio, %	99.15%	121.30%	100.62%	93.96%	91.53%	92.80%	99.71%
Down Market Capture Ratio, %	98.78%	110.62%	99.14%	95.44%	97.01%	96.08%	99.05%

	Wealthfront	Wealthsimple	Wells Fargo	WiseBanyan	Zacks Advantage
Up Market Capture Ratio, %	111.16%	100.63%	107.51%	106.00%	97.84%
Down Market Capture Ratio, %	105.25%	101.27%	103.77%	102.94%	97.14%

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Retirement Upside/Downside Capture Ratios

1-Year Trailing Upside/Downside Capture Ratio for Retirement Robos

	Ally Financial IRA	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Merrill Edge IRA	Morgan Stanley IRA	Personal Capital IRA	Schwab IRA
Up Market Capture Ratio, %	101.41%	93.07%	114.88%	89.18%	94.76%	84.98%	98.65%	91.72%
Down Market Capture Ratio, %	100.85%	97.69%	106.11%	93.65%	97.73%	92.57%	99.87%	97.81%

	SigFig IRA	SoFi IRA	T Rowe Price IRA	TD Ameritrade IRA	TIAA IRA	United Income IRA	USAA IRA	Wealthsimple IRA
Up Market Capture Ratio, %	104.79%	120.86%	114.62%	96.05%	96.95%	113.00%	100.41%	83.40%
Down Market Capture Ratio, %	102.24%	107.89%	104.93%	97.74%	97.45%	106.90%	100.42%	92.20%

	Wells Fargo IRA	WiseBanyan IRA	Zacks Advantage IRA
Up Market Capture Ratio, %	98.59%	102.92%	104.30%
Down Market Capture Ratio, %	99.71%	100.53%	101.76%

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2-Year Trailing Upside/Downside Capture Ratio for Retirement Robos

	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Personal Capital IRA	Schwab IRA	SigFig IRA	TD Ameritrade IRA	WiseBanyan IRA
Up Market Capture Ratio, %	96.13%	112.58%	86.77%	99.70%	98.57%	108.87%	95.21%	103.12%
Down Market Capture Ratio, %	98.23%	107.55%	90.41%	101.26%	100.64%	104.19%	96.66%	100.45%

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Trades Commentary

The fourth quarter of 2018 saw significant volatility in the markets, which created opportunities for tax-loss harvesting and spurred rebalancing trades in many of the robo portfolios. The rebalancing trades we saw were typically moves from fixed income to equities, as well as trades from domestic to international securities. Below is a recap of the most significant trading activity that we saw this past quarter.

The most advantageous strategy shift we saw this year was from Merrill Edge. Beginning in August, Merrill began initiating a more conservative portfolio composition, which affected the amount of gains their portfolios saw at the time, but benefited them as market performance became more volatile in the second half of the year.

In a signal that tax-loss harvesting technologies are still being refined, we saw an interesting sequence of trades in TD Ameritrade's SRI portfolio. This portfolio was opened earlier this year, making the portfolio more likely to see an unrealized loss as markets dipped. TD harvested tax losses multiple times throughout December as markets fell. Typically, each time a tax-loss trade is executed the fund that is sold is replaced by a fund with similar characteristics to maintain the overall asset allocation of the portfolio. TD did multiple trades within their domestic and international holdings, but the trades involving their domestic equities fund are of particular interest. On October 12th, their holding in the iShares MSCI USA ESG Optimized ETF (ESGU) was swapped for iShares MSCI KLD 400 Social ETF (DSI), and on December 18th, the opposite occurred, when they sold DSI and purchased ESGU. Both trades captured a tax loss. On December 24th, ESGU was sold, again capturing a tax loss, but no alternative fund was purchased. By purchasing DSI, they would have run afoul of the wash sale rule, negating the December 18th tax loss, as it would have been within 30 days of the sale of DSI. While they captured a tax loss by selling ESGU, not making a matching purchase significantly changed the allocation of the portfolio, leaving the portfolio with a 35% cash holding at year end. They did not reinvest the cash until January 24th. During the period from December 24th to January 24th, DSI returned 12.84% and ESGU returned 12.41%, while the portfolio continued to have more than a third of its assets invested in cash. Despite robo advisors being more than a decade old now, many of these systems are still relatively new, especially at institutions that have launched a robo advice product more recently and are still experiencing some growing pains.

