The Robo Ranking™

Bringing Transparency to Robo Investing

We are excited to publish our fifth edition of the *Robo Ranking™*. *The Robo Ranking™* 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.

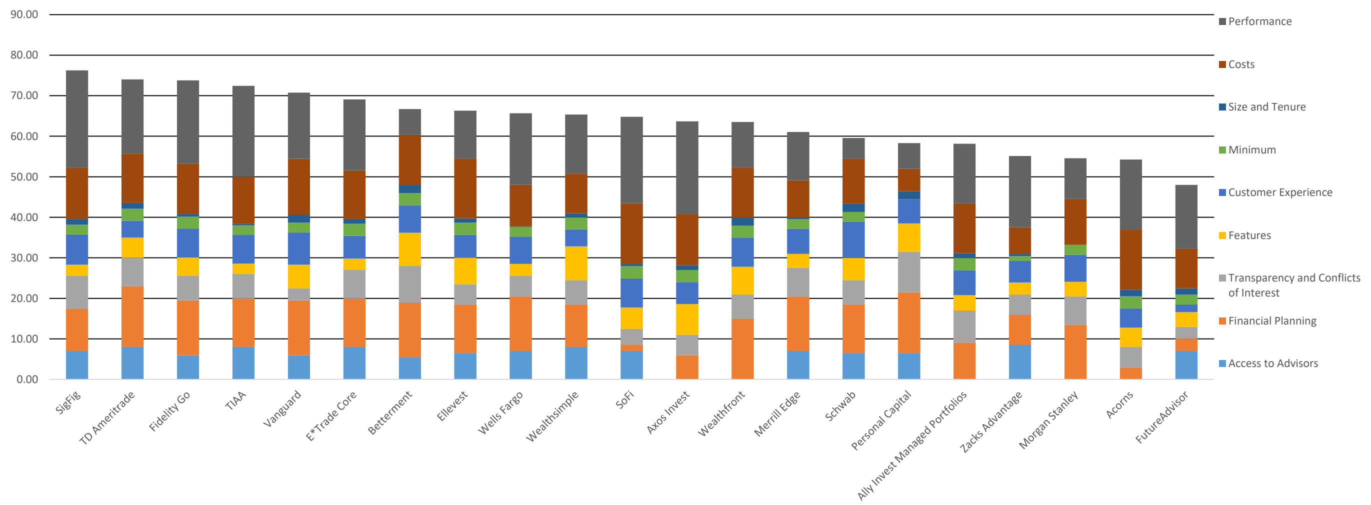
Introduction

The *Robo Ranking™* grades robo advisors 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.

The *Robo Ranking* is a powerful tool to help those investors who are considering using a digital advisor. 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-rankings 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. In this edition, we have added Merrill Edge's Guided Investing and Wells Fargo's Intuitive Investor.

The performance score 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 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 Scores



Robo Name	Access to Advisors	Financial Planning	Transparency and Conflicts	Features	Customer Experience	Minimum	Size and Tenure	Costs	Performance	Total
SigFig	7.00	10.50	8.00	2.80	7.48	2.40	1.40	12.61	24.06	76.24
TD Ameritrade	8.00	15.00	7.00	5.00	4.12	3.00	1.50	12.04	18.36	74.02
Fidelity Go	6.00	13.50	6.00	4.60	7.12	3.00	0.58	12.39	20.60	73.79
TIAA	8.00	12.00	6.00	2.60	7.03	2.40	0.33	11.69	22.37	72.43
Vanguard	6.00	13.50	3.00	5.80	8.00	2.40	2.00	13.75	16.30	70.75
E*Trade Core	8.00	12.00	7.00	2.80	5.62	3.00	1.27	11.91	17.48	69.07
Betterment	5.50	13.50	9.00	8.17	6.80	3.00	2.00	12.50	6.23	66.69
Ellevest	6.50	12.00	5.00	6.55	5.64	3.00	1.07	14.74	11.79	66.28
Wells Fargo	7.00	13.50	5.00	3.00	6.72	2.40	0.17	10.27	17.61	65.66
Wealthsimple	8.00	10.50	6.00	8.34	4.17	3.00	1.00	9.68	14.65	65.34
SoFi	7.00	1.50	4.00	5.25	7.19	3.00	0.53	15.00	21.31	64.78
Axos Invest	0.00	6.00	5.00	7.60	5.40	3.00	1.20	12.60	22.87	63.67
Wealthfront	0.00	15.00	6.00	6.80	7.18	3.00	2.00	12.29	11.25	63.51
Merrill Edge	7.00	13.50	7.00	3.47	6.16	2.40	0.42	9.21	11.91	61.07
Schwab	6.50	12.00	6.00	5.53	8.89	2.40	2.00	11.17	5.11	59.59
Personal Capital	6.50	15.00	10.00	7.00	5.96	0.00	2.00	5.51	6.35	58.32
Ally Invest Managed Portfolios	0.00	9.00	8.00	3.80	6.15	3.00	1.20	12.29	14.69	58.13
Zacks Advantage	8.50	7.50	5.00	2.93	5.29	1.20	0.50	6.63	17.56	55.12
Morgan Stanley	0.00	13.50	7.00	3.60	6.68	2.40	0.08	11.30	10.00	54.57
Acorns	0.00	3.00	5.00	4.80	4.72	3.00	1.60	14.85	17.27	54.24
FutureAdvisor	7.00	3.00	3.00	3.60	1.89	2.40	1.60	9.84	15.69	48.02
Maximum	**10**	**15**	**10**	**10**	**10**	**3**	**2**	**15**	**25**	**100**

