

BRINGING TRANSPARENCY TO ROBO INVESTING

EDITION 7

*The Robo Report*TM First Quarter 2018



We are proud to publish the 7th edition of *The Robo Report*TM, covering the 1st quarter of 2018. This report is a continuation of an ongoing study that monitors the most well-known robo advisors. We strive to provide a reliable resource for both investors and professionals interested in the digital advice industry.

Report Highlights

- **Market Commentary:** Amid volatility, active portfolios perform comparatively well in the first quarter.
- **News:** Wealthfront starts the year off rocky with a down round while drawing questions about their launch of a proprietary risk/parity fund.
- **Interviews:** A conversation with founder of Acorns about the power of first-time investors and United Income's innovative product aimed at the wealthiest generation.
- **Trades:** A trend of managers looking abroad.
- **Funding and AUM:** Fundraising activity and AUM all in one place.

The Executive Summary

■ Robo Report Housekeeping

This quarter, we have introduced three Socially Responsible Investing (SRI) portfolios to the report from TIAA, Betterment, and Morgan Stanley. Additionally, we are publishing results for the first time from Morgan Stanley, Wells Fargo, USAA, United Income, and Capital One. Next quarter we will be introducing SRI portfolios from WealthSimple and Hedgeable. Finally, we have changed the Wealthfront account that is tracked in the report. Performance from the old account is still available in the addendum.

■ Methodology

To get a first-hand understanding of how the different providers operate and invest clients' money, we opened up, funded, and sought specific portfolios

at various Robo advisors. For the taxable accounts, we sought a moderate allocation of approximately 60% stocks and 40% bonds for an investor in a high tax bracket. We have a tolerance for target equity allocations between 55% and 65% in taxable accounts. For comparability between portfolios that have different target allocations, we track the equity-only and fixed-income only portions of the portfolios, and encourage investors to look at differences in target allocations and compare asset class to asset class when appropriate. As for the IRAs, our goal was to have the most aggressive (highest stock) allocation. Starting with a similar baseline allocation across the portfolios allows us to measure performance and compare how our funds are invested as equally as possible

Top Performers

■ 1st Quarter Top Performers

	Best	2nd	3rd
Total Portfolio	SoFi	Schwab	TIAA SRI
Equity	SigFig	TIAA SRI & United Income	SoFi
Fixed Income	Schwab	Future Advisor	SoFi

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■ 1-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	TD Ameritrade	SigFig	Schwab
Equity	SigFig	TD Ameritrade	Vanguard
Fixed Income	Schwab	Fidelity Go	FutureAdvisor

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■ 2-Year Trailing Top Performers

	Best	2nd	3rd
Total Portfolio	Schwab	SigFig	Betterment
Equity	SigFig	Vanguard	Schwab
Fixed Income	Schwab	SigFig	Personal Capital

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Robo News

Catch up on what you missed in the digital advise industry over the last quarter. Below are highlights of the biggest news from the 1st Quarter of 2018.

■ *New Features and Offerings*

An automated investment solution has become commonplace at large financial institutions, while independent robos are all trying to push innovation and find the right balance of features to stay ahead. Ellevest followed their addition of multiple service levels, including access to financial planners late last year, with the introduction of an impact portfolio focused on investments that positively impact the advancement of women. The addition of impact portfolios and hybrid advice was a strong trend we saw in 2017 on this and other platforms. Meanwhile, Wealthsimple is branching out of brokerage accounts and is now offering savings accounts. Betterment has been increasing features available to advisors on their Betterment for Advisors platform and has introduced the ability for advisors to have more control of the asset weighting of the clients with their new Flexible Portfolio feature. As the independents try to increase features and offerings, incumbents continue to add digital advice products, the most recent being UBS, which launched their robo advice product, while offerings from JP Morgan Chase and Goldman Sachs are still anticipated later this year.

■ *Wealthfront's Risk/Parity Controversy*

Wealthfront debuted a controversial new product this quarter when they rolled out a proprietary risk/parity mutual fund that drew a variety of criticisms. The newly released fund employs a risk/parity strategy that is supposed to increase risk-adjusted returns and will be included with an allocation as high as 20% in eligible accounts that do not opt out. Some in the investment community are pointing out that by offering a proprietary mutual fund, Wealthfront is introducing the common conflict of interest of selling one's own products. The mutual fund employs a more complex strategy that comes with a higher expense ratio and will increase fees paid by investors and, in turn, increase the amount earned by Wealthfront. Critics

of this launch point out that eligible Wealthfront clients had to opt out of having this fund included in their portfolio, and those that took no action were invested in it. Having clients opt out instead of opt in increases the risk that clients who do not understand the product are now invested in it.

This product employs a relatively complex strategy that uses leverage, either through direct borrowing or derivatives like futures or swaps. This fund represents a departure from Wealthfront's low-cost passive indexing strategies. Our opinion is that the introduction of leverage to a portfolio is something that clients should clearly understand and actively consent to.

Transitioning to the fund can impact clients in other ways as well. Shifting assets from existing holdings in ETFs to the new fund will likely create tax events and, according to Wealthfront's website, the risk/parity fund cannot be used as collateral for their Portfolio Line of Credit product and may impact how much an investor can borrow against their portfolio. Another concern that was raised is that the expense ratio underestimates costs, as this expense ratio does not include the cost of swaps used in the strategy, which can be significant. The expense ratio was originally set at 0.50% but was halved to 0.25% in mid-April. Wealthfront also eliminated their promotional offer to manage the first \$10,000 in assets at no charge.

While there is plenty of discussion to be had around the merits of risk/parity, the largest issue that we raise about this product is whether or not investors, who are now owners of this fund, understand their investments and the risk that comes with them. The philosophy section on Wealthfront's website was slightly changed in mid-April, but at the time of the risk/parity fund launch Simon at Wired Magazine astutely pointed out that the philosophy section said, "We believe in passive investing. This simply means parking your money in a diversified portfolio of low-cost index funds and having the patience to stay the course..." Is the same investor that signed up with Wealthfront based on their stated philosophy the same investor that wants or understands a risk/parity fund?

■ *NonFinance Companies Offering Advice*

The combination of Overstock.com launching a robo advisor and news that Amazon was considering venturing into banking sparked a discussion about whether Amazon, or others, will try and enter the investment advice industry. At first, many were not concerned about Overstock.com's launch, but Overstock.com's CEO pushed back, pointing out they currently have 40 million unique visitors a month and existing financial products offerings, like loans. After the initial surprise of the announcement settled in, the next logical question was, if Overstock.com is doing it, is one of the tech giants like Amazon next? Although robo advice has brought the barrier to entry for a digital-only solution very low, digital-only is not the rising trend in digital advice. Amazon or Google launching a hybrid model seems far less likely, as it would involve significant investments in hiring, training, and supporting financial planners. Although the prospect of a tech giant entering the digital investment space is still entirely possible, it seems less likely than the headlines suggest. At least for Amazon, it seems more likely they will enter finances through checking, savings, and lending products first.

■ *Loss of Access*

On Monday, February 5th, the Dow Jones Industrial Index was down as much as 1,500 points during the trading day. It was reported that the two largest independent robo advisors, Wealthfront and Betterment, experienced outages on their websites and clients could not log in to view or take action on their accounts for brief windows during the day. However, at the time these outages made headlines, they were not the only financial institutions that had online traffic-related issues: Finance heavyweights Fidelity, Schwab, Vanguard, T. Rowe Price, and TD Ameritrade all reportedly had issues with website response times or accessibility. Although the recent website outages should be addressed and spur a conversation in the investment community about how automated trading and digital advice products will react in volatile markets, we do not believe this recent incident is a game-changer for digital advice.

■ *Funding Update*

Funding has continued to stay strong in the digital advice industry. Wealthsimple, a Canadian-based robo, announced in February a \$51 million round, planning to use the funds to add features and expand to other financial products. Acorns raised an undisclosed amount in January from The Rise Fund. Stash, an app focused on younger investors, raised \$37.5 million with eyes on expanding into banking and other financial products. NextCapital, a primarily B2B digital advice platform, raised \$30 million in January.

The largest story that shook the robo advice industry came after unconfirmed reports of Wealthfront's latest round of \$75 million was a down round. Although the valuation figure has been disputed, Bloomberg reported that the round valued Wealthfront at \$500 million, down from their previous round's valuation in 2014 of \$700 million. Some speculate that their decision to stay as a digital-only solution, while others have moved to offering a hybrid model, contributed to the lower valuation. Higher than anticipated customer acquisition costs likely contributed as well. As the market has become more competitive and many early adopters have already likely signed on to a robo, new customer acquisition is likely becoming more difficult. Competition is also contributing to slowing growth rates across the industry. Despite the negative news surrounding this funding round for Wealthfront, as shown by other significant investments made this quarter in other platforms, there still appears to be an appetite for funding digital advice companies.

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 (Millions)	Clients	As of Date	Source of AUM and Clients Figures
Acorns	\$102 (before most recent round)	Not Disclosed	Jan, 2018	Unknown	\$545	1,347,000	12/18/2017	Most Recent ADV
Betterment	\$275	\$70	Jul, 2017	\$800	\$13,455	346,000	12/31/2017	Most Recent ADV
Ellevest	\$44.6	\$34.6	Jul, 2017	Unknown	\$91	7,673	12/31/2017	Most Recent ADV
FutureAdvisor	N/A	N/A	N/A	Acquired for \$152 Million August, 2015	\$1,213	8,587	12/31/2017	Most Recent ADV
Hedgeable	N/A	N/A	N/A	Unknown	\$81	1,627	12/31/2017	Most Recent ADV
Personal Capital	\$250	\$39.5	Aug, 2017	Unknown	\$6,489	37,793	12/31/2017	Most Recent ADV
Schwab Intelligent Portfolio Products	N/A	N/A	N/A	N/A	\$27,000	223,000 Accounts (# of clients unavailable)	12/31/2017	4th Quarter Earnings Report
SigFig	\$67.1	\$33	May, 2016	Unknown	\$210	3,934	12/31/2017	Most Recent ADV
SoFi Wealth	N/A	N/A	N/A	N/A	\$43	9,163	12/31/2017	Most Recent ADV
TD Ameritrade Selective and Essential Portfolios	N/A	N/A	N/A	N/A	\$16,880	Unknown	2/28/2018	Company Reports
T Rowe Price ActivePlus Portfolios	N/A	N/A	N/A	N/A	\$252	Unknown	12/31//2017	Company Representative
United Income	\$5	\$5	Jun, 2016	\$22	\$308	154	AUM as of 2/28/2018; Clients as of 12/31/2018	Company Representative (AUM) and Most Recent ADV (Clients)
Vanguard Personal Advisor Services	N/A	N/A	N/A	N/A	\$101,000	Unknown	12/31/2017	News Media/ Vanguard Spokesperson
Wealthfront	\$204	\$75	Jan, 2018	\$500 ^Δ	\$10,233	193,287	12/31/2017	Most Recent ADV
WealthSimple	\$114.7	\$51.8	Feb, 2018	Unknown	\$52 (U.S.)	7,980 (U.S.)	12/31/2017	Most Recent ADV
WiseBanyan	\$4.65	\$0.5	Jun, 2016	Unknown	\$152	31,772	12/31/2017	Most Recent ADV

