

# BRINGING TRANSPARENCY TO ROBO INVESTING

EDITION 14

## *The Robo Report*<sup>TM</sup> Fourth Quarter 2019



**W**e are proud to publish the 14th edition of *The Robo Report*<sup>TM</sup> and the 4th edition of *The Robo Ranking*<sup>TM</sup> covering the fourth quarter of 2019. 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:*

- *Fidelity Go and Vanguard awarded Best Overall Robo (page 6)*
- *Fidelity Go and Axos Invest win Best Robo for Performance at a Low Cost (page 6)*
- *Betterment and SoFi are the best platforms to those new to investing (page 8)*
- *Wealthfront and Personal Capital stand out for Best Digital Financial Planning Tools (page 9)*
- *SRI portfolios maintain strong performance through the end of 2019 (page 14)*
- *Interview with Interactive Advisors' CIO, Sanjoy Ghosh (page 19)*



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## *The Executive Summary*

This edition of *The Robo Report*<sup>™</sup> also contains *The Robo Ranking*<sup>™</sup>, the most comprehensive analysis of digital advice products. The ranking includes both qualitative factors, such as access to advisors and financial planning features, as well as the performance reporting of our portfolios held at each one of these providers.

### *Recap of 2019: Digital Advice Evolving Past Investment Management*

2019 was a year of continued evolution in the digital advice industry. Many digital advice providers made significant developments to their platforms in an effort to expand beyond investment management. In the first half of the year, many independent robos launched both cash savings accounts and checking accounts. Personal Capital and Betterment both launched savings account products, while Wealthfront released and saw its high-yield cash account bring in billions in deposits. Wealthfront also acquired Grove Financial and is developing “Self Driving Money,” a product that they claim will automate savings and budgeting tasks for clients. They also announced that they are working on a feature to begin assisting clients with mortgages. Schwab launched a retirement income-focused feature for Intelligent Portfolios that will help users tackle spending during retirement. Overall, digital advice providers are continuing to invest in their platforms and expand past investment management into other areas of personal finance. We anticipate this trend to continue into 2020.

### *Vanguard and Schwab Focus on Expansion*

Building on its success with Personal Advisor Services, Vanguard announced a new digital-only product in September. According to an ADV update, Vanguard’s digital-only advice product will have lower minimums and be priced below many of their competitors, at an all-in management fee of 0.20%. In some of the largest news of the year, Schwab announced its acquisition of TD

Ameritrade (subject to regulatory approval). This will have wide-ranging consequences across the advisor and brokerage industries. TD Ameritrade currently has more than \$20 billion in assets invested in its digital advice products. It is still unclear how Schwab will handle the integration of TD Ameritrade’s Essential and Selective Portfolios with its Intelligent Portfolios, which currently has over \$43 billion in assets. Regardless, this acquisition significantly closes the gap between Vanguard and Schwab in terms of digitally advised assets under management.

### *Fidelity and Vanguard Lead The Robo Ranking<sup>™</sup>, while Independents Still Lead in Terms of Digital Tools*


Bolstered by strong returns, Fidelity Go has again been awarded the Top Overall Robo in this edition of *The Robo Ranking*<sup>™</sup>, while Vanguard placed second. Although the younger and more tech-reliant digital advice platforms are still continuing to lead the way in terms of the quality of user interfaces and digital tools, Schwab’s 2019 improvements to their financial planning tools now put its digital planning experience on par with leading independents Wealthfront and Personal Capital. Wealthfront and Personal Capital won the top two spots for Best Robo for Digital Financial Planning, while Schwab was awarded an honorable mention in this category.

### *SRI Portfolios Maintain Strong Performance*

SRI portfolios continue to perform well. Of the three SRI portfolios we track with a two-year track record, all three have outperformed the standard portfolio at the same provider. The nine SRI portfolios we track showed mixed results over the one-year period. However, the data still suggest that clients are not seeing performance dragged down by the higher fees associated with SRI funds. In fact, TIAA, Morgan Stanley, and Wealthsimple SRI portfolios were top performers amongst all the taxable robos we track.

# *The Robo Ranking*<sup>™</sup>

## Bringing Transparency to Robo Investing



**W**e are excited to publish our fourth edition of *The Robo Ranking*<sup>™</sup>. *The Robo Ranking*<sup>™</sup> is the only comprehensive ranking of robo advisors. It examines not only the features and services but also portfolio performance that is sourced from real accounts tracked by Backend Benchmarking. Robo advisors have taken the advice industry by storm, with the larger independent providers continuing to show strong growth and innovative features, and robo advice technology being adopted across banks, brokerages, and other traditional advice firms. Robo advice providers are proving attractive to individual investors in large part due to their significantly lower minimums and costs. Since these products are relatively new to the investment landscape, there is little information available to investors. Here at Backend Benchmarking, our goal is to bring transparency to the digital advice industry to empower investors to seek the best products and services.



### *Robo Ranking Introduction*

*The Robo Ranking*<sup>™</sup> grades the robos across more than 45 specific metrics and is the only examination that includes real and reliable performance data. We scored each robo on various high-level categories, such as features, financial planning, customer experience, access to live advisors, transparency and conflicts of interest, size and tenure, account minimums, costs, and performance. Each metric that we grade is specific and unambiguous.

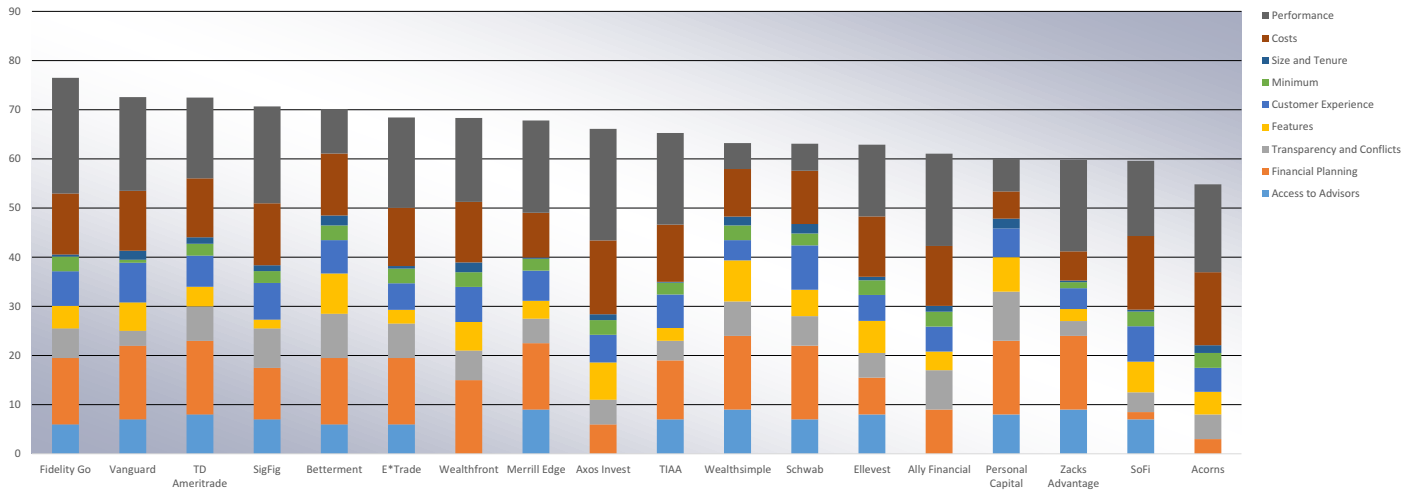
We believe *The Robo Ranking*<sup>™</sup> is a powerful tool to help those investors who are considering using a digital adviser. Although we rank and give each robo an overall score, we also acknowledge the differences in individual investors and their situations. To help different types of investors find a product that is right for them, we created sub-rank-

ings to help understand areas where different products excel. Once investors have identified their needs, the category rankings can help them select a provider that stands out in the areas that are most important to them.

Performance is partly based on Backend Benchmarking's innovative method to compare globally diversified portfolios called Normalized Benchmarking. A methodology of Normalized Benchmarking can be found [here](#) on our website. The details of how we created the scores and ranking can be found at the end of the report, as well as on our website. Please refer to our methodology section to review any changes to our scoring methods since our last issue.



## Robo Ranking



Produced by Backend Benchmarking for BackendB.com

Robo Name	Access to Advisors	Financial Planning	Transparency and Conflicts	Features	Customer Experience	Minimum	Size and Tenure	Costs	Performance	Total
Fidelity Go	6	13.5	6	4.6	7.03	3	0.42	12.39	23.55	76.49
Vanguard	7	15	3	5.8	8.08	0.6	1.83	12.18	19.06	72.55
TD Ameritrade	8	15	7	4	6.32	2.4	1.33	11.98	16.45	72.48
SigFig	7	10.5	8	1.8	7.46	2.4	1.2	12.61	19.68	70.65
Betterment	6	13.5	9	8.17	6.8	3	2	12.6	9.05	70.12
E*Trade	6	13.5	7	2.8	5.39	3	0.5	11.87	18.37	68.43
Wealthfront	0	15	6	5.8	7.15	3	2	12.29	17.09	68.32
Merrill Edge	9	13.5	5	3.61	6.17	2.4	0.25	9.1	18.76	67.79
Axos Invest	0	6	5	7.6	5.6	3	1.2	15	22.71	66.11
TIAA	7	12	4	2.6	6.81	2.4	0.17	11.63	18.67	65.27
Wealthsimple	9	15	7	8.34	4.12	3	1.8	9.68	5.27	63.21
Schwab	7	15	6	5.36	9.06	2.4	1.92	10.85	5.48	63.07
Ellevest	8	7.5	5	6.55	5.25	3	0.7	12.29	14.59	62.88
Ally Financial	0	9	8	3.8	5.09	3	1.2	12.18	18.77	61.04
Personal Capital	8	15	10	7	5.85	0	2	5.52	6.58	59.95
Zacks Advantage	9	15	3	2.45	4.26	1.2	0.33	5.95	18.57	59.76
SoFi	7	1.5	4	6.25	7.2	3	0.37	14.98	15.31	59.61
Acorns	0	3	5	4.6	4.9	3	1.6	14.85	17.87	54.82
FutureAdvisor	7	3	4	3.6	4.28	2.4	1.6	9.7	11.49	47.07
<b>MAX</b>	<b>10</b>	<b>15</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>3</b>	<b>2</b>	<b>15</b>	<b>25</b>	<b>100</b>

Produced by Backend Benchmarking for BackendB.com



## Best Robos

### ■ *Best Overall Robo*

**Winner: Fidelity Go**

**Runner-Up: Vanguard Personal Advisor Services**

**Honorable Mention: TD Ameritrade**

Fidelity Go has once again been awarded the Best Overall Robo for the third consecutive *Robo Ranking*<sup>™</sup>. With a portfolio constructed using proprietary Fidelity Flex mutual funds, our Fidelity Go account has steadily outperformed in terms of performance above the Normalized Benchmark and Sharpe ratio. Their managed portfolios come with a low annual fee of 0.35% of assets under

management. Since the underlying mutual funds do not charge any internal expense ratios, this 0.35% fee represents the all-in cost to invest with Fidelity Go. Live advisors are available for clients enrolled in their Personalized Planning and Advice service, which comes with a slightly higher 0.50% all-in management fee. With this higher-tier service, account holders can work with an advisor to address investment and planning needs which are not covered by Fidelity Go's digital tools. Consistent performance, a competitive fee structure, and strong digital planning tools are why we ranked Fidelity Go as the Best Overall Robo.

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management fee. With this higher-tier service, account holders can work with an advisor to address investment and planning needs which are not covered by Fidelity Go's digital tools. Consistent performance, a competitive fee structure, and strong digital planning tools are why we ranked Fidelity Go as the Best Overall Robo.

Vanguard is once again the runner-up for Best Overall Robo in this edition of *The Robo Ranking*<sup>™</sup>.

While Vanguard lags behind in digital planning tools, Vanguard excels by focusing its offering around access to live advisors for all robo clients. Vanguard offers dedicated advisors to assist in financial planning for those with more than \$500K in assets.

Despite the shortcomings of their web platform, unlimited access to live advisors for 0.30% annually helped Vanguard receive the award for the runner-up Best Overall Robo. Although it was not considered in this ranking,

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*Vanguard's compelling platform has gathered the most assets of any digital advice provider by a wide margin.*

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as it has yet to be released, Vanguard has also announced a Digital Advisor platform that will be a digital-only offering at a lower cost and minimum. Vanguard's compelling platform has gathered the most assets of any digital advice provider by a wide margin. Building on this success, we expect Vanguard will continue to invest and improve its digital advice services.

TD Ameritrade placed third in total scores in this edition of the ranking. TD has a compelling offering. Similar to products from most other incumbent financial institutions, Essential and Selective Portfolios lack the intuitive online experience provided by independent robos. TD Ameritrade offers financial planning to all customers through their financial consultants either over the phone or in branches. Although this represents a more traditional approach to planning, the plans created can be comprehensive. While we acknowledge the quality of the Essential and Selective Portfolios' products, the recent acquisition of TD by Schwab creates uncertainty around the future of this product and how existing client accounts will be handled if and when the product is integrated with Intelligent Portfolios. We suggest that clients shopping for a new provider hold off on selecting Essential or Selective Portfolios until there is more visibility into how the integration with Schwab will be handled.

### ■ *Best Robo for Performance at a Low Cost*

**Winner: Fidelity Go**

**Runner-Up: Axos Invest**

*The Robo Ranking*<sup>™</sup> performance score is based on the performance of the account we track at the provider measured by its performance compared to the Normalized Benchmark, as well as the account's Sharpe ratio. This ranking analyzes a period of two and a quarter years. We awarded the Best Robo for Performance at a Low Cost to the top-performing robos, Fidelity Go and Axos Invest. Fidelity Go and Axos Invest are also the top-performing robos based solely on their performance

compared to the Normalized Benchmark in the trailing three-year period.

Fidelity Go charges a flat, all-in cost of 0.35% of assets under management. All funds held by Fidelity Go come with zero internal operating expenses. Therefore, while robos like Vanguard and Wealthfront have lower management fees, Fidelity Go's cost is right in line with other leading providers when including the average weighted expense ratio of the funds held in the portfolios. Fidelity Go has a history of strong performance. It placed first for total portfolio and equity performance, and second for fixed-income performance over the three-year trailing period.

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*All funds held by Fidelity Go come with zero internal operating expenses.*

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Axos Invest (formerly WiseBanyan) placed second for Best Robo for Performance at a Low Cost. In addition to having the second-best performance over the three-year period, there is no management fee for investors in their most basic service plan for taxable accounts, regardless of account size. Axos Invest also offers a la carte pricing for additional services, like tax-loss harvesting. While taxable accounts carry no management fee, investors are required to purchase the tax-efficiency package in their IRA accounts at Axos Invest. Even including this cost, Axos Invest's fee of 0.24% annually for its IRAs is on par with other inexpensive products. While Schwab also offers free management of taxable accounts at its lowest service level, Axos does not mandate a high cash balance in their models, which could hinder long-term performance.

Axos Invest's platform is a digital-only platform, meaning there is no access to live advisors for clients. Their financial planning tools follow a different design than most other digital planning tools. Axos clients work through a series of modules, answering questions about their financial lives. These questions cover a broad set of topics, including student loans, mortgages, and budgeting. The software then

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*For those seeking a robo with a history of strong performance at a low cost, Axos is a quality choice.*

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delivers advice on areas the client should focus on next, many of which are not directly related to investments. This approach covers a wider breadth of personal finance topics than many other tools and can help clients identify important areas of their wholistic financial picture that need to be

addressed. The downside to this method is it does not produce a comprehensive, integrated, multi-goal plan.

For those seeking a best-performing robo, Axos is a quality choice. However, those with more complex financial planning needs or the desire to be able to work with a live advisor may want to consider other options.

## ■ *Best Robo for Complex Financial Planning Needs*

**Winner: Vanguard Personal Advisor Services**

**Runner-Up: Personal Capital**  
**Honorable Mentions: Ellevest & Wealthsimple**

We believe that complex financial planning benefits from the ability to work with a live planner. Therefore, investors looking for more personalized advice and tailored portfolio allocations may still need to work with human advisors. To justify the level of customization being offered, such services typically have higher investment minimums than digital-only products.

Vanguard's large scale has allowed them to create a service that can build comprehensive plans with live advice for all of its robo clients for a low fee of 0.30%. This is a discount compared to most similar offerings that provide access to live planners. At Vanguard, planning centers around the direct client-advisor relationship. Working with an advisor, users can plan for multiple long-term investment goals and receive

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*For those with complex planning needs, Vanguard is a quality option due to its emphasis on the human experience and overall low costs.*

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a comprehensive illustration of their assets. While Vanguard's digital planning tools are not as robust as those offered by Personal Capital, their individualized approach stands out. Vanguard's offering represents a more traditional advice relationship, as planning is primarily driven by communications with live planners. Generally, Vanguard's user interface is not as intuitive as the leading independent providers. For

those with complex planning needs, Vanguard is a quality option due to its emphasis on the human experience and overall low costs.

Personal Capital also excels in this category due to their top-in-class digital planning tools. Their free digital planning tools are flexible and can handle a broad set of income and spending goals. When the digital planning tool falls short, all Personal Capital investors have access to live advisors to handle complex planning needs.

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*When the digital planning tool falls short, all Personal Capital investors have access to live advisors to handle complex planning needs.*

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Through their tiered-service model, the level of portfolio customization and advice services offered increases with the amount of assets under management. Those investing more than \$1,000,000 with Personal

Capital's Private Client service receive custom portfolios that include individual stocks and bonds, as well as the option of gaining exposure to private equity. Compared to other leading digital advice providers, the biggest detriment to Personal Capital are high fees, which currently start at 0.89%. When compared to other digital advice providers, this fee is high but is still lower than typical traditional advisors. Fees aside, Personal Capital was one of the few advisors in our ranking with a perfect score in the financial planning category.

