BRINGING TRANSPARENCY TO ROBO INVESTING

EDITION 5

The Robo Report™ Third Quarter 2017

We are proud to publish the 5th edition of *The Robo Report*™, covering the 3rd quarter of 2017. 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. Alongside reporting performance on a quarterly basis, *The Robo Report*™ includes a discussion on the trends we saw during the quarter that drove performance, highlighting portfolios that benefited or were disadvantaged by market trends. Additionally there is a Robo News section covering the most relevant news from the quarter, a risk/return and asset allocation analysis, as well as a Robo Reviews section discussing the non-performance features of a couple of robo advisors each quarter. This quarter also includes takeaways from interviews with Betterment, Personal Capital, and WiseBanyan.

The Executive Summary

Digital advice continues to achieve adoption across the financial advisory industry. This quarter we begin tracking robo offerings from TIAA, Sofi, and Wealthsimple. Next quarter, we look forward to adding robo products from T. Rowe Price and Zack's Advantage. Robo advisors are continuing to bring in significant assets, with Vanguard recently reporting $83 billion in assets under management in their robo product. Additionally, Schwab's robo program is approaching $20 billion under management, and Betterment announced they are over $10 billion under management. Aite Group published a report predicting total assets managed by digital advice providers to reach $166 billion by year end and $1 trillion by 2020. As assets continue to climb and acceptance is spreading across the traditional advice landscape, robos are reshaping the way financial advice is delivered and assets are managed.

Total portfolio performance for the quarter ranged from 3.01% to 3.97% in our moderate taxable portfolios. In our aggressive IRA portfolios total performance ranged from 3.24% to 5.21% in the quarter. Year-to-date our taxable portfolios performance ranges from 9.07% to 11.81% in the taxable accounts and 15.07% to 12.80% in our IRA's. This quarter two of our portfolios, Betterment and Schwab, have full two year numbers. The two year return on the taxable Schwab portfolio was 25.94% and the Betterment portfolio was 21.89%. In the next report we will add Acorns, Personal Captial, SigFig, WiseBanyon, and Vanguard to the portfolios with two year numbers and look forward to diving into the long term results of these seven portfolios.

	Best	2nd	3rd
Total Portfolio	Schwab	Betterment	SigFig & Sofi *(Tied)*
Equity	Schwab & SigFig *(Tied)*	Sofi & Wealthfront *(Tied)*	TD Ameritrade
Fixed Income	Schwab	Fidelity Go	WealthSimple

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Robo News

This has been another busy quarter in the robo advice industry. This year has already seen many legacy financial advice firms launch robo investment services, and we anticipate more new entrants by year end. We are also watching how robo-related services are evolving, as legacy players like Vanguard and Schwab put pressure on the pure robos. Advisors from all corners of the financial universe are evaluating how their value propositions stand up against robo services and whether the technology represents an opportunity or a threat. As the robo advice industry becomes crowded, firms are searching for ways to stand out with investment styles that target specific audiences. At the same time, some financial institutions are questioning whether robo advice platforms meet the fiduciary standards set by the Department of Labor.

While questions still remain about the ways in which digital advice will change the investment industry, it is clear that it is having a transformative effect. Many of the largest financial firms have rolled out or plan to roll out digital advice solutions. This quarter, T. Rowe Price and Zack's Advantage launched robo advisors, adding to the growing list of legacy financial firms with a robo offering. We are still looking forward to launches from Morgan Stanley, Wells Fargo, and potentially Goldman Sachs later this year.

Additionally, there has been a lot of activity amongst companies that offer digital advice solutions to advice firms. Zack's new offering is built on Schwab's institutional robo platform. Franklin Templeton participated as a strategic investor in a series A funding round for Bambu, a Singapore based B2B digital advice platform. The President of Voya's broker-dealer was quoted as saying, "I don't have one but I want one" in an interview about robo advisors. LPL has released a digital advice solution through a strategic partnership with Blackrock's FutureAdvisor that is available to their advisors. Riskalyze, which currently offers advisors a technology-based platform to assess and monitor risk tolerance, has added a robo advice solution. Digital advice solutions are popping up everywhere, and investors and advisors alike need to be aware of this technology to help navigate the changing advice market.