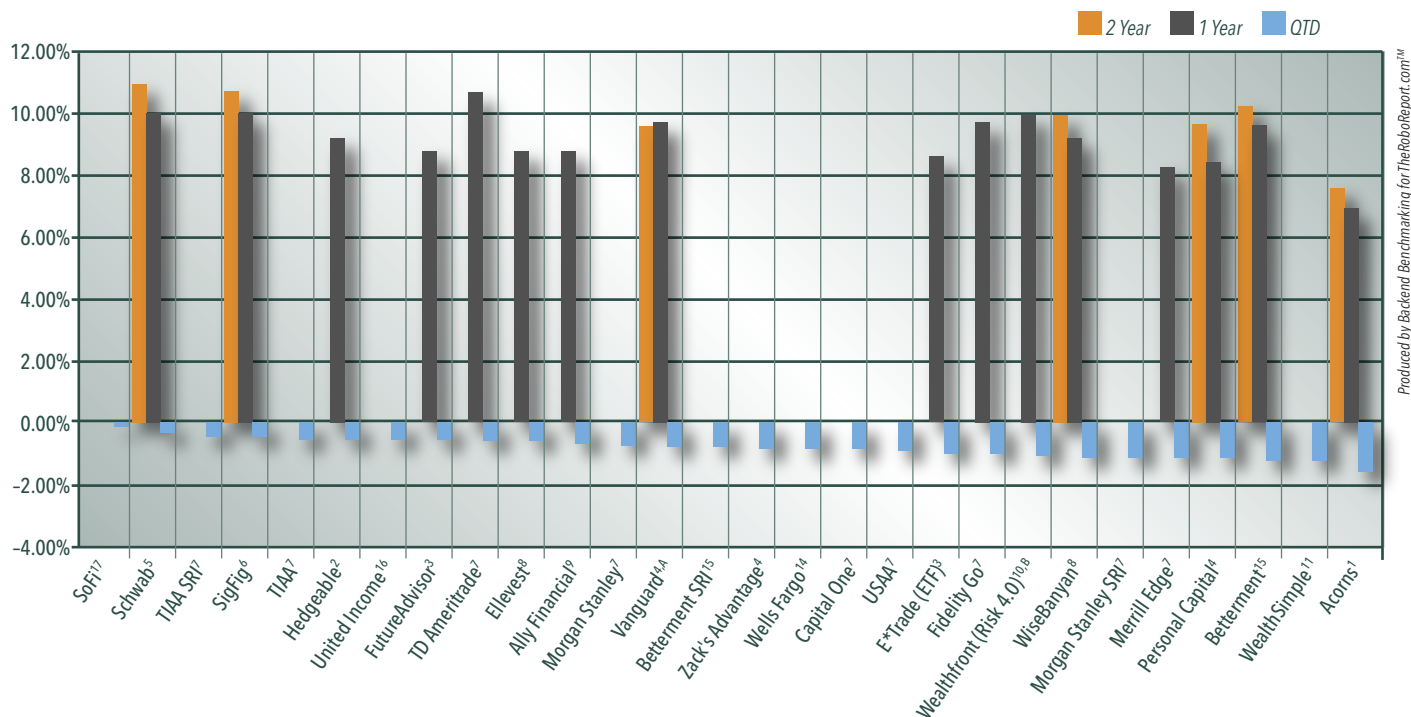
*all funding and valuation amounts are estimates

**sources: Crunchbase, Pitchbook, News Media

^ΔThis valuation number has been disputed

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Performance



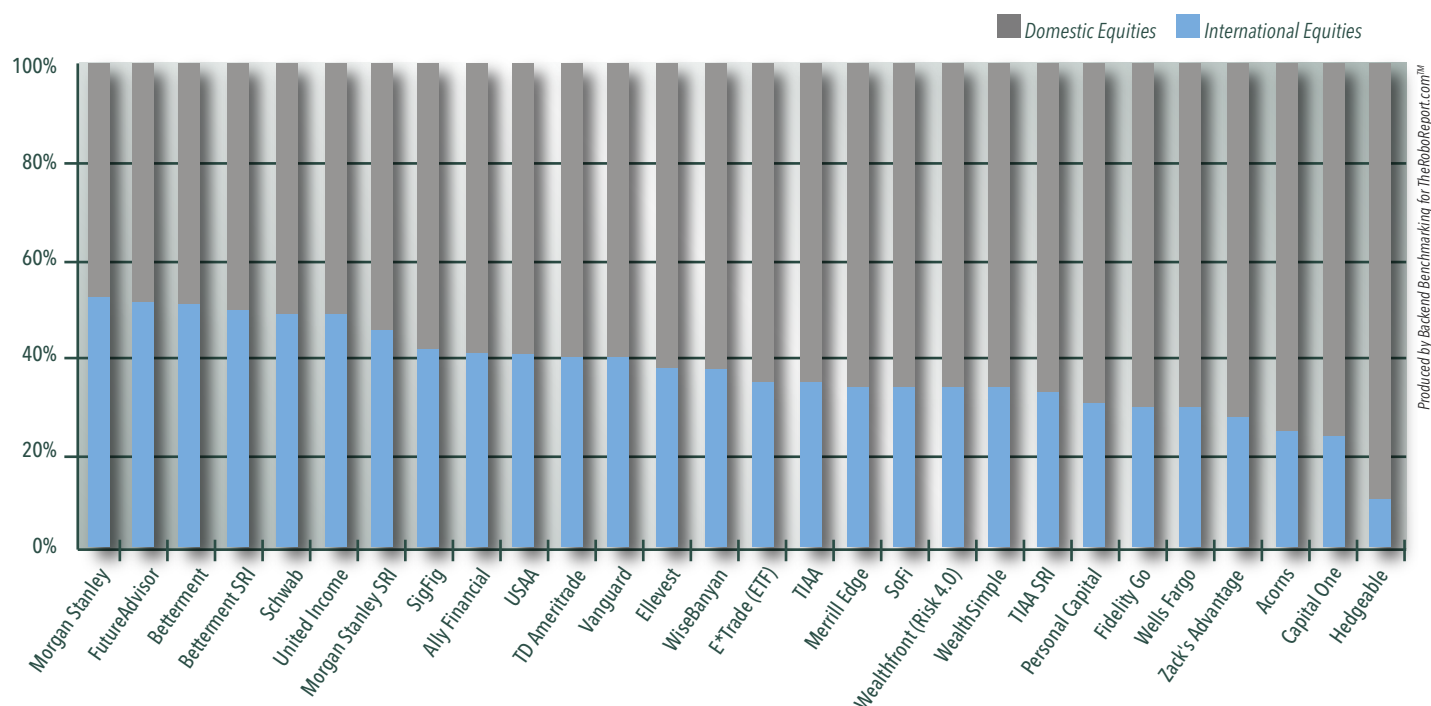
Performance Commentary

After a prolonged period of low volatility, volatility returned to domestic equity markets in the first quarter of 2018. As represented by the S&P 500 Index, the U.S. stock market had six days of moves that were either higher or lower by 2% or more in the quarter after no such moves in the entirety of 2017. Concerns over valuation, Federal Reserve rate increases, trade, and inflation led the S&P 500 to end the quarter down 0.76%. Internationally, results were mixed, with developed markets finishing the quarter down while emerging markets posting a small gain. While the technology sector was once again the top-performing sector, it was not immune from the market's newfound volatility. Most other sectors posted negative returns, with energy, consumer staples, and telecom among the biggest laggards. Growth slightly outperformed value, and small-caps edged out their mid- and large-cap peers by a small margin. Additionally, real estate performed poorly on concerns that rising interest rates will slow demand.

International and Small Cap Lead

Portfolios with higher than average emerging markets and small-cap exposure tended to fare better. Both SigFig and SoFi have some of the highest dedicated allocations to emerging markets, helping them both secure a spot on the quarter's leaderboard. United Income employs a focus on small-cap equities as one of their actively managed strategies, which benefited them this quarter. On the other hand, Personal Capital lagged, with their sector allocations to energy, consumer staples, telecom, and real estate creating drag. Betterment's value tilt also held back equity returns in the first quarter.

International Allocation of Total Equity



■ Active Boosts Portfolios

In a quarter where lackluster returns were seen in most areas of the markets, those portfolios engaging in active funds or strategies found success. T. Rowe Price currently only supports IRA accounts, and led the IRA group with their collection of proprietary, actively managed funds, followed by the United Income IRA that also holds funds with active strategies. In particular T. Rowe's Growth Fund returned 3.83%, with a weighting near a quarter of the portfolio. Hedgeable, who uses algorithms to deploy their active strategy, placed sixth for quarterly equity returns. The Hedgeable IRA portfolio's heavy weighting towards tech has led them to the top of equity performance over the past year. That said, their total portfolio has fallen well behind others, as their fixed income allocation is, on average, much higher than its peers. Wells Fargo's equity holdings placed in the top half of performance, led by two active beta strategy funds. United Income IRA's actively managed holdings performed well overall, led by a domestic momentum fund that returned 2.97%.

■ Bonds Abroad

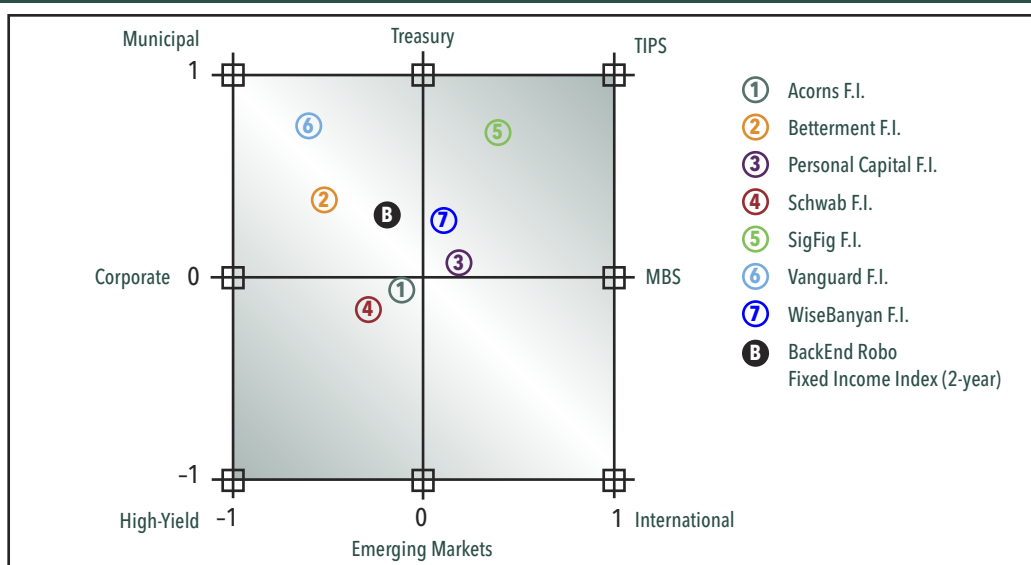
Fixed income markets faced a variety of headwinds, ranging from the Federal Reserve's slow increase in rates, rising yields abroad, concerns over the return of inflation, and a ballooning national debt. Fixed income portfolios with a more risk-on approach have fared well in both the short and long run. In a persistent low-yield environment, investors continue to seek income from high yield bonds, which have shown resilience in a difficult quarter. Expanding abroad has paid off in many cases, as some of the best performing fixed income portfolios are those holding international debt.