TD Ameritrade aside, the uptick in volatility towards quarter end provided ample opportunity for robo advisors to take advantage of tax-loss harvesting opportunities. This past quarter we saw multiple robo advisors do exactly that, especially towards quarter-end. Schwab, TD Ameritrade, Betterment, Wealthfront, United Income, and Morgan Stanley were among those that took advantage of opportunities to harvest tax losses in their portfolios.

Schwab made adjustments to their portfolio. While taking advantage of several opportunities to harvest tax losses, they increased their position in international equities, thus marking a return to having nearly half of their equities invested in international funds.

UBS and Fidelity Go executed trades in December towards the end of the quarter to address the drift the portfolios experienced. The Wells Fargo IRA increased their exposure to emerging markets this past quarter. UBS followed suit by steadily purchasing the iShares Core MSCI ETF throughout the quarter, expanding their international developed holdings.

Wealthfront had an active quarter, where they harvested tax losses in their equity holdings. In their fixed income holdings, they swapped out a shorter average-duration Vanguard Tax- Exempt Bond ETF for a longer average-duration SPDR Nuveen Barclays Municipal Bond ETF.

Normalized Benchmarking Methodology

Equity Portfolio

Category	Asset Type	Ticker	Name	Taxable Benchmark Weight	Retirement Benchmark Weight
Equity	Domestic	VTI	Vanguard Total Stock Market ETF	64%	63%
Equity	International	VXUS	Vanguard Total International Stock ETF	36%	37%

Bond Portfolio

Category	Asset Type	Ticker	Name	Taxable Benchmark Weight	Retirement Benchmark Weight
Fixed Income	Multi-Sector US	AGG	iShares Core US Aggregate Bond ETF	30%	29%
Fixed Income	Investment-Grade Corporates	LQD	iShares iBoxx $ Investment Grade Corporate Bond ETF	7%	5%
Fixed Income	High-Yield Corporates	JNK	SPDR Bloomberg Barclays High Yield Bond ETF	4%	2%
Fixed Income	International Developed	IGOV	iShares International Treasury Bond ETF	5%	4%
Fixed Income	International Emerging Markets	EMB	iShares J.P. Morgan USD Emerging Markets Bond ETF	5%	7%
Fixed Income	Municipals	MUB	iShares National Muni Bond ETF	28%	3%
Fixed Income	TIPS	TIP	iShares TIPS Bond ETF	7%	3%
Fixed Income	Short-Term Treasuries (0-3 Year Maturity)	VGSH	Vanguard Short-Term Treasury ETF	3%	0%
Fixed Income	Intermediate-Term Treasuries (3-10 Year Maturity)	VGIT	Vanguard Intermediate-Term Treasury ETF	3%	3%
Fixed Income	Securitized	VMBS	Vanguard Mortgage-Backed Securities ETF	1%	2%
Fixed Income	Cash	FDRXX	Fidelity® Government Cash Reserves	6%	43%

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Normalized Benchmarking

Normalized Benchmarking is a method to compare portfolios with differing equity and fixed income allocations. The percent allocated to equities in a portfolio is one of the largest drivers of returns. Because of this, comparing two portfolios that have a different level of equity allocation is difficult and can be misleading. Normalized Benchmarking controls for differences in equity holdings by adjusting the benchmark to match the equity/fixed income ratio of the portfolio. When this is done across a group of portfolios, the portfolios can then be measured against each other by their return above or below the benchmark specific to the portfolio.

Below is a more detailed explanation of how the benchmark is constructed and used.

To begin, one must define the universe of portfolios that will be analyzed. For our purposes, we analyzed taxable accounts at robo advisors as one universe, and retirement accounts at robo advisors as a separate universe.

To construct the Normalized Benchmark, each portfolio within the investment universe must be separated into a portfolio of equity holdings and a portfolio of fixed income holdings (cash is included with the fixed income). This means that for each robo portfolio in a universe, we now have two portfolios, one made up of fixed income and one made up of equities. We then take all of the equity portfolios, equal weight them, and make them into one Equity Aggregate Portfolio. This portfolio contains a piece of every fund held in each equity portion of the portfolios. The same is done for fixed income.

After this step is completed, each aggregate portfolio is analyzed to determine the type and weight of assets held in each. The Equity Aggregate Portfolio is analyzed to determine the allocation of the portfolio to domestic equities and the allocation to international equities. For the Fixed Income Aggregate Portfolio, allocations to the following categories are determined: municipal bonds, investment-grade corporate bonds, high-yield corporate bonds, foreign emerging markets debt, foreign developed markets debt, TIPS, short-term treasuries (0-3 year maturities), mid-term treasuries (3-10 year maturities), long-term treasuries (maturities of 10 years or greater), multi-sector bond funds, and cash.