As digital advice technology becomes more pervasive, the lines are blurring between traditional advisory services and robo advisors. For example, Morgan Stanley has been working on improving their offering on two fronts. First, they are rolling out a service dubbed "next best action" to their advisors. This tool will make suggestions to advisors about their clients by leveraging a combination of client-specific, market, and demographic data. The goal is to help advisors interact with their clients more effectively and efficiently by combining digital and human advice. Additionally, we anticipate Morgan Stanley will roll out a more traditional robo advice product, presumably to help capture the segment of the market that is not interested in a traditional advisor or does not have sufficient assets to be a desirable money management client. Both independent robos and traditional advice firms are asking themselves the same questions as Morgan Stanley: What is the right combination of digital advice and live advisors, and how can we segment the market to deliver an optimal product for different types of investors?

In addition to robo advisors considering how to segment the market, many are considering how to stand out in a crowded marketplace. Many are turning to investment themes to help differentiate their platforms. Socially Responsible Investing (SRI) is now being offered by Motif, Hedgeable, TIAA, Betterment, and is anticipated in the new Morgan Stanley offering. Wealthsimple recently announced a portfolio that stays compliant with Islamic investing principles. Hedgeable pursues active management and momentum rebalancing strategies, while TIAA offers an active management strategy option. Meanwhile, Betterment continues to broaden its offering. This quarter they announced access to a smart-beta Goldman Sachs strategy and an actively managed fixed income BlackRock fund.

There has been a rapid increase in competition in the digital advice industry and it shows no signs of stopping. Independent robo advisors need to quickly acquire market share and innovate or they risk being overshadowed by larger, more established financial institutions. Going forward, we expect to see the market share for robo advice products continue to expand as the trend towards digitization continues to impact all aspects of people's lives. We are already seeing signs of digital advice expanding to adjacent industries, including insurance and lending. We will be reporting on these developments in our next report.

What Lies Ahead:

Interviews with Betterment, WiseBanyan, Personal Capital

This quarter we wanted to hear first-hand what the robo advisors see as the future of digital advice, so we reached out to Betterment, Personal Capital, and WiseBanyan for their insights. All three companies are continuing to innovate and expand their product offerings. They are witnessing the digital advice space becoming more crowded as incumbent financial institutions start to adopt the technology they helped pioneer. At the same time, they are all confident that their products have strong value propositions and will continue to stay ahead of the incumbent players with innovative product offerings. We could not agree more when Jim Del Favero, Chief Products Officer at Personal Capital, said, "It's an exciting time to be a consumer, there is so much disruption in this industry, your experience, the fees you pay, the value you're getting for your money, are all getting much better."

Joe Ziemer, VP of Communications and Policy at Betterment, sees the financial industry in the midst of a transformative phase where increasingly fewer people have a single strong relationship with a financial institution. Services and products are being unbundled at an unprecedented rate, opening an opportunity for a firm like Betterment to become the central trusted relationship in a client's life. Filling this role is not a new aspiration for a financial advisor, but we believe that robo-advisors may have the tools to succeed where traditional institutions are falling behind.

Personal Capital is having success at centralizing a user's financial life. They have attracted an astounding 1.7 million users to sign up for their online tools, of which only 15,000 use Personal Capital as their investment manager. They are focusing on the relationship with their users first. As Jim put it, "Come to us for free tools, there is not a cost to you...we are going to start delivering value to you, and then over time you are going to get more comfortable with us and expand your relationship to where we are helping you manage your money."

WiseBanyan is willing to offer free basic money management services for the opportunity to be a user's primary financial relationship. Herbert Moore, Co-Founder and CEO of WiseBanyan, says, "I think that the simple provision of automated portfolio management that industry players are providing isn't the future of robo, I think what is a lot more interesting is the combination of advisory services with other financial products and services to be able to offer more holistic financial advice for a client." WiseBanyan plans to leverage their relationship with their clients to help connect to services they need. They recently starting selling life insurance, helping people find a mortgage, and refinancing student loans. They see great opportunities to use the data they have on their clients and their financial plans to help them connect to the correct financial products when they need them. When asked what's next, WiseBanyan said they are looking into personal auto purchases, as this transaction can be one of the most financially important transactions for younger and less wealthy clients.