Produced by Backend Benchmarking for BackendB.com

Best Overall Robo Advisor

- **Winner: SigFig**
- **Runner-up: TD Ameritrade**
- **Honorable Mention: Fidelity Go**

The *Robo Ranking* has a new Best Overall Robo Advisor, as SigFig has taken the top spot from Fidelity Go. SigFig won because of its record of strong performance, low fees, and access to advisors at lower asset levels than many other providers. Over the 2.5-year analysis period used for this *Ranking*, SigFig had the best performance relative to its Normalized Benchmark and the best risk-adjusted performance measured by the Sharpe ratio. Its resulting performance score drove it to the top of the *Ranking*. However, SigFig has many attractive features beyond performance.

SigFig won because of its record of strong performance, low fees, and access to advisors at lower asset levels than many other providers.

With a $2,000 account minimum and a $10,000 minimum for access to live advisors, SigFig is widely accessible to new investors and can provide live advice at a low minimum with an affordable fee. SigFig only charges 0.25% annually and there is no management fee on the first $10,000 invested.

But even at its lower tier, SigFig offers customers strong digital tools. Its built-in retirement planner allows users to adjust retirement and investing variables, such as where a user will retire, standard of living in retirement, risk profile of the user's investment strategy, life expectancy, and more. SigFig also offers several unique features. Users can link external brokerage accounts and SigFig will analyze the portfolio and flag issues, such as high fees and improper diversification across and within asset types. At its premium level, SigFig is one of the only providers that flexibly handles unrealized taxable gains on securities transferred in from an outside account. One noted detriment to SigFig is, despite advertising tax-loss harvesting, we did not witness SigFig take advantage of the recent market volatility to execute any tax-loss harvesting trades. Strong risk-adjusted performance, affordable access to live advisors, and strong digital tools are why SigFig has claimed the top spot.

TD Ameritrade moved up to the runner-up position for Best Overall in this *Ranking*. TD received a perfect score in the Financial Planning category and most of the points for the Access to Advisors category. Clients can call or visit a TD financial consultant found across its network of local branches. These professionals will create a comprehensive financial plan. We note that this financial planning service is not native to Essential or Selective portfolios itself, but is available to all TD customers via branch representatives, in-person or over the phone. However, this is still an old-school approach to providing advice. TD's website does not have the suite of digital tools or user experience that we have come to expect in today's digital providers.

TD received a perfect score in the Financial Planning category.

Another area that TD does well is cost. TD offers its Essential Portfolios service for a low fee of 0.30% and has underlying fund fees of only 0.05%. Low fees, combined with a low minimum, strong performance, and the access to advisors, make TD a compelling offering for most investors. Unfortunately, there is a large unknown as to how Schwab will eventually integrate Essential and Selective Portfolios after the planned acquisition. We suggest potential new clients hold off choosing TD until they can understand clearly what the acquisition will mean for their portfolio and service.

Fidelity Go, after being ranked the best robo three consecutive times, has dropped to third place. Fidelity Go constructs its portfolios with its proprietary Fidelity Flex mutual funds. Although we acknowledge the conflict of interest in a provider relying on proprietary funds, this account has steadily outperformed in terms of performance vs. the Normalized Benchmark and Sharpe ratio. Fidelity Go has a competitive annual management fee of 0.35% and the Fidelity Flex funds do not have any underlying expense ratios, making 0.35% an all-in cost. We have always been an advocate for transparency and like the fact that clients can easily and clearly understand the all-in cost of Fidelity Go. Clients can upgrade to the Personalized Planning and Advice level, but the fees jump to 0.50%, and the minimum increases from $10 to $25,000. This 0.50% fee and increased minimum, although not the lowest on the market, is competitive with other "hybrid-advice" offerings. With this higher-tier service, account holders can work with an advisor to address investment and planning needs that are not covered by Fidelity Go's digital tools. Consistent performance, a competitive fee structure, and useful digital planning tools are the hallmark of a good robo advisor and why we ranked Fidelity Go third in the Best Overall Robo category.

Fidelity Go has a competitive annual management fee of 0.35% and the Fidelity Flex funds do not have any underlying expense ratios, making 0.35% an all-in cost.

Best Robo for Performance at a Low Cost

- **Winner: SigFig**
- **Runner-Up: Axos Invest**

The *Robo Ranking* performance score is based on the account's Sharpe ratio and performance compared to the account's Normalized Benchmark. This *Ranking* uses data from the last two and a half years.