Next, we select a broad-based, passive, low-cost, commonly used ETF to represent each asset type. For example, the Vanguard Total Stock Market and Vanguard Total International Stock Market ETFs are used for the domestic and international positions in the equity benchmark portfolio, respectively. These are widely used, highly liquid, low-cost ETFs that are representative of the type of asset to which they are assigned.

We then match the weight of the selected ETFs to the allocation of the corresponding asset types within its respective aggregate portfolio. For example, the amount of the Vanguard Total Stock Market ETF in the Equity Portfolio of the Normalized Benchmark matches the weight of domestic stocks in the Equity Aggregate Portfolio. This creates the Equity and Fixed Income Portfolios of the Normalized Benchmark that represent the robo portfolios' equity and fixed income holdings, respectively.

Now that we have constructed the Equity and Fixed Income Normalized Benchmark Portfolios, we can use it to compare performance across accounts within the previously determined investment universes. To compare an account, we first determine the initial target asset allocations to equity and fixed income, including cash. Next, we take note of significant shifts to these target allocations and when they occur. Then, we proportion the Equity and Fixed Income Portfolios of the Normalized Benchmark to match that of the portfolio being compared. For example, if we are measuring a portfolio with 60% equities and 40% bonds and cash, we create a benchmark that is made up of 60% of the equity benchmark and 40% of the fixed income benchmark. If we are measuring a portfolio with 65% equities and 35% fixed income, a benchmark is created, again using the Equity and Fixed Income Portfolios of the Normalized Benchmark, but in a 65% to 35% proportion. For portfolios that experienced significant shifts to their target allocations, their benchmark reflects these shifts. For example, if a portfolio experiences a shift from a 60% equity and 40% fixed income target allocation to a 55% equity and 45% fixed income target allocation on January 1, 2016, their Normalized Benchmark would reflect a 60% equity and 40% fixed income portfolio prior to January 1, 2016, and a 55% equity and 45% fixed income allocation thereafter.

The Equity and Fixed Income Portfolios of the Normalized Benchmark are consistent, holding the same funds, in the same weights, regardless of the account you wish to compare, but the proportion of all of the equities and all of the fixed income changes to match the target allocation of the portfolio we are comparing. Therefore, a 65/35 portfolio is measured against a 65/35 benchmark, and a 70/30 portfolio is measured against a 70/30 benchmark. Each of the underlying equity and fixed income assets of the benchmark are consistent in each case, but the amount of the benchmark that is fixed income or equities changes to match the portfolio.

After benchmarks are created, we introduce a 0.30% annual management fee to make the benchmark comparable to the fee charged by the most prominent robo advisors.

Portfolios can then be measured based on their returns above or below the Normalized Benchmark. These returns for each portfolio above or below the Normalized Benchmark can then be compared to each other. This gives the investor a good idea of how the portfolios are performing, regardless of how much is in equities and how much is in fixed income.