Schwab continues to outperform, particularly in their fixed income allocation. Holdings in high-yield bonds and international debt paid off in the quarter. Schwab's risk-on fixed income portfolio has served them well, earning them the top fixed income performance for the quarter, 1-year trailing, and 2-year trailing time periods. SoFi achieved their outperformance by allocating a majority of their fixed income to a single high-yield municipal bond fund that returned 0.03%, which outperformed

other segments of the domestic fixed income market. Ellevest and Personal Capital also outperformed in fixed income, with allocations to high-yield municipals and high-yield corporates, respectively, as well as the same emerging markets bond ETF as Schwab, which returned 4.19% for the quarter. FutureAdvisor also benefited from sizable positions in an international bonds fund, as well as a TIPs ETF positioned at the shorter end of the yield curve. One of the more popular funds seen in portfolios with foreign bond holdings is the

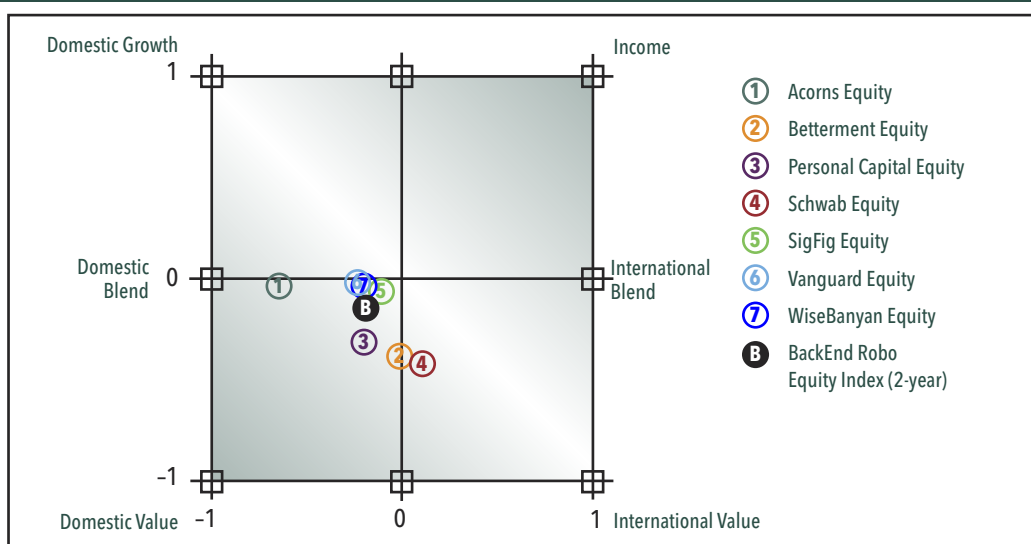
Vanguard Total International Bond ETF. Future Advisor has an 8% allocation and Ally Financial holds a 12% position in this fund, which returned 0.83% for the quarter, helping drive their fixed income outperformance. Personal Capital also holds this fund, but at a much lower allocation in combination with other foreign bond holdings. This, alongside allocations to high-yield bonds, and positioning themselves at the intermediate, to shorter end of the yield curve helped their fixed income portfolio finish in 4th place for the quarter.

Two-Year Trailing Fixed Income Style Map



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

Two-Year Trailing Equity Style Map



Produced by BackEnd Benchmarking for TheRoboReport.com™
This analysis produced with the help of Markov Process International, Inc.

Taxable Returns

	Total			Equity			Fixed Income		
	QTD	1 Yr Trailing	2 Yr Trailing Annualized	QTD	1 Yr Trailing	2 Yr Trailing Annualized	QTD	1 Yr Trailing	2 Yr Trailing Annualized
Acorns ¹	-1.55%	6.93%	7.53%	-1.53%	10.72%	12.21%	-1.56%	0.46%	-0.01%
Ally Financial ⁹	-0.69%	8.73%	-	-0.60%	14.30%	-	-0.87%	0.96%	-
Betterment ¹⁵	-1.18%	9.68%	10.24%	-1.44%	13.41%	14.77%	-0.68%	2.41%	1.75%
Betterment SRI ¹⁵	-0.79%	-	-	-0.87%	-	-	-0.66%	-	-
Capital One ⁷	-0.83%	-	-	-0.77%	-	-	-0.91%	-	-
E*Trade (ETF) ³	-0.96%	8.61%	-	-0.51%	13.67%	-	-1.99%	1.05%	-
Ellevest ⁸	-0.59%	8.78%	-	-0.79%	13.51%	-	-0.58%	1.94%	-
Fidelity Go ⁷	-0.97%	9.72%	-	-0.73%	14.56%	-	-1.34%	2.73%	-
FutureAdvisor ³	-0.56%	8.77%	-	-1.12%	13.27%	-	0.08%	2.54%	-
Hedgeable ²	-0.54%	9.17%	-	-0.41%	12.80%	-	-1.54%	2.02%	-
Merrill Edge ⁷	-1.12%	8.25%	-	-1.02%	13.15%	-	-1.49%	1.49%	-
Morgan Stanley ¹²	-0.70%	-	-	-0.30%	-	-	-1.47%	-	-
Morgan Stanley SRI ⁷	-1.12%	-	-	-1.12%	-	-	-1.15%	-	-
Personal Capital ⁴	-1.14%	8.42%	9.64%	-1.34%	10.99%	12.47%	-0.62%	1.39%	1.93%
Schwab ⁵	-0.33%	9.96%	10.98%	-0.68%	13.38%	15.02%	0.56%	4.62%	5.10%
SigFig ⁶	-0.46%	10.02%	10.71%	-0.06%	15.81%	16.40%	-1.40%	1.00%	2.04%
SoFi ¹⁷	-0.14%	-	-	-0.20%	-	-	-0.05%	-	-
TD Ameritrade ⁷	-0.57%	10.64%	-	-0.43%	15.00%	-	-0.96%	1.62%	-
TIAA ⁷	-0.51%	-	-	-0.43%	-	-	-1.11%	-	-
TIAA SRI ⁷	-0.45%	-	-	-0.13%	-	-	-0.92%	-	-
United Income ¹⁶	-0.54%	-	-	-0.13%	-	-	-1.20%	-	-
USAA ⁷	-0.87%	-	-	-0.57%	-	-	-1.61%	-	-
Vanguard ^{4,A}	-0.76%	9.66%	9.59%	-0.62%	14.79%	15.44%	-0.98%	1.83%	0.87%
Wealthfront (Risk 4.0) ^{10,B}	-1.06%	9.92%	-	-1.04%	13.81%	-	-1.58%	1.90%	-
WealthSimple ¹¹	-1.22%	-	-	-1.14%	-	-	-1.36%	-	-
Wells Fargo ¹⁴	-0.82%	-	-	-0.52%	-	-	-1.42%	-	-
WiseBanyan ⁸	-1.10%	9.20%	9.98%	-1.00%	13.88%	14.76%	-1.43%	1.09%	1.70%
Zack's Advantage ⁴	-0.80%	-	-	-0.71%	-	-	-1.20%	-	-

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

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

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IRA Returns

	Total			Equity			Fixed Income		
	QTD	1 Yr Trailing	2 Yr Trailing Annualized	QTD	1 Yr Trailing	2 Yr Trailing Annualized	QTD	1 Yr Trailing	2 Yr Trailing Annualized
Ally Financial IRA ⁹	-0.59%	13.23%	-	-0.60%	14.24%	-	-0.63%	1.27%	-
Betterment IRA ¹⁵	-0.98%	12.40%	-	-1.03%	13.95%	-	-0.68%	2.58%	-
E*Trade (ETF) IRA ³	-0.56%	13.43%	-	-0.54%	13.78%	-	-	-	-
Fidelity Go IRA ⁷	-0.84%	12.16%	-	-0.74%	14.28%	-	-1.60%	0.72%	-
Hedgeable IRA ²	-1.43%	11.81%	-	-0.07%	19.93%	-	-1.52%	-1.12%	-
Merrill Edge IRA ⁷	-1.09%	-	-	-0.96%	-	-	-2.47%	-	-
Morgan Stanley IRA ⁷	-0.35%	-	-	-0.10%	-	-	-1.46%	-	-
Personal Capital IRA ⁴	-1.23%	11.05%	-	-1.29%	11.36%	-	0.71%	2.63%	-
Schwab IRA ⁷	-0.83%	12.62%	14.27%	-0.90%	13.49%	15.26%	-	-	-
SigFig IRA ⁶	-0.35%	14.19%	14.47%	-0.07%	15.75%	15.73%	-2.83%	1.17%	3.72%
SoFi IRA ¹⁸	0.49%	-	-	0.07%	-	-	-	-	-
T Rowe Price IRA ¹³	0.77%	-	-	0.77%	-	-	-	-	-
TD Ameritrade IRA ⁷	-0.43%	12.85%	-	-0.41%	15.00%	-	-0.64%	2.06%	-
TIAA IRA ⁷	-0.51%	-	-	-0.41%	-	-	-1.46%	-	-
United Income IRA ¹⁶	0.39%	-	-	0.39%	-	-	-	-	-
USAA IRA ⁷	-0.57%	-	-	-0.57%	-	-	-	-	-
WealthSimple IRA ²	-1.14%	-	-	-1.13%	-	-	-1.19%	-	-
Wells Fargo IRA ¹⁴	-0.35%	-	-	-0.22%	-	-	-2.02%	-	-
WiseBanyan IRA ⁸	-0.65%	13.82%	14.51%	-0.61%	14.98%	15.68%	-1.41%	1.56%	2.30%
Zack's Advantage IRA ⁴	-0.83%	-	-	-0.73%	-	-	-	-	-