Betterment's Joe del Favero agrees that amidst the jockeying to become the client's central and trusted financial relationship "...undoubtedly we will see players in the space offer more products than just the wealth management and financial planning aspect of this industry." We believe selling insurance and consumer lending are two of the most likely areas for robos to expand.

Although Betterment sees digital advice providers wading into other industries, they are focusing on expanding their investment management product offerings and grow their B2B platform. They have recently launched an option to invest in strategies managed by Goldman Sachs and BlackRock. They additionally offer a Socially Responsible Investing portfolio and an income-focused offering to pair with their retirement planning tool. They are not only segmenting markets for themselves, but also through their platform sold to advisors. Betterment for Advisors is proving popular amongst RIAs looking for a solution for lower asset clients as well as clients who are looking for a technology-rich solution.

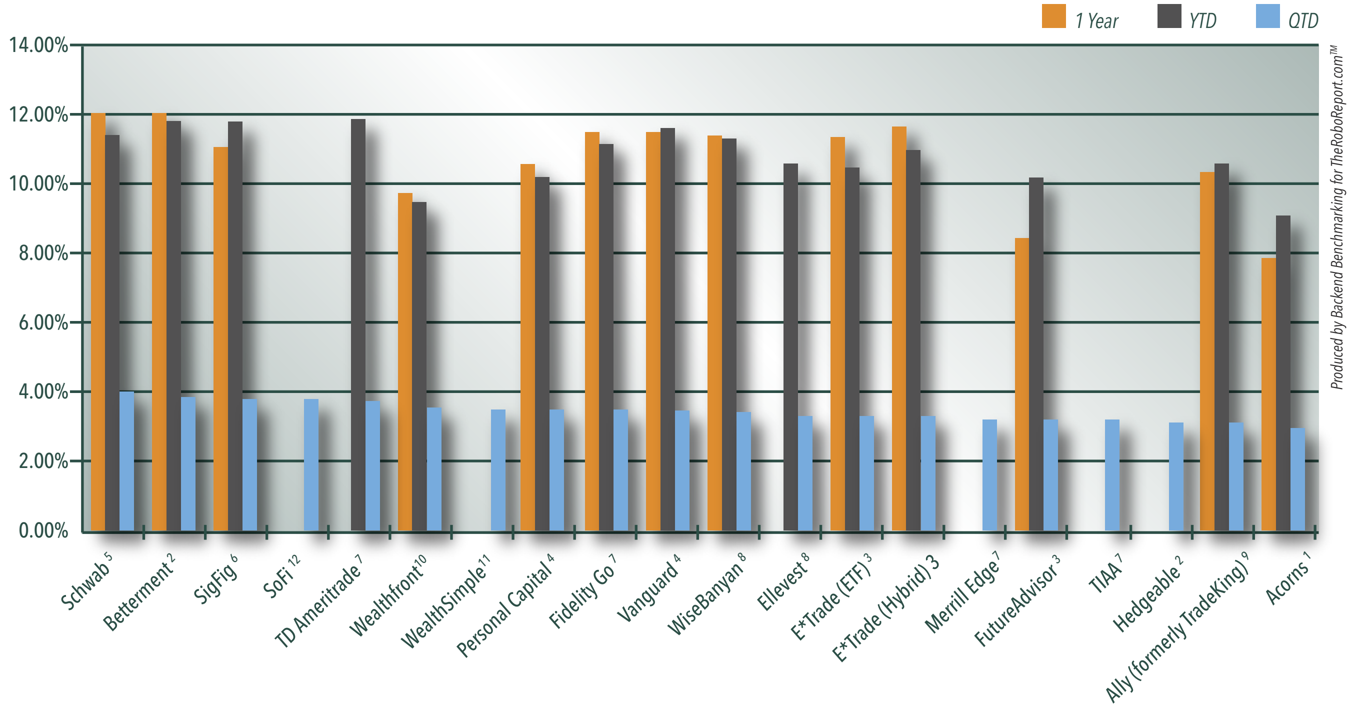
Although a digital advice solution is attractive to firms looking for a solution to service younger clients with fewer assets, Betterment, Personal Capital, and others are successfully targeting high-net-worth clients. Betterment shared with us that their average client age is 36, and over 30% of their assets are with clients older than 50. While Personal Capital has a $100,000 minimum, they say around 9% of their clients have more than $1 million invested with them, these households represent more than 40% of their managed assets. Personal Capital may be having more success with their hands-on approach and the ability to customize portfolios. Personal Capital often buys individual securities in an index-tracking strategy that allows them to increase opportunities for tax-loss harvesting and limit exposure to specific securities for clients with existing high single-asset concentrations. Betterment's addition of access to live advisors earlier this year will also help them attract clients with more sophisticated financial needs. Traditional financial advisors should be careful writing off robo advisors as a solution only for young or low asset clients.