Both Wealthsimple and Ellevest earned honorable mentions for complex financial planning capabilities. In their highest service levels, Wealthsimple Generation and Ellevest Private Wealth, investors receive individualized planning and investment services comparable to those offered by Personal Capital's Private Client offering. Ellevest, which caters to female investors, also has the unique feature of offering career coaching to help clients navigate salary negotiations and other career challenges. Wealthsimple, on the other hand, provides live advisors to all of their clients, regardless of service level. Those who wish to build a plan with a Wealthsimple advisor will need a minimum investment of \$100,000 and be signed up for Wealthsimple Black. Wealthsimple can provide comprehensive plans, but the planning portal and the regular client portal are not currently integrated. Similarly, full planning services at Ellevest are introduced at its premium service tier, which requires a minimum of \$50,000.

## ■ *Best Robo for First-Time Investors*

**Winner: Betterment**

**Runner-Up: SoFi**

Betterment wins the award for Best Robo for First-Time Investors. With no investment minimum and a 0.25% annual fee on assets under management, their digital-only product is a strong choice for first-time investors. Betterment's single-goal financial planning tools make it easy for users to plan for future financial success. Investors can easily track both total portfolio and account-specific performance. They can also use Betterment's goal forecaster to see how one-time or recurring investments would impact the probability of achieving a goal. The retirement goal forecaster provides an estimate of retirement spending that users can adjust. In addition, Betterment offers various financial planning packages that provide personal consultations with a Certified Financial Planner on an as-needed basis for an additional one-time fee. Thus, users can pay for personalized professional help as they see fit without upgrading to Betterment Premium. It is important to recognize that as a client's assets grow, so do their financial planning and management

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*Betterment's tiered service model is attractive as an investor can always upgrade to the premium service levels without having to change providers.*

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needs. Betterment's tiered service model is attractive as an investor can always upgrade to the premium service levels without having to change providers.

Betterment users can also open savings and checking accounts with Betterment Everyday. The latter has a debit card option, while the high-yield savings account pays a competitive interest rate and is a good place to maintain an emergency fund or save for short-term goals.

While SoFi does not have the best overall score in our ranking, it features no account minimum, no management fees, free access to career counseling and live financial advisors, which together make it attractive to a cost-conscious first-time investor.

While SoFi's primary business is built around consumer lending, it sees investment management as an important financial service offering to prospect

new clients and strengthen its current client relationships. Many SoFi customers start their relationship by consolidating student loans. Once debt repayment is planned, the next logical step is to begin saving and investing. In addition to lending and investment services, SoFi also offers free checking and high-interest savings accounts through SoFi Money, free budget tracking and planning with SoFi Relay, as well as various insurance offerings. With the wide breadth of financial services offered, SoFi is positioning itself as a comprehensive provider for all of its users' financial needs.

### ■ *Best Robo for Digital Financial Planning*

**Winner: Wealthfront**

**Runner-Up: Personal Capital**

**Honorable Mention: Schwab**

Wealthfront, Personal Capital, and Schwab stand above their peers in this category by offering robust planning tools to clients and prospective clients alike. Their tools can handle complex, multi-goal plans that show users the interaction of all their goals in a single, unified plan. These digital planners also leverage automated account aggregation and provide users with a comprehensive view of their financial picture, regardless of where their assets are held. Wealthfront and Personal Capital also have the added bonus of providing their tools for free without the requirement of first becoming a paying client. In the past, independent robo advisors have offered the best digital financial planning experiences; however, Schwab's upgrade of their financial planning tools in 2019 earned them the honorable mention in this category.

Wealthfront once again takes the top spot for best digital planning tools, as their platform can model six different planning scenarios: retirement, saving for college, buying a home, large one-time expenses, income windfalls, and taking extended time off work to travel. Whenever adding a new goal, Wealthfront has built an intuitive questionnaire that walks users through the variables that are considered in their analysis, projecting how a new goal will impact each of their other investing and spending goals. For example, their extended travel goal considers your current income, net worth, and estimated travel costs to help users determine the potential impact on their holistic financial plan.

Once set up, all goals are plotted along the net-worth timeline for easy visualization. Wealthfront has also taken steps in recent months to bolster its financial planning platform by acquiring another fintech startup, Grove. With the help of Grove's team and technology, Wealthfront is developing a platform called "Self-Driving Money," aimed at further reducing the friction of saving and meeting financial goals. Wealthfront has also hinted at a platform to help users acquire mortgages, which will most likely take into consideration a user's overall planning needs.

Like Wealthfront, Personal Capital's planning tool can model a broad set of goals in a unified plan. Within their suite of planning tools, Personal Capital provides users with a retirement planner, savings planner, investment checkup tool, and retirement fee analyzer. Using the retirement analysis tool, individuals can factor seven different types of income events and ten different spending goals, covering a wide range of client needs. However, there are limitations to the tools provided. For example, Personal Capital's home purchase tool takes into consideration the down payment and age at which the purchase will occur, but does not adjust spending to account for a change in the cost of living due to mortgage payments, property taxes, etc. In contrast, Wealthfront's tool considers a user's current housing costs, income, where they want to purchase, the length of the mortgage, and other variables to give users a range of home values they can afford. Wealthfront then shows how homeownership will affect a user's net worth over time by plotting it in its unified plan. While Personal Capital offers a wider breadth of planning options, Wealthfront wins as the Best Robo for Digital Financial Planning due to its more dynamic, data-driven planning tools.

Schwab deserves an honorable mention in this category, after it revamped its financial planning experience in 2019, as well as introduced a set of features to help retirees with income during retirement in 2020. Within the financial planning platform, investors can build multiple financial goals with different risk tolerances that factor in assets held in outside accounts. The new tool also allows for 16 different goals, including starting a business, leaving an inheritance, and anticipated healthcare needs, among others. Schwab also allows users to customize the importance of each goal, ranking them between needs, wants, and wishes. The tool then walks users through an 11-step questionnaire that factors in all money sources available, including



*Schwab deserves an honorable mention in this category, after it revamped its financial planning experience in 2019*

Social Security, pensions, insurance, stock options, etc. They allow a user to allocate certain accounts towards specific goals. After assessing risk tolerance, the planning tool runs a Monte Carlo simulation, helping users

understand their probability of successfully achieving their goals. This tool is powered by Money Guide Pro, an in-depth planning software commonly utilized by financial professionals. When combined with a scheduled call with a financial planner, Schwab's platform provides significant value.



## Robo Ranking Facts

	2.25-Year Annualized Return	2.25-Year Return Above/Below Normalized Benchmark	2.25-Year Sharpe Ratio	Account Minimum	Advisory Fee	Average Weighted Expense Ratio
Acorns <sup>1</sup>	6.92%	-0.26%	0.63	No minimum	\$1/month for Acorns Invest; \$2/month for Invest + Acorns Later, \$3/month for Acorns Invest + Acorns Later + Acorns Spend. For balances above \$1 million, \$100/month per \$1 million in AUM	0.09%
Ally Financial <sup>9</sup>	6.88%	-0.24%	0.65	\$100	0.30% annually; Also offer Cash-enhanced portfolio with 30% invested in cash and no management fee	0.07%
Axos Invest <sup>8</sup>	7.73%	0.32%	0.71	No minimum	No fee for basic package; add-on packages, such as tax-loss harvesting, come at additional cost	0.09%
Betterment <sup>27</sup>	6.26%	-1.21%	0.53	Digital: No minimum; Premium: \$100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor), 0.30% above \$2M	0.08%
E*Trade (ETF) <sup>21</sup>	6.94%	-0.24%	0.64	\$500	0.30% annually	0.10%
Ellevest <sup>15</sup>	6.30%	-0.71%	0.61	Digital: No minimum; Premium: \$50,000	Digital: 0.25%; Premium: 0.50% (access to live advisors and executive coaches)	0.07%
Fidelity Go <sup>33</sup>	7.69%	0.45%	0.74	Digital Only: No Minimum; Personalized Planning & Advice: \$25,000	Digital Only: 0.35%; Personalized Planning & Advice: 0.50%	0.00%
FutureAdvisor <sup>3</sup>	5.95%	-1.07%	0.58	\$5,000	0.50% annually	0.08%
Merrill Edge <sup>31</sup>	6.67%	-0.38%	0.67	Guided Investing: \$5,000; Guided Investing with an Advisor: \$20,000 (digital only);	Guided Investing: 0.45% annually; Guided Investing with an Advisor: 0.85% annually	0.07%
Personal Capital <sup>4</sup>	6.16%	-1.78%	0.49	\$100,000	0.89% annually for the first \$1 million; lower at different tiers over \$1 million	0.11%
Schwab <sup>5</sup>	5.54%	-1.86%	0.39	Intelligent Portfolios: \$5,000; Intelligent Portfolios Premium: \$25,000	Intelligent Portfolios: No fee (digital only); Intelligent Portfolios Premium: \$300 initial planning fee, \$30/month subscription	0.21%
SigFig <sup>6</sup>	7.26%	-0.04%	0.65	\$2,000	No fee for the first \$10k; 0.25% annually for balance over \$10k	0.06%
SoFi <sup>17</sup>	6.54%	-0.50%	0.60	No minimum	No management fee	0.05%
TD Ameritrade <sup>10</sup>	7.28%	-0.37%	0.61	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.05%
TIAA <sup>7</sup>	6.98%	-0.26%	0.65	\$5,000	0.30% annually	0.07%
Vanguard <sup>4A</sup>	7.00%	-0.18%	0.65	Vanguard Personal Advisor Services \$50,000	Vanguard Personal Advisor Services 0.30% annually for the first \$5 million; lower at different tiers over \$5 million.	0.07%
Wealthfront <sup>22,B</sup>	7.14%	-0.33%	0.62	\$500	0.25% annually	0.11%
Wealthsimple <sup>11</sup>	5.00%	-2.18%	0.40	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%

\*Net of Fees Returns for the period of: 9/30/2017 - 12/31/2019

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

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## Robo News

- *Schwab launches Intelligent Income for retirees*
- *Schwab announces acquisition of TD Ameritrade*
- *USAA announces closure of digital advice product*
- *SigFig reported to have laid off 10% of its workforce*

### Entry and New Products

The robo advice industry will soon have a new player: Goldman Sachs. Details are limited but Rachel Schnoll, head of Goldman's RIA platform, said that the product is built but not yet available to the public. The new robo advisor is expected to pair nicely with Marcus, Goldman's consumer-facing bank. Both are part of Goldman's initiative to serve the mass-affluent segment.

Industry giant Principal Financial Group launched its own hybrid robo advisor called Principal SimpleInvest. Principal will target the 401(k) rollover market, which Principal believes is underserved. Additionally, Bloom, a leader in independent 401(k) management, has expanded to manage IRAs.

As robo advice becomes commoditized, providers have moved to expand their product offerings.

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*As robo advice has become commoditized, providers have moved to expand their product offerings.*

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Schwab recently unveiled Schwab Intelligent Income, a retirement paycheck tool that will be available for Intelligent Portfolio users. The tool draws assets from a user's portfolio in a "tax-smart and efficient way" and provides that user with a

monthly distribution to fund retirement needs. JP Morgan Chase, late to the robo advice space, is also piloting a retirement robo portfolio with access to its GlidePath Portfolios, which are currently only available to employees.

All of this activity reflects the fact that companies are continuing to dedicate resources to further develop digital advice products. A November report by the Aite Group claims that assets

managed by robos are up 10% over the first three quarters of 2019, excluding a roughly 10% increase in equity markets in the fourth quarter. At least two robos, United Income and Twine, passed the \$1 billion in assets mark. Vanguard reported that its Personal Advisor Services has \$148 billion in AUM as of September 30, 2019. The Aite report paints a bright future for the industry, predicting a four-fold increase in robo assets by 2023.

### Cash Products Continue to Shine

According to a November Wall Street Journal article, the amount of cash in money markets has

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*Digital advisers and other fintech platforms have jumped on this trend by offering high-yield savings accounts and other banking products.*

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recently reached an all-time high. Digital advisers and other fintech platforms have jumped on this trend by offering high-yield savings accounts and other banking products. Betterment recently released its Betterment Everyday debit card and Wealthfront is expected to release a debit card product soon.

After originally running into regulatory issues when it first launched a cash management product, Robinhood has regrouped with a newly designed debit card. The interest rate on the cash in this account is comparable to existing high-yield accounts in the market. Robinhood was previously pursuing a bank charter to offer these services but

instead opted to partner with banks, similar to the arrangements that other fintechs have. The original launch of their cash account in 2018 is not the only time Robinhood has run into regulators. Last quarter, FINRA fined the company \$1.25 million for failing to ensure investors were getting the best execution on trades.

Google announcing a partnership with Citigroup to offer a debit card is another example of how technology firms are now competing over traditional personal banking products. Bank accounts were the first wave of robo advisors' expansion into traditional banking products, but robos will not stop there. For example, Wealthfront will soon help connect customers with home mortgages through its platform.

### *Troubles, Regulatory Mishaps*

Although established firms are continuing to invest in their digital advice platform, not all firms are thriving. In the spring of this year, Axos Financial acquired WiseBanyan and recently completed rebranding it as Axos Invest. Axos CEO, Greg Garrabrants, said that he expects that the new Axos Invest will lose \$3 million to \$4 million in the 12 months following the acquisition. This is substantial, considering that prior to the acquisition, WiseBanyan raised \$6.6 million, according to Crunchbase.

B2B-focused robo SigFig reportedly laid off 10% of its workforce and has also experienced the departure of three senior staff in recent months. Although SigFig now partners with major institutions like UBS, Wells Fargo, and Citizens Bank, it has been reported that B2B advice platforms have not seen high levels of adoption.

Meanwhile, the second half of 2019 witnessed some closures of digital advice products. The most noticeable was USAA, who alerted customers that it would be closing its robo accounts in February. The USAA announcement follows the acquisition of its investment management arm by Schwab. Planswell, a Canadian robo, shut down in Novem-

ber after investors pulled out of a \$20 million fundraising round.

### *Other News*

Schwab announced that it will acquire TD Ameritrade in an all-stock deal. The acquisition represents significant consolidation within the online brokerage and RIA custody markets. It will also

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*The TD Ameritrade acquisition represents significant consolidation within the online brokerage and RIA custody markets.*

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boost Schwab's position as the second-largest direct-to-consumer robo advisor. Schwab's Intelligent Portfolios, which already manages over \$43 billion, is set to absorb TD Ameritrade's estimated \$20 billion digitally advised assets. Even after the merger, Vanguard is still well ahead with \$148 billion in digital advice AUM.

The merger does raise questions for TD Ameritrade customers. It is unclear how Schwab will handle integrating customers into the Schwab network. In its Intelligent Portfolios, Schwab invests clients in proprietary funds. If Schwab wants to convert TD Ameritrade's Essential and Selective Portfolio customers to its Intelligent Portfolios platform, there will be a conflict of interest for Schwab, who could sell clients into Schwab funds but trigger a taxable event by doing so. SoFi made headlines earlier this year when it introduced its own proprietary funds and sold customers into them without any notification or consideration of tax consequences. Months later, SoFi rectified the situation by compensating customers for any tax they would owe.

TD Ameritrade and JP Morgan lowered their investment minimums to \$500. Schwab's minimum currently sits at \$5,000. With pressure from JP Morgan, Fidelity, and Vanguard, it remains to be seen whether or not Schwab will also lower its minimum after its acquisition of TD Ameritrade is complete.



## Performance Commentary

- *SRI portfolios maintain strong performance through the end of 2019*
- *Axos Invest is emerging as a performance leader*
- *Fidelity Go and SigFig lead the three- and four-year performance periods*

## Taxable Top Performers

### 1-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Axos Invest	Prudential	TIAA Active
Equity	Wealthsimple SRI	Prudential	Morgan Stanley SRI
Fixed Income	E*Trade	Wells Fargo	Axos Invest

*Produced by Backend Benchmarking for BackendB.com*

### 2-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Axos Invest	TIAA SRI	Fidelity Go
Equity	Zacks Advantage	Fidelity Go	TIAA SRI
Fixed Income	Ally Financial	E*Trade	Axos Invest

*Produced by Backend Benchmarking for BackendB.com*

### 3-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Fidelity Go	Axos Invest	SigFig
Equity	Fidelity Go	SigFig	Axos Invest
Fixed Income	Schwab	E*Trade	Fidelity Go

*Produced by Backend Benchmarking for BackendB.com*

### 4-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	SigFig	Axos Invest	Schwab
Equity	SigFig	Axos Invest	Vanguard
Fixed Income	Schwab	SigFig	Axos Invest

*\*Net of Fees Returns as of: 12/31/2019*

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

*Produced by Backend Benchmarking for BackendB.com*

## *Markets Recap*

Financial markets finished the year near all-time highs, wrapping up a decade marked almost exclusively by bull markets. The S&P 500 Index was up 9.06% in the fourth quarter of 2019 and 31.48% for the year. While 2019 returns look impressive, they are in part due to a significant market downturn at the end of 2018. Regardless, 2019 was a year of strong economic growth, despite trade tensions and political uncertainties. Growth stocks outperformed value stocks in the fourth quarter, as was the case throughout 2019. However, the gap in performance between the two did narrow in the second half of the year.

International markets, both developed and emerging, had a very strong fourth quarter. Emerging markets equities outpaced their developed counterparts. China was a main driver, as it benefited from positive developments in trade talks with the U.S. Additionally, Brazilian equities also moved higher on the passage of a pro-market pension reform bill, helping boost emerging markets as a group. Markets in the United Kingdom bounced back strongly in the fourth quarter after a period of stagnation; a decisive election gave hope that the nation might finally be able to put the uncertainty surrounding Brexit in the rearview mirror.

Accommodative central bank policies around the world and low corporate default rates kept fixed-income yields historically low. The 10-year Treasury yield finished the year at just 1.92%. While the yield curve remains flat, it is no longer inverted. This is an important development, at least psychologically, for investors. Persistently low yields have continued to push yield-seeking investors towards riskier sectors of the bond market. Consequently, high-yield debt was a top performer in the period.

## *SRI Portfolios Continue to Post Strong Results*

Socially Responsible Investing (SRI) portfolios are continuing to perform strongly. Our TIAA, Morgan Stanley, and Betterment SRI portfolios now have a full two-year performance track record. All three outperformed the non-SRI portfolio tracked at each provider over the same period. Betterment's

SRI portfolio outperformed on a total-return basis despite having a slightly lower risk allocation and holding 60% equities compared to our regular portfolio, which holds 65%. Over the one-year period, Betterment's standard portfolio outperformed on a total-return basis. However, when looking at the portfolios compared to the Normalized Benchmark, which accounts for differences in equity and fixed income allocations between portfolios, the SRI portfolio outperformed the regular.