Benchmark Returns

Taxable Benchmark Returns

	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)
Acorns Normalized Benchmark	-7.76%	-5.41%	4.70%	5.47%
Ally Financial Normalized Benchmark	-7.63%	-5.22%	-	-
Betterment Normalized Benchmark	-8.46%	-5.83%	4.64%	5.52%
Betterment SRI Normalized Benchmark	-7.76%	-5.41%	-	-
E*Trade Normalized Benchmark	-7.76%	-5.41%	4.44%	-
Ellevest Normalized Benchmark	-7.19%	-5.08%	4.71%	-
Ellevest SRI Normalized Benchmark	-7.19%	-	-	-
Fidelity Go Normalized Benchmark	-7.90%	-5.50%	4.48%	-
FutureAdvisor Normalized Benchmark	-7.05%	-4.98%	4.42%	-
Interactive Brokers Normalized Benchmark	-7.05%	-	-	-
IQvestment (Overstock.com) Normalized Benchmark	-7.33%	-	-	-
Merrill Edge Normalized Benchmark	-6.91%	-4.80%	-	-
Morgan Stanley Normalized Benchmark	-8.46%	-5.83%	-	-
Morgan Stanley Active Normalized Benchmark	-8.32%	-	-	-
Morgan Stanley SRI Normalized Benchmark	-7.90%	-5.52%	-	-
Personal Capital Normalized Benchmark	-9.72%	-6.60%	4.99%	5.97%
Schwab Normalized Benchmark	-8.18%	-5.62%	4.84%	5.68%
SigFig Normalized Benchmark	-8.04%	-5.58%	4.52%	5.37%
SoFi Normalized Benchmark	-7.76%	-5.30%	-	-
TD Ameritrade Normalized Benchmark	-8.88%	-6.09%	4.64%	-
TD Ameritrade SRI Normalized Benchmark	-8.68%	-	-	-
TIAA Normalized Benchmark	-7.90%	-5.50%	-	-
TIAA Active Normalized Benchmark	-9.58%	-	-	-
TIAA SRI Normalized Benchmark	-7.76%	-5.41%	-	-
UBS Advice Advantage Normalized Benchmark	-8.88%	-	-	-
United Income Normalized Benchmark	-7.62%	-5.33%	-	-
US Bank Normalized Benchmark	-7.76%	-	-	-
USAA Normalized Benchmark	-7.90%	-5.52%	-	-
Vanguard Normalized Benchmark	-7.76%	-5.41%	4.44%	5.27%
Wealthfront Normalized Benchmark	-8.46%	-5.83%	4.64%	-
Wealthsimple Normalized Benchmark	-7.76%	-5.41%	-	-
Wealthsimple SRI Normalized Benchmark	-7.76%	-	-	-
Wells Fargo Normalized Benchmark	-8.18%	-5.66%	-	-
WiseBanyan Normalized Benchmark	-8.32%	-5.75%	4.60%	5.47%
Zacks Advantage Normalized Benchmark	-7.33%	-5.16%	-	-

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Retirement Benchmark Returns

	4Q 2018	1-Year Trailing	2-Year Trailing (Annualized)
Ally Financial IRA Normalized Benchmark	-12.35%	-8.30%	-
Betterment IRA Normalized Benchmark	-11.54%	-7.75%	5.40%
E*Trade IRA Normalized Benchmark	-13.02%	-8.76%	5.85%
Fidelity Go IRA Normalized Benchmark	-11.27%	-7.56%	5.32%
Merrill Edge IRA Normalized Benchmark	-11.81%	-7.93%	-
Morgan Stanley IRA Normalized Benchmark	-10.45%	-7.02%	-
Personal Capital IRA Normalized Benchmark	-12.75%	-8.58%	5.77%
Schwab IRA Normalized Benchmark	-12.49%	-8.39%	5.69%
SigFig IRA Normalized Benchmark	-12.08%	-8.11%	5.56%
SoFi IRA Normalized Benchmark	-13.29%	-8.95%	-
T Rowe Price IRA Normalized Benchmark	-13.29%	-8.95%	-
TD Ameritrade IRA Normalized Benchmark	-11.13%	-7.47%	5.23%
TIAA IRA Normalized Benchmark	-11.67%	-7.84%	-
United Income IRA Normalized Benchmark	-13.16%	-8.86%	-
USAA IRA Normalized Benchmark	-13.16%	-8.86%	-
Wealthsimple IRA Normalized Benchmark	-10.59%	-7.11%	-
Wells Fargo IRA Normalized Benchmark	-12.08%	-8.11%	-
WiseBanyan IRA Normalized Benchmark	-12.22%	-8.21%	5.61%
Zacks Advantage IRA Normalized Benchmark	-12.35%	-8.30%	-

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DISCLOSURES:

[1] These accounts were funded with more than the minimum amount required to establish an account. Had the accounts been funded with more assets, they would be charged a flat dollar fee up to $1,000,000. Because the fee is a flat dollar amount, a higher account balance would have the result of increasing reflected performance, while a lower account balance would have the result of decreasing reflected performance.

[2] This account has no minimum required to establish an account, but had the account been funded with more assets, it would, at certain asset levels, be eligible for a lower advisory fee. The lower advisory fee would have the result of increasing reflected performance.

[3] These accounts were funded with more than the minimum amount required to establish an account. There is no fee schedule; all accounts are charged the same asset-based fee. Therefore, performance is not affected by the account's asset level.

[4] This account was funded with the minimum amount required to establish an account at the time of opening. Had the account been funded with more assets it would, at certain asset levels, be eligible for a lower advisory fee. The lower advisory fee would have the result of increasing reflected performance.

[5] This account was funded with more than the minimum in order to take advantage of tax-loss harvesting. Tax-loss harvesting may result in better or worse performance compared to similarly positioned accounts that are not enrolled in tax-loss harvesting. This account is enrolled in their digital only "Intelligent Portfolios", thus it is not charged an advisory fee. If one were to upgrade to "Intelligent Advisory" which introduces access to live advisors, an asset-based advisory fee would be levied, which would decrease reflected performance.