Robo-advisors and firms adopting digital advice solutions are blurring the lines between an all-digital solution and traditional advisors. Clients both young and old want quick communication, access to information, and smartphone apps that help them manage all aspects of their life. Personal

Capital's management feels strongly that customers will increasingly demand increased access and the latest technology, saying, "Days of quarterly statements and punch binders are over." They believe a living financial plan that lets you track progress, compare different scenarios, and offers regular reminders to help clients stay on track is a far superior experience to more traditional financial planning services.

At ***The Robo Report***™, transparency is at the core of our mission. Our conversation with Betterment's Joe Ziemer turned to The Robo Report™ itself, and so we wanted to share his perspective. Performance is not the entire picture when looking at a robo advisor. Financial planning, online tools, regular updates on your account, and suggestions on how to save are all things that can help investors meet their goals. We always encourage our readers to use the performance data as just one part of an analysis on which robo is best for them, and to keep in mind that decisions should not be made solely on performance. This is, in part, why this quarter we are expanding the risk/return analysis and continuing to add to our robo reviews.

Performance Commentary



This quarter we are excited to add a more in-depth asset allocation analysis of the equity portion of the taxable portfolios. The style map seen in this section is created not using underlying holdings, but rather regression analysis on returns. We have only included portfolios in this analysis that have been open for one year to improve accuracy of the output. This type of analysis grows in accuracy over time, and one year's data is a short time frame for this technique. That said, one of the most interesting findings is the clear bias towards value stocks. This is particularly interesting as we close another quarter where growth has outperformed.

Domestic equity markets continued their strong year-to-date run in the third quarter of 2017, with international and fixed income markets generally following suit. The S&P 500 Index posted a 4.48% gain, finishing the quarter at yet another all-time high. Steady macroeconomic data and another round of strong corporate earnings growth were two key catalysts here, helping domestic markets shrug off some lingering concerns over higher-than-average valuations. The technology sector was a market leader once again in the quarter, while consumer staples was the only sector to post a loss. Energy, which had been the worst performer by far in the second quarter, rebounded on rising oil prices. Central banks were in the spotlight once again in the third quarter. Domestically, the Federal Reserve elected not to raise interest rates at its September meeting, breaking a streak of three consecutive quarters of rising rates. The central bank did, however, announce plans to begin winding down its balance sheet. The European Central Bank and Bank of Japan, on the other hand, proved much less willing to scale back stimulus programs of their own.