Of the eight SRI portfolios we track with a one-year track record, results were less consistent. Merrill, TIAA, Wealthsimple, Morgan Stanley, and Wealthsimple SRI portfolios all outperformed their regular counterparts based on both the total return and return compared to the Normalized Benchmark. The standard Ellevest, TD Ameritrade, and E\*Trade portfolios, on the other hand, outperformed their respective SRI portfolios. Our TD Ameritrade SRI portfolio experienced a trading mishap at the end of 2018 due to tax-loss harvesting. While this error significantly held back the portfolio's performance starting in the first quarter of 2019, this trading mishap was not related to the portfolio's SRI theme. Betterment's one-year results were split: the regular portfolio outperformed based on total performance, while the SRI portfolio outperformed based on performance compared to the Normalized Benchmark.

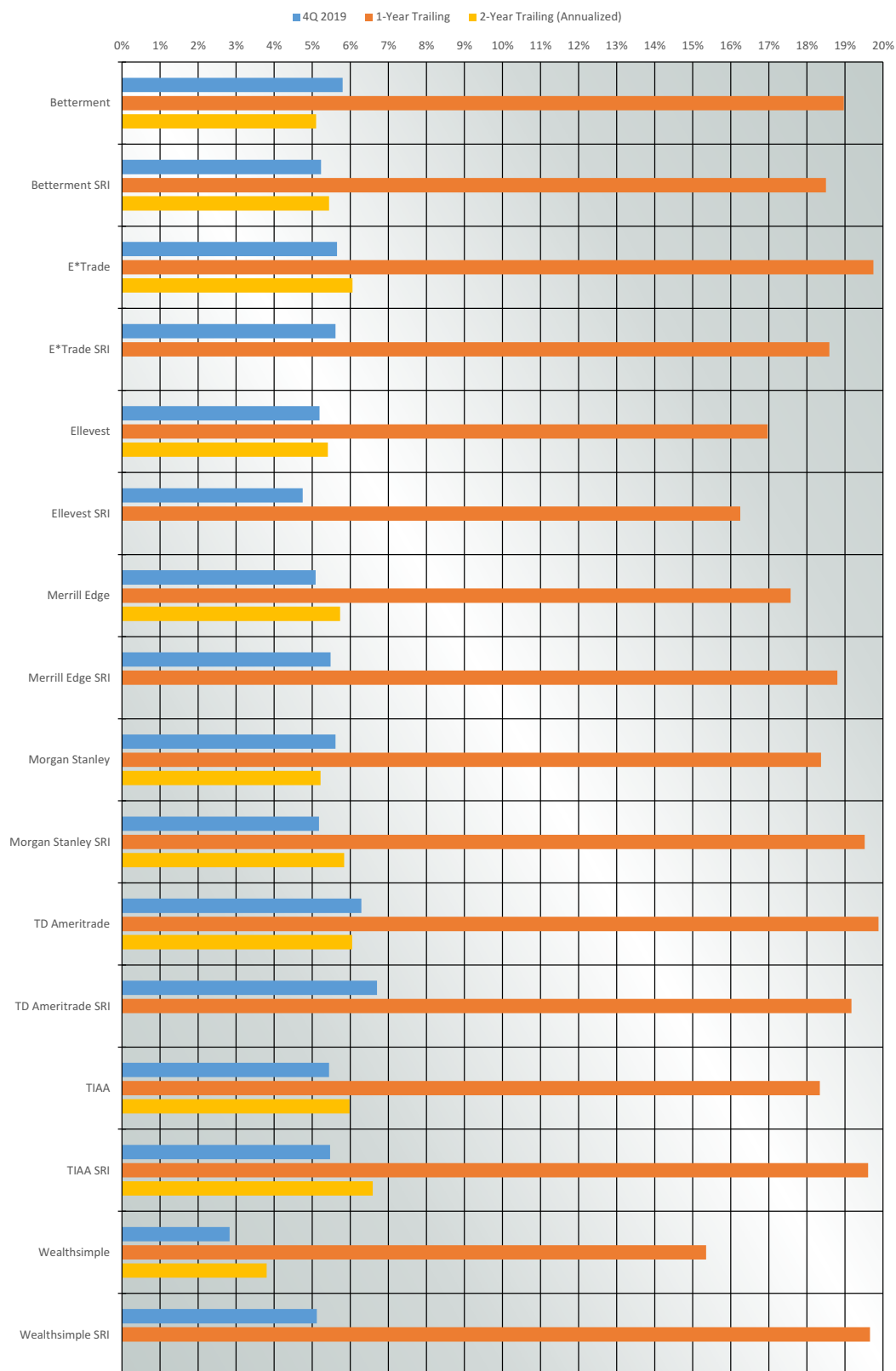
The SRI portfolios we track are performing well compared not only to the standard portfolios at the same provider but also compared to all of the taxable portfolios we track. Over a one-year trailing period, the Wealthsimple SRI portfolio and the Morgan Stanley SRI portfolio placed first and third overall, respectively, for top equity performance. This is an impressive showing as the report now contains 43 portfolios with a one-year track record. Additionally, the TIAA SRI portfolio placed second for total performance in the two-year time period.

While the track record of our SRI portfolios is still short, our performance results are a positive sign for investors interested in SRI offerings. The SRI portfolios that we track rely on SRI-focused funds, which typically carry higher expense ratios compared to low-cost index funds commonly held by robos. So far, investors in SRI portfolios at





## SRI Performance Chart



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*So far, investors in SRI portfolios at digital advice providers have not experienced a significant performance drag, despite higher fees, when opting for these portfolios.*

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the available data suggests that SRI portfolios may be able to provide higher net-of-fees performance.

### ***Axos Invest Emerging as Performance Leader***

Axos Invest has been a strong performer. Their fixed-income holdings placed third in the one-, two-, and three-year time periods. A large allocation to an investment-grade corporate fixed income fund has performed well over the past years. Exposure to high-yield debt has also boosted their performance.

Axos Invest has a relatively simple equity portfolio. It relies heavily on a domestic all-cap ETF, which means they have heavy exposure to large caps. Large caps have consistently outperformed small- and mid-cap stocks over the past three years. Maintaining a market-neutral approach to value and growth has also helped them outperform many of their peers that tilt towards value.

### ***Fidelity Go Maintains Strong Performance***

Fidelity Go has maintained their top performer spot over the three-year time period. A market-

neutral stance towards growth and value, as well as a high allocation to domestic large caps, has propelled their equity performance.

Fidelity Go's fixed-income portfolio has a longer maturity than most. This has contributed to its performance over a period during which bonds with longer maturities have outperformed their shorter-maturity counterparts.

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*Fidelity Go has maintained their top performer spot over the three-year time period.*

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digital advice providers have not experienced a significant performance drag, despite higher fees, when opting for these portfolios. In fact,

### ***SigFig Takes Top Four-Year Total Performance Leader***

Over the three-year and four-year periods, SigFig is a top performer. It placed first for the four-year total and equity returns and third for total returns in the three-year period. SigFig's portfolio holds a larger percentage of its international holdings in emerging markets versus foreign developed than its peers do. Emerging markets have significantly outperformed foreign developed markets over the four-year period. Their domestic equity allocation relies on total stock market ETFs. This choice has kept their portfolio from being overweight in mid- or small-caps and from taking on a significant value or growth tilt. Both of these characteristics have helped them achieve their long-term success.

### ***Schwab Holds onto Long-Term Fixed Income Top Performer but Lags in Total Performance***

Schwab has held onto its strong fixed-income performance in the three- and four-year periods. The portfolio tilts towards longer-maturity issues that have driven their outperformance. Although the allocations are small, exposure to high-yield and international bonds have also boosted performance during these periods.

Although Schwab has strong three- and four-year fixed income performance, its total performance has not performed well in the one-, two-, and three-year periods based on performance compared to the Normalized Benchmark. High international exposure, a value tilt, and high allocation to cash has held back the performance of Schwab's portfolio.

### ***One- and Two-Year Trailing Performance Highlights***

E\*Trade's fixed income portfolio has stood out, placing first in the one-year trailing period and second in the two- and three-year periods. Their fixed-income portfolio is made up of nearly equal portions of an intermediate corporate bond fund and a Barclays aggregate bond index ETF. Both funds sit primarily in the intermediate maturity range and hold only investment-grade issues. This

strategy of taking on low credit risk and only moderate interest rate risk has propelled their fixed income returns and proven that simple portfolios can be performance leaders.

Zacks had the best equity performance in the two-year period. Zacks relies heavily on an S&P 500 ETF and a low allocation to international holdings that, together, have helped them drive strong equity performance.

Wealthsimple made significant changes to its portfolio in the fourth quarter. They nearly doubled their international exposure, as a percent of equities, and replaced some existing international funds with global and developed foreign markets funds. These new holdings are advertised as “Minimum

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*Wealthsimple made significant changes to its portfolio in the fourth quarter.*

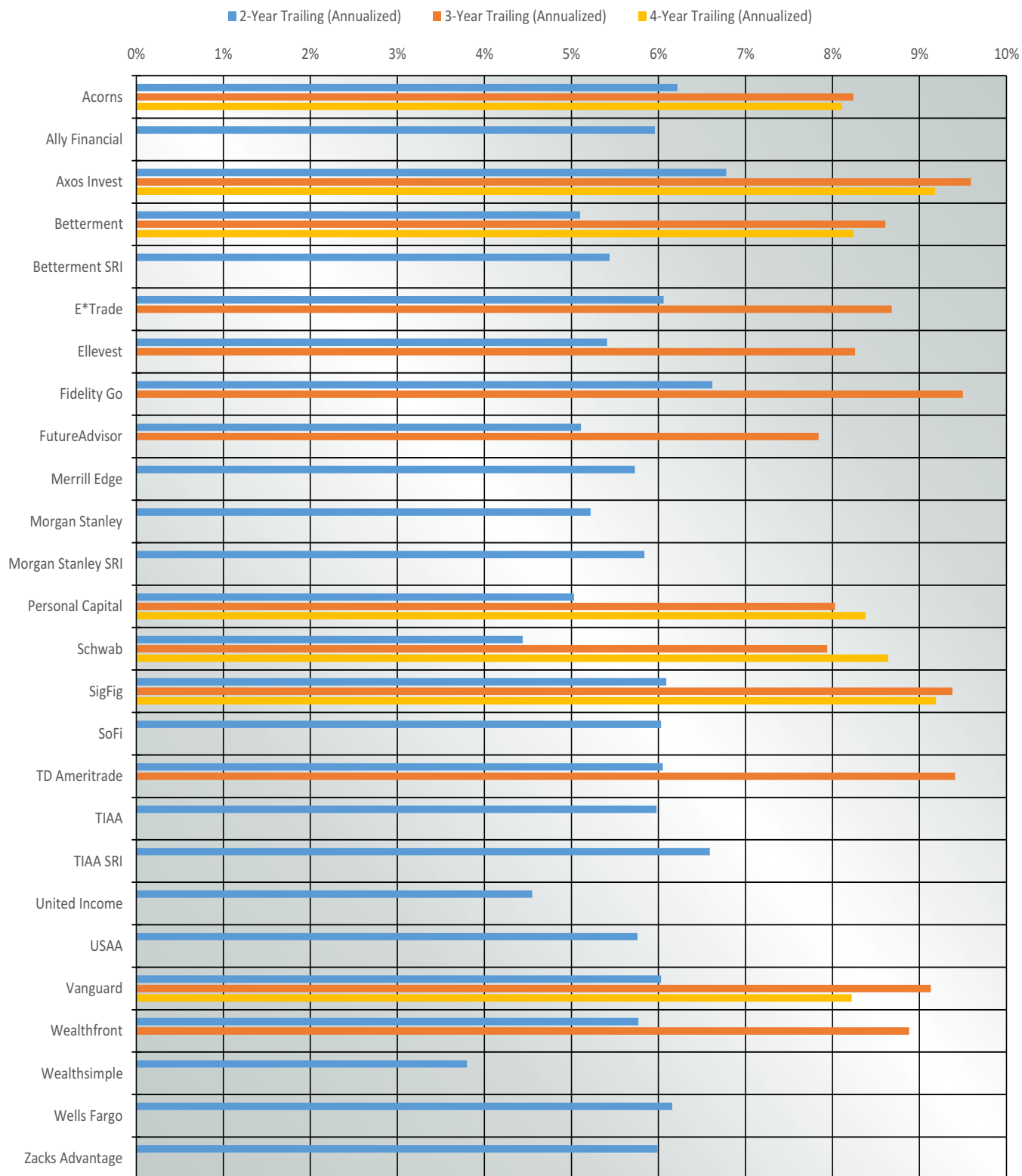
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Volatility” funds. These funds significantly underperformed other domestic and foreign funds. In the fourth quarter, Wealthsimple had the poorest performance by more than a percentage point.

Prudential performed second best over the one-year period for both total and equity-only performance. Relying heavily on an S&P 500 ETF and maintaining low international exposure has benefited this portfolio. Within their fixed income holdings, Prudential’s exposure to international and high-yield funds propelled their top performance.



## Taxable Account Performance



Produced by Backend Benchmarking for BackendB.com



## Robo Interview

- *Interactive Advisors' unique approach gives clients more control and access to active strategies.*
- *Fractional shares and low-cost trading pose a threat to the dominance of ETFs.*
- *Industry-wide, digital planning tools need improvement before they can compete more fully with traditional advisors.*

This quarter we spoke with Interactive Advisors' CIO, Sanjoy Ghosh, who provided insight into Interactive Advisors' unique approach to digital investing and where he predicts the industry is headed.

### *Interactive Advisors' Unique Approach*

In 2015, Interactive Brokers acquired digital advice platform Covestor, which then became Interactive Advisors. Sanjoy started at Covestor in 2013 and has been with the product ever since. When asked about how Covestor has changed over the years, Sanjoy responded, "When Covestor started, it was a marketplace for portfolio managers where retail clients could access the marketplace and easily replicate trades that the portfolio managers were making." In this sense, it was different from other robos, who offered a select few portfolios they constructed based on an investor's risk tolerance. He continued, "In a sense it was a way to get exposure to portfolio manager portfolios that were not mutual funds or ETFs, but buy and sell them as easily as you would any structured product."

While Wealthfront and Betterment were also increasing access to professional management, the major players were only offering a single portfolio at this time. Covestor was appealing to investors who still wanted to have more direction on how their assets were managed and to gain access to third-party managers. A difficulty in any marketplace, though, is quality control. As Sanjoy describes, quality control was one of the initiatives put in place after the acquisition by Interactive

Brokers: "When I joined, the marketplace had a very large number of portfolios, and I would say that one change at that point is it was more a quantity game, whereas now it has become a quality game... After Interactive Advisors took over Covestor, we changed the platform and started curating the marketplace of managers... We now have a more risk-controlled, higher quality product than we did at Covestor."

While the number of portfolios and the process of allowing third-party managers onto the platform has changed, Sanjoy shared with us that "the crux of the fintech company that we were, which was to allow investors to buy and sell portfolios in their SMA account as easily as they could buy and sell stocks, still remains."

Other leading advice providers, like Betterment and Wealthfront, have a much more limited set of portfolio options and do not give clients nearly as much control over strategies as Interactive Advisors currently does. Interactive Advisors both constructs and manages portfolios itself. It also has outside managers, like Wisdom Tree and State Street Global, construct portfolios that are available on the platform.

This model allows Interactive Advisors to provide both low-cost indexed portfolios and to give self-directed investors the ability to seek out active management. Investors who have an opinion on active strategies can seek out providers that specialize in certain market segments or practice specific portfolio construction strategies.



### *Fractional Shares and Free Trading: Consequences in Customization*

When speaking about the future of the investing platform, Sanjoy highlighted that the expansion of fractional shares and no-commission trades will open the doors for customization. Fractional shares and no-commission trading lower the barriers to replicating an index or strategy by owning the underlying securities directly. Sanjoy said, “I would say that the ETFs will soon start losing their edge because you can effectively replicate an ETF with fractional, low-cost trading, and also apply customization.” The example he gave of customization was a client who wants to own the S&P 500 but wants to screen out any companies that do animal testing. By replicating an index directly, instead of owning an S&P 500 ETF, it is possible to screen out individual companies or a set of companies based on specific criteria.

### *Interactive Advisors Response to the Growing ESG Investing Trend*

This approach to environmental, social, governance (ESG) investing ties directly into another area Interactive Advisors has been developing. Socially responsible investing (SRI) and ESG investing has been a growing trend across the industry. While many digital advice providers now offer access to SRI- or ESG-themed portfolios, Interactive Advisors is expanding options for their clients. ESG investing is a broad umbrella of different causes and themes and Interactive Advisors is aiming to provide the ability for clients to either invest in broad

ESG portfolios or to focus on specific areas within this broad umbrella.

### *Planning Tools and Personalized Advice: The Next Frontier*

We also asked Sanjoy about whether or not digital advice platforms are providing significant competition with traditional advice. He thinks that the quality of the digital tools needs to improve before platforms could better replicate a live-advisor experience. Sanjoy said, “When you think of a financial advisor, he spends a lot of time talking to you, finding out about your needs, finding out how fungible your different goals are. I think the current framework of just asking some questions and giving you a risk score is not enough. I think you are going to see a lot of improvement in financial planning tools... coming up with a risk profile of the client which is more goals-based and then giving advice and holding their hand to make sure they get there.” Citing examples of advising a client to push a goal or retirement age out further or to consider purchasing a less expensive house, Sanjoy said, “That kind of advice—where it starts talking to the client based on interactions of the client with the tool—I think is at its infancy stage right now.”

While digital advice tools now operate mostly based on a simple risk tolerance questionnaire, both digital planning tools and the introduction of live advisors are making these platforms more capable of handling complex client interactions. This trend will continue as these platforms evolve.