[6] These accounts were funded with the minimum amount required to establish an account. At balances less than $10,000, there is no advisory fee. Had the account been funded with $10,000 or more, an asset-based advisory fee would be levied, which would decrease reflected performance.

[7] These accounts were funded with the minimum amount required to establish an account at the time of opening. There is no fee schedule; all accounts are charged the same asset-based fee. Therefore, performance is not affected by the account's asset level.

[8] These accounts have no minimum required to establish an account. There is no advisory fee on these accounts. Had additional service packages, such as tax-loss harvesting, been added, the lesser of an asset-based fee or flat dollar fee would have been assessed. These fees would decrease the reflected performance.

[9] This account was funded with the minimum investment amount at the time. At the time of opening, the account had a 0.25% management fee. Due to changes in the service at the end of the 1st quarter 2017, new accounts are charged a 0.30% management fee. The fee on our account was grandfathered in and remains at 0.25%. The higher advisory fee would have the result of decreasing reflected performance.

[10] These accounts were funded with the minimum amount required to establish an account. This account is enrolled in their digital only "Essential Portfolios" and is charged an asset-based advisory fee. If one were to upgrade to "Selective Portfolios" which introduces access to live advisors, a higher asset-based advisory fee schedule would apply, which would decrease reflected performance.

[11] This account has no minimum required to establish an account, but had the account been funded with more assets, it would, at certain asset levels, be eligible for a lower advisory fee. The lower advisory fee would have the result of increasing reflected performance. A special request was made for an allocation of 60% equities and 40% fixed income or close to it, but this allocation was not one of the standard models at the time of account opening. At the time of account opening the closest standard models offered were a in the range of 50/50 or 75/25 equity to fixed income split.

[12] These accounts were funded with more than the minimum amount required to establish an account. Due to the flat advisory fee, performance is not affected by the accounts' asset levels. In previous reports we reported the performance of two accounts that were combined to achieve a 60/40 allocation. Due to our introduction of Normalized Benchmarking we are no longer reporting the combined account, but just the account with the closest to a 60/40 allocation as we could achieve at this provider.

[13] These accounts were funded with less than the minimum investment through an agreement between Backend Benchmarking and the provider. There is no advisory fee levied regardless of the amount of assets invested.

[14] This account was funded with the minimum amount required to establish an account. A flat, asset-based advisory fee is levied on the account. Had we subscribed to additional, specific, Wells Fargo Products the account would be eligible for a lower asset-based advisory fee. A lower advisory fee would have the result of increasing reflected performance.

[15] This account has no minimum required to establish an account and is enrolled in the Digital Only plan. If the account was enrolled in the premium service with access to live advisors, there would be a higher asset-based advisory fee. The higher advisory fee would have the result of decreasing reflected performance.

[16] This account is enrolled in the Self Service plan. If the account was enrolled in the Full Service Plan, the fee would be higher or lower depending on the level of assets in the account. The higher/lower advisory fee would have the result of decreasing/increasing reflected performance.

[17] This account was funded with more than the minimum amount required to establish an account. This account will not be charged an advisory fee through 2019. In previous reports we reported the performance of two accounts that were combined to achieve a 60/40 allocation. Due to our introduction of Normalized Benchmarking we are no longer reporting the combined account, but only the account with the closest to a 60/40 allocation as we could achieve at this provider.

[18] This account was funded with more than the minimum amount required to establish an account. This account will not be charged an advisory fee through 2019.

[19] These accounts were funded with the minimum required to establish an account. Had the account been funded with a greater amount, it would still be charged the same flat dollar fee. Because the fee is a flat dollar amount, a higher account balance would have the result of increasing reflected performance, while a lower account balance would have the result of decreasing reflected performance. Fee was waived for the first year starting in June 2018. Had a fee been levied, reflected performance would have been lower. During the third quarter of 2018, a security that was held in this account was classified as fixed income due to its underlying holdings when it was actually equity. This resulted in a greater allocation to fixed income and a lower allocation to equity, which resulted in overstated equity and fixed income performance and performance above the normalized benchmark for the period. This has since been adjusted and historical performance has been recalculated. Therefore, this issue will have no effect going forward. This robo advisor changed their name from tZERO to IQvestment in January 2019.