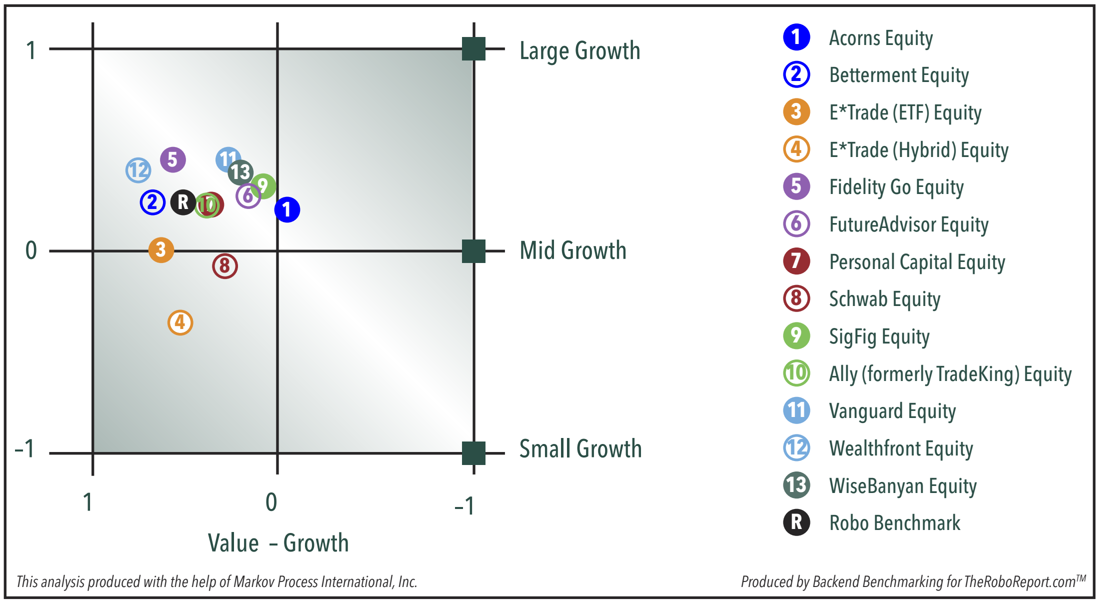
Growth Continues to Outperform

Led by technology, growth has continued to outperform value throughout the course of the year. This quarter, financials and energy rebounded on talks of tax reform and an increase in energy prices, but not enough to help value indexes outperform growth.

We have noted in previous reports that all of our portfolios show either a neutral weighting between value and growth or a tilt towards value with one notable exception: our Hedgeable IRA. The Hedgeable IRA holds all individual securities, ending the quarter with just eight equity holdings, six of which are technology stocks representing nearly 60% of their total allocation. This heavy weighting towards technology stocks led their IRA equity portion to significantly outperform its peers, returning 7.21%, leading the next-best IRA equity performance by the SigFig IRA at 5.56% for the quarter. That said, Hedgeable actively exercises its discretion over the the equity–bond allocation depending on their algorithm's detection of risk in the market. They currently have over 30% of their allocation to fixed income, which is significantly higher than its peers in the our aggressive IRAs. This fixed income drag on performance led to Hedgeable coming in last place in total performance. In our report, we wait until we have one year's performance before analyzing risk-adjusted returns, and we certainly look forward doing this analysis on Hedgeable once the account has reached a one-year maturity to dive further into the merits of Hedgeable's active strategy.

Schwab, Merrill Edge, Betterment, and Ellevest all have value-oriented weightings, which have continued to detract from performance this year. Wealthfront's dedicated energy exposure helped it outperform this quarter, but has held back performance YTD.

Robo 6-ETF Style Map



Small Caps Bounce Back, But Large Caps Still Lead YTD

Small caps led their mid- and large-cap peers in the quarter as they are expected to gain the most from a potential tax reform. That said, large caps have outperformed YTD on strong earnings and an improving global economy.