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

Taxable Account Facts

Portfolio	Fee	Account Minimum	Initial 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 (Percent Muni Bonds of Overall Fixed Income)
Acorns	\$1/month for Acorns; \$2/month when adding Acorns later for Retirement accounts. Custom pricing for balances above \$1 million	No minimum	62%/ 38%/ 0%/ 0%	62%/38%/0%/0%	84%/ 16%	75%/25%	0%
Ally Financial	0.30% annually	\$2,500	59%/ 38%/ 2%/ 1%	61%/36%/0%/3%	69%/ 31%	59%/41%	0%
Betterment	Digital Only: 0.25%; "Plus" (unlimited chat, 1 call/year with advisor): 0.40%; "Premium" (unlimited chat and calls with advisor); stop paying any fee on money above \$2MM	Digital Only": No minimum; "Plus" and "Premium": \$100k Minimum	65%/ 35%/ 0%/ 0%	65%/35%/0%/0%	49%/ 51%	49%/51%	58%

Taxable Account Facts continued on following page

Taxable Account Facts continued from previous page

Portfolio	Fee	Account Minimum	Initial 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 (Percent Muni Bonds of Overall Fixed Income)
Betterment SRI	Digital Only: 0.25%; "Plus" (unlimited chat, 1 call/year with advisor): 0.40%; "Premium" (unlimited chat and calls with advisor); stop paying any fee on money above \$2MM	"Digital Only": No minimum; "Plus" and "Premium": \$100k Minimum	60%/40%/0%/0%	60%/40%/0%/0%	50%/50%	50%/50%	59%
Capital One	0.90% annually	\$25,000	55%/44%/0%/1%	55%/44%/0%/1%	76%/24%	76%/24%	0%
Ellevest	0.25% annually for digital only; 0.50% for premium adding access to live advisors at this level	No minimum digital only; \$50k minimum for premium	62%/ 36%/ 0%/ 2%	54%/44%/0%/1%	71%/ 29%	62%/38%	94%
E*Trade (ETF)	0.30% (promo – fee waived for 2016)	\$5,000	60%/ 39%/ 0%/ 1%	59%/40%/0%/2%	75%/ 25%	65%/35%	0%
Fidelity Go	0.35% annually	\$5,000	61%/ 39%/ 0%/ 0%	60%/39%/0%/1%	71%/ 29%	70%/30%	100%
FutureAdvisor	0.50% annually	\$10,000	59%/ 41%/ 0%/ 0%	54%/45%/0%/1%	49%/ 51%	48%/52%	0%
Hedgeable	0.75% for first \$50k decreasing in tiers to 0.30% for \$1 million and above	\$1	56%/ 34%/ 8%/ 2%	48%/41%/8%/3%	79%/ 21%	89%/11%	100%
Merrill Edge	0.45% annually	\$5,000	60%/ 39%/ 0%/ 1%	54%/44%/0%/2%	66%/ 34%	66%/34%	87%
Morgan Stanley	0.35% annually	\$5,000	56%/39%/0%/5%	59%/38%/0%/3%	46%/54%	47%/53%	0%
Morgan Stanley SRI	0.35% annually	\$5,000	64%/35%/0%/1%	64%/35%/0%/1%	56%/44%	56%/44%	14%
Personal Capital	0.89% annually for the first \$1 million; lower at different tiers over \$1 million	\$100,000	68%/ 25%/ 5%/ 2%	69%/25%/4%/1%	70%/ 30%	69%/31%	0%
Schwab	No fee for digital only "Intelligent Portfolio"; Access to live advisor with "Intelligent Advisory" has 0.28% fee	\$5,000	62%/ 23%/ 5%/ 10%	63%/22%/4%/11%	51%/ 49%	51%/49%	32%
SigFig	No fee for the first \$10k; 0.25% annually over \$10k	\$2,000	61%/ 37%/ 0%/ 2%	60%/39%/0%/1%	59%/ 41%	58%/42%	0%
SoFi	No Fee on first \$10k invested; 0.25% annually on funds above \$10k; no fee if client also has a SoFi loan	\$100	60%/40%/0%/0%	60%/40%/0%/0%	33%/67%	66%/34%	84%
TD Ameritrade	0.30% annually for Essential Portfolios. Selective Portfolios tiered at a higher fee level depending on account balance and portfolio selected.	\$5,000 for Essential Portfolios, \$25,000 for Selective Portfolios	65%/ 33%/ 0%/ 2%	71%/28%/0%/2%	65%/ 35%	60%/40%	0%
TIAA	0.30% annually	\$5,000	61%/37%/0%/3%	59%/39%/0%/2%	61%/29%	65%/35%	0%
TIAA SRI	0.30% annually	\$5,000	60%/39%/0%/1%	59%/40%/0%/1%	70%/30%	67%/33%	9%
United Income	Self Service: 0.50% Annually; Full Service: 0.80% to 0.45% depending on account balances	Self Service:\$10,000; Full Service: \$300,000	60%/39%/0%/1%	60%/38%/0%/2%	52%/48%	51%/49%	0%
USAA	0.50% annually	\$2,000	66%/33%/0%/1%	61%/37%/0%/2%	62%/38%	59%/41%	0%
Vanguard	0.30% annually for the first \$5 million; lower at different tiers over \$5 million	\$50,000	59%/ 41%/ 0%/ 0%	63%/37%/0%/0%	61%/ 39%	60%/40%	100%
Wealthfront (Risk 4.0)	0.25% annually	\$500	65%/35%/0%/0%	65%/34%/0%/1%	66%/34%	66%/34%	100%
WealthSimple	0.50% fee on accounts less than \$100k; 0.40% on accounts greater than \$100k annually	No minimum	61%/39%/0%/0%	62%/38%/0%/0%	66%/34%	66%/34%	55%
WiseBanyan	No fee	No minimum	64%/ 36%/ 0%/ 0%	64%/36%/0%/0%	62%/ 38%	62%/38%	0%
Wells Fargo	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products	\$10,000	62%/34%/0%/3%	63%/34%/0%/4%	70%/30%	70%/30%	0%
Zack's Advantage	0.50% accounts less than \$100k, 0.35% on accounts above \$100k	\$5,000	57%/33%/0%/9%	58%/32%/0%/10%	72%/28%	72%/28%	40%

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*Due to rounding, may not add to 100%

IRA Facts

Portfolio	Fee	Account Minimum	Initial 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	0.30% annually	\$2,500	96%/ 3%/ 0%/ 1%	93%/4%/0%/3%	62%/ 38%	60%/40%
Betterment IRA	Digital Only: 0.25%; "Plus" (unlimited chat, 1 call/year with advisor): 0.40%; "Premium" (unlimited chat and calls with advisor): 0.50%; stop paying any fee on money above \$2MM	"Digital Only": No minimum; "Plus" and "Premium": 100k	87%/ 13%/ 0%/ 0%	87%/13%/0%/0%	47%/ 53%	57%/43%
E*Trade (ETF) IRA	0.30% (promo - fee waived for 2016)	\$5,000	98%/ 0%/ 0%/ 2%	99%/0%/0%/1%	75%/ 25%	65%/35%
Fidelity Go IRA	0.35% annually	\$5,000	85%/ 15%/ 0%/ 1%	85%/15%/0%/1%	71%/ 29%	70%/30%
Hedgeable IRA	0.75% for first \$50k decreasing in tiers to 0.30% for \$1 million and above.	\$1	87%/ 10%/ 0%/ 3%	52%/35%/0%/13%	100%/ 0%	100%/0%
Merrill Edge IRA	0.45% annually	\$5,000	89%/8%/0%/3%	88%/9%/0%/3%	62%/38%	63%/37%
Morgan Stanley IRA	0.35% annually	\$5,000	79%/15%/0%/6%	80%/15%/0%/5%	47%/53%	47%/53%
Personal Capital IRA	0.89% annually for the first \$1 million; lower at different tiers over \$1 million	\$100,000	91%/ 3%/ 2%/ 4%	94%/2%/2%/1%	70%/ 30%	69%/31%
Schwab IRA	No fee	\$5,000	94%/ 0%/ 0%/ 6%	93%/0%/0%/7%	54%/ 46%	52%/48%
SigFig IRA	No fee for the first \$10k; 0.25% annually over \$10k	\$2,000	91%/ 9%/ 0%/ 0%	89%/10%/0%/0%	45%/ 55%	44%/56%
SoFi IRA	No Fee on first \$10k invested:	\$100	100%/0%/0%/0%	99%/0%/0%/1%	35%/65%	47%/53%
TD Ameritrade IRA	0.30% annually for Essential Portfolios. Selective Portfolios tiered at a higher fee level depending on account balance and portfolio selected.	\$5,000 for Essential Portfolios, \$25,000 for Selective Portfolios	83%/ 15%/ 0%/ 2%	84%/13%/0%/3%	65%/ 35%	60%/40%
TIAA IRA	0.30% annually	\$5,000	88%/11%/0%/2%	88%/10%/0%/2%	72%/28%	65%/35%
T Rowe Price IRA	No Fee	\$50,000 ¹³	100%/0%/0%/0%	98%/0%/2%/0%	69%/31%	67%/33%
United Income IRA	Digital only "Self Serve": 0.50% Annually; Access to Live advisor "Full Service": 0.80% to 0.45% depending on account balances	Self Service: \$10,000; Full Service \$300,000	99%/0%/0%/1%	99%/0%/0%/1%	51%/49%	51%/49%
USAA IRA	0.50% annually	\$2,000	99%/0%/1%/0%	100%/0%/0%/0%	60%/40%	60%/40%
WealthSimple IRA	0.50% fee on accounts less than \$100k; 0.40% on accounts greater than \$100k annually	No minimum	80%/20%/0%/0%	81%/19%/0%/1%	66%/34%	66%/34%
Wells Fargo IRA	0.50% annually; discounted to 0.40% if subscribed to other specific Wells Fargo products 0.25% annually on funds above \$10k; no fee if client also has a SoFi loan	\$10,000	91%/7%/0%/2%	91%/7%/0%/2%	63%/37%	62%/38%
WiseBanyan IRA	No fee	No minimum	92%/ 8%/ 0%/ 0%	91%/9%/0%/0%	60%/ 40%	60%/40%
Zack's Advantage IRA	0.50% accounts less than \$100k; 0.35% on accounts above \$100k	\$5,000	86%/4%/0%/10%	93%/0%/0%/7%	60%/40%	62%/38%

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*Due to rounding, may not add to 100%

Risk/Return

The two-year risk/return numbers have shown Schwab as not only a strong performer, but one that delivers high risk-adjusted returns. Their portfolio is more of a risk on approach with high international holdings both in equities and fixed income. Their fixed income in particular holds a variety of international holdings, as well as domestic high-yield positions that have led their fixed income to lead by a wide margin. Although they have historically riskier holdings, the diversity of the portfolio has kept volatility down over the two-year period. Vanguard's passive strategy of holding only five very broad-based funds has helped them keep their volatility low over the two-year period.

Hedgeable has managed to secure the highest Sharpe ratio of their portfolio. Hedgeable is more actively traded and their algorithms are designed to shift more towards fixed income in times of volatility.