SigFig wins the Best Robo for Performance at a Low Cost award. It took the top spot in performance with an annualized return of 0.38% above its Normalized Benchmark, while the average robo underperformed its Benchmark by -1.11%. Additionally, SigFig's Sharpe ratio was 0.26, while the group average was 0.16, meaning SigFig not only had compelling returns but had an efficient level of risk taken to achieve those returns. SigFig's portfolio benefited from a few major factors. First, its stock portfolio avoided a value tilt and an international tilt which were both detrimental. Second, its bond allocation was predominantly allocated to high-quality fixed-income ETFs, including a large allocation to a Barclays Aggregate ETF and allocations to US TIPS ETFs. These choices helped bolster the higher Sharpe ratio as high quality bonds offer diversification benefits when paired with stocks.

SigFig took the top spot in performance with an annualized return of 0.38% above its Normalized Benchmark, while the average robo underperformed its Benchmark by -1.11%.

From a fee perspective, SigFig is a competitive offering with a 0.25% management fee and 0.07% in underlying fund fees. SigFig lacks the digital features of Wealthfront or Personal Capital, and its financial planning offering does not score at the top of the pack, but its compelling performance cannot be overstated. This robo is recommended for those that are looking for an efficient portfolio, low expenses, and a strong track record of performance.

Axos Invest (formerly WiseBanyan) placed second for Best Robo for Performance at a Low Cost. In this *Ranking* and in previous ones, Axos has consistently been a top performer and only charges 0.24% annually, which is on par with other inexpensive products. It is one of only two robos to outperform its Normalized Benchmark and has the second-best Sharpe ratio, meaning that it is providing superior returns when adjusting for the risk of the portfolio. Over the 2.5-year period analyzed for this *Ranking*, the total portfolio returned 4.38% annually, beating the average portfolio's return of 3.22%.

Axos Invest's product is a digital-only platform, meaning there is no access to live advisors for clients. Unlike most other digital planning tools, Axos clients work through a series of modules, answering questions about their financial lives that cover a broad set of topics, including student loans, mortgages, and budgeting. The software then delivers advice on areas that it believes 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 holistic financial picture that need to be addressed. Unfortunately, the downside to this method is it does not produce a comprehensive, integrated, and multi-goal plan. For those seeking a robo advisor with a strong performance track record, Axos is a quality choice. However, its tool might not be robust enough for those with more complex financial planning needs.

For those seeking a robo advisor with a strong performance track record, Axos is a quality choice.

Best Robo for Complex Financial Planning Needs

- **Winner: Vanguard Personal Advisor Services**
- **Runner-up: Personal Capital**
- **Honorable Mention: Wealthsimple and Ellevest**

Investors with complex financial planning needs benefit from the ability to work with a live planner and should consider robo advisors with access to human advisors.

Although many providers offer more robust planning services at a higher-fee service tier or a-la-carte planning packages, Vanguard's Personal Advisor Services includes planning with a live advisor for just a 0.30% management fee. Personal Advisor Services championed the hybrid-advice model early and centers the planning experience around live advisors. Working with an advisor, users can plan for multiple long-term investment goals and receive a comprehensive illustration of their assets. While Vanguard's digital planning tools at the Personal Advisor Services level are not as feature-rich or flexible as those offered by Personal Capital, the runner-up in this category, its individualized approach stands out. What Personal Advisor Services lacks in an intuitive user interface it makes up for with its traditional approach to delivering high-quality advice through live planners.

Vanguard's Personal Advisor Services includes planning with a live advisor for just a 0.30% management fee.

The runner-up in this category, Personal Capital, combines a traditional, live-advisor approach with best-in-class digital planning tools. Its free digital planning tools are flexible and can handle a broad set of income and spending goals. Additionally, Personal Capital has a 'Retirement Paycheck' feature that will help users determine a tax-efficient withdrawal strategy as they transition from earning a salary to relying on assets to supplement their income during retirement. When an investor needs help beyond the digital planning tools, Personal Capital's team of live advisors and planners is there to bridge the gap.

Personal Capital also offers access to multiple portfolio strategies including direct indexing and SRI-themed portfolios. Those investing more than $1,000,000 with Personal Capital's Private Client service can receive custom portfolios that include individual stocks and bonds, as well as the option of gaining exposure to private equity.

Personal Capital was one of the few advisors in our ranking with a perfect score in the financial planning category.

The biggest detriment to Personal Capital is its 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 and is well-suited to help clients with complex needs.

Both Wealthsimple and Ellevest earned honorable mentions for their complex financial planning capabilities. At 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. Ellevest recently changed to a subscription model and now offers live planning sessions to their non-Private Wealth clients for an additional fee. Additionally, Wealthsimple provides access to live advisors to all of their clients, regardless of service level. But, those who wish to build a full financial plan with a Wealthsimple planner will need a minimum investment of $100,000 and must be signed up for Wealthsimple Black. Wealthsimple can provide comprehensive plans, but the planning portal and the regular client portal are not currently integrated.