[20] This account was funded with the minimum required to establish an account. This account is enrolled in their digital only "Intelligent Portfolios", thus it is not charged an advisory fee. If one were to upgrade to "Intelligent Advisory" which introduces access to live advisors, an asset-based advisory fee would be levied, which would decrease reflected performance.

[21] These accounts were funded with more than the minimum amount required to establish an account. There is no fee schedule; all accounts are charged the same asset-based fee. Therefore, performance is not affected by the account's asset level. Fee was waived for the first year. Had a fee been levied, reflected performance would have been lower.

[22] These accounts were funded with more than the minimum amount required to establish an account. There is currently no fee schedule; all accounts are charged the same asset-based fee. Therefore, performance is not affected by the account's asset level. Previously, the fee was only assessed on balances in excess of $10,000.

[23] These accounts were funded with the minimum amount required to establish an account. There is no fee schedule; all accounts are charged the same asset-based fee. Therefore, performance is not affected by the account's asset level. Fee was waived for an initial promotional period. Had a fee been levied, reflected performance would have been lower.

[24] This account was funded with the minimum required to open an account and is invested in their Asset Allocation portfolio. It is charged an asset-based fee. There is no fee schedule on this account; therefore performance is not affected by the account's asset levels. Previously, the account was charged a lower asset-based fee; the increase took effect starting March 2019. Interactive Brokers offers multiple strategies each with a different set of fees. They also offer an advisor marketplace for actively managed accounts in which each individual advisor sets their own fees.

[25] Originally, there was no advisory fee on these accounts. Had additional service packages, such as tax-loss harvesting, been added, the lesser of an asset-based fee or flat dollar fee would have been assessed. In June 2018, one package was activated, resulting in a fee on these accounts. This fee decreases the reflected performance.

[A] On June 19th, 2017, Vanguard removed Backend Benchmarking's primary Vanguard account from the Vanguard Personal Advisor Services program. As of June 20th, 2017, the primary account was replaced by a secondary account with the same risk profile as the primary account. The returns for the secondary account have been linked to the original primary account. Asset type and allocation between the two accounts at the time of the switch were very close but not identical.

[B] In the 1st Quarter of 2018 Wealthfront liquidated the positions in the account used for the 4th Quarter 2017 and previous editions of this report. A different account was used for this report and is labeled "Wealthfront (Risk 4.0)". The performance numbers from the previous account are available in the addendum labeled as "Wealthfront (Risk 3.0)". The risk scores and thus allocations of the two accounts are different and labeled as such. Asset type and allocation between the two accounts at the time of the switch were close but not identical. The difference of equity allocation between the accounts on 12/31/2017 was approximately 5.4%.

[c] Due to the down market, this account engaged in tax loss harvesting during the last month of the quarter. All alternative options were exhausted for this security type, so to prevent a wash sale, the entire position was liquidated and held as cash. Cash is expected to be reinvested after the 30-day wash sale period passes.

In previous reports the initial target asset allocation was calculated as the asset allocation at the end of the first month after the account was opened. In the Q3 2018 report we adjusted our method to calculate the initial target asset allocation as of the end of the trading day after all initial trades were placed in the accounts. This adjustment has caused some portfolio's initial target allocation to be updated from previous reports. These updates did not change any initial target allocations of equity, fixed income, cash, or other by more than 1%.

Prior to Q3 2018, due technological limitations of our portfolio management system, some accounts which contained fractional shares had misstated the quantity of shares when transactions quantities were smaller than 1/1000th of a share in a position as a result of purchases, sales, or dividend reinvestments. This had a marginal effect on historical performance of the accounts. The rounding of position quantities caused by this limitation has been resolved, and quantities have been adjusted to reflect the full position to the 1/1,000,000th of a share as of the end of Q3 2018. Therefore, this rounding of fractional shares will not be necessary in the future.

This report represents Backend Benchmarking's research, analysis and opinion only; the period tested was short in duration and may not provide a meaningful analysis; and, there can be no assurance that the performance trend demonstrated by Robos vs indices during the short period will continue. Backend Benchmarking is under common ownership and control with Condor Capital Management, an SEC registered investment adviser. A copy of Condor's disclosure Brochure is available at www.condorcapital.com. Condor Capital initiated a position in Schwab and TD Ameritrade in one of the strategies used in many of their discretionary accounts on 5/30/2017 and 5/31/2017. As of 12/31/2018 the total size of the position was 35,696 shares of Schwab common stock and 33,254 shares of TD Ameritrade common stock.

For more information, please contact BackendBenchmarking at Info@BackendB.com

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