## Charts and Tables

### 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	\$207	\$105	Aug, 2019	\$860	\$1,149	4,500,000 Accounts	Recent ADV & Company Reports
Ally Invest Advisors	N/A	N/A	N/A	Acquired TradeKing for \$294 Million June, 2016	\$242	21,513	Recent ADV
Betterment	\$275	\$70	Aug, 2017	\$800	\$20,000	419,543	Recent ADV & Company Representative
Ellevest	\$78	\$33	Mar, 2019	Unknown	\$357	29,441	Recent ADV
FutureAdvisor	N/A	N/A	N/A	Acquired by BlackRock for \$152 Million August, 2015	\$1,192	12,285	Recent ADV
Personal Capital	\$265	\$50	Feb, 2019	Unknown	\$12,000	22,000	Company Representative
Schwab Intelligent Portfolio Products	N/A	N/A	N/A	N/A	\$43,000	315,000 Accounts	Company Representative & Spring '19 Business Update
SigFig	\$120	\$50	June, 2018	\$471	\$485	11,168	Recent ADV
SoFi Invest	N/A	N/A	N/A	N/A	\$106	26,537	Recent ADV
TD Ameritrade Selective and Essential Portfolios	N/A	N/A	N/A	N/A	\$20,700	Unknown	Company Representative
T Rowe Price ActivePlus Portfolios	N/A	N/A	N/A	N/A	\$355	Unknown	Company Representative
United Income	N/A	N/A	N/A	Acquired by Capital One for undisclosed amount in Aug. 2019	\$1,014	1,143	Recent ADV
Vanguard Personal Advisor Services	N/A	N/A	N/A	N/A	\$148,000	Unknown	Press Release
Wealthfront	\$205	\$75	Jan, 2018	\$500	\$23,000	247,041	Recent ADV & Website
Wealthsimple	\$267 (CAD)	\$100 (CAD)	May, 2019	Unknown	5,000 (CAD)	175,000	Company Website
Axos Invest	N/A	N/A	N/A	Acquired by Axos Financial for undisclosed amount in Oct. 2018	\$179	23,659	Recent ADV

\*all funding and valuation amounts are estimates

\*\*sources: Crunchbase, Pitchbook, News Media

△This valuation number has been disputed

^Other Than Annual Amendment

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## Taxable Returns

	Total									
	4Q 2019	4Q 2019 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)	4-Year Trailing (Annualized)	4-Year Trailing Return Above/Below Benchmark (Annualized)
Acorns <sup>1</sup>	5.26%	-0.21%	20.09%	0.92%	6.22%	0.05%	8.24%	-1.08%	8.11%	-0.63%
Ally Financial <sup>9</sup>	4.98%	-0.40%	18.70%	-0.27%	5.96%	-0.17%	-	-	-	-
Axos Invest <sup>8</sup>	5.64%	-0.17%	21.10%	1.16%	6.78%	0.45%	9.59%	0.11%	9.18%	0.26%
BBVA Compass <sup>7</sup>	4.65%	-0.65%	17.69%	-1.09%	-	-	-	-	-	-
Betterment <sup>27</sup>	5.80%	-0.10%	18.97%	-1.17%	5.10%	-1.26%	8.61%	-0.96%	8.24%	-0.76%
Betterment Smart Beta <sup>32</sup>	5.77%	0.30%	-	-	-	-	-	-	-	-
Betterment SRI <sup>27</sup>	5.23%	-0.24%	18.50%	-0.67%	5.44%	-0.73%	-	-	-	-
Citizens Bank <sup>7</sup>	6.25%	0.44%	18.98%	-0.96%	-	-	-	-	-	-
E*Trade <sup>21</sup>	5.65%	0.18%	19.75%	0.58%	6.06%	-0.11%	8.68%	-0.45%	-	-
E*Trade Active <sup>23</sup>	5.55%	0.00%	18.49%	-0.87%	-	-	-	-	-	-
E*Trade SRI <sup>23</sup>	5.61%	0.06%	18.59%	-0.77%	-	-	-	-	-	-
Edelman Financial Engines <sup>4</sup>	5.04%	-1.03%	17.94%	-2.70%	-	-	-	-	-	-
Ellevest <sup>15</sup>	5.19%	0.06%	16.97%	-1.43%	5.41%	-0.60%	8.26%	-0.83%	-	-
Ellevest SRI <sup>15</sup>	4.75%	0.04%	16.25%	-1.76%	-	-	-	-	-	-
Fidelity Go <sup>33</sup>	5.44%	-0.11%	19.15%	-0.21%	6.62%	0.41%	9.50%	0.28%	-	-
Fifth Third Bank <sup>7</sup>	5.35%	-0.12%	18.98%	-0.19%	-	-	-	-	-	-
FutureAdvisor <sup>3</sup>	5.07%	-0.14%	18.00%	-0.41%	5.11%	-0.96%	7.84%	-1.05%	-	-
Interactive Advisors <sup>24</sup>	4.58%	-0.47%	16.94%	-1.26%	-	-	-	-	-	-
JP Morgan Chase You Invest <sup>7</sup>	4.12%	-0.50%	-	-	-	-	-	-	-	-
Liftoff (Ritholtz Wealth Management) <sup>3</sup>	5.35%	-0.12%	-	-	-	-	-	-	-	-
M1 Finance <sup>34</sup>	5.91%	-0.07%	-	-	-	-	-	-	-	-
Merrill Edge <sup>31</sup>	5.09%	0.13%	17.57%	-0.51%	5.73%	-0.30%	-	-	-	-
Merrill Edge SRI <sup>31</sup>	5.48%	0.10%	18.80%	-0.17%	-	-	-	-	-	-
Morgan Stanley <sup>12</sup>	5.61%	-0.12%	18.37%	-1.66%	5.22%	-1.10%	-	-	-	-
Morgan Stanley Active <sup>3</sup>	5.76%	-0.05%	19.49%	-0.45%	-	-	-	-	-	-
Morgan Stanley Defense and Cyber Security <sup>7</sup>	5.15%	-0.66%	-	-	-	-	-	-	-	-
Morgan Stanley Emerging Consumer <sup>7</sup>	6.37%	0.56%	-	-	-	-	-	-	-	-
Morgan Stanley Gender Diversity <sup>7</sup>	4.78%	-0.69%	-	-	-	-	-	-	-	-
Morgan Stanley Genomics <sup>7</sup>	6.21%	1.67%	-	-	-	-	-	-	-	-
Morgan Stanley Global Frontier <sup>7</sup>	6.08%	0.10%	-	-	-	-	-	-	-	-
Morgan Stanley Inflation Conscious <sup>7</sup>	4.17%	-1.28%	-	-	-	-	-	-	-	-
Morgan Stanley Robotics <sup>7</sup>	6.74%	0.76%	-	-	-	-	-	-	-	-
Morgan Stanley SRI <sup>7</sup>	5.18%	-0.03%	19.52%	0.36%	5.84%	-0.27%	-	-	-	-

\*Net of Fees Returns as of: 12/31/2019

\*\*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 (continued from previous page)

	Total									
	4Q 2019	4Q 2019 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)	4-Year Trailing (Annualized)	4-Year Trailing Return Above/Below Benchmark (Annualized)
Motif <sup>3</sup>	4.80%	-0.58%	-	-	-	-	-	-	-	-
Personal Capital <sup>4</sup>	5.85%	-0.73%	19.68%	-2.01%	5.03%	-1.63%	8.03%	-2.23%	8.38%	-1.28%
Prudential <sup>26</sup>	5.26%	-0.21%	20.28%	1.11%	-	-	-	-	-	-
Qapital <sup>30</sup>	5.34%	-0.73%	-	-	-	-	-	-	-	-
Schwab <sup>5</sup>	5.44%	-0.22%	17.20%	-2.41%	4.44%	-1.84%	7.94%	-1.57%	8.64%	-0.32%
Schwab Domestic Focus <sup>5</sup>	5.30%	-0.60%	-	-	-	-	-	-	-	-
SigFig <sup>6</sup>	5.78%	0.14%	19.22%	-0.33%	6.09%	-0.16%	9.38%	0.07%	9.19%	0.44%
SoFi <sup>17</sup>	5.87%	0.40%	18.82%	-0.35%	6.03%	-0.20%	-	-	-	-
TD Ameritrade <sup>10</sup>	6.29%	0.14%	19.88%	-0.84%	6.05%	-0.43%	9.41%	-0.34%	-	-
TD Ameritrade SRI <sup>10,C</sup>	6.70%	0.63%	19.17%	-1.35%	-	-	-	-	-	-
TIAA <sup>7</sup>	5.44%	-0.11%	18.34%	-1.02%	5.98%	-0.23%	-	-	-	-
TIAA Active <sup>7</sup>	6.25%	0.17%	22.20%	1.08%	-	-	-	-	-	-
TIAA SRI <sup>7</sup>	5.47%	0.00%	19.61%	0.44%	6.59%	0.42%	-	-	-	-
Twine (John Hancock) <sup>3</sup>	6.24%	0.00%	21.10%	0.19%	-	-	-	-	-	-
UBS Advice Advantage <sup>7</sup>	6.06%	-0.09%	19.20%	-1.52%	-	-	-	-	-	-
United Income <sup>16</sup>	4.93%	-0.45%	17.55%	-1.42%	4.55%	-1.58%	-	-	-	-
US Bank <sup>28</sup>	5.39%	0.18%	19.11%	0.15%	-	-	-	-	-	-
USAA <sup>7</sup>	5.35%	-0.20%	18.87%	-0.49%	5.76%	-0.43%	-	-	-	-
Vanguard <sup>4,A</sup>	5.79%	0.32%	18.79%	-0.38%	6.03%	-0.14%	9.13%	0.00%	8.22%	-0.36%
Wealthfront <sup>22,B</sup>	5.64%	-0.26%	18.60%	-1.54%	5.77%	-0.59%	8.88%	-0.69%	-	-
Wealthfront PassivePlus <sup>22</sup>	5.23%	0.10%	-	-	-	-	-	-	-	-
Wealthsimple <sup>11</sup>	2.83%	-2.64%	15.35%	-3.82%	3.80%	-2.37%	-	-	-	-
Wealthsimple SRI <sup>11</sup>	5.12%	-0.35%	19.66%	0.49%	-	-	-	-	-	-
Wells Fargo <sup>14</sup>	5.54%	-0.19%	19.76%	0.01%	6.16%	-0.13%	-	-	-	-
Zacks Advantage <sup>4</sup>	5.34%	-0.13%	17.91%	-1.26%	5.99%	-0.10%	-	-	-	-

\*Net of Fees Returns as of: 12/31/2019

\*\*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 (continued from previous page)

	Equity					Fixed Income				
	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)
Acorns <sup>1</sup>	8.08%	27.55%	7.93%	11.28%	11.34%	0.72%	9.11%	3.45%	3.18%	2.85%
Ally Financial <sup>9</sup>	8.51%	25.96%	6.31%	-	-	-0.47%	8.68%	4.76%	-	-
Axos Invest <sup>8</sup>	8.44%	27.46%	7.86%	12.53%	11.77%	0.70%	10.27%	4.50%	4.24%	4.37%
BBVA Compass <sup>7</sup>	8.21%	24.90%	-	-	-	-0.19%	7.99%	-	-	-
Betterment <sup>27</sup>	8.82%	25.33%	5.41%	10.76%	10.50%	0.32%	8.37%	4.36%	4.32%	3.80%
Betterment Smart Beta <sup>32</sup>	8.54%	-	-	-	-	1.59%	-	-	-	-
Betterment SRI <sup>27</sup>	8.49%	25.82%	6.01%	-	-	0.41%	8.56%	4.43%	-	-
Citizens Bank <sup>7</sup>	9.37%	25.42%	-	-	-	0.28%	7.61%	-	-	-
E*Trade <sup>21</sup>	8.91%	26.12%	6.70%	11.24%	-	0.58%	10.93%	4.75%	4.57%	-
E*Trade Active <sup>23</sup>	8.73%	26.08%	-	-	-	0.62%	7.10%	-	-	-
E*Trade SRI <sup>23</sup>	8.83%	26.32%	-	-	-	0.62%	7.10%	-	-	-
Edelman Financial Engines <sup>4</sup>	7.83%	24.50%	-	-	-	-0.20%	6.67%	-	-	-
Ellevest <sup>15</sup>	8.67%	26.44%	6.92%	11.55%	-	0.78%	5.90%	3.16%	3.49%	-
Ellevest SRI <sup>15</sup>	8.62%	25.95%	-	-	-	0.74%	5.73%	-	-	-
Fidelity Go <sup>33</sup>	8.82%	27.63%	8.21%	12.82%	-	0.59%	7.30%	3.93%	4.44%	-
Fifth Third Bank <sup>7</sup>	8.67%	27.34%	-	-	-	0.51%	7.14%	-	-	-
FutureAdvisor <sup>3</sup>	9.12%	27.02%	6.26%	11.11%	-	0.06%	8.08%	3.73%	3.59%	-
Interactive Advisors <sup>24</sup>	8.08%	24.60%	-	-	-	0.47%	8.39%	-	-	-
JP Morgan Chase You Invest <sup>7</sup>	8.76%	-	-	-	-	-0.31%	-	-	-	-
Liftoff (Ritholtz Wealth Management) <sup>3</sup>	8.80%	-	-	-	-	0.26%	-	-	-	-
M1 Finance <sup>34</sup>	8.72%	-	-	-	-	0.70%	-	-	-	-
Merrill Edge <sup>31</sup>	8.98%	27.64%	7.55%	-	-	0.37%	7.19%	3.59%	-	-
Merrill Edge SRI <sup>31</sup>	9.23%	27.36%	-	-	-	0.21%	8.41%	-	-	-
Morgan Stanley <sup>12</sup>	8.91%	25.23%	6.02%	-	-	0.12%	7.40%	3.87%	-	-
Morgan Stanley Active <sup>3</sup>	9.06%	26.88%	-	-	-	0.45%	8.42%	-	-	-
Morgan Stanley Defense and Cyber Security <sup>7</sup>	7.34%	-	-	-	-	0.44%	-	-	-	-
Morgan Stanley Emerging Consumer <sup>7</sup>	9.36%	-	-	-	-	0.44%	-	-	-	-
Morgan Stanley Gender Diversity <sup>7</sup>	7.81%	-	-	-	-	0.22%	-	-	-	-
Morgan Stanley Genomics <sup>7</sup>	11.48%	-	-	-	-	0.44%	-	-	-	-
Morgan Stanley Global Frontier <sup>7</sup>	8.86%	-	-	-	-	0.45%	-	-	-	-
Morgan Stanley Inflation Conscious <sup>7</sup>	6.54%	-	-	-	-	0.47%	-	-	-	-
Morgan Stanley Robotics <sup>7</sup>	9.71%	-	-	-	-	0.44%	-	-	-	-
Morgan Stanley SRI <sup>7</sup>	8.73%	28.46%	7.39%	-	-	0.21%	6.93%	3.43%	-	-

\*Net of Fees Returns as of: 12/31/2019

\*\*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 (continued from previous page)

	Equity					Fixed Income				
	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)
Motif <sup>3</sup>	9.17%	-	-	-	-	-1.75%	-	-	-	-
Personal Capital <sup>4</sup>	7.84%	24.73%	5.96%	9.93%	10.22%	0.64%	7.06%	2.58%	2.91%	3.40%
Prudential <sup>26</sup>	8.36%	28.49%	-	-	-	0.70%	9.29%	-	-	-
Qapital <sup>20</sup>	7.67%	-	-	-	-	0.66%	-	-	-	-
Schwab <sup>5</sup>	8.48%	24.23%	5.27%	10.26%	11.23%	1.03%	8.74%	3.93%	4.78%	5.35%
Schwab Domestic Focus <sup>5</sup>	8.00%	-	-	-	-	0.62%	-	-	-	-
SigFig <sup>6</sup>	9.36%	26.98%	7.47%	12.81%	12.26%	0.34%	8.49%	3.87%	4.08%	4.49%
SoFi <sup>17</sup>	9.40%	27.47%	6.97%	-	-	0.60%	6.44%	4.20%	-	-
TD Ameritrade <sup>10</sup>	9.12%	26.61%	6.95%	12.16%	-	0.31%	7.85%	3.62%	3.50%	-
TD Ameritrade SRI <sup>10,C</sup>	9.42%	27.48%	-	-	-	0.35%	8.11%	-	-	-
TIAA <sup>7</sup>	9.04%	25.90%	7.13%	-	-	0.25%	8.03%	4.07%	-	-
TIAA Active <sup>7</sup>	8.92%	28.00%	-	-	-	0.65%	9.69%	-	-	-
TIAA SRI <sup>7</sup>	9.03%	27.76%	8.13%	-	-	0.38%	8.23%	4.17%	-	-
Twine (John Hancock) <sup>3</sup>	8.83%	26.96%	-	-	-	0.68%	9.32%	-	-	-
UBS Advice Advantage <sup>7</sup>	8.66%	25.67%	-	-	-	0.55%	7.73%	-	-	-
United Income <sup>16</sup>	8.05%	24.78%	5.14%	-	-	0.13%	7.30%	3.08%	-	-
US Bank <sup>28</sup>	8.68%	25.93%	-	-	-	0.70%	9.57%	-	-	-
USAA <sup>7</sup>	8.84%	26.70%	7.06%	-	-	-0.01%	7.90%	3.65%	-	-
Vanguard <sup>4,A</sup>	8.93%	27.02%	7.42%	12.46%	11.66%	0.54%	6.35%	3.64%	3.80%	2.85%
Wealthfront <sup>22,B</sup>	8.35%	25.19%	6.45%	11.12%	-	0.50%	7.35%	4.23%	4.38%	-
Wealthfront PassivePlus <sup>22</sup>	8.32%	-	-	-	-	0.53%	-	-	-	-
Wealthsimple <sup>11</sup>	5.76%	22.19%	4.48%	-	-	-1.50%	5.90%	2.72%	-	-
Wealthsimple SRI <sup>11</sup>	8.75%	28.61%	-	-	-	-0.37%	7.32%	-	-	-
Wells Fargo <sup>14</sup>	8.37%	26.63%	7.72%	-	-	0.92%	10.37%	4.00%	-	-
Zacks Advantage <sup>4</sup>	8.59%	27.27%	8.28%	-	-	0.41%	-	6.31%	3.03%	-

\*Net of Fees Returns as of: 12/31/2019

Produced by Backend Benchmarking for BackendB.com

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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.