Best Robo for First-Time Investors

- **Winner: Betterment**
- **Runner-up: Wealthsimple**
- **Honorable Mention: SoFi**

Betterment once again wins the award for Best Robo for First-Time Investors. Betterment has no investment minimum, making it accessible to all customers. Its annual management fee of 0.25% is low and, thus, is a prudent option. Additionally, Betterment stands out with financial planning tools that are easy to understand and compare an investor's options intuitively. The user interface allows an investor to create specific portfolios that correspond to separate goals. The goal forecaster shows how a one-time deposit, a change in recurring deposits, or even a change in time horizon can influence the outcome. The outcomes themselves show a range of possibilities so that the investor can understand the risks and manage their expectations. Finally, for those new to understanding investment risk, there is a sliding scale feature that displays how modifying the allocation to stocks increases the likelihood of achieving your goal but comes with increased volatility.

Betterment stands out with financial planning tools that are easy to understand and compare an investor's options intuitively.

Betterment offers access to CFPs, for both one-time financial planning sessions or unlimited access with Betterment Premium. A new investor can benefit from having a one-time consultation to create a clear plan and ask questions. As the investor's assets grow over time, their financial planning needs may become more complex and Betterment Premium is a natural next step. The CFP designation is the industry standard for financial planning, and Betterment is one of the only robos to specify this credential as part of their offering.

Additionally, Betterment Everyday offers a high-yield cash account where investors can use their reserves to earn more interest than they would in a checking account. Betterment also offers socially-responsible investing, income-oriented investing, and smart-beta investing. These strategies may be interesting to new investors still exploring what makes sense for them. With no investment minimum, competitive fees, clear financial planning tools, CFPs, and different investing options to explore, Betterment is our top choice for the first-time investor.

Wealthsimple is a new addition to this category. Its Basic tier is a compelling offering with no account minimum to encourage accessibility, options for SRI or Halal investing, roundups to facilitate extra savings, and access to financial experts without additional cost.

Access to a portfolio review with a financial expert at the lowest tier, without additional cost, makes asking questions and starting a dialogue with a professional easy for a first-time investor. Common behavioral pitfalls like trading when emotions are high, misjudging one's risk capacity, or failure to stay the course, can all be mitigated with the assistance of an expert.

SoFi receives an honorable mention in this category. SoFi has no minimum or management fee and offers access to expert advice. While SoFi originally began as a provider of consumer lending and student debt management, it views investment management as an important complement. Once customers pay down their student loans, they can begin saving, planning, and investing in-house with SoFi. SoFi Money offers high-interest saving and budgeting tools to support day-to-day personal finance needs. With SoFi, a new investor has an expert to call with questions, the knowledge that they are getting a great deal on their investing, and access to other financial tools and resources in the same place.

Best Robo for Digital Financial Planning

- **Winner: Wealthfront**
- **Runner-Up: Personal Capital**
- **Honorable Mention: Schwab**

High-quality financial planning has traditionally been reserved for wealthy individuals. The advent of digital advice has lowered barriers for professional money management and democratized financial services. Wealthfront, Personal Capital, and Schwab have all embraced this trend and offer robust planning tools.

These companies offer tools that can handle complex, multi-goal plans and show users the interaction of all their goals in a single, unified plan. Automated account aggregation available at these robos provides users with a comprehensive view of their financial picture, regardless of where their assets are held. Wealthfront and Personal Capital provide their planning tools for free to non-clients. Historically, independent robo advisors have offered the best digital financial planning experiences. However, Schwab's upgrade of its financial planning tools at the premium service level earned them an honorable mention in this category.

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

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

Wealthfront has also taken steps in recent months to bolster its financial planning platform. Wealthfront is developing a platform called "Self-Driving Money," aimed at further reducing the friction of saving and meeting financial goals. Self-Driving Money is still evolving but Wealthfront has built the first steps. Users can now deposit paychecks into their Wealthfront cash accounts. According to Wealthfront, it will soon take that paycheck and automatically split it optimally across paying bills, saving, and investing. Wealthfront has also hinted at a platform to help users acquire mortgages, which will likely take into consideration a user's overall planning needs. We rate Wealthfront as the best robo advisor for digital financial planning based on what is currently available on the platform, and we are also excited to see what new features will be released in the future.

Wealthfront is developing a platform called "Self-Driving Money" aimed at further reducing the friction of saving and meeting financial goals.

Like Wealthfront, Personal Capital's planning tool can model a broad set of goals in a unified plan. 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 user's mortgage payments, property taxes, etc.

In contrast, Wealthfront's tool considers users' 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. Notably, both platforms provide their planning tools for free to users without needing to open and contribute to an account. Regardless of whether a user needs a simple single-goal plan, or a complex multi-goal plan, either planner is capable of producing a quality plan.

Both platforms provide their planning tools for free to users without needing to open an account.

Schwab deserves an honorable mention in this category after it revamped its financial planning experience in 2019 and introduced a set of features to help retirees with income during retirement in 2020. The planning experience is significantly upgraded at the Premium service tier, but only limited functionality is available at the digital-only service tier. Within the Premium 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. Additionally, Schwab allows users to customize the importance of each goal, ranking them between needs, wants, and wishes. The tool then walks users through a questionnaire that factors in all available money sources, including 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 the probability of successfully achieving their goals. This tool is powered by Money Guide Pro, a leading planning software commonly used by financial professionals. When combined with a scheduled call with a financial planner, Schwab's platform provides significant value. Unfortunately, this level of planning is not available until clients have over $25,000 in invested assets on the platform and have signed up for the Premium service tier.