Acorns made some large allocation shifts that were poorly timed in 2017. This has both held back returns and kept their Sharpe ratio down over the 1- and 2-year period. Some of this poorly timed trading activity should fall off of their 1-year returns next quarter and we look forward to seeing their 1-year results then.

1-Year Trailing Risk/Return Statistics

	Acorns ¹	Ally Financial ⁹	Betterment ¹⁵	E*Trade (ETF) ³	Ellevest ⁸	Fidelity Go ⁷	Future-Advisor ³	Hedgeable ²	Merrill Edge ⁷
Annualized StdDev, %	4.97%	4.67%	5.47%	4.94%	4.59%	4.85%	4.74%	4.81%	4.52%
Sharpe Ratio	1.33	1.63	1.55	1.53	1.70	1.74	1.65	1.75	1.63

	Personal Capital ⁴	Schwab ⁵	SigFig ⁶	TD Ameritrade ⁷	Vanguard ^{4A}	Wealthfront (Risk 4.0) ^{10,8}	WiseBanyan ⁸	BackEnd Robo Index 1 Year History™
Annualized StdDev, %	5.65%	5.39%	5.23%	5.82%	5.07%	5.89%	5.12%	5.06%
Sharpe Ratio	1.42	1.58	1.64	1.63	1.68	1.45	1.52	1.6

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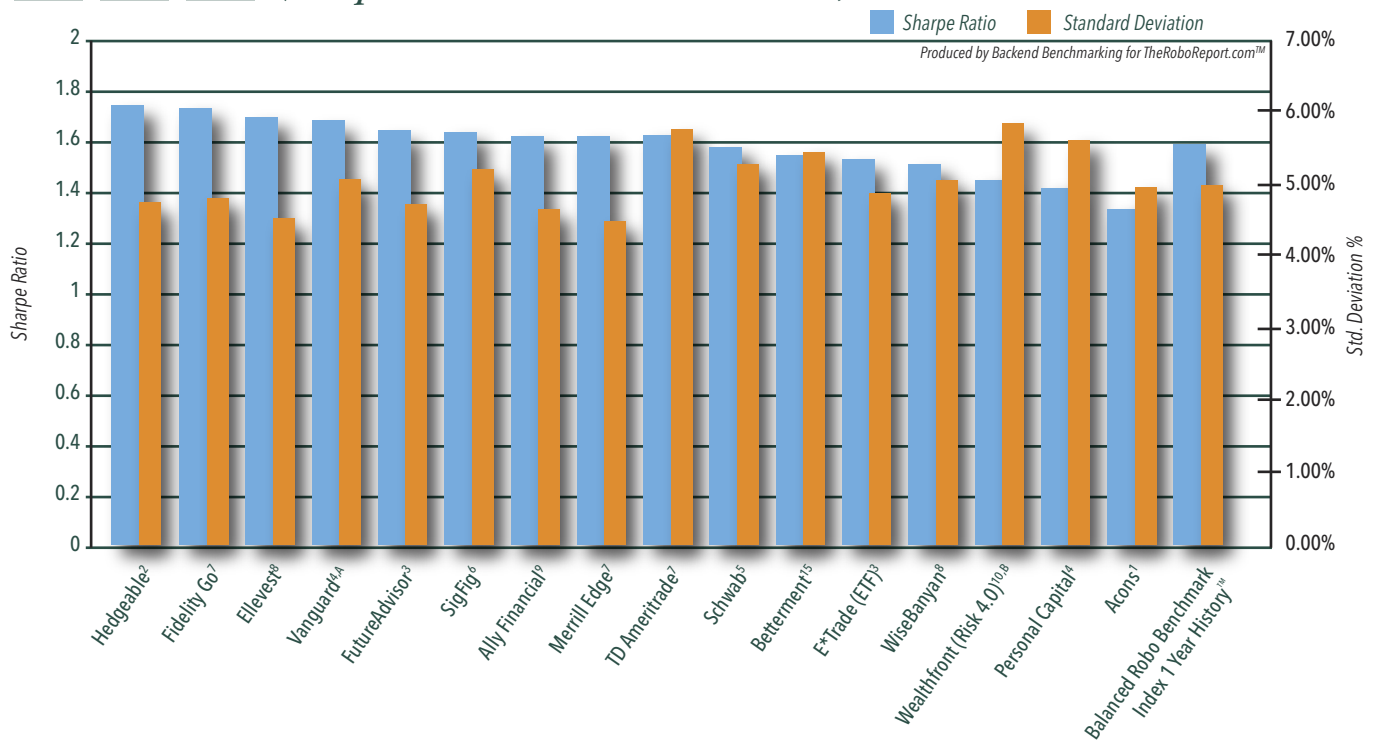
2-Year Trailing Risk/Return Statistics

	Acorns ¹	Betterment ¹⁵	Personal Capital ⁴	Schwab ⁵	SigFig ⁶	Vanguard ^{4A}	WiseBanyan ⁸	BackEnd Robo Index 2 Year History™
Annualized StdDev, %	5.02%	4.64%	4.94%	4.75%	4.64%	4.36%	4.53%	4.59%
Sharpe Ratio	1.51	2.02	1.91	2.07	2.07	2.02	1.96	1.98

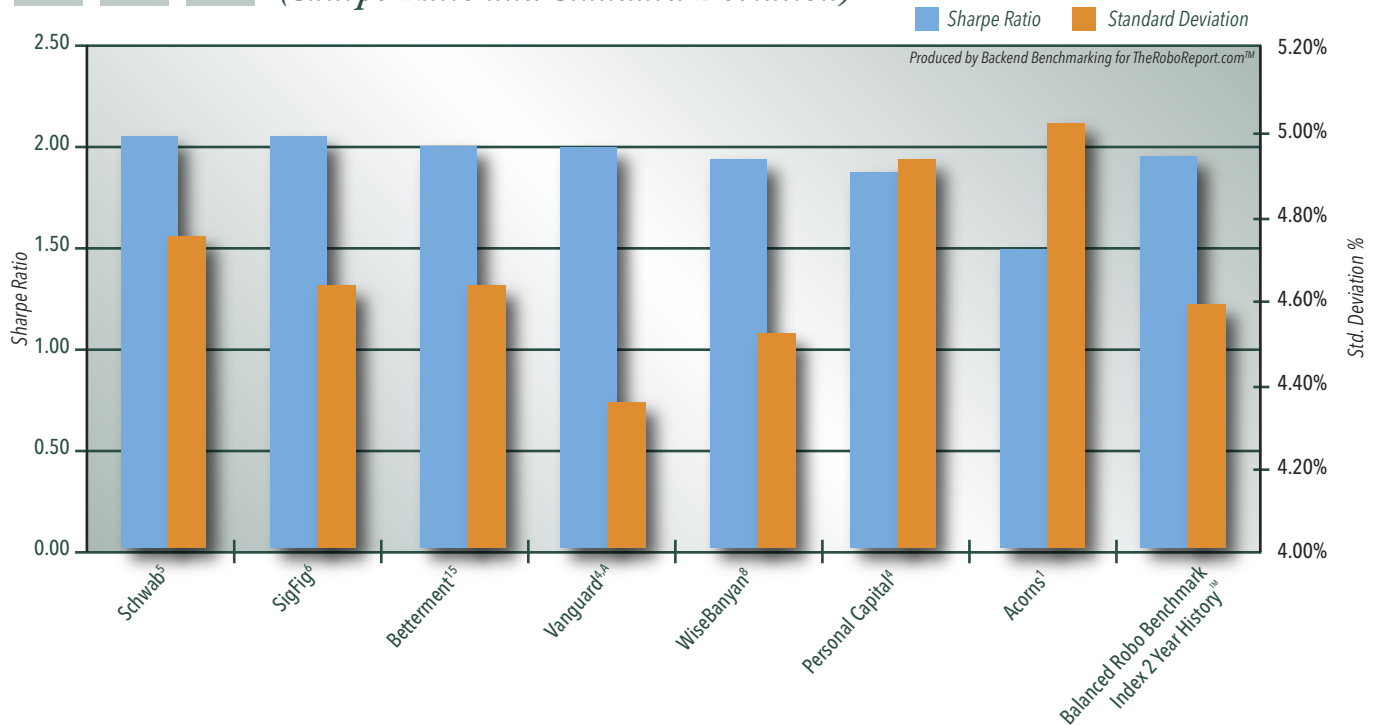
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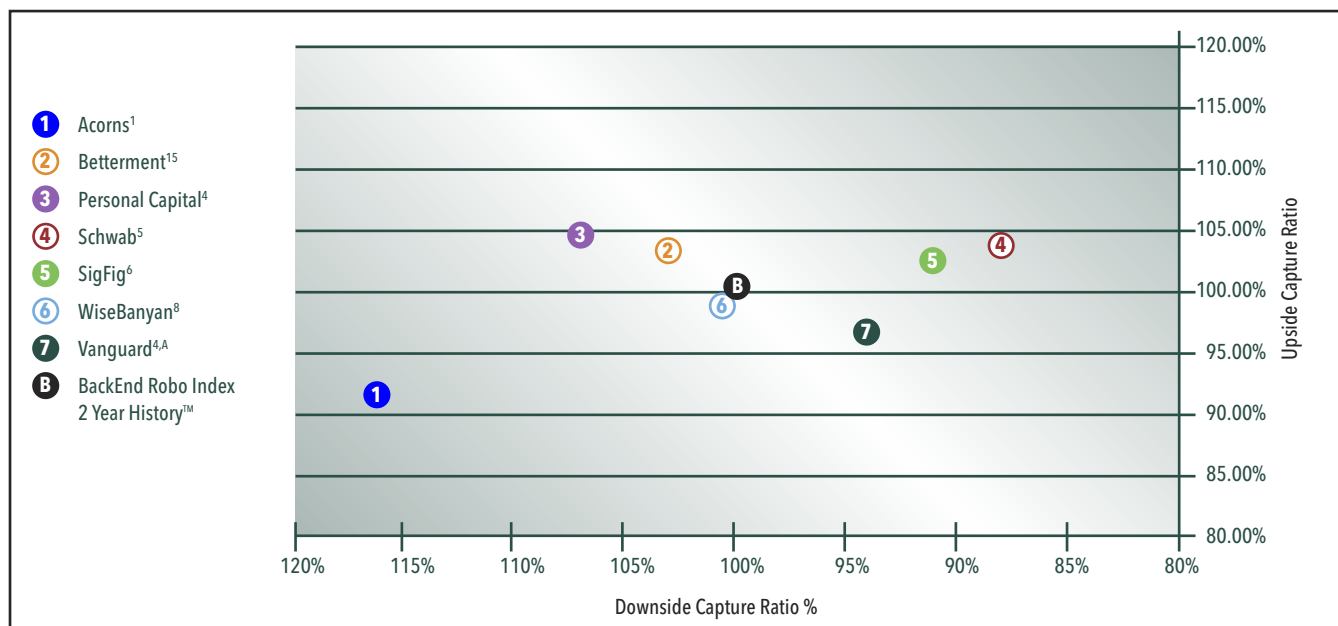
Risk/Return: Robos with 1-Year History (Sharpe Ratio and Standard Deviation)