## Non 60-40 Target Allocation Taxable Returns

	Total Portfolio			Equity	Fixed Income
	% Equity	4Q 2019	4Q 2019 Return Above/Below Benchmark	4Q 2019	4Q 2019
Betterment Income <sup>27</sup>	0%	0.62%	0.18%	-	0.62%
TD Ameritrade Income <sup>35</sup>	22%	1.76%	-0.42%	4.62%	0.80%
TD Ameritrade Managed Risk <sup>35</sup>	9%	1.99%	0.31%	*^	*^
TD Ameritrade Opportunistic <sup>10</sup>	49%	4.99%	0.63%	*^	*^
Titan Invest <sup>3</sup>	100%	11.04%	2.13%	11.07%	-
Wealthsimple Halal <sup>11</sup>	100%	7.10%	-1.81%	7.15%	-

\*Net of Fees Returns as of: 12/31/2019

Produced by Backend Benchmarking for BackendB.com

\*\*Some accounts have not been open long enough for 1 year, 2 year, 3 year returns, others have no fixed income holdings thus no fixed income returns

\*^These portfolios hold balanced funds. The nature of these funds and limits of our portfolio management system do not enable us to accurately breakdown equity and fixed income performance individually.

## Retirement Returns

	Total Portfolio							
	4Q 2019	4Q 2019 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)
Ally Financial IRA <sup>9</sup>	7.88%	-0.42%	24.49%	-0.90%	6.23%	-1.00%	-	-
Axos Invest IRA <sup>25</sup>	8.15%	-0.06%	25.29%	0.12%	7.15%	-0.04%	11.83%	0.07%
Betterment IRA <sup>27</sup>	7.63%	-0.15%	22.91%	-1.15%	5.79%	-1.20%	10.32%	-0.97%
E*Trade IRA <sup>21</sup>	8.76%	0.03%	25.70%	-0.80%	6.50%	-0.93%	11.01%	-1.32%
Fidelity Go IRA <sup>33</sup>	7.44%	-0.17%	24.38%	0.76%	7.57%	0.67%	11.37%	0.27%
Honest Dollar (Goldman Sachs) IRA <sup>3</sup>	8.53%	-0.29%	26.17%	-0.55%	-	-	-	-
Merrill Edge IRA <sup>31</sup>	7.85%	0.07%	24.43%	0.14%	6.49%	-0.49%	-	-
Morgan Stanley IRA <sup>7</sup>	6.96%	-0.13%	21.11%	-1.20%	5.57%	-1.08%	-	-
Personal Capital IRA <sup>4</sup>	7.44%	-1.11%	23.97%	-2.07%	5.93%	-1.42%	9.90%	-2.23%
Schwab IRA <sup>20</sup>	7.89%	-0.50%	22.55%	-3.06%	4.76%	-2.51%	9.44%	-2.51%
SigFig IRA <sup>6</sup>	8.10%	-0.03%	24.57%	-0.38%	6.20%	-0.95%	11.44%	-0.23%
SoFi IRA <sup>18</sup>	9.39%	0.48%	27.47%	0.53%	7.40%	-0.11%	-	-
T Rowe Price IRA <sup>13</sup>	8.11%	-0.80%	26.89%	-0.05%	7.84%	0.33%	-	-
TD Ameritrade IRA <sup>10</sup>	7.97%	0.45%	24.03%	0.63%	6.69%	-0.17%	10.92%	-0.05%
TIAA IRA <sup>7</sup>	7.89%	0.02%	23.27%	-1.01%	6.81%	-0.22%	-	-
United Income IRA <sup>16</sup>	8.38%	-0.44%	23.57%	-3.15%	4.51%	-2.96%	-	-
USAA IRA <sup>7</sup>	8.64%	-0.18%	25.83%	-0.89%	6.83%	-0.64%	-	-
Wealthsimple IRA <sup>2</sup>	4.12%	-3.06%	18.78%	-3.75%	4.31%	-2.38%	-	-
Wells Fargo IRA <sup>14</sup>	7.85%	-0.28%	23.46%	-1.49%	5.81%	-1.34%	-	-
Zacks Advantage IRA <sup>4</sup>	7.99%	-0.31%	24.39%	-1.00%	6.34%	-0.89%	-	-

\*Net of Fees Returns as of: 12/31/2019

\*\*Some accounts have not been open long enough for 1 year, 2 year, 3 year returns, others have no fixed income holdings thus no fixed income returns

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## Retirement Returns (continued from previous page)

	Equity				Fixed Income			
	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)
Ally Financial IRA <sup>9</sup>	8.48%	25.92%	6.35%	-	-0.44%	8.64%	4.89%	-
Axos Invest IRA <sup>25</sup>	8.86%	26.74%	7.35%	12.50%	0.67%	10.21%	4.34%	4.37%
Betterment IRA <sup>27</sup>	8.79%	25.26%	5.99%	11.24%	0.15%	8.89%	4.26%	4.23%
E*Trade IRA <sup>21</sup>	8.92%	26.11%	6.64%	11.25%	-	-	-	-
Fidelity Go IRA <sup>33</sup>	8.82%	27.59%	8.22%	12.78%	-0.07%	8.19%	3.83%	3.64%
Honest Dollar (Goldman Sachs) IRA <sup>3</sup>	8.60%	26.56%	-	-	-	-	-	-
Merrill Edge IRA <sup>31</sup>	9.04%	27.24%	7.11%	-	0.29%	9.24%	3.16%	-
Morgan Stanley IRA <sup>7</sup>	8.94%	25.25%	6.14%	-	0.13%	7.32%	3.73%	-
Personal Capital IRA <sup>4</sup>	7.76%	24.78%	6.10%	10.19%	1.01%	7.18%	2.03%	2.74%
Schwab IRA <sup>20</sup>	8.45%	24.27%	5.08%	10.09%	-	-	-	-
SigFig IRA <sup>6</sup>	8.87%	25.91%	6.41%	12.13%	1.88%	14.55%	4.66%	5.67%
SoFi IRA <sup>18</sup>	9.40%	27.50%	7.19%	-	-	-	-	-
T Rowe Price IRA <sup>13</sup>	8.11%	26.89%	7.84%	-	-	-	-	-
TD Ameritrade IRA <sup>10</sup>	9.13%	26.99%	7.28%	12.40%	0.79%	8.42%	3.44%	3.40%
TIAA IRA <sup>7</sup>	9.04%	25.94%	7.15%	-	0.35%	8.19%	3.92%	-
United Income IRA <sup>16</sup>	8.57%	24.06%	4.65%	-	-	-	-	-
USAA IRA <sup>7</sup>	8.85%	26.59%	7.05%	-	-	-	-	-
Wealthsimple IRA <sup>2</sup>	5.78%	22.76%	4.78%	-	-2.36%	4.48%	2.41%	-
Wells Fargo IRA <sup>14</sup>	8.58%	25.04%	6.07%	-	1.34%	11.65%	4.31%	-
Zacks Advantage IRA <sup>4</sup>	8.47%	26.02%	6.87%	-	-	-	-	-

\*Net of Fees Returns as of: 9/30/2019

\*\*Some accounts have not been open long enough for 1 year, 2 year, 3 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 Invest; \$2/month for Invest + Acorns Later, \$3/month for Acorns Invest + Acorns Later + Acorns Spend. For balances above \$1 million, \$100/month per \$1 million in AUM	0.09%	61%/39%/0%/0%	63%/37%/0%/0%	84%/16%	79%/21%	0%
Ally Financial	\$100	0.30% annually; Also offer Cash-enhanced portfolio with 30% invested in cash and no management fee	0.07%	59%/39%/0%/2%	62%/36%/0%/2%	59%/41%	60%/40%	0%
Axos Invest	No minimum	No fee for basic package; add-on packages, such as tax-loss harvesting, come at additional cost	0.09%	64%/36%/0%/0%	64%/36%/0%/0%	62%/38%	63%/37%	0%
BBVA Compass	\$10,000	0.75% annually	0.14%	57%/39%/3%/1%	58%/37%/3%/2%	63%/37%	64%/36%	0%
Betterment	Digital: No minimum; Premium: \$100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor), 0.30% above \$2M	0.08%	65%/35%/0%/0%	66%/34%/0%/0%	49%/51%	57%/43%	37%
Betterment Smart Beta	Digital: No minimum; Premium: \$100,000	Digital: 0.25%, 0.15% above \$2M; Premium: 0.40% (unlimited chat and calls with advisor), 0.10% discount on balance above \$2M	0.18%	60%/40%/0%/0%	61%/38%/0%/0%	57%/43%	59%/41%	10%
Betterment Income	Digital: No minimum; Premium: \$100,000	Digital: 0.25%, 0.15% above \$2M; Premium: 0.40% (unlimited chat and calls with advisor), 0.10% discount on balance above \$2M	0.17%	0%/100%/0%/0%	0%/100%/0%/0%	N/A	N/A	0%
Betterment SRI	Digital: No minimum; Premium: \$100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor), 0.30% above \$2M	0.13%	60%/40%/0%/0%	61%/39%/0%/0%	50%/50%	52%/48%	60%
Citizens Bank	\$2,000	0.50% annually	0.08%	64%/36%/0%/1%	67%/32%/0%/1%	54%/46%	56%/44%	0%
E*Trade	\$500	0.30% annually	0.10%	60%/39%/0%/1%	62%/36%/0%/2%	75%/25%	65%/35%	0%
E*Trade Active	\$500	0.30% annually	0.09%	61%/35%/0%/3%	62%/37%/0%/1%	65%/35%	65%/35%	100%
E*Trade SRI	\$500	0.30% annually	0.13%	61%/35%/0%/4%	62%/37%/0%/1%	65%/35%	65%/35%	100%
Edelman Financial Engines	\$5,000	1.75% annually on accounts under \$400,000. Lower at different tiers over \$400,000	0.11%	67%/30%/0%/3%	65%/31%/0%/4%	80%/20%	80%/20%	1%
Ellevest	Digital: No minimum; Premium: \$50,000	Digital: 0.25%; Premium: 0.50% (access to live advisors and executive coaches)	0.07%	62%/36%/0%/2%	57%/41%/0%/2%	71%/29%	61%/39%	95%
Ellevest SRI	Digital: No minimum; Premium: \$50,000	Digital: 0.25%; Premium: 0.50% (access to live advisors and executive coaches)	0.17%	56%/43%/0%/1%	52%/46%/0%/2%	63%/37%	63%/37%	83%
Fidelity Go	Digital Only: No Minimum; Personalized Planning & Advice: \$25,000	Digital Only: 0.35%; Personalized Planning & Advice: 0.50%	0.00%	61%/39%/0%/0%	60%/39%/0%/1%	71%/29%	70%/30%	100%
Fifth Third Bank	\$5,000	0.50% annually	0.20%	60%/40%/0%/1%	61%/38%/0%/1%	70%/30%	71%/29%	100%
FutureAdvisor	\$5,000	0.50% annually	0.08%	58%/41%/0%/1%	56%/43%/0%/1%	49%/51%	68%/32%	0%
Interactive Advisors <sup>24</sup>	Interactive Advisor Portfolios: \$1,000 and up depending on Portfolios	Interactive Advisor Portfolios range from 0.08% to 0.30% annually; Manager Portfolios range from 0.25% to 1.5% annually	0.13%	55%/44%/0%/0%	55%/42%/0%/2%	55%/45%	54%/46%	31%
JP Morgan Chase You Invest	\$500	0.35% annually	0.00%	50%/48%/0%/2%	51%/46%/0%/4%	55%/45%	57%/43%	38%
Liftoff (Ritholtz Wealth Management)	\$5,000	0.40% annually	0.09%	60%/40%/0%/0%	61%/39%/0%/0%	57%/43%	57%/43%	37%
M1 Finance	\$100	No advisory fee	0.05%	66%/34%/0%/0%	66%/34%/0%/0%	61%/39%	61%/39%	0%

\*Net of Fees Returns for the period of: 9/30/2017 - 12/31/2019

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

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## Taxable Account Facts (continued from previous page)

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)
Merrill Edge	Guided Investing: \$5,000; Guided Investing with an Advisor: \$20,000	Guided Investing: 0.45% annually (digital only); Guided Investing with an Advisor: 0.85% annually	0.07%	60%/39%/0%/1%	56%/38%/0%/5%	66%/34%	81%/19%	81%
Merrill Edge SRI	Guided Investing: \$5,000; Guided Investing with an Advisor: \$20,000	Guided Investing: 0.45% annually (digital only); Guided Investing with an Advisor: 0.85% annually	0.26%	59%/37%/0%/4%	60%/34%/0%/6%	65%/35%	77%/23%	9%
Morgan Stanley	\$5,000	0.35% annually	0.08%	65%/30%/0%/5%	64%/34%/0%/2%	45%/55%	47%/53%	0%
Morgan Stanley Active	\$5,000	0.35% annually	0.37%	64%/35%/0%/1%	64%/35%/0%/1%	44%/56%	48%/52%	0%
Morgan Stanley Defense and Cyber Security	\$5,000	0.35% annually	0.43%	64%/29%/0%/8%	69%/29%/0%/2%	58%/42%	62%/38%	0%
Morgan Stanley Emerging Consumer	\$5,000	0.35% annually	0.46%	64%/29%/0%/8%	69%/31%/0%/1%	57%/43%	48%/52%	0%
Morgan Stanley Gender Diversity	\$5,000	0.35% annually	0.40%	60%/37%/0%/3%	61%/38%/0%/1%	68%/32%	68%/32%	11%
Morgan Stanley Genomics	\$5,000	0.35% annually	0.40%	49%/45%/0%/6%	54%/45%/0%/1%	56%/44%	60%/40%	0%
Morgan Stanley Global Frontier	\$5,000	0.35% annually	0.54%	66%/29%/0%/5%	69%/30%/0%/1%	40%/60%	41%/59%	0%
Morgan Stanley Inflation Conscious	\$5,000	0.35% annually	0.41%	58%/30%/3%/9%	61%/34%/3%/1%	63%/37%	62%/38%	0%
Morgan Stanley Robotics	\$5,000	0.35% annually	0.45%	66%/28%/0%/5%	69%/29%/0%/1%	52%/48%	53%/47%	0%
Morgan Stanley SRI	\$5,000	0.35% annually	0.44%	64%/35%/0%/1%	60%/39%/0%/1%	56%/44%	61%/39%	11%
Motif	\$1,000	0.25% annually for Motif Impact account	0.07%	59%/41%/0%/0%	62%/36%/0%/2%	33%/67%	33%/67%	0%
Personal Capital	\$100,000	0.89% annually for the first \$1 million; lower at different tiers over \$1 million	0.11%	69%/25%/5%/1%	71%/24%/4%/1%	70%/30%	71%/29%	0%
Prudential	\$5,000	0.79% annually for first \$100K; lower at different tiers above \$100K	0.08%	60%/38%/0%/2%	61%/37%/0%/2%	80%/20%	81%/19%	0%
Qapital	\$10	Complete: \$6 per month; Master: \$12 per month for additional non-investing features	0.14%	67%/29%/0%/4%	69%/28%/0%/3%	70%/30%	70%/30%	0%
Schwab	Intelligent Portfolios: \$5,000; Intelligent Portfolios Premium: \$25,000	Intelligent Portfolios: No fee (digital only); Intelligent Portfolios Premium: \$300 initial planning fee, \$30/month subscription	0.21%	61%/23%/5%/10%	61%/26%/2%/11%	51%/49%	55%/45%	56%
Schwab Domestic Focus	Intelligent Portfolios: \$5,000; Intelligent Portfolios Premium: \$25,000	Intelligent Portfolios: No fee (digital only); Intelligent Portfolios Premium: \$300 initial planning fee, \$30/month subscription	0.14%	65%/25%/0%/11%	65%/23%/0%/11%	78%/22%	78%/22%	73%
SigFig	\$2,000	No fee for the first \$10k; 0.25% annually for balance over \$10k	0.06%	62%/37%/0%/1%	62%/37%/0%/1%	58%/42%	60%/40%	0%
SoFi	No minimum	No management fee	0.05%	52%/48%/0%/0%	61%/38%/0%/1%	67%/33%	68%/32%	65%
TD Ameritrade	Essential Portfolios: \$5,000; or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.05%	65%/33%/0%/1%	70%/28%/0%/2%	65%/35%	60%/40%	0%

\*Net of Fees Returns for the period of: 9/30/2017 - 12/31/2019

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

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## Taxable Account Facts (continued from previous page)

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)
TD Ameritrade Income	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.60%	21%/78%/0%/1%	22%/78%/0%/1%	72%/38%	59%/41%	0%
TD Ameritrade Managed Risk	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	1.29%	9%/49%/41%/1%	9%/51%/38%/1%	29%/71%	31%/69%	0%
TD Ameritrade Opportunistic	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.18%	43%/53%/0%/4%	49%/49%/0%/1%	53%/47%	60%/40%	0%
TD Ameritrade SRI	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; 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%	71%/27%/0%/2%	59%/41%	58%/42%	0%
TIAA	\$5,000	0.30% annually	0.07%	61%/37%/0%/2%	60%/37%/0%/2%	71%/29%	64%/36%	0%
TIAA Active	\$5,000	0.30% annually	0.64%	73%/26%/0%/1%	60%/38%/0%/1%	66%/34%	61%/39%	0%
TIAA SRI	\$5,000	0.30% annually	0.34%	60%/39%/0%/1%	61%/38%/0%/1%	71%/29%	64%/36%	1%
Titan Invest	\$500	1% annually	0.00%	100%/0%/0%/0%	100%/0%/0%/0%	100%/0%	100%/0%	1%
Twine (John Hancock)	\$100	0.60% annually	0.08%	69%/29%/0%/2%	70%/27%/0%/3%	64%/36%	65%/35%	0%
UBS Advice Advantage	\$10,000	0.75% annually	0.07%	68%/27%/0%/5%	70%/25%/0%/5%	59%/41%	62%/38%	80%
United Income	\$300,000	0.99% annually; lower at different tiers over \$1 million	0.18%	59%/40%/0%/1%	62%/35%/0%/3%	51%/49%	58%/42%	0%
US Bank	\$5,000	0.24% annually	0.15%	60%/39%/0%/1%	60%/38%/0%/2%	59%/41%	71%/29%	92%
USAA	\$2,000	0.50% annually	0.05%	66%/32%/0%/1%	63%/36%/0%/1%	63%/37%	59%/41%	0%
Vanguard <sup>A</sup>	Vanguard Personal Advisor Services \$50,000	Vanguard Personal Advisor Services 0.30% annually for the first \$5 million; lower at different tiers over \$5 million	0.07%	60%/40%/0%/0%	64%/36%/0%/0%	60%/40%	64%/36%	100%
Wealthfront <sup>B</sup>	\$500	0.25% annually	0.11%	65%/35%/0%/0%	66%/33%/0%/1%	67%/33%	67%/33%	100%
Wealthfront PassivePlus	\$500	0.25% annually	0.10%	45%/35%/19%/0%	46%/35%/19%/0%	60%/40%	64%/36%	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%	61%/39%/0%/0%	66%/34%	41%/59%	34%
Wealthsimple Halal	Basic: No minimum; Black: \$100,000	Basic: 0.50% fee on accounts less than \$100k; Black: 0.40% on accounts greater than \$100k	0.00%	100%/0%/0%/0%	100%/0%/0%/0%	58%/42%	57%/43%	34%
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	0.25%	60%/40%/0%/0%	62%/38%/0%/0%	69%/31%	69%/31%	0%
Wells Fargo	\$10,000	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products	0.14%	63%/34%/0%/3%	64%/32%/0%/4%	77%/23%	76%/24%	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%	62%/32%/0%/6%	72%/28%	78%/22%	45%