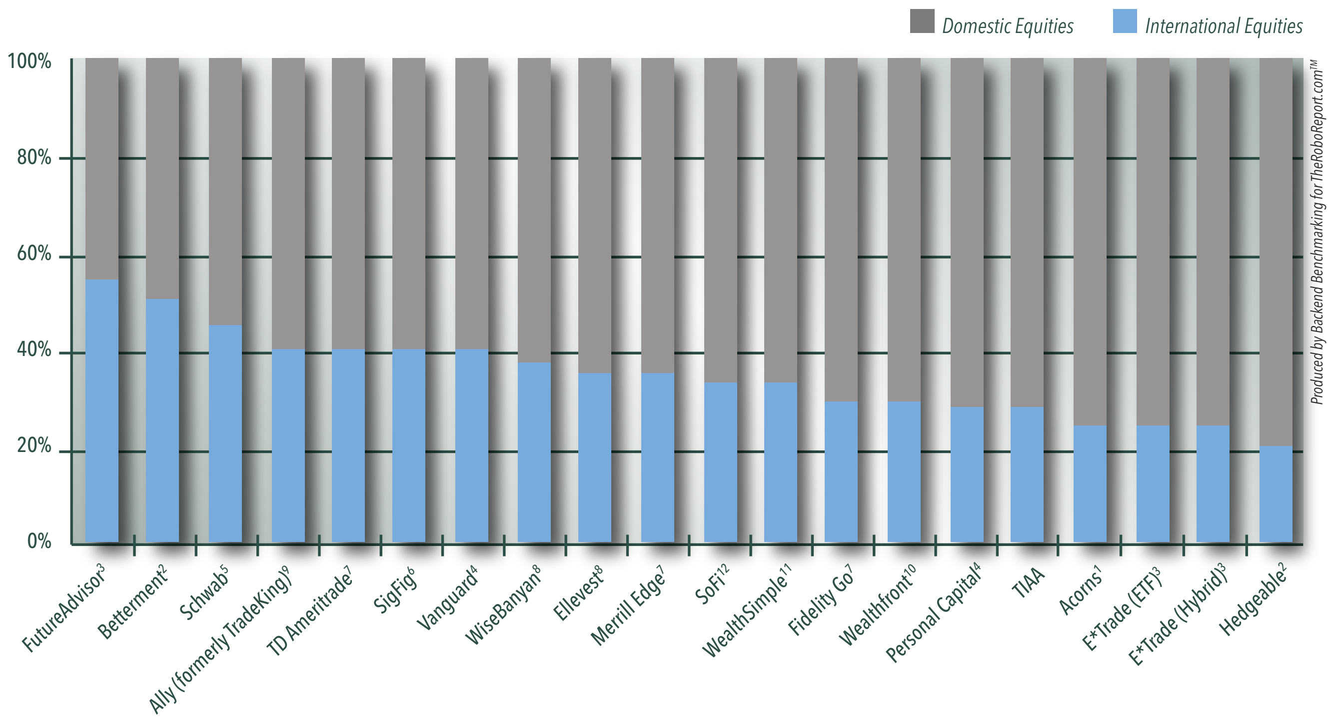
This year, equity performance in some of our simplest portfolios have done the best. The four top YTD equity performers all rely on a total stock market ETF for their entire domestic equity exposure. SigFig, Vanguard, and WiseBanyan hold the Vanguard Total Stock Market ETF, while TD Ameritrade holds the iShares Total Stock Market ETF. These ETFs have helped outperform by having large allocations to large-cap companies and not taking on a style bias between value and growth. Acorns, our worst performer in YTD equity returns, started the year off with a significant dedicated small-cap position of 21% of the total portfolio. They trimmed back that position late in this quarter to just 10% of the portfolio. Although it was late in the quarter, they missed much of the September rally in small caps and their performance has suffered as a result.

International Continues to Outperform

Internationally, equity markets across the board were characterized by economic growth and positive returns. Roughly 94% of global economies generated positive year-over-year growth in the period, providing a sound economic backdrop for both developed and emerging stock markets, while a weakening U.S. dollar proved to be a tailwind for foreign-denominated securities. Although developed markets were supported by a slight easing of political tensions and the continuation of accommodative central bank policies, these economies still generally underperformed their emerging counterparts in both the quarter and year to date.

International continues to be an area where we see the largest differences between many of our portfolios, and is one of the main drivers in the distributions of returns. This quarter, emerging markets helped propel equity returns in our top performers. SigFig and SoFi both hold a near equal weight between emerging markets and developed markets in their portfolio at 20% and 16% of total equities allocated to emerging markets, respectively. Schwab has one of the larger overall international weightings at 49%, while the dedicated emerging markets funds only make up 11% of their equity allocation, and their holdings in other international funds are broad-based and have underlying emerging markets exposure. TD Ameritrade also had a large dedicated emerging markets exposure at 13% of total equity, and is on the higher end of total international allocation at 41% of total equity. Although Wealthfront is in the middle of the pack with 30% of total equity in international holdings, their 10% of equity in emerging markets added to gains. Acorn's and Hedgeable's taxable portfolio had the lowest two equity performances this quarter, and equally had the lowest average international allocations in the quarter. Equally important, Hedgeable has no dedicated emerging markets exposure, and Acorns cut their emerging markets exposure to less than 5% of total equity.