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



Upside/Downside Capture Ratio 2-Year History



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1-Year Trailing Upside/Downside Capture Ratio

	Acorns ¹	Ally Financial ⁹	Betterment ¹⁵	E*Trade (ETF) ³	Ellevest ⁸	Fidelity Go ⁷	Future-Advisor ³	Hedgeable ²	Merrill Edge ⁷
Up Market Capture Ratio, %	89.16%	92.21%	106.72%	95.23%	94.50%	102.44%	91.89%	100.25%	91.25%
Down Market Capture Ratio, %	105.31%	87.93%	112.48%	98.68%	88.85%	97.67%	81.29%	92.13%	90.31%

	Personal Capital ⁴	Schwab ⁵	SigFig ⁶	TD Ameritrade ⁷	Vanguard ^{4,A}	Wealthfront (Risk 4.0) ^{10,B}	WiseBanyan ⁸	BackEnd Robo Index 1 Year History™
Up Market Capture Ratio, %	102.20%	102.44%	103.94%	115.87%	104.40%	108.98%	98.71%	100.00%
Down Market Capture Ratio, %	109.78%	96.73%	100.02%	114.14%	102.34%	117.57%	104.83%	100.00%

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2-Year Trailing Upside/Downside Capture Ratio

	Acorns ¹	Betterment ¹⁵	Personal Capital ⁴	Schwab ⁵	SigFig ⁶	Vanguard ^{4,A}	WiseBanyan ⁸	BackEnd Robo Index 2 Year History™
Up Market Capture Ratio, %	91.18%	103.19%	104.68%	103.52%	102.18%	96.52%	98.56%	100.00%
Down Market Capture Ratio, %	116.25%	103.03%	106.85%	87.81%	91.24%	94.20%	100.71%	100.00%

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Trades

Unlike previous quarters, we saw some significant trades in the robo portfolios in the first quarter of 2018. The largest trend we saw was managers decreasing domestic equities and reallocating towards international equities. E*Trade, Merrill Edge, TIAA, and SoFi all increased international exposure in one or more of our portfolios with them.

Near the end of February, an 8% cut of domestic equity holdings was seen in the E*Trade taxable portfolio. Proceeds were used to increase their holding in a broad-based international ETF by 6%, with the remaining proceeds used to rebalance towards fixed income. The E*Trade IRA portfolio also experienced a similar allocation shift away from domestic and towards international. The TIAA Socially Responsible Portfolio also increased emerging markets exposure. The SoFi IRA increased international exposure by nearly 20% this quarter. They also greatly reduced their exposure to emerging markets as part of this transition. The resulting portfolio has a 40% exposure to developed international markets. Additionally, the T. Rowe Price portfolio saw small increases to international holdings as part of a rebalance.

The Hedgeable IRA eliminated Comcast, Kraft Heinz, Facebook, and Google from its holdings. Starbucks and Amazon are now the only non-tech equity holdings. This portfolio also increased fixed income from 4% to 34% over the quarter. The taxable portfolio, which trades less than the IRA but much more than other robos, also experienced a significant net increase to fixed income.

In addition to increasing international exposure, Merrill Edge also made significant changes to their fixed income holdings. Merrill eliminated positions in international bonds, mortgage-backed securities, and treasuries. Proceeds were used to increase holdings in two high-yield bond funds and municipals. TIAA also made changes to their fixed income portfolio along with their changes to domestic and international holdings. TIAA trimmed a position in a short-term treasuries fund by 6% to increase their position in the TIAA Social Choice Bond Fund.

Ellevest made allocation changes away from their value tilt towards a more balanced position in growth and value while executing some rebalancing trades.

Merrill Edge, Personal Capital, USAA, Fidelity Go, Future Advisor, T. Rowe Price, and TIAA all executed what appeared to be rebalancing trades. FutureAdvisor also rebalanced while simultaneously reducing their developed international exposure.

SigFig introduced SPDR ETFs into their portfolio across many asset classes. Most trades involved selling a portion of a Vanguard or iShares fund and introducing a similar SPDR fund. This trend appeared in both the IRA and taxable accounts. SigFig also introduced a broad-based fixed income fund and a short-term treasury fund. It is unclear to us why SigFig is transitioning from one type of passive fund to another.

Robo Reviews

Wells Fargo Overview:

Fee	Account Minimum	Our Taxable Account's Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.50% Annually; possible discount to 0.40% dependent on customer relationship	\$10,000	0.18%	Yes	Yes	Yes

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■ Wells Fargo: Intuitive Investor ★★★★★

Wells Fargo Intuitive investor is a strong offering from a well known name in finance. The website has robust features and is relatively easy to navigate. Although Wells Fargo Intuitive Investor has a higher fee and account minimum than many other major robo investment providers, the cost is still well below average fees and minimums for more traditional financial advice services.

Sign up and Onboarding ★★

The sign-up experience is similar to other basic robo advisor questionnaires. With eight basic questions, Wells Fargo is ready to invest your money. The questionnaire does ask the user to self-rate their comfort with losses and volatility. This onboarding process is in line with other offerings.

Online Experience ★★★★★

Wells Fargo relies on their existing retail site for many of the advice, education, and planning tools, but both sections are well integrated. The online portal offers a variety of functions including feature-rich interactive charting, news and research. Wells Fargo has done a better job integrating their digital advice product with their legacy site than many others we have reviewed. All in, Wells Fargo has a strong online experience providing both the simple account reporting and more in-depth features for those who want them.

Financial Planning ★★★★★

Wells Fargo has leveraged some of their existing planning tools to help users with a variety of financial needs. The retirement planner starts with some basic assumptions which minimizes the amount of information the user has to input, but has the ability to adjust these for increased flexibility. The planner provides a simple savings plan to reach a retirement goal which is a useful and informative tool. In addition there are other tools and calculators to help with non-investment-related planning needs. Wells Fargo also offers the ability to speak with live advisors who can help with basic financial planning needs for those that need more guidance.

Advice and Education ★★★★★

Wells Fargo has a robust library of information on a variety of finance topics. Combined with budgeting and planning tools, the site is a good resource for users who take a DIY approach to personal finance.

Tax-Loss Harvesting and Other Features ★★★

Wells Fargo does offer tax-loss harvesting. Their portfolios employ some active beta strategy funds, making Intuitive Investor a good option for those seeking some active management. There is little to no flexibility to customize portfolios outside of the investment models. It is possible to aggregate outside accounts so a user can see both Wells Fargo and third party accounts in one place.

Robo Reviews

Morgan Stanley Overview:

Fee	Account Minimum	Our Taxable Account's Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.35% Annually	\$5,000	0.18%	Live customer support only	Yes	Yes

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■ Morgan Stanley: Access Investing ★★★★★

Morgan Stanley Access Investing is a compelling offering. The cost is slightly higher than the lowest cost alternatives, but still competitive. Clients have the benefit of Morgan Stanley's rich institutional knowledge and experience in capital markets, research, and portfolio construction. The one area that truly sets Morgan Stanley's Access Investing apart from other portfolios is their breadth of investing options. From impact portfolios that invest with a cause, to robotics or bio-technology themed portfolios, Morgan Stanley has more portfolio options than any other robo advisor we are familiar with.

Sign up and Onboarding ★★★★★

Morgan Stanley's onboarding is a little different than other offerings. Each account is based on a specific goal, and allocations are set with a combination of personal and goal-specific information. This method makes sense as money set aside for short term goals should be managed differently than long term goals regardless of the user's personal information like age. Some users will find this method of managing money based on goal-based buckets intuitive while others will feel it does not provide a holistic financial picture.

Online Experience ★★★★★

Morgan Stanley has a clean page with many features. Navigation is good but not great. Some features, like performance, required some searching. Once found, we appreciated that performance was displayed alongside a benchmark to help the user understand the numbers. On the whole, the site is robust in its reporting and features.

Financial Planning ★★

Although Access Investing takes a goal-based approach to portfolios, we would like to see more flexible planning features and guidance. Access Investing does well at reporting the progress and probability achieving a goal. What we found lacking is guidance on how to improve the likelihood of success within any given goal. Once off-track it can be difficult for a user to determine what the best next steps are.

Advice and Education ★★★★★

One of the advantages of becoming an Access Investing client is access to Morgan Stanley's research and analysis. For those interested in investing, there is quality content produced daily on capital markets, strategy, economic trends and other finance topics. There are also a variety of articles on personal finance, but we could not find archives of personal-finance-oriented articles or a way to search by personal finance topics. Outside of goal reporting, there is not a lot of advice through Access Investing. Although a user can call and talk to customer support, they will be limited to logistical support and general questions regarding accounts.

Tax-Loss Harvesting and Other Features ★★★★★

Morgan Stanley does offer tax-loss harvesting and automatic rebalancing. Where the product stands out is their thematic investing options. Users are not just offered one portfolio per risk tolerance range, but a variety of themes. Users are given an option of socially responsible, active, or passive portfolios. There are then further options to add one of six thematic tilts to the portfolio like "Defense and Cyber Security" or "Emerging Consumer."

Robo Review

USAA Overview:

Fee	Account Minimum	Our Taxable Account's Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.50% Annually	\$2,000	0.07%	Live customer support only	Yes	Yes

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■ USAA: Digital Investment Advisor ★★

For those familiar and comfortable with USAA products and services USAA's Digital Investment Advisor can be a good option. Their cost is higher than many others in the robo universe and, with just three broad based funds in our taxable account, portfolio construction leaves something to be desired.

Sign up and Onboarding ★★

Signing up for an account is simple and quick, in line with other robo advice products. The questionnaire is simple, but does little to assess the user's attitude towards investing. The onboarding process does not overcomplicate setting a risk tolerance, which makes the account opening process easy and fast.

Online Experience ★★

The online experience covers most of the basic features well. We were easily able to navigate to performance, transactions, asset allocation and other essential information. Performance numbers are available online, but do not provide the option to compare against benchmarks, which we believe is important to understanding a portfolio. They also provide an investment simulation tool, which is simple to use and lets the user model different risk models and funding scenarios. Overall USAA is easy to navigate and handles the basics well.

Financial Planning ★★

USAA offers some online planning tools and accounts are set-up with a goal. Outside of the Digital Investment Advisor area of the site, there is a quality retirement planning tool that helps model tax rates, social security, and other features. The output gives a range of outcomes and probabilities which are important to understanding any financial plan. The planning feature inside the Digital Investment Advisor area of the site is less robust, and there is a lack of integration between their Digital Investment Advisor and the legacy retirement planner. USAA does not offer financial planning by live advisors.