<sup>A</sup>Net of Fees Returns for the period of: 9/30/2017 - 12/31/2019

<sup>B</sup>Average weighted expense ratio calculations exclude cash holdings from the portfolio

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## Retirement Account Facts

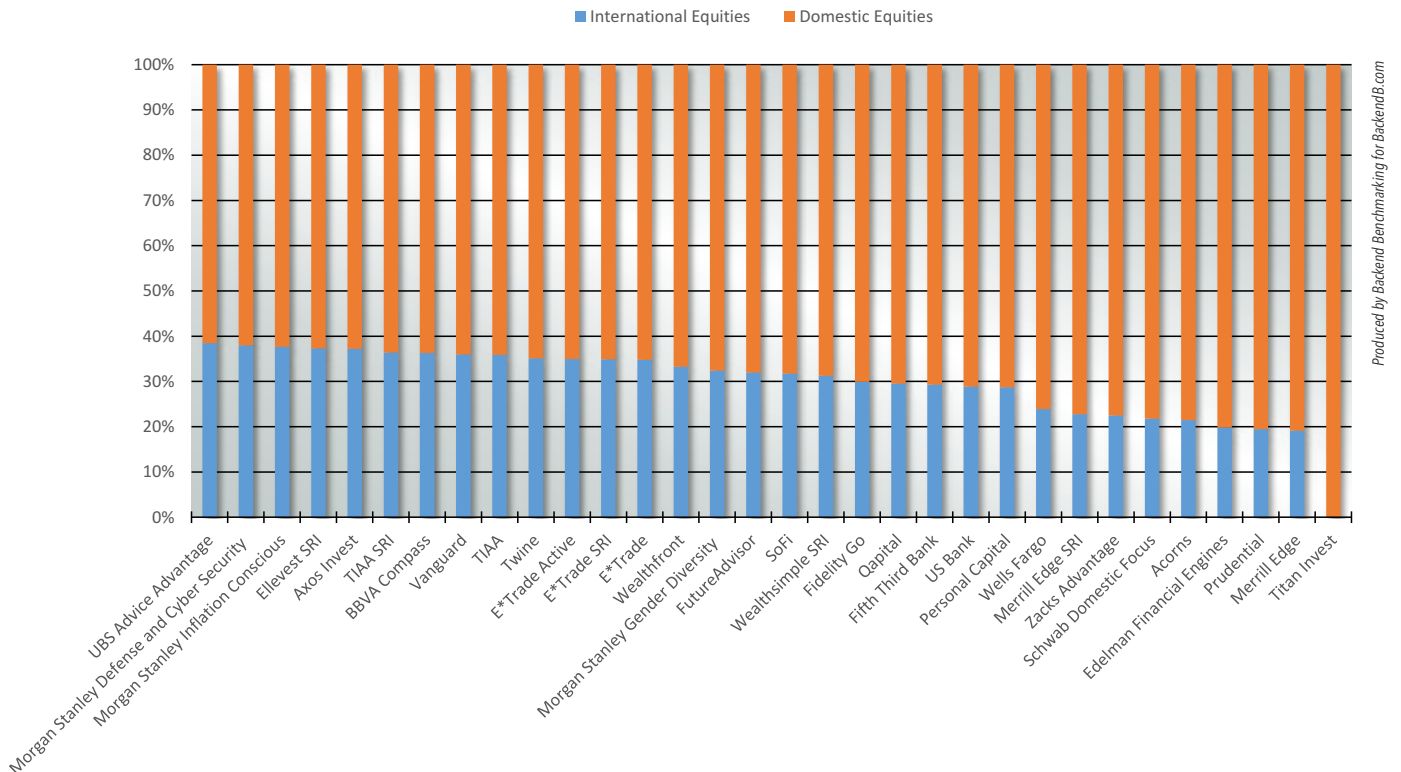
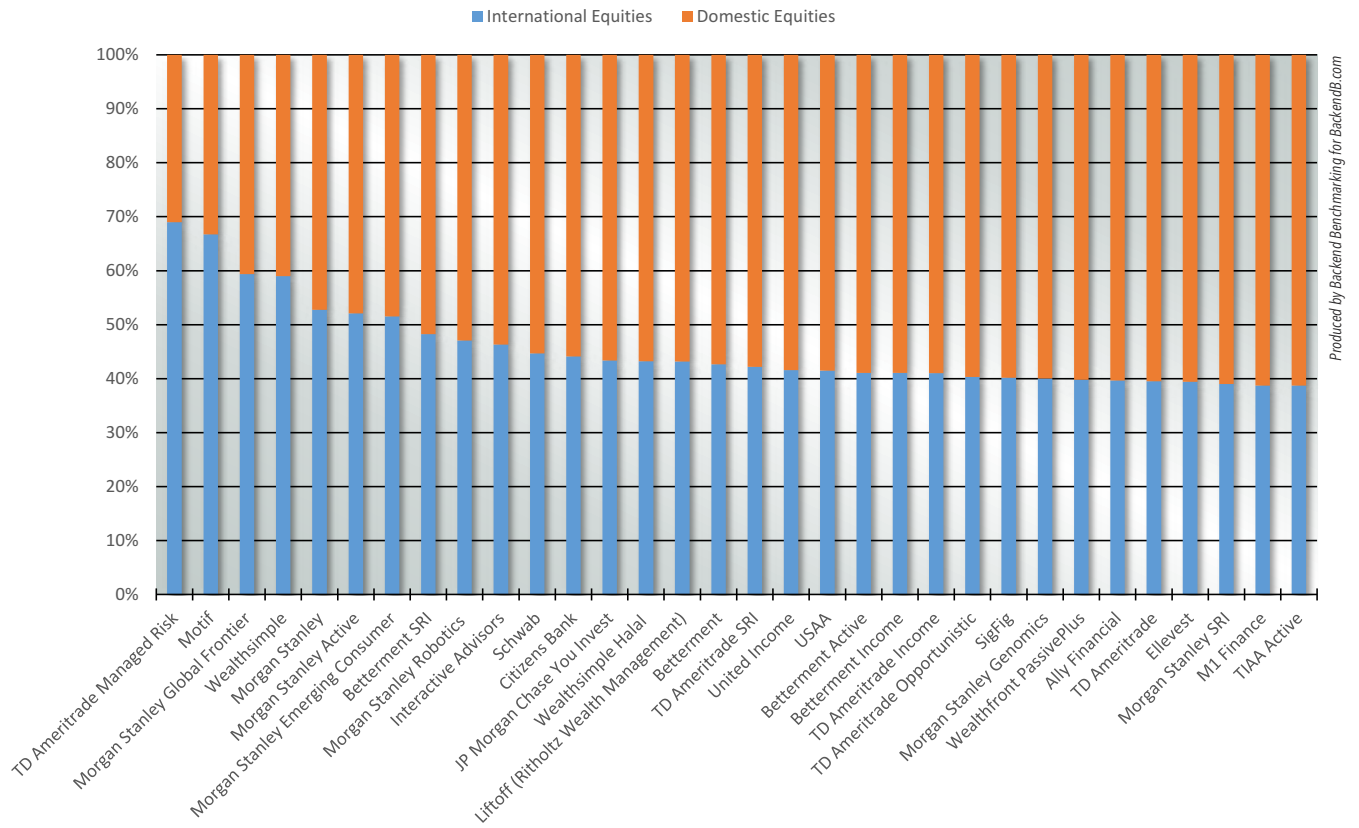
Portfolio	Account Minimum	Advisory Fee	Average Weighted Expense Ratio	Initial Target Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Current Asset Allocation (Equities/ Fixed Income/ Miscellaneous/ Cash)	Initial Domestic/ International Equity Split	Current Domestic/ International Equity Split
Ally Financial IRA	\$100	0.30% annually; Also offer Cash-enhanced portfolio with 30% invested in cash and no management fee	0.06%	93%/5%/0%/2%	94%/4%/0%/2%	60%/40%	61%/39%
Axos Invest IRA	No minimum	0.24% annually for required tax efficiency package; additional add-on packages come at an additional cost	0.05%	92%/8%/0%/0%	92%/8%/0%/0%	60%/40%	60%/40%
Betterment IRA	Digital: No minimum; Premium: \$100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor), 0.30% above \$2M	0.06%	87%/13%/0%/0%	87%/13%/0%/0%	47%/53%	56%/44%
E*Trade IRA	\$500	0.30% annually	0.13%	98%/0%/0%/2%	98%/0%/0%/2%	75%/25%	65%/35%
Fidelity Go IRA	Digital Only: No Minimum; Personalized Planning & Advice: \$25,000	Digital Only: 0.35%; Personalized Planning & Advice: 0.50%	0.00%	85%/14%/0%/1%	85%/14%/0%/0%	71%/29%	71%/29%
Honest Dollar (Goldman Sachs) IRA	\$1,000	0.25% annually	0.06%	99%/0%/0%/1%	98%/0%/0%/2%	68%/32%	72%/28%
Merrill Edge IRA	Guided Investing: \$5,000; Guided Investing with an Advisor: \$20,000	Guided Investing: 0.45% annually (digital only); Guided Investing with an Advisor: 0.85% annually	0.06%	89%/9%/0%/2%	87%/8%/0%/5%	64%/36%	72%/28%
Morgan Stanley IRA	\$5,000	0.35% annually	0.07%	79%/15%/0%/6%	79%/20%/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%	93%/3%/3%/1%	69%/31%	70%/30%
Schwab IRA	Intelligent Portfolios: \$5,000; Intelligent Portfolios Premium: \$25,000	Intelligent Portfolios: No fee (digital only); Intelligent Portfolios Premium: \$300 initial planning fee, \$30/month subscription	0.19%	94%/0%/0%/6%	93%/0%/0%/7%	54%/46%	54%/46%
SigFig IRA	\$2,000	No fee for the first \$10k; 0.25% annually for balance over \$10k	0.08%	91%/9%/0%/0%	89%/10%/0%/1%	45%/55%	47%/53%
SoFi IRA	No minimum	No management fee	0.02%	100%/0%/0%/0%	99%/0%/0%/1%	66%/34%	69%/31%
T Rowe Price IRA <sup>13</sup>	\$50,000	No advisory fee	0.80%	100%/0%/0%/0%	100%/0%/0%/0%	63%/37%	63%/37%
TD Ameritrade IRA	Essential Portfolios: \$5,000, or \$500 if automatic recurring deposits are set up; Selective Portfolios: \$25,000	Essential Portfolios: 0.30% annually; Selective Portfolios: tiered at a higher fee level depending on account balance and portfolio selected	0.05%	83%/15%/0%/1%	86%/12%/0%/2%	65%/35%	61%/39%
TIAA IRA	\$5,000	0.30% annually	0.07%	88%/11%/0%/1%	87%/11%/0%/2%	72%/28%	62%/38%
United Income IRA	\$300,000	0.99% annually; lower at different tiers above \$1 million	0.25%	99%/0%/0%/1%	97%/0%/0%/3%	51%/49%	56%/44%
USAA IRA	\$2,000	0.50% annually	0.05%	99%/0%/0%/1%	98%/0%/0%/2%	59%/41%	63%/37%
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	0.11%	80%/20%/0%/0%	80%/19%/0%/0%	66%/34%	73%/27%
Wells Fargo IRA	\$10,000	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products	0.13%	91%/7%/0%/2%	90%/7%/0%/3%	67%/33%	66%/34%
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	0.09%	93%/0%/0%/7%	94%/0%/0%/6%	62%/38%	80%/20%

\*Net of Fees Returns for the period of: 9/30/2017 - 12/31/2019

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

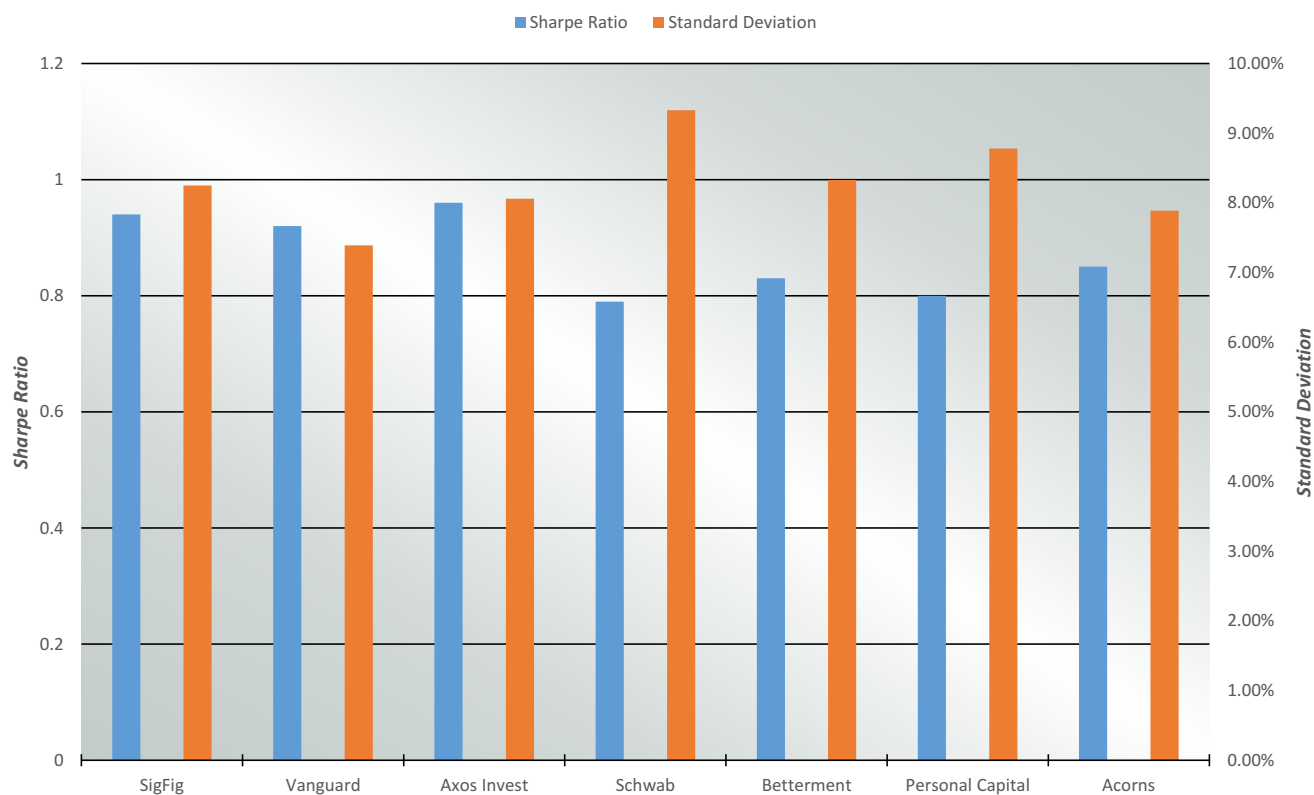
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## International Allocation of Total Equity for Taxable Robos



## Taxable Risk/Return Charts and Tables

### Trailing 4-Year Risk/Return Statistics of Taxable Robos

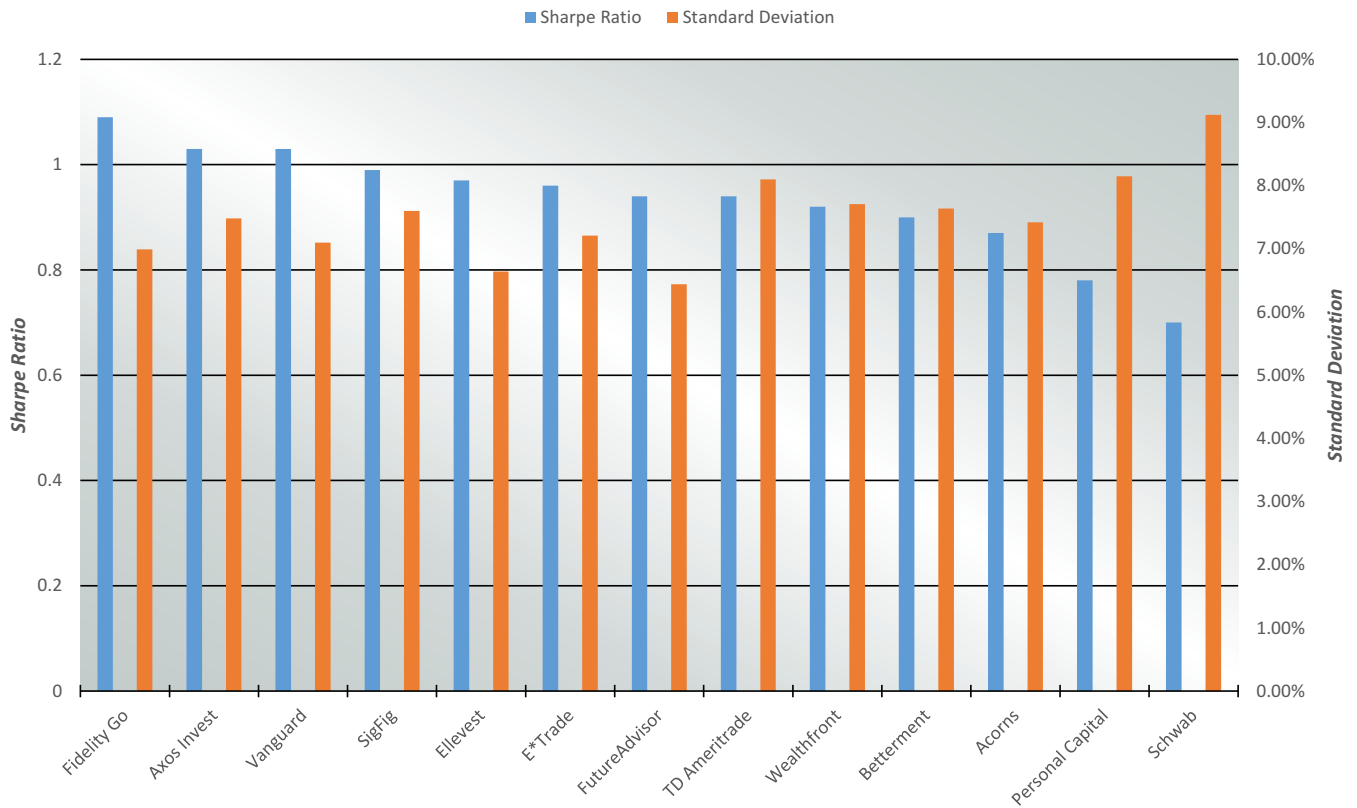


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	Acorns	Axos Invest	Betterment	Personal Capital	Schwab	SigFig	Vanguard
Annualized StdDev, %	7.89%	8.06%	8.33%	8.78%	9.33%	8.25%	7.39%
Sharpe Ratio	0.85	0.96	0.83	0.80	0.79	0.94	0.92

This analysis produced by Backend Analytics with the help of Markov Process International, Inc.