International Allocation of Total Equity



Fixed Income Shows Modest Gains

Beyond central banks, fixed-income markets in the third quarter were generally driven by persistently tight credit spreads and another slight flattening of the yield curve. Despite fluctuating during the quarter, treasury yields finished the quarter right around where they began, with short-term yields ticking slightly higher, and longer-term yields finishing essentially flat. Risk-on sentiment among investors again proved to be a driving factor for fixed income in the period, with high-yield bonds outperforming their investment-grade peers and corporate debt generally outpacing its government-issued counterpart. Emerging markets bonds, particularly those issued in local currencies, were the top performing area of the bond market in the third quarter.

The top performer in fixed income for the quarter was SoFi. SoFi has allocated their entire fixed income allocation between a high-yield municipal bond fund and an emerging markets bond fund. Like SoFi, Schwab also has a risk-on perspective to fixed income, but to a lesser extent. 66% of Schwab's fixed income is allocated to international and high-yield bond funds. Within that, 24% of their fixed income is in emerging markets debt that helped propel them to the top place this quarter. Schwab's fixed income performance is in the lead YTD, with a 6.01% return. The next best YTD performance is the E*Trade Hybrid at 4.62%. Fidelity Go has earned the third-place position in fixed income for both the quarter and YTD with 1.46% and 4.59% return, respectively. Fidelity's success relies mostly on an 80% fixed income allocation to their Fidelity Municipal Income Fund.

There is a wide dispersion of what is held on the fixed income side of the taxable portfolios. For example, contrasting the leader, SoFi, with the last place performer, Acorns, you can quickly see that SoFi's portfolio is much more aggressive. SoFi holds all international and high-yield bond funds, while Acorns holds only a 1-3 year treasury bond fund and an investment-grade corporate fund. It is important to keep in mind the risk of these portfolios, as they have only been tracked in an extended bull market thus far.

Taxable Returns

	Total			Equity			FixedIncome		
	QTD	YTD	1Year	QTD	YTD	1Year	QTD	YTD	1Year
Acorns[1]	3.01%	9.07%	7.85%	4.17%	12.67%	13.08%	0.55%	2.59%	-0.99%
Ally (formerly TradeKing)[9]	3.11%	10.49%	10.28%	4.88%	15.91%	17.62%	0.60%	2.82%	-0.03%
Betterment[2]	3.83%	11.75%	11.97%	5.11%	15.88%	18.18%	1.24%	3.84%	0.54%
Ellevest[8]	3.34%	10.58%	-	4.80%	15.00%	-	1.15%	4.03%	-
E*Trade (ETF)[3]	3.34%	10.38%	11.29%	4.99%	14.73%	18.46%	0.94%	3.87%	0.55%
E*Trade (Hybrid)[3]	3.33%	10.90%	11.61%	4.94%	15.15%	19.17%	1.01%	4.62%	0.26%
Fidelity Go[7]	3.51%	11.11%	11.46%	4.90%	15.70%	19.14%	1.46%	4.59%	0.61%
FutureAdvisor[3]	3.21%	10.12%	8.40%	4.88%	15.72%	15.39%	0.91%	2.89%	-0.63%
Hedgeable[2]	3.14%	-	-	4.31%	-	-	1.04%	-	-
Merrill Edge[7]	3.23%	-	-	4.90%	-	-	0.98%	-	-
Personal Capital[4]	3.54%	10.21%	10.53%	4.51%	12.70%	14.10%	0.87%	3.47%	0.74%
Schwab[5]	3.97%	11.38%	11.93%	5.41%	15.12%	16.80%	1.53%	6.01%	3.78%
SigFig[6]	3.79%	11.75%	11.05%	5.41%	17.34%	18.71%	1.29%	3.43%	-0.39%
SoFi[12]	3.79%	-	-	5.27%	-	-	1.57%	-	-
TD Ameritrade[7]	3.74%	11.81%	-	5.14%	16.58%	-	0.78%	2.87%	-
TIAA[7]	3.20%	-	-	4.95%	-	-	0.56%	-	-
Vanguard[4]	3.47%	11.60%	11.41%	5.11%	16.64%	18.62%	0.98%	3.81%	0.65%
Wealthfront[10]	3.57%	9.44%	9.72%	5.26%	13.36%	16.18%	0.99%	3.64%	0.26%
WealthSimple[11]	3.55%	-	-	5.05%	-	-	1.27%	-	-
WiseBanyan[8]	3.40%	11.30%	11.32%	4.85%	16.10%	17.78%	0.87%	3.19%	0.53%