Schwab allows users to customize the importance of each goal, ranking between needs, wants, and wishes.

Robo Ranking Facts (Results as of 06/30/2020)

	2.5-Year Annualized Return	2.5-Year Return vs. Normalized Benchmark	2-Year Sharpe Ratio	Account Minimum	Advisory Fee	Weighted Average Expense Ratio
Acorns[1]	3.49%	-0.88%	0.18	No minimum	$1/mo for Acorns Invest; $3/mo for Invest + Acorns Late + Acorns Spend; $5/mo for Acorns Family (includes family services). For balances above $1 million contact Acorns directly.	0.09%
Ally Financial[9]	3.22%	-1.16%	0.16	$100	0.30% annually; Also offer a 'Cash-enhanced' portfolio with 30% invested in cash and no management fee	0.06%
Axos Invest[8]	4.38%	0.08%	0.23	No minimum	0.24% annually	0.09%
Betterment[27]	1.80%	-2.48%	0.07	Digital: No minimum; Premium: $100,000	Digital: 0.25%; Premium: 0.40% (unlimited chat and calls with advisor), 0.30% above $2M	0.09%
E*Trade[21]	3.54%	-0.83%	0.18	$500	0.30% annually	0.09%
Ellevest[15]	2.90%	-1.53%	0.14	Digital: No minimum; Private Client: $1 million	$1/mo, $5/mo, $9/mo - all of which offer investing, debit card, and increased access to discounts for coaching and financial planning based on tier level	0.07%
Fidelity Go[33]	3.88%	-0.47%	0.21	Digital Only: No minimum; Personalized Planning & Advice: $25,000	Digital Only: for balances less than $10,000 there is no fee, for balances between $10,000 - $49,999.99 it is $3/mo, for balances $50,000 and above it is 0.35% annually. Personalized Planning & Advice: 0.50% annually	0.00%
FutureAdvisor[3]	3.34%	-1.09%	0.17	$5,000	0.50% annually	0.07%
Merrill Edge[31]	2.83%	-1.35%	0.13	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%
Morgan Stanley[12]	2.65%	-1.69%	0.12	$5,000	0.35% annually	0.08%
Personal Capital[4]	1.72%	-2.40%	0.07	$100,000	0.89% annually for the first $1 million; lower at different tiers over $1 million	0.11%
Schwab[5]	0.81%	-3.56%	0.02	Intelligent Portfolios: $5,000; Intelligent Portfolios Premium: $25,000	Intelligent Portfolios: No fee (digital only); Intelligent Portfolios Premium: $300 initial planning fee, $30/mo subscription	0.19%
SigFig[6]	4.71%	0.38%	0.26	$2,000	No fee for the first $10k; 0.25% annually for balance over $10k	0.07%
SoFi[17]	4.03%	-0.39%	0.22	No minimum	No management fee	0.04%
TD Ameritrade[10]	3.62%	-0.61%	0.18	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[7]	4.20%	-0.15%	0.23	$5,000	0.30% annually	0.07%
Vanguard[4,A]	3.42%	-0.95%	0.17	Vanguard Personal Advisor Services: $50,000; Vanguard Digital Advisor: $3,000	Vanguard Personal Advisor Services 0.30% annually for the first $5 million; lower at different tiers over $5 million. Vanguard Digital Advisor Services all-in fee capped at 0.20% annually.	0.07%
Wealthfront[22,B]	2.77%	-1.51%	0.13	$500	0.25% annually	0.11%
Wealthsimple[11]	3.20%	-1.17%	0.16	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%
Wells Fargo[14]	3.52%	-0.80%	0.18	$5,000	0.35% annually; discounted to 0.30% if subscribed to other specific Wells Fargo products	0.13%
Zacks Advantage[29]	3.49%	-0.81%	0.18	$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%

Produced by Backend Benchmarking for BackendB.com

Returns are net of fees and from 12/31/2017 - 06/30/2020. The weighted average expense ratio calculations exclude cash holdings from the portfolio.

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	65%	62%
Equity	International	VXUS	Vanguard Total International Stock ETF	35%	38%

Produced by Backend Benchmarking for BackendB.com

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

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	29%	24%
Fixed Income	Investment-Grade Corporates	LQD	iShares iBoxx $ Investment Grade Corporate Bond ETF	10%	3%
Fixed Income	High-Yield Corporates	JNK	SPDR Bloomberg Barclays High Yield Bond ETF	2%	5%
Fixed Income	International Developed	IGOV	iShares International Treasury Bond ETF	6%	4%
Fixed Income	International Emerging Markets	EMB	iShares J.P. Morgan USD Emerging Markets Bond ETF	4%	7%
Fixed Income	Municipals	MUB	iShares National Muni Bond ETF	26%	0%
Fixed Income	TIPS	TIP	iShares TIPS Bond ETF	5%	6%
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	4%	4%
Fixed Income	Long-Term Treasuries (10+ Year Maturity)	VGLT	Vanguard Long-Term Treasury ETF	1%	4%
Fixed Income	Securitized	VMBS	Vanguard Mortgage-Backed Securities ETF	1%	1%
Fixed Income	Cash	FDRXX	Fidelity® Government Cash Reserves	8%	42%