## Trailing 3-Year Risk/Return Statistics of Taxable Robos



Produced by Backend Benchmarking for BackendB.com

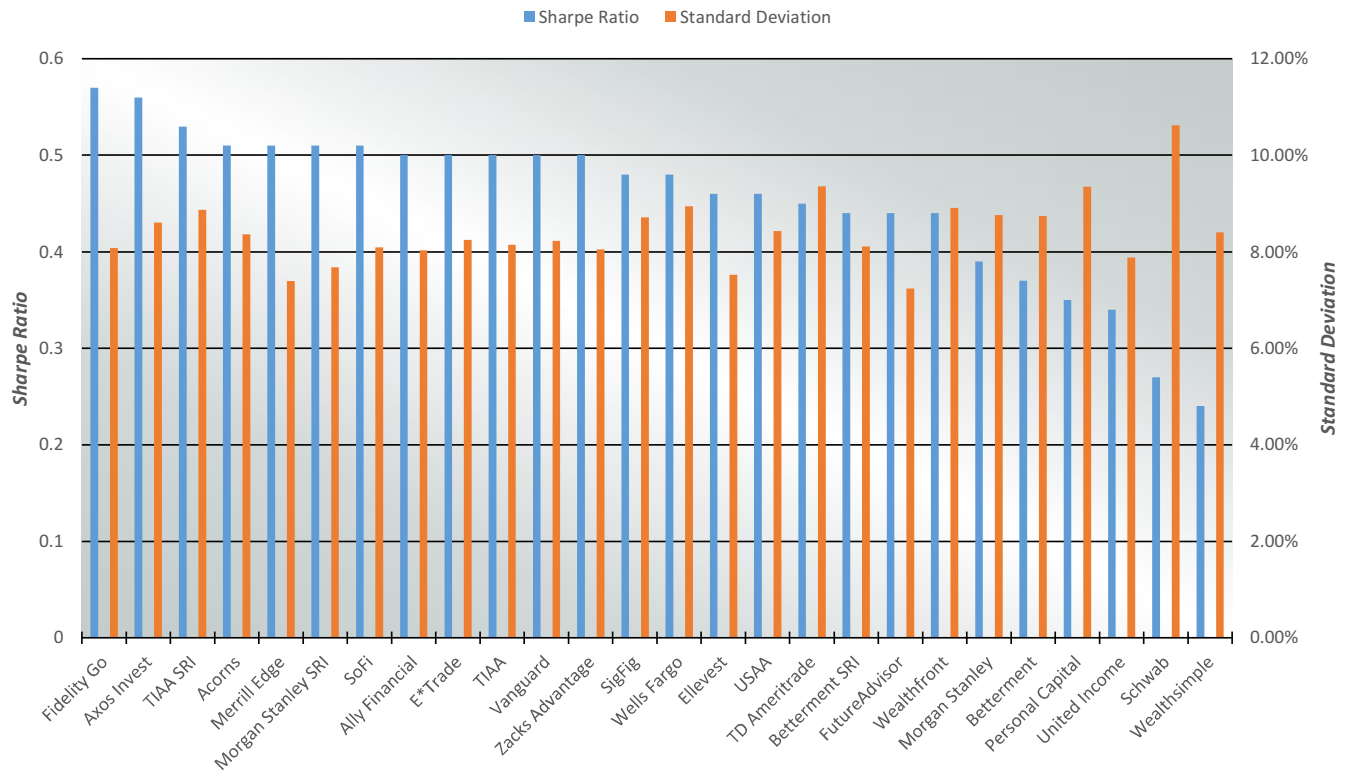
	Acorns	Axos Invest	Betterment	E*Trade	Ellevest	Fidelity Go	FutureAdvisor	Personal Capital
Annualized StdDev, %	7.42%	7.48%	7.64%	7.21%	6.64%	6.99%	6.44%	8.15%
Sharpe Ratio	0.87	1.03	0.90	0.96	0.97	1.09	0.94	0.78

	Schwab	SigFig	TD Ameritrade	Vanguard	Wealthfront
Annualized StdDev, %	9.12%	7.60%	8.10%	7.10%	7.71%
Sharpe Ratio	0.70	0.99	0.94	1.03	0.92

This analysis produced by Backend Analytics with the help of Markov Process International, Inc.



## Trailing 2-Year Risk/Return Statistics of Taxable Robos



Produced by Backend Benchmarking for BackendB.com

	Acorns	Ally Financial	Axos Invest	Betterment	Betterment SRI	E*Trade	Ellevest	Fidelity Go
Annualized StdDev, %	8.36%	8.03%	8.61%	8.74%	8.11%	8.25%	7.52%	8.08%
Sharpe Ratio	0.51	0.50	0.56	0.37	0.44	0.50	0.46	0.57

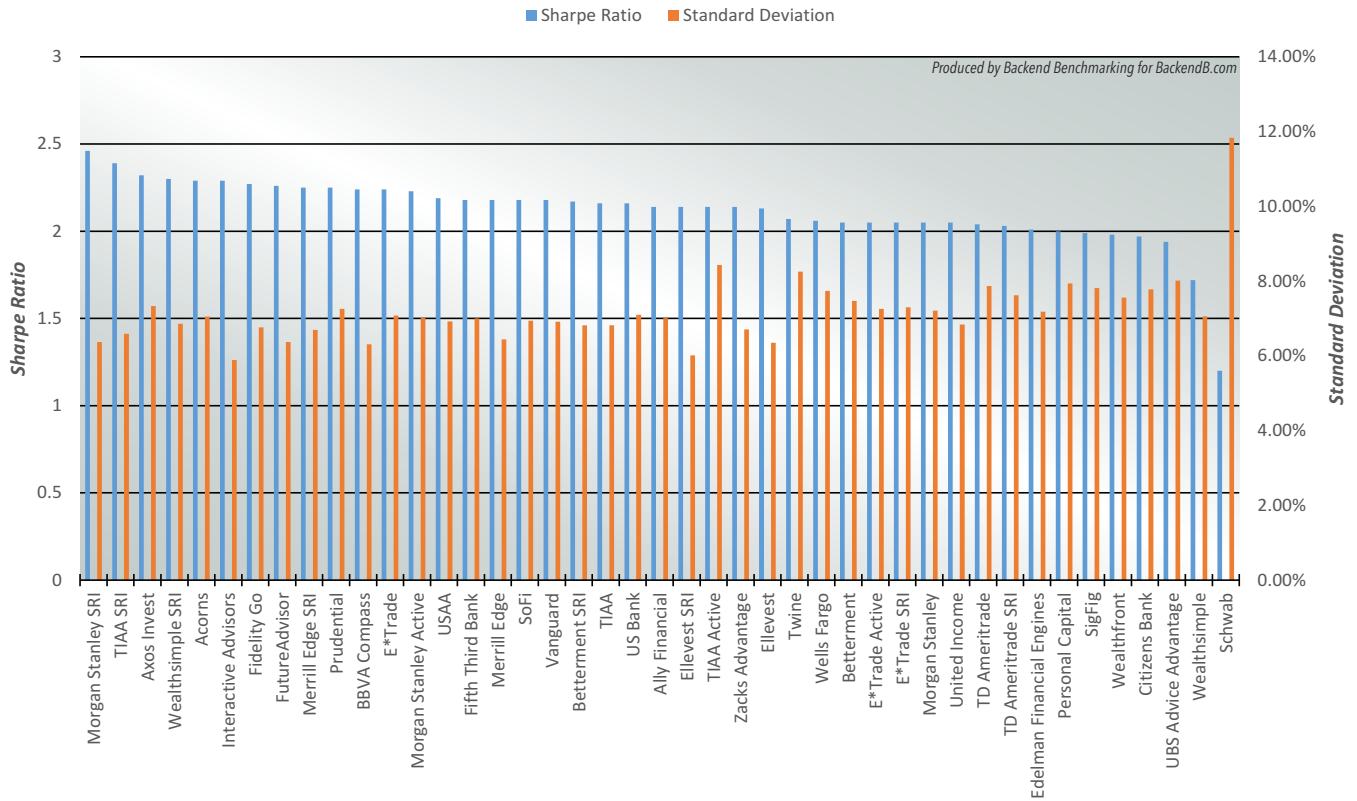
	FutureAdvisor	Merrill Edge	Morgan Stanley	Morgan Stanley SRI	Personal Capital	Schwab	SigFig	SoFi
Annualized StdDev, %	7.24%	7.39%	8.76%	7.68%	9.35%	10.62%	8.71%	8.09%
Sharpe Ratio	0.44	0.51	0.39	0.51	0.35	0.27	0.48	0.51

	TD Ameritrade	TIAA	TIAA SRI	United Income	USAA	Vanguard	Wealthfront	Wealthsimple
Annualized StdDev, %	9.36%	8.15%	8.87%	7.88%	8.43%	8.23%	8.91%	8.40%
Sharpe Ratio	0.45	0.50	0.53	0.34	0.46	0.50	0.44	0.24

	Wells Fargo	Zacks Advantage
Annualized StdDev, %	8.94%	8.05%
Sharpe Ratio	0.48	0.50

This analysis produced by Backend Analytics with the help of Markov Process International, Inc.

## Trailing 1-Year Risk/Return Statistics of Taxable Robos



	Acorns	Ally Financial	Axos Invest	BBVA Compass	Betterment	Betterment SRI	Citizens Bank	E*Trade
Annualized StdDev, %	7.05%	7.01%	7.33%	6.31%	7.47%	6.82%	7.78%	7.08%
Sharpe Ratio	2.29	2.14	2.32	2.24	2.05	2.17	1.97	2.24

	E*Trade Active	E*Trade SRI	Edelman Financial Engines	Ellevest	Ellevest SRI	Fidelity Go	Fifth Third Bank	FutureAdvisor
Annualized StdDev, %	7.26%	7.30%	7.18%	6.35%	6.01%	6.76%	7.00%	6.37%
Sharpe Ratio	2.05	2.05	2.01	2.13	2.14	2.27	2.18	2.26

	Interactive Advisors	Merrill Edge	Merrill Edge SRI	Morgan Stanley	Morgan Stanley Active	Morgan Stanley SRI	Personal Capital	Prudential
Annualized StdDev, %	5.89%	6.44%	6.69%	7.21%	7.02%	6.37%	7.94%	7.26%
Sharpe Ratio	2.29	2.18	2.25	2.05	2.23	2.46	2.00	2.25

	Schwab	SigFig	SoFi	TD Ameritrade	TD Ameritrade SRI	TIAA	TIAA Active	TIAA SRI
Annualized StdDev, %	11.83%	7.81%	6.94%	7.87%	7.62%	6.82%	8.43%	6.59%
Sharpe Ratio	1.20	1.99	2.18	2.04	2.03	2.16	2.14	2.39

	Twine	UBS Advice Advantage	United Income	US Bank	USAA	Vanguard	Wealthfront	Wealthsimple
Annualized StdDev, %	8.25%	8.01%	6.84%	7.10%	6.92%	6.91%	7.56%	7.06%
Sharpe Ratio	2.07	1.94	2.05	2.16	2.19	2.18	1.98	1.72

	Wealthsimple SRI	Wells Fargo	Zacks Advantage
Annualized StdDev, %	6.86%	7.74%	6.71%
Sharpe Ratio	2.30	2.06	2.14

This analysis produced by Backend Analytics with the help of Markov Process International, Inc.

## Retirement Risk/Return Charts and Tables

### Trailing 3-Year Risk/Return Statistics of Retirement Robos

	Axos Invest IRA	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Personal Capital IRA	Schwab IRA	SigFig IRA	TD Ameritrade IRA
Annualized StdDev, %	10.92%	10.31%	12.06%	9.88%	10.72%	10.77%	10.85%	10.34%
Sharpe Ratio	0.92	0.84	0.78	0.97	0.78	0.73	0.89	0.89

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### Trailing 2-Year Risk/Return Statistics of Retirement Robos

	Ally Financial IRA	Axos Invest IRA	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Merrill Edge IRA	Morgan Stanley IRA	Personal Capital IRA
Annualized StdDev, %	12.83%	12.60%	11.85%	13.87%	11.45%	12.17%	10.77%	12.32%
Sharpe Ratio	0.37	0.45	0.36	0.37	0.51	0.41	0.36	0.36

	Schwab IRA	SigFig IRA	SoFi IRA	T Rowe Price IRA	TD Ameritrade IRA	TIAA IRA	United Income IRA	USAA IRA
Annualized StdDev, %	12.24%	12.40%	14.01%	14.74%	11.98%	12.00%	13.66%	13.65%
Sharpe Ratio	0.27	0.38	0.43	0.44	0.43	0.44	0.24	0.40

	Wealthsimple IRA	Wells Fargo IRA	Zacks Advantage IRA
Annualized StdDev, %	11.03%	12.72%	12.79%
Sharpe Ratio	0.25	0.34	0.38

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### Trailing 1-Year Risk/Return Statistics of Retirement Robos

	Ally Financial IRA	Axos Invest IRA	Betterment IRA	E*Trade IRA	Fidelity Go IRA	Honest Dollar IRA	Merrill Edge IRA	Morgan Stanley IRA
Annualized StdDev, %	11.29%	10.79%	10.15%	12.13%	9.68%	11.70%	10.56%	9.03%
Sharpe Ratio	1.78	1.92	1.85	1.75	2.05	1.84	1.89	1.90

	Personal Capital IRA	Schwab IRA	SigFig IRA	SoFi IRA	T Rowe Price IRA	TD Ameritrade IRA	TIAA IRA	United Income IRA
Annualized StdDev, %	10.50%	10.83%	10.53%	12.04%	11.96%	10.27%	10.16%	11.75%
Sharpe Ratio	1.87	1.71	1.91	1.88	1.85	1.91	1.87	1.66

	USAA IRA	Wealthsimple IRA	Wells Fargo IRA	Zacks Advantage IRA
Annualized StdDev, %	11.63%	9.40%	11.25%	10.89%
Sharpe Ratio	1.83	1.63	1.72	1.84

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## Normalized Benchmark

### Equity Portfolio

Category	Asset Type	Ticker	Name	Current Taxable Benchmark Weight	Current Retirement Benchmark Weight
Equity	Domestic	VTI	Vanguard Total Stock Market ETF	62%	62%
Equity	International	VXUS	Vanguard Total International Stock ETF	38%	38%

\*Benchmark weights updated at the end of each calendar year. Benchmark updates do not affect performance prior to update.

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### Bond Portfolio

Category	Asset Type	Ticker	Name	Current Taxable Benchmark Weight	Current Retirement Benchmark Weight
Fixed Income	Multi-Sector US	AGG	iShares Core US Aggregate Bond ETF	37%	26%
Fixed Income	Investment-Grade Corporates	LQD	iShares iBoxx \$ Investment Grade Corporate Bond ETF	6%	6%
Fixed Income	High-Yield Corporates	JNK	SPDR Bloomberg Barclays High Yield Bond ETF	3%	2%
Fixed Income	International Developed	IGOV	iShares International Treasury Bond ETF	4%	3%
Fixed Income	International Emerging Markets	EMB	iShares J.P. Morgan USD Emerging Markets Bond ETF	3%	6%
Fixed Income	Municipals	MUB	iShares National Muni Bond ETF	28%	3%
Fixed Income	TIPS	TIP	iShares TIPS Bond ETF	4%	3%
Fixed Income	Short-Term Treasuries (0-3 Year Maturity)	VGSH	Vanguard Short-Term Treasury ETF	4%	0%
Fixed Income	Intermediate-Term Treasuries (3-10 Year Maturity)	VGIT	Vanguard Intermediate-Term Treasury ETF	2%	3%
Fixed Income	Long-Term Treasuries (10+ Year Maturity)	VGLT	Vanguard Long-Term Treasury ETF	0%	0%
Fixed Income	Securitized	VMBS	Vanguard Mortgage-Backed Securities ETF	2%	1%
Fixed Income	Cash	FDRXX	Fidelity® Government Cash Reserves	7%	48%

\*Benchmark weights updated at the end of each calendar year. Benchmark updates do not affect performance prior to update.