Advice and Education ★★★

USAA has an existing library of articles on planning and personal finance topics which are informative and useful. Digital Investment Advisor does not come with access to live advisors, so those seeking advice on more complicated questions would have to upgrade to a more traditional advice model with USAA.

Tax-Loss Harvesting and Other Features ★

USAA does not offer tax-loss harvesting but they will automatically rebalance accounts. Outside of the few online tools there are not other noteworthy features.

Robo Review

United Income Overview:

Fee	Account Minimum	Our Taxable Account's Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.50% Annually; possible discount to 0.40% dependent on customer relationship	\$10,000 (Self Service); \$300,000 (Full Service)	0.18%	Yes	Yes	Yes

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■ United Income ★★★★★

United Income is a hybrid offering focused on clients in and near retirement. The financial planning capabilities of United Income help it stand out in a crowded field of robo advice providers. Strong financial planning, a high level of account customization, and access to live advisors makes United Income one of the stronger product offerings that we have seen.

Sign up and Onboarding ★★★★★

United Income has a thorough onboarding process. The questionnaire collects information on income, health, assets, and spending along with other more basic demographic information. The upside is the user walks away with anywhere from a basic to a rather complex financial plan. The downside is this process can take a long time.

Online Experience ★★★★★

United Income has a clear and easy to navigate site. Reporting surrounding the financial plan is robust with graphs to help users understand different aspects of their plan. We also liked the to-do list feature which helps users stay on track with their financial plan. Although the reporting around the financial plan is excellent, we would have liked more features around performance reporting.

Financial Planning ★★★★★

United Income stands out in the robo advisor field when it comes to financial planning. The financial plan is far more complex than those created by other planning tools we have seen. Plans have the ability to incorporate multiple financial goals, multiple income streams, taxes and other complexities. Additionally, users have access to live financial planners to help them build plans and make large financial decisions. The combination of live planners with robust digital modeling make United Income a compelling offering.

Advice and Education ★★★

The website itself has little to offer for content about capital markets or financial planning topics. That said, with access to live advisors, clients can receive advice and guidance on financial planning or other topics through their relationship with the advisor.

Tax-Loss Harvesting and Other Features ★★★★★

United Income does provide tax-loss harvesting. They also have the ability to customize their portfolios around existing assets allowing for accommodation of assets with large capital gains or other client specific circumstances. Robust planning tools combined with a high level of customization in the accounts helps United Income stand out.

Historical Taxable Returns

Taxable Account Portfolio	2015			2016											
	Q4 Equities Return	Q4 Fixed Income Return	Q4 Portfolio Return	Q1 Equities Return	Q1 Fixed Income Return	Q1 Portfolio Return	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return	Q3 Equities Return	Q3 Fixed Income Return	Q3 Portfolio Return	Q4 Equities Return	Q4 Fixed Income Return	Q4 Portfolio Return
Acorns ¹	-	-	-	3.17%	2.96%	3.08%	3.78%	2.08%	3.12%	3.76%	0.44%	2.49%	0.37%	-3.49%	-1.12%
Ally Financial ⁹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Betterment ¹⁵	4.95%	1.39%	3.67%	0.39%	2.24%	1.04%	1.77%	2.98%	2.19%	5.32%	0.31%	3.55%	1.99%	-3.18%	0.20%
Ellevest ⁸	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E*Trade (ETF) ³	-	-	-	-	-	-	-	-	-	5.56%	0.68%	3.63%	3.25%	-3.19%	0.82%
E*Trade (Hybrid) ³	-	-	-	-	-	-	-	-	-	6.19%	-0.37%	3.62%	3.49%	-4.16%	0.64%
Fidelity Go ⁷	-	-	-	-	-	-	-	-	-	-	-	-	2.98%	-3.81%	0.31%
FutureAdvisor ³	-	-	-	-	-	-	-	-	-	5.05%	0.44%	3.16%	-0.28%	-3.42%	-1.57%
Hedgeable ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Merrill Edge ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Personal Capital ⁴	-	-	-	2.53%	3.90%	2.85%	3.34%	2.36%	3.04%	3.57%	1.30%	2.95%	1.24%	-2.64%	0.29%
Schwab ⁵	3.19%	0.24%	2.10%	3.71%	3.81%	3.33%	2.94%	3.63%	2.56%	5.42%	1.64%	3.98%	1.46%	-2.10%	0.50%
SigFig ⁹	-	-	-	1.41%	4.65%	2.58%	2.10%	2.84%	2.33%	5.59%	2.03%	4.13%	1.16%	-3.69%	-0.63%
SoFi ¹²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TD Ameritrade ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIAA ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TradeKing Pre-Ally Transition ⁹	-	-	-	0.86%	2.93%	1.61%	2.29%	2.75%	2.43%	4.54%	0.83%	3.07%	1.47%	-2.77%	-0.19%
Vanguard ^{4,A}	-	-	-	0.45%	1.37%	0.82%	1.64%	2.04%	1.80%	5.26%	-0.26%	3.01%	1.70%	-3.04%	-0.17%
Wealthfront (Risk 4.0) ^{10,B}	-	-	-	-	-	-	-	-	-	5.04%	1.64%	3.98%	1.46%	-2.10%	0.50%
Wealthfront (Risk 3.0) ^{10,B}	-	-	-	-	-	-	-	-	-	-	-	-	2.49%	-3.26%	0.26%
WealthSimple ¹¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WiseBanyan ⁸	-	-	-	0.83%	3.56%	1.91%	2.07%	2.86%	2.38%	4.89%	0.95%	3.47%	1.45%	-2.57%	0.02%
Zack's Advantage ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Taxable Account Portfolio (continued)	2017											
	Q1 Equities Return	Q1 Fixed Income Return	Q1 Portfolio Return	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return	Q3 Equities Return	Q3 Fixed Income Return	Q3 Portfolio Return	Q4 Equities Return	Q4 Fixed Income Return	Q4 Portfolio Return
Acorns ¹	5.21%	0.59%	3.48%	2.80%	1.43%	2.32%	4.17%	0.55%	3.01%	5.01%	0.06%	3.04%
Ally Financial ⁹	-	-	-	3.81%	1.00%	2.63%	4.88%	0.60%	3.11%	5.62%	0.23%	3.45%
Betterment ¹⁵	6.25%	1.09%	4.50%	3.75%	1.47%	2.99%	5.11%	1.24%	3.83%	5.51%	0.38%	3.79%
Ellevest ⁸	6.11%	1.58%	4.35%	3.41%	1.25%	2.55%	4.80%	1.15%	3.34%	5.57%	0.12%	3.26%
E*Trade (ETF) ³	5.85%	1.09%	4.07%	3.23%	1.79%	2.63%	4.99%	0.94%	3.34%	5.41%	0.34%	3.39%
E*Trade (Hybrid) ³	5.49%	1.44%	3.98%	4.01%	2.11%	3.22%	4.94%	1.01%	3.33%	6.00%	0.83%	3.94%
Fidelity Go ⁷	6.27%	1.29%	4.24%	3.79%	1.79%	2.98%	4.90%	1.46%	3.51%	-	-	-
FutureAdvisor ³	6.05%	0.82%	3.79%	4.04%	1.14%	2.80%	4.88%	0.91%	3.21%	4.98%	0.40%	3.08%
Hedgeable ²	-	-	-	3.13%	1.75%	2.61%	4.31%	1.04%	3.14%	5.28%	0.79%	3.72%
Merrill Edge ⁷	-	-	-	3.25%	1.54%	2.51%	4.90%	0.98%	3.23%	5.54%	0.48%	3.45%
Personal Capital ⁴	5.18%	1.51%	4.23%	2.53%	1.06%	2.13%	4.51%	0.87%	3.54%	4.98%	0.08%	3.71%
Schwab ⁵	5.97%	2.39%	4.52%	3.06%	1.97%	2.49%	5.41%	1.53%	3.97%	5.08%	0.48%	3.53%
SigFig ⁶	7.27%	2.02%	5.21%	3.78%	0.10%	2.34%	5.41%	1.29%	3.79%	5.93%	1.03%	4.05%
SoFi ¹²	-	-	-	-	-	-	5.27%	1.57%	3.79%	6.30%	-1.20%	3.33%
TD Ameritrade ⁷	6.81%	0.64%	4.66%	3.81%	1.42%	2.98%	5.14%	0.78%	3.74%	5.82%	0.38%	4.16%
TIAA ⁷	-	-	-	-	-	-	4.95%	0.56%	3.20%	0.0587	0.0015	0.0365
TradeKing Pre-Ally Transition ⁹	6.47%	1.19%	4.41%	-	-	-	-	-	-	-	-	-
Vanguard ^{4,A}	6.71%	1.25%	4.62%	3.99%	1.53%	3.10%	5.11%	0.98%	3.47%	5.67%	0.30%	3.59%
Wealthfront (Risk 4.0) ^{10,B}	5.97%	2.39%	4.52%	3.06%	1.97%	2.49%	5.41%	1.53%	3.97%	5.08%	0.48%	3.53%
Wealthfront (Risk 3.0) ^{10,B}	5.00%	1.11%	3.46%	2.57%	1.49%	2.13%	5.26%	0.99%	3.57%	6.43%	0.84%	4.28%
WealthSimple ¹¹	-	-	-	-	-	-	5.05%	1.27%	3.55%	5.55%	0.53%	3.60%
WiseBanyan ⁸	6.48%	1.12%	4.53%	4.00%	1.16%	2.97%	4.85%	0.87%	3.40%	5.49%	0.50%	3.71%
Zack's Advantage ⁴	-	-	-	-	-	-	-	-	-	5.44%	0.54%	3.30%

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Historical Taxable Returns (continued)

Portfolio	2016 →			2017 →			2016–2017 2-Year Annualized →		
	Equities Return	Fixed Income Return	Portfolio Return	Equities Return	Fixed Income Return	Portfolio Return	Equities Return	Fixed Income Return	Portfolio Return
Acorns ¹	11.51%	1.88%	7.72%	18.31%	2.65%	12.39%	14.86%	2.26%	10.03%
Betterment ¹⁵	9.74%	2.24%	7.14%	22.27%	4.24%	15.98%	15.84%	3.24%	11.47%
Ellevest ⁸	-	-	-	21.41%	4.16%	14.18%	-	-	-
E*Trade (ETF) ³	-	-	-	20.93%	4.22%	14.12%	-	-	-
E*Trade (Hybrid) ³	-	-	-	22.64%	5.46%	15.49%	-	-	-
FutureAdvisor ³	-	-	-	21.47%	3.30%	13.52%	-	-	-
Personal Capital ⁴	11.10%	4.90%	9.41%	18.32%	3.56%	14.30%	14.65%	4.23%	11.83%
Schwab ⁵	14.19%	7.06%	10.75%	20.97%	6.52%	15.31%	17.53%	6.79%	13.01%
SigFig ⁶	10.60%	5.76%	8.62%	24.31%	4.50%	16.28%	17.25%	5.13%	12.38%
TD Ameritrade ⁷	-	-	-	23.36%	3.27%	16.47%	-	-	-
TradeKing Pre-Ally Transition ⁹	9.45%	3.67%	7.07%	-	-	-	-	-	-
Vanguard ^{4A}	9.29%	0.04%	5.55%	23.26%	4.12%	15.60%	16.06%	2.06%	10.46%
Wealthfront (Risk 4.0) ^{10,B}	-	-	-	21.09%	4.68%	15.38%	-	-	-
Wealthfront (Risk 3.0) ^{10,B}	-	-	-	20.65%	4.51%	14.11%	-	-	-
WiseBanyan ⁸	9.51%	4.78%	7.98%	22.48%	3.71%	15.42%	15.81%	4.24%	11.64%