Produced by Backend Benchmarking for BackendB.com

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

Taxable Normalized Benchmark Returns

	2Q 2020	YTD	1-Year	2-Year	3-Year	4-Year
Acorns Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	6.15%	7.41%
Ally Invest Managed Portfolios Normalized Benchmark	13.56%	-1.17%	4.96%	5.59%	6.04%	-
Axos Invest Normalized Benchmark	14.41%	-1.72%	4.71%	5.43%	6.13%	7.49%
BBVA SmartPath Normalized Benchmark	13.40%	-1.06%	5.01%	-	-	-
Betterment Normalized Benchmark	14.57%	-1.84%	4.65%	5.40%	6.14%	7.55%
Betterment Goldman Sachs Smart Beta Normalized Benchmark	13.73%	-1.28%	4.91%	-	-	-
Betterment Income Normalized Benchmark	3.68%	4.01%	6.22%	-	-	-
Betterment SRI Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	-	-
CitiGroup Normalized Benchmark	13.90%	-	-	-	-	-
Citizens Bank SpeciFi Normalized Benchmark	14.41%	-1.72%	4.71%	-	-	-
E*Trade Active Normalized Benchmark	13.90%	-1.39%	4.86%	-	-	-
E*Trade Core Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	6.06%	7.25%
E*Trade SRI Normalized Benchmark	13.90%	-1.39%	4.86%	-	-	-
Edelman Financial Engines Normalized Benchmark	14.91%	-2.07%	4.54%	-	-	-
Ellevest Normalized Benchmark	13.06%	-0.84%	5.11%	5.68%	6.11%	-
Ellevest SRI Normalized Benchmark	12.22%	-0.32%	5.33%	5.78%	-	-
Fidelity Go Normalized Benchmark	13.90%	-1.39%	4.86%	5.53%	6.08%	-
Fifth Third Bank OptiFi Normalized Benchmark	13.73%	-1.28%	4.91%	-	-	-
FutureAdvisor Normalized Benchmark	13.23%	-0.95%	5.06%	5.68%	6.02%	7.11%
Interactive Advisors Normalized Benchmark	12.72%	-0.63%	5.20%	-	-	-
Interactive Advisors Legg Mason Global Growth and Income Normalized Benchmark	15.25%	-2.30%	-	-	-	-
Interactive Advisors State Street SSGA Moderate Normalized Benchmark	14.74%	-1.95%	-	-	-	-
Interactive Advisors Wisdom Tree Moderate Aggressive Normalized Benchmark	15.08%	-2.18%	-	-	-	-
JP Morgan Chase You Invest Portfolios Normalized Benchmark	12.05%	-0.21%	5.37%	-	-	-
Liftoff (Ritholtz Wealth Management) Normalized Benchmark	13.73%	-1.28%	4.91%	-	-	-
M1 Finance Normalized Benchmark	14.74%	-1.95%	4.60%	-	-	-
Merrill Edge Normalized Benchmark	13.90%	-1.46%	4.32%	5.32%	5.90%	-
Merrill Edge SRI Normalized Benchmark	14.15%	-1.19%	4.94%	-	-	-
Morgan Stanley Access Investing Normalized Benchmark	14.24%	-1.61%	4.76%	5.48%	-	-
Morgan Stanley Active Normalized Benchmark	14.41%	-1.72%	4.71%	-	-	-
Morgan Stanley Defense and Cyber Security Normalized Benchmark	15.25%	-2.30%	4.43%	-	-	-
Morgan Stanley Emerging Consumer Normalized Benchmark	15.25%	-2.30%	4.43%	-	-	-
Morgan Stanley Gender Diversity Normalized Benchmark	13.73%	-1.28%	4.91%	-	-	-
Morgan Stanley Genomics Normalized Benchmark	12.55%	-0.53%	5.24%	-	-	-
Morgan Stanley Global Frontier Normalized Benchmark	15.08%	-2.18%	4.49%	-	-	-
Morgan Stanley Inflation Conscious Normalized Benchmark	13.90%	-1.39%	4.86%	-	-	-
Morgan Stanley Robotics Normalized Benchmark	15.25%	-2.30%	4.43%	-	-	-
Morgan Stanley SRI Normalized Benchmark	13.23%	-0.95%	5.06%	5.67%	-	-

Returns are net of fees and are as of 6/30/2020. All returns for periods longer than one year are annualized.