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## Taxable Benchmark Returns

	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)
Acorns Normalized Benchmark	5.47%	19.17%	6.17%	9.32%	8.74%
Ally Financial Normalized Benchmark	5.38%	18.97%	6.13%	-	-
Axos Invest Normalized Benchmark	5.81%	19.94%	6.33%	9.48%	8.92%
BBVA Compass Normalized Benchmark	5.30%	18.78%	-	-	-
Betterment Normalized Benchmark	5.90%	20.14%	6.36%	9.57%	9.00%
Betterment Smart Beta Normalized Benchmark	5.47%	-	-	-	-
Betterment Income Normalized Benchmark	0.44%	-	-	-	-
Betterment SRI Normalized Benchmark	5.47%	19.17%	6.17%	-	-
Citizens Bank Normalized Benchmark	5.81%	19.94%	-	-	-
E*Trade Normalized Benchmark	5.47%	19.17%	6.17%	9.13%	-
E*Trade Active Normalized Benchmark	5.55%	19.36%	-	-	-
E*Trade SRI Normalized Benchmark	5.55%	19.36%	-	-	-
Edelman Financial Engines Normalized Benchmark	6.07%	20.64%	-	-	-
Ellevest Normalized Benchmark	5.13%	18.40%	6.01%	9.09%	-
Ellevest SRI Normalized Benchmark	4.71%	18.01%	-	-	-
Fidelity Go Normalized Benchmark	5.55%	19.36%	6.21%	9.22%	-
Fifth Third Bank Normalized Benchmark	5.47%	19.17%	-	-	-
FutureAdvisor Normalized Benchmark	5.21%	18.41%	6.07%	8.89%	-
Interactive Advisors Normalized Benchmark	5.05%	18.20%	-	-	-
JP Morgan Chase You Invest Normalized Benchmark	4.62%	-	-	-	-
Liftoff (Ritholtz Wealth Management) Normalized Benchmark	5.47%	-	-	-	-
M1 Finance Normalized Benchmark	5.98%	-	-	-	-
Merrill Edge Normalized Benchmark	4.96%	18.08%	6.03%	-	-
Merrill Edge SRI Normalized Benchmark	5.38%	18.97%	-	-	-
Morgan Stanley Normalized Benchmark	5.73%	20.03%	6.32%	-	-
Morgan Stanley Active Normalized Benchmark	5.81%	19.94%	-	-	-
Morgan Stanley Defense and Cyber Security Normalized Benchmark	5.81%	-	-	-	-
Morgan Stanley Emerging Consumer Normalized Benchmark	5.81%	-	-	-	-
Morgan Stanley Gender Diversity Normalized Benchmark	5.47%	-	-	-	-
Morgan Stanley Genomics Normalized Benchmark	4.54%	-	-	-	-
Morgan Stanley Global Frontier Normalized Benchmark	5.98%	-	-	-	-
Morgan Stanley Inflation Conscious Normalized Benchmark	5.45%	-	-	-	-
Morgan Stanley Robotics Normalized Benchmark	5.98%	-	-	-	-
Morgan Stanley SRI Normalized Benchmark	5.21%	19.16%	6.11%	-	-
Motif Normalized Benchmark	5.38%	-	-	-	-
Personal Capital Normalized Benchmark	6.58%	21.69%	6.66%	10.26%	9.66%
Prudential Normalized Benchmark	5.47%	19.17%	-	-	-
Qapital Normalized Benchmark	6.07%	-	-	-	-
Schwab Normalized Benchmark	5.66%	19.61%	6.28%	9.51%	8.96%
Schwab Domestic Focus Normalized Benchmark	5.90%	-	-	-	-
SigFig Normalized Benchmark	5.64%	19.55%	6.25%	9.31%	8.75%
SoFi Normalized Benchmark	5.47%	19.17%	6.23%	-	-

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For more detailed information about the Normalized Benchmark please visit  
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## Taxable Benchmark Returns (continued from previous page)

	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)	4-Year Trailing (Annualized)
TD Ameritrade Normalized Benchmark	6.15%	20.72%	6.48%	9.75%	-
TD Ameritrade Income Normalized Benchmark	2.18%	-	-	-	-
TD Ameritrade Managed Risk Normalized Benchmark	1.68%	-	-	-	-
TD Ameritrade Opportunistic Normalized Benchmark	4.03%	-	-	-	-
TD Ameritrade SRI Normalized Benchmark	6.07%	20.52%	-	-	-
TIAA Normalized Benchmark	5.55%	19.36%	6.21%	-	-
TIAA Active Normalized Benchmark	6.08%	21.12%	-	-	-
TIAA SRI Normalized Benchmark	5.47%	19.17%	6.17%	-	-
Titan Invest Normalized Benchmark	8.91%	-	-	-	-
Twine Normalized Benchmark	6.24%	20.91%	-	-	-
UBS Advice Advantage Normalized Benchmark	6.15%	20.72%	-	-	-
United Income Normalized Benchmark	5.38%	18.97%	6.13%	-	-
US Bank Normalized Benchmark	5.21%	18.96%	-	-	-
USAA Normalized Benchmark	5.55%	19.36%	6.19%	-	-
Vanguard Normalized Benchmark	5.47%	19.17%	6.17%	9.13%	8.58%
Wealthfront Normalized Benchmark	5.90%	20.14%	6.36%	9.57%	-
Wealthfront PassivePlus Normalized Benchmark	5.13%	-	-	-	-
Wealthsimple Normalized Benchmark	5.47%	19.17%	6.17%	-	-
Wealthsimple Halal Normalized Benchmark	8.91%	-	-	-	-
Wealthsimple SRI Normalized Benchmark	5.47%	19.17%	-	-	-
Wells Fargo Normalized Benchmark	5.73%	19.75%	6.29%	-	-
Zacks Advantage Normalized Benchmark	5.47%	19.17%	6.09%	-	-

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## Retirement Benchmark Returns

	4Q 2019	1-Year Trailing	2-Year Trailing (Annualized)	3-Year Trailing (Annualized)
Ally Financial IRA Normalized Benchmark	8.30%	25.39%	7.23%	-
Axos Invest IRA Normalized Benchmark	8.21%	25.17%	7.19%	11.76%
Betterment IRA Normalized Benchmark	7.78%	24.06%	6.99%	11.29%
E*Trade IRA Normalized Benchmark	8.73%	26.50%	7.43%	12.33%
Fidelity Go IRA Normalized Benchmark	7.61%	23.62%	6.90%	11.10%
Honest Dollar IRA Normalized Benchmark	8.82%	26.72%	-	-
Merrill Edge IRA Normalized Benchmark	7.78%	24.29%	6.98%	-
Morgan Stanley IRA Normalized Benchmark	7.09%	22.31%	6.65%	-
Personal Capital IRA Normalized Benchmark	8.55%	26.04%	7.35%	12.13%
Schwab IRA Normalized Benchmark	8.39%	25.61%	7.27%	11.95%
SigFig IRA Normalized Benchmark	8.13%	24.95%	7.15%	11.67%
SoFi IRA Normalized Benchmark	8.91%	26.94%	7.51%	-
T Rowe Price IRA Normalized Benchmark	8.91%	26.94%	7.51%	-
TD Ameritrade IRA Normalized Benchmark	7.52%	23.40%	6.86%	10.97%
TIAA IRA Normalized Benchmark	7.87%	24.28%	7.03%	-
United Income IRA Normalized Benchmark	8.82%	26.72%	7.47%	-
USAA IRA Normalized Benchmark	8.82%	26.72%	7.47%	-
Wealthsimple IRA Normalized Benchmark	7.18%	22.53%	6.69%	-
Wells Fargo IRA Normalized Benchmark	8.13%	24.95%	7.15%	-
Zack's Advantage IRA Normalized Benchmark	8.30%	25.39%	7.23%	-

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## Robo Ranking Methodology

### *How We Rank the Robos*

The robo advisors are ranked on a comprehensive set of criteria. The final robo score is made up of a qualitative score of their services, platform, company, and features, and a quantitative score based primarily on the costs and performance of the portfolio. A small portion of the quantitative score is based on the minimum investment and size and tenure of the robo advice product. When looking at the qualitative aspects of the service, we focus on five categories: financial planning, user interface and customer experience, product features, access to live advisors, and transparency and conflicts of interest.

In this issue of *The Robo Ranking*<sup>™</sup>, we made a few adjustments on how we scored different categories. First, instead of allocating points based on if a provider made a live advisor available at the lowest level, we adjusted that metric to award points based on the minimum at which live advisors are made available. Lower minimums for live advisors scored more points. Second, we removed the metric of whether or not onboarding could be completed in less than 30 minutes, as every robo in the Ranking scored those points. Instead, we changed the metric to score whether or not a robo's financial planning tool integrates directly with the investment portal. Lastly, we awarded full points to any advisor who had a minimum of \$500 or less. Previously, the bar was set at \$10 or less.

Below, we give examples of what earned points in each category.

#### **Financial Planning:**

Here we graded the platforms on the quality of financial planning services offered. Robos that allowed users to build or create single or multi-goal financial plans were awarded points. Other financial planning tool features that earned points were those that allowed for “what if” scenarios; helped users calculate retirement spending needs, including Social Security benefit estimates; allowed for the inclusion of pension or other retirement income;

and offered suggestions on appropriate monthly saving goals. In this issue of the rankings, points were awarded if their planning tools had specific functionality. For example, if the single-goal planning tool could: one, model future account values or spending; two, accept a user input of an account value or spending goal; and three, show either a likelihood of success or changes, then all points were awarded. If only some of these features were present, then partial points were awarded.

#### **User Interface and Customer Experience:**

Here we evaluated the user interface and the digital customer experience. We looked at the ease of getting to basic account information and general accessibility of the site. We measured the number of clicks required to access basic account and portfolio information, and used third-party software to produce an “accessibility score.” Points were also awarded to platforms that had good content and articles on basic personal finance and investing topics. During onboarding, we looked to see if the onboarding questionnaire took into account a user's comfort with investing and inquired or mentioned whether the user has an emergency fund. We also scored robos that had the ability to aggregate held-away accounts for a holistic financial picture. Availability of live chat options and mobile apps also helped robos score higher in this category.

#### **Product Features:**

Robos were awarded points for different types of features. Tax-loss harvesting, tax efficiency, tax location strategies, smart dividend reinvestment, ability to trade fractional shares, cash management features, types of accounts offered, access to impact or other themed portfolios, and the ability of a robo to customize a portfolio to a specific customer situation were the features we looked for in this category. We also included a field for unique and additive features that were not explicit in our scoring. This unique and additive features criteria was a small portion of the overall features score.

### Transparency and Conflicts of Interest:

In this category, we looked for things like whether or not a user could easily compare their portfolio to relevant benchmarks to help them understand performance. We also awarded points for platforms that made their models available before account opening, and further points if they also published the performance of their models to prospective customers. Availability of white papers and other information on how portfolios are constructed were also awarded points. We also awarded points to those portfolios that did not rely entirely on proprietary products or chose no proprietary products when constructing their portfolios.

### Access to Live Advisors:

Robos with access to live advisors, or the ability to upgrade to a product that has live advisors, earned points. Robos earned more points if there was a dedicated live advisor option, if they required their advisors to hold CFPs, and the minimums at which live advisors are made available. Partial points were awarded to firms that had products or programs with live advisors if those programs were not part of the digital advice offering. In this issue of *The Robo Ranking*<sup>™</sup>, more points were awarded to robo advisors that made live advisors available for no additional cost at their lowest service level.

### Account Minimum:

Robos earned points for having lower investment minimums.

### Costs:

We scored costs on the sum of the management fee and average-weighted expense ratio rather than scoring these two components separately. This method better reflects the true cost incurred by clients. Additionally, we consider a cash allocation as a cost if the cash holding is earning less than 1.25% APY. If a cash position was earning 1.25% or more, robos received full points in this section. Robos with cash positions that are earning less than 1.25% received less than full points in this category. The cash allocation had a much smaller impact than management fees and weighted expense ratios.

### Performance:

We used two metrics to grade a robo's performance. The first was the Sharpe ratio, which is a measure of risk-adjusted returns. The second was their return above/below the Normalized Benchmark. This measurement method reduces the impact of different equity/bond allocations in the portfolio. The method of using a Normalized Benchmark was created by the team at BackendBenchmarking and is explained in detail in the Normalized Benchmarking section on the website.

### Size and Tenure:

This score is based on the AUM and age of the robo advice products. Large amounts of AUM and older products are less likely to be discontinued in the future, forcing a client to change providers or products, which can be disadvantageous to the client. Robos that do not publish their AUM specific to the robo advice product only received the points available for the age of the robo. We encourage robo advisors and their parent companies to release AUM data for their different products in the interest of transparency to the investor.



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Last updated: 12/12/2018

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- <sup>1</sup> 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. In December of 2018 a \$1 fee was not recorded. Performance has been updated to include this fee as of Q1 2019.
- <sup>2</sup> 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.
- <sup>3</sup> 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.
- <sup>4</sup> This account was funded with the minimum or more than 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.
- <sup>5</sup> 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, a subscription fee would be levied, which would decrease reflected performance.
- <sup>6</sup> 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.
- <sup>7</sup> 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.
- <sup>8</sup> 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.
- <sup>9</sup> 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.
- <sup>10</sup> 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.
- <sup>11</sup> 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 in the range of 50/50 or 75/25 equity to fixed income split.
- <sup>12</sup> 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.
- <sup>13</sup> 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.
- <sup>14</sup> 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.
- <sup>15</sup> 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.
- <sup>16</sup> 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. Recently, this provider changed its fee schedule, but our account was grandfathered in at the previous, lower fee for the size of the account. New accounts would be subject to the new fee schedule, which would decrease reflected performance at most account size levels.
- <sup>17</sup> 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.
- <sup>18</sup> 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.
- <sup>20</sup> 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, a subscription fee would be levied, which would decrease reflected performance.
- <sup>21</sup> 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.
- <sup>22</sup> 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.
- <sup>23</sup> 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.
- <sup>24</sup> Interactive Advisors is registered as an advisor under the name of Covestor Ltd. and is part of the Interactive Brokers Group. 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 Advisors offers multiple strategies with different sets of fees, including Smart Beta, index-tracking and model ETF portfolios, in addition to the Asset Allocation portfolios. Interactive Advisors also offers a marketplace for actively managed portfolios for which it charges higher fees (0.5-1.5%), part of which it remits to the portfolio managers supplying the data underlying those strategies.
- <sup>25</sup> 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.
- <sup>26</sup> This account was enrolled in Prudential's Strategic Portfolios. It was funded with the minimum required to open an account. 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. Prudential also offers Reserve Portfolios for short-term investing, which have a lower account minimum and fee. However, the Reserve Portfolios do not allow asset-allocation customization based on individual demographic and risk tolerance.
- <sup>27</sup> This account has no minimum required to establish an account and is enrolled in the Digital Only plan. If more was invested, the account would be assessed a lower asset-based fee, which would increase reflected performance. 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. All balances above \$2 million are charged a lower asset-based advisory fee. A lower advisory fee would have the result of increasing reflected performance. The 2018 end-of-year statement for Betterment did not include dividends received near the end of 2018, these dividends first appeared on the March 31st, 2019 statement. These dividends are reflected as of the *Q1 2019 Robo Report*<sup>™</sup> but were not reflected in performance reported in the *Q4 2018 Robo Report*<sup>™</sup>.
- <sup>28</sup> 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. As of March 27, 2019, the management fee has been lowered. The lower advisory fee will increase reflected performance.
- <sup>29</sup> This account was funded with the minimum or more than 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. After opening, this provider changed its fee schedule, raising the fee for the asset level of the account, but our account was grandfathered in at the previous, lower fee. New accounts would be subject to the new fee schedule, which may change reflected performance.
- <sup>30</sup> These accounts were funded with more than the minimum amount required to establish an account. The account is charged a flat dollar fee subscription at its service level. Had the accounts been enrolled in different service packages, they could be assessed a higher subscription 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.
- <sup>31</sup> These accounts were funded with the minimum amount required to establish an account at the time of opening. This account is enrolled in their digital only "Guided Investing" and is charged an asset-based advisory fee. If one were to upgrade to "Guided Investing with an Advisor" which introduces access to live advisors, a higher asset-based advisory fee schedule would apply, which would decrease reflected performance.

- <sup>32</sup> 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. All balances above \$2 million are charged a lower asset-based advisory fee. A lower advisory fee would have the result of increasing reflected performance.
- <sup>33</sup> 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.
- <sup>34</sup> This account was funded with more than the minimum required to establish an account. There is no management fee levied. Therefore, performance is not affected by the account's asset level. This platform has numerous different portfolio strategies. We chose the "moderately aggressive" strategy. Different portfolio strategies have different allocations which could increase or decrease reflected performance.
- <sup>35</sup> These accounts were funded with the minimum amount required to establish an account. This account is enrolled in their "Selective Portfolios" and is charged an asset-based advisory fee. These specific portfolios are only offered at the "Selective Portfolios" level, which charges a higher asset-based advisory fee due to access to live advisors than the "Essential Portfolios." Additionally, these portfolios hold balanced funds. Due to the nature of these funds and limits in our portfolio management system, we cannot accurately track equity and fixed income performance individually at the portfolio level. Total portfolio performance is unaffected by holding balanced funds.
- <sup>36</sup> 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. This platform has numerous different portfolio strategies. We chose the "60/40 classic" option. Different portfolio strategies have different allocations which could increase or decrease reflected performance.
- <sup>37</sup> These accounts were funded with the minimum amount required to establish an account. This account is enrolled in their "Selective Portfolios" and is charged an asset-based advisory fee. These specific portfolios are only offered at the "Selective Portfolios" level, which charges a higher asset-based advisory fee due to access to live advisors than the "Essential Portfolios."
- <sup>A</sup> 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.
- <sup>B</sup> 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%.
- <sup>C</sup> Due to the down market in December 2018, this account engaged in repeated tax loss harvesting on one of its asset types. All alternative securities were exhausted for this asset type, so to prevent a wash sale, the entire position, representing approximately 31% of the portfolio, was liquidated and held as cash for a 1 month period, during which time the market experienced a large upswing. Because this portfolio missed the market upswing, its performance versus the normalized benchmark is lower.

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 to 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](http://www.condorcapital.com). Condor Capital initiated a position in Schwab and JP Morgan Chase in one of the strategies used in many of their discretionary accounts on 5/30/2017 and 1/2/2001, respectively. As of 12/31/2019 the total size of the position was 37,949 shares of Schwab common stock and 12,796 shares of JP Morgan Chase common stock.



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