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Historical IRA Returns

Portfolio	2016									2017		
	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return	Q3 Equities Return	Q3 Fixed Income Return	Q3 Portfolio Return	Q4 Equities Return	Q4 Fixed Income Return	Q4 Portfolio Return	Q1 Equities Return	Q1 Fixed Income Return	Q1 Portfolio Return
Ally Financial IRA ⁹	-	-	-	-	-	-	-	-	-	-	-	-
Betterment IRA ¹⁵	-	-	-	5.43%	0.98%	4.84%	1.73%	-3.01%	1.11%	6.42%	0.86%	5.69%
E*Trade (ETF) IRA ³	-	-	-	-	-	-	-	-	-	5.85%	-	5.74%
E*Trade (Hybrid) IRA ³	-	-	-	-	-	-	-	-	-	5.63%	-	5.50%
Fidelity Go IRA ⁷	-	-	-	-	-	-	-	-	-	6.40%	0.90%	5.55%
Hedgeable IRA ²	-	-	-	-	-	-	-	-	-	-	-	-
Merrill Edge IRA	-	-	-	-	-	-	-	-	-	-	-	-
Personal Capital IRA ⁴	-	-	-	3.99%	0.58%	3.71%	1.52%	-3.25%	1.36%	5.37%	2.22%	5.22%
Schwab IRA ⁷	2.01%	-	1.89%	5.71%	-	5.36%	2.88%	-	2.69%	5.51%	-	5.17%
SigFig IRA ⁶	2.09%	4.84%	2.33%	5.58%	3.87%	5.41%	-0.14%	-5.61%	-0.64%	7.51%	3.46%	7.08%
TD Ameritrade IRA ⁷	-	-	-	-	-	-	-	-	-	6.86%	0.60%	5.77%
TIAA IRA ⁷	-	-	-	-	-	-	-	-	-	-	-	-
TradeKing Pre-Ally Transition	-	-	-	4.82%	1.29%	4.67%	1.58%	-1.16%	1.46%	6.34%	-0.35%	6.00%
T Rowe Price ¹³												
WealthSimple IRA ²	-	-	-	-	-	-	-	-	-	-	-	-
WiseBanyan IRA ⁸	1.82%	3.12%	1.94%	5.26%	1.22%	4.91%	1.67%	-2.61%	1.31%	6.80%	1.37%	6.33%

Portfolio	2017 ➔											
	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return	Q3 Equities Return	Q3 Fixed Income Return	Q3 Portfolio Return	Q4 Equities Return	Q4 Fixed Income Return	Q4 Portfolio Return	2017 Equities Return	2017 Fixed Income Return	2017 Portfolio Return
Ally Financial IRA ⁹	3.79%	0.92%	3.56%	4.87%	0.62%	4.53%	5.59%	0.36%	5.22%	-	-	-
Betterment IRA ¹⁵	3.83%	1.41%	3.51%	5.20%	1.16%	4.67%	5.40%	0.68%	4.78%	22.52%	4.18%	19.98%
E*Trade (ETF) IRA ³	3.38%	-	3.32%	4.89%	-	4.79%	5.49%	-	5.35%	-	-	-
E*Trade (Hybrid) IRA ³	3.97%	-	3.86%	5.08%	-	4.95%						
Fidelity Go IRA ⁷	3.79%	1.26%	3.39%	4.85%	0.80%	4.24%	5.79%	0.28%	4.95%	22.50%	3.28%	19.39%
Hedgeable IRA ²	2.05%	1.68%	2.71%	7.21%	0.73%	3.24%	9.69%	-1.97%	6.97%	-	-	-
Merrill Edge IRA	-	-	-	4.93%	0.90%	4.45%	5.56%	0.59%	4.98%	-	-	-
Personal Capital IRA ⁴	2.80%	0.81%	2.72%	4.48%	1.00%	4.37%	5.03%	0.09%	4.87%	18.87%	4.17%	18.29%
Schwab IRA ⁷	3.11%	-	2.92%	5.46%	-	5.13%	5.32%	-	4.97%	20.83%	0.00%	19.44%
SigFig IRA ⁶	4.03%	1.32%	3.75%	5.56%	2.10%	5.21%	5.48%	0.65%	4.97%	24.53%	7.72%	22.70%
TD Ameritrade IRA ⁷	3.78%	1.41%	3.36%	5.13%	0.96%	4.46%	5.84%	0.33%	4.97%	23.40%	3.33%	19.88%
TIAA IRA ⁷	-	-	-	4.95%	0.69%	4.40%	5.90%	0.35%	5.21%	-	-	-
T Rowe Price ¹³							5.03%	-	5.03%	-	-	-
TradeKing Pre-Ally Transition	-	-	-	-	-	-						
WealthSimple IRA ²	-	-	-	5.05%	1.07%	4.24%	5.56%	0.53%	4.57%	-	-	-
WiseBanyan IRA ⁸	4.14%	1.14%	3.88%	5.09%	1.04%	4.74%	5.71%	0.79%	5.29%	23.56%	4.42%	21.82%

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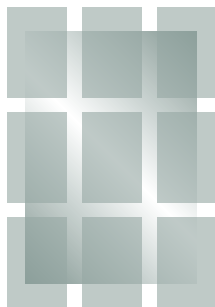
DISCLOSURE:

- 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 same flat dollar fee up to \$5,000 or a flat percentage on assets under management fee over \$5,000. A higher advisory fee would have the result of decreasing reflected performance, while a lower advisory fee would have the result of increasing reflected performance.
- ² This account has no minimum required to establish an account, but had the account been funded with more assets, it would, at certain asset levels, be eligible for a lower advisory fee. The lower advisory fee would have the result of increasing reflected performance.
- ³ These accounts were funded with more than the minimum amount required to establish an account. Due to the flat advisory fee, performance is not affected by the accounts' asset levels.
- ⁴ This account was funded with the minimum amount required to establish 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.
- ⁵ This account was funded with more than the minimum in order to take advantage of tax-loss harvesting. However, due to the flat advisory fee, performance is not affected by the account's asset level. Tax-loss harvesting may result in better or worse performance compared to similarly positioned accounts that do not have tax-loss harvesting associated with the account.
- ⁶ This account was funded with the minimum amount required to establish an account. Had the account been funded with more assets it would be charged the same or, in the case of over \$10,000, a higher advisory fee. A higher advisory fee would have the result of decreasing reflected performance.
- ⁷ These accounts were funded with the minimum amount required to establish an account. Due to the flat advisory fee, performance is not affected by the accounts' asset levels.
- ⁸ These accounts have no minimum required to establish an account. Due to the flat advisory fee, performance is not affected by these accounts' asset level.
- ⁹ This account was funded with the minimum investment amount at the time. At the time of opening, the account had a 0.25% management fee. Due to changes in the service at the end of the 1st quarter 2017, new accounts are charged a 0.30% management fee. e fee on our account was grandfathered in and remains at 0.25%. e higher advisory fee would have the result of decreasing reflected performance.
- ¹⁰ These accounts were funded with more than the minimum amount required to establish an account. The first \$10k in the account is not charged an advisory fee. New accounts are charged an advisory fee on the full amount of assets which would decrease reflected performance.
- ¹¹ This account has no minimum required to establish an account, but had the account been funded with more assets, it would, at certain asset levels, be eligible for a lower advisory fee. The lower advisory fee would have the result of increasing reflected performance. A special request was made for an allocation of 60% equities and 40% fixed income or close to it, but this allocation was not one of the standard models at the time of account opening. At the time of account opening the closest standard models offered were a in the range of 50/50 or 75/25 equity to fixed income split.
- ¹² These accounts were funded with more than the minimum amount required to establish an account. Due to the flat advisory fee, performance is not affected by the accounts' asset levels. Because this provider does not offer a standard portfolio with close to a 60/40 equity bond split, two accounts with different risk tolerances were opened and funded with the amount so that the overall asset allocation between the combined accounts was close to a 60/40 equity bond split. Results and other metrics are reported on the accounts as though there were a single account.
- ¹³ These accounts were funded with less than the minimum investment through an agreement between BackEnd Benchmarking and the provider. At higher levels of assets the fee remains the same and will not affect performance.
- ¹⁴ This account was funded with the minimum amount required to establish an account. Had we subscribed to additional, specific, Wells Fargo Products the account would be eligible for a lower advisory fee. 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 advisory. 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 service the fee would be higher or lower depending on the level of assets in the account. The higher/lower advisory fee would have the result of decreasing/increasing reflected performance.
- ¹⁷ These accounts were funded with more than the minimum amount required to establish an account. This account is not charged an advisory fee because there is less than \$10,000 invested. At a higher account balance a fee would be charged and would decrease reflected performance. Because this provider does not offer a standard portfolio with close to a 60/40 equity bond split, two accounts with different risk tolerances were opened and funded with the amount so that the overall asset allocation between the combined accounts was close to a 60/40 equity bond split. Results and other metrics are reported on the accounts as though there were a single account.
- ¹⁸ These accounts were funded with more than the minimum amount required to establish an account. This account is not charged an advisory fee because there is less than \$10,000 invested. At a higher account balance a fee would be charged and would decrease reflected performance.

^A On June 19th, 2017, Vanguard removed BackEnd Benchmarking's primary Vanguard account from the Vanguard Personal Advisor Services program. As of June 20th, 2017, the primary account was replaced by a secondary account with the same risk profile as the primary account. e 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%

This report represents Condor's research, analysis and opinion only; the period tested was short in duration and may not provide a meaningful analysis; and, there can be no assurance that the performance trend demonstrated by Robos vs indices during the short period will continue. BackEnd Benchmarking is under common ownership and control with Condor Capital Management, an SEC registered investment adviser. A copy of Condor's disclosure Brochure is available at www.condorcapital.com. Condor Capital initiated a position in Schwab and TD Ameritrade in one of the strategies used in many of their discretionary accounts on 5/30/2017 and 5/31/2017. As of 03/31/2018 the total size of the position is 37,671 shares of Schwab common stock and 34,476 shares of TD Ameritrade common stock.



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

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