Produced by Backend Benchmarking for BackendB.com

Taxable Normalized Benchmark Returns *(continued from previous page)*

	2Q 2020	YTD	1-Year	2-Year	3-Year	4-Year
Personal Capital Normalized Benchmark	15.92%	-2.77%	4.19%	5.11%	6.26%	8.01%
Prudential LINK Normalized Benchmark	13.73%	-1.28%	4.91%	-	-	-
Qapital Normalized Benchmark	14.91%	-2.07%	4.54%	-	-	-
Schwab Normalized Benchmark	14.11%	-1.53%	4.80%	5.49%	6.20%	7.59%
Schwab Domestic Focus Normalized Benchmark	14.57%	-1.84%	4.65%	-	-	-
SigFig Normalized Benchmark	14.07%	-1.50%	4.81%	5.50%	6.09%	7.37%
SoFi Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	5.85%	-
TD Ameritrade Normalized Benchmark	15.08%	-2.18%	4.49%	5.30%	6.19%	-
TD Ameritrade Income Normalized Benchmark	7.19%	2.47%	6.15%	-	-	-
TD Ameritrade Managed Risk Normalized Benchmark	6.18%	2.94%	6.21%	-	-	-
TD Ameritrade Opportunistic Normalized Benchmark	11.55%	0.09%	5.59%	-	-	-
TD Ameritrade SRI Normalized Benchmark	15.25%	-1.78%	4.85%	-	-	-
TIAA Normalized Benchmark	13.90%	-1.39%	4.86%	5.53%	6.08%	-
TIAA Active Normalized Benchmark	13.90%	-1.39%	5.17%	-	-	-
TIAA SRI Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	-	-
Titan Invest Normalized Benchmark	20.47%	-6.21%	2.19%	-	-	-
Twine Normalized Benchmark	15.25%	-2.30%	4.43%	-	-	-
UBS Advice Advantage Normalized Benchmark	15.42%	-1.90%	4.79%	5.45%	-	-
United Income Normalized Benchmark	13.56%	-1.17%	4.96%	5.59%	-	-
US Bank Normalized Benchmark	13.23%	-0.95%	5.08%	-	-	-
Vanguard Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	6.06%	7.25%
Vanguard Digital Advisor Normalized Benchmark	13.40%	-	-	-	-	-
Wealthfront Normalized Benchmark	14.57%	-1.84%	4.65%	5.40%	6.14%	7.55%
Wealthfront PassivePlus Normalized Benchmark	13.06%	-0.84%	5.11%	-	-	-
Wealthsimple Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	6.06%	-
Wealthsimple Halal Normalized Benchmark	20.47%	-6.21%	2.19%	-	-	-
Wealthsimple SRI Normalized Benchmark	13.73%	-1.28%	4.91%	5.56%	-	-
Wells Fargo Normalized Benchmark	14.24%	-1.61%	4.76%	5.47%	-	-
Zacks Advantage Normalized Benchmark	13.73%	-1.28%	4.91%	5.51%	-	-

Returns are net of fees and are as of 6/30/2020. All returns for periods longer than one year are annualized. *Produced by Backend Benchmarking for BackendB.com*

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™*, 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.

Updates from the Previous Report:

In this issue of the *Robo Ranking*, we made two changes to our Methodology. First, we are now rewarding half points instead of full points for Financial Planning scores where a higher-service tier is required in order to benefit from the criteria. Second, we are now rewarding half points instead of full points for Access to Live Advisors scores where a higher-service tier is required to access advisors.

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, the single-goal planning tool was awarded full points if it can model future account values or spending, accept a user input of an account value or spending goal, and show either a likelihood of success or changes. If only some of these features were present, then partial points were awarded. Half-point scores were awarded if fulfilling the criteria required a higher-service tier.

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 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 awarded points. Additionally, we 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 advisors to hold CFPs, and the minimums at which live advisors are made available. Full points were awarded if these advisors were available at the lowest-service tier while half points were awarded if advisors required a higher-service tier.

Account Minimum:

Robos earned points for having lower investment minimums.

Costs:

We scored costs on the sum of the management fee and weighted-average 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 0.20% APY. If a cash position was earning 0.20% or more, robos received full points in this section. Robos with cash positions that are earning less than 0.20% 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 the *Robo Ranking* 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. 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.

Terms of Use ("Terms")

Last updated: 7/1/2020

Please read these Terms of Use ("Terms", "Terms of Use") carefully before subscribing to the *Robo Report™* and the *Robo Ranking™* ("Our Research", "Research") distributed by BackEndB.com, LLC ("The Company") through the websites https://theroboreport.com/ and https://backendbenchmarking.com/ ("Websites", "Website").

Your access to and use of Our Research is conditioned on your acceptance of and compliance with the Terms. These Terms apply to all subscribers and others who access or use Our Research.

The Company reserves the right to change these terms at any time without notice. By continuing to subscribe to Our Research, you agree to abide by them.

Our Research focuses on digital services providing automated investment advice ("Robo", "Robos"). A "Covered Robo" is any Robo for which the Company publishes historical return data in Our Research.

Our Research is copyrighted and owned by the Company. Use of Our Research for commercial purposes is strictly prohibited without written consent or a license, except for Covered Robos who wish to use Our Research for marketing purposes, subject to the following requirements:

1. **If materials, insights, facts, data or other information from Our Research is used, Our Research must be cited as the source and it must be stated Our Research is produced by Backend Benchmarking.**
2. **To avoid misrepresentation, the name or time period of Our Research cited must be stated. For example, if the information used is performance from the First Quarter 2018 the *Robo Report*, it must be clearly stated that the performance is from the first quarter report, or performance numbers are from the time period ending 03/31/2018.**
3. **The Company does not permit the redistribution of Our Research. We welcome and encourage including a link to our Website in any articles or other materials. We provide the report for free to anyone who wants to subscribe. Attaching, hosting for download, or including a link that allows a user to directly access Our Research is prohibited. The appropriate link for our Website to use is: https://www.backendbenchmarking.com/the-robo-report/**
4. **One must use the most recent version of Our Research at the time of publishing. The most recent version of Our Research and the date it was published are on https://www.backendbenchmarking.com/the-robo-report/. The newest version can be obtained by filling out the subscription form on the Website or by contacting the Company directly.**

Failure to comply with the aforementioned guidelines may result in a takedown notice, revocation of your subscription to Our Research, and/or legal action.

To request written consent or a license, contact The Company at info@backendb.com or call 732-893-8290 and ask for David Goldstone.

Disclaimer of Warranties:

Our Research is provided "as is"; with all faults. The Company disclaims all warranties of any kind regarding the Research, either express or implied, including but not limited to, any implied warranty of merchantability, fitness for a particular purpose, ownership, noninfringement, accuracy of informational content, and absence of viruses and damaging or disabling code.

The Company does not warrant the accuracy, completeness, or timeliness of the Research. The Company shall not be responsible for investment decisions, damages, or other losses resulting from use of Our Research.

Past performance does not guarantee future performance. The Company shall not be considered an "expert" under the Securities Act of 1933. The Company does not warrant that this service complies with the requirements of the FINRA or any similar organization or with the securities laws of any jurisdiction."

Some jurisdictions do not allow the exclusion or limitation of implied warranties, so the above exclusions or limitations may not apply.

Disclosures

1 These accounts were funded with more than the minimum amount required to establish an account. Had the accounts been funded with more assets, they would be charged a flat dollar fee up to $1,000,000. Because the fee is a flat dollar amount, a higher account balance would have the result of increasing reflected performance, while a lower account balance would have the result of decreasing reflected performance. In December of 2018 a $1 fee was not recorded. Performance has been updated to include this fee as of Q1 2019.

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

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

4 This account was funded with the minimum 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.

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

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

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

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

9 This account was funded with the minimum investment amount at the time. At the time of opening, the account had a 0.25% management fee. Due to changes in the service at the end of the Q1 2017, new accounts are charged a 0.30% management fee. The fee on our account was grandfathered in and remains at 0.25%. The higher advisory fee would have the result of decreasing reflected performance.

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

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

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

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

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

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

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

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

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

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

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

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

23 These accounts were funded with the minimum amount required to establish an account. There is no fee schedule; all accounts are charged the same

asset-based fee. Therefore, performance is not affected by the account's asset level. Fee was waived for an initial promotional period. Had a fee been levied, reflected performance would have been lower.

24 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.

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

26 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 shortterm 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.

27 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* but were not reflected in performance reported in the Q4 2018 *Robo Report*.

28 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.

29 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.

30 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.

31 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.

32 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.

33 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. Prior to August 2020, this account was assessed a 0.35% annual management fee As of August 2020, the provider changed the fee structure such that accounts under $10,000 are not charged a management fee. Our account is under this threshold and will therefore not be charged a management fee starting in August of 2020. This will have the result of increasing reflected performance.

34 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.

35 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.

36 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.

37 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."

38 These accounts were opened when the provider charged 0.25% annual management fee. Recently, the fee structure changed to be a flat monthly fee. However, our account was grandfathered into the old fee structure. This change may have the result of increasing/decreasing reflected performance based on account size.

39 This account charges a flat 0.15% annual management fee and caps the underlying fund fees at 0.05% so that the all-in fee never exceeds 0.20% annually. The same fee is charged at all asset levels.

40. This account charges 0.55% annually. However, those with a Citi Gold or Priority account (required balances of $50,000 and $200,000 respectively)

will not be charged a management fee, which would increase reflected performance.

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

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

C Due to the down market 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 portfolios' initial target allocations 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 transaction 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.

At certain custodians, a combination of the custodian providing us a limited number of digits on fractional shares and fractional cent transactions' rounding errors are introduced into our tracking. Starting March 31, 2020, we implemented a new process at quarter end to enter small transactions to eliminate any rounding errors that have built up to more than a full cent. These transactions are small and do not have an appreciable effect on performance.

This report represents Backend Benchmarking's research, analysis and opinion only; the period tested was short in duration and may not provide a meaningful analysis; and, there can be no assurance that the performance trend demonstrated by Robos vs indices during the short period will continue. Backend Benchmarking is under common ownership and control with Condor Capital Management, an SEC registered investment adviser. A copy of Condor's disclosure Brochure is available at www.condorcapital.com. Condor Capital initiated a position in Schwab and 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 06/30/2020 the total size of the position was 39,488 shares of Schwab common stock and 17,911 shares of JP Morgan Chase common stock.

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

Connect with us at: www.facebook.com/TheRoboReport
www.linkedin.com/company/TheRoboReport
www.twitter.com/TheRoboReport