**Some accounts have not been open long enough for YTD or YoY returns*

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IRA Returns

	Total			Equity			FixedIncome		
	QTD	YTD	1Year	QTD	YTD	1Year	QTD	YTD	1Year
Ally IRA (formerly TradeKing)[9]	4.53%	14.74%	16.42%	4.87%	15.75%	17.57%	0.62%	1.18%	0.01%
Betterment IRA[2]	4.67%	14.51%	15.78%	5.20%	16.24%	18.25%	1.16%	3.48%	0.36%
E*Trade (ETF) IRA[3]	4.79%	14.48%	-	4.89%	14.78%	-	-	-	-
E*Trade (Hybrid) IRA[3]	4.95%	15.00%	-	5.08%	15.40%	-	-	-	-
Fidelity Go IRA[7]	4.24%	13.76%	-	4.85%	15.79%	-	0.80%	2.99%	-
Hedgeable IRA[2]	3.24%	-	-	7.21%	-	-	0.73%	-	-
Merrill Edge IRA	4.45%	-	-	4.93%	-	-	0.90%	-	-
Personal Capital IRA[4]	4.37%	12.80%	14.34%	4.48%	13.17%	14.89%	1.00%	4.08%	0.69%
Schwab IRA[7]	5.13%	13.78%	16.84%	5.46%	14.73%	18.04%	-	-	-
SigFig IRA[6]	5.21%	16.89%	16.14%	5.56%	18.06%	17.89%	2.10%	7.02%	1.01%
TD Ameritrade IRA[7]	4.46%	14.20%	-	5.13%	16.60%	-	0.96%	2.99%	-
TIAA IRA[7]	4.40%	-	-	4.95%	-	-	0.69%	-	-
WealthSimple IRA[2]	4.24%	-	-	5.05%	-	-	1.07%	-	-
WiseBanyan IRA[8]	4.74%	15.70%	17.22%	5.09%	16.89%	18.84%	1.04%	3.60%	0.89%

**Some accounts have not been open long enough for YTD or YoY returns*

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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 up to $5k; 0.25% annually over $5k	No minimum	62%/38%/0%/0%	60%/40%/0%/0%	84%/16%	75%/25%	0%
Ally (formerly TradeKing)	0.30% annually	$2,500	59%/38%/2%/1%	60%/38%/0%/2%	69%/31%	59%/41%	0%
Betterment	Digital Only: 0.25%; "Plus" (unlimited Digital Only" chat, 1 call/year with advisor): 0.40%; "Premium" (unlmited chat and calls with advisor): 0.50%; stop paying any fee on money above $2MM	No minimum; "Plus" and "Premium": 100k	65%/35%/0%/0%	67%/33%/0%/0%	49%/51%	49%/51%	60%
Ellevest	0.50% annually	No minimum	62%/36%/0%/2%	62%/36%/0%/3%	71%/29%	62%/38%	84%
E*Trade (ETF)	0.30% (promo – fee waived for 2016)	$5,000	60%/39%/0%/1%	60%/38%/0%/2%	75%/25%	75%/25%	0%
E*Trade (Hybrid)	0.30% (promo – fee waived for 2016)	$5,000	60%/39%/0%/1%	61%/38%/0%/2%	75%/25%	75%/25%	100%
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%	59%/41%/0%/1%	49%/51%	45%/55%	0%
Hedgeable	0.75% for first $50k decreasing in tiers to 0.30% for $1 million and above.	$1	56%/34%/8%/2%	58%/33%/8%/2%	79%/21%	79%/21%	100%
Merrill Edge	0.45% annually	$5,000	60%/39%/0%/1%	59%/37%/0%/4%	66%/34%	64%/36%	59%
Personal Capital	0.89% annually for the first $1 million; lower at different tiers over $1 million	$100,000	68%/25%/5%/2%	70%/25%/4%/1%	70%/30%	69%/31%	0%
Schwab	No fee	$5,000	62%/23%/5%/10%	63%/21%/4%/11%	51%/49%	51%/49%	34%
SigFig	No fee for the first $10k; 0.25% annually over $10k	$2,000	61%/37%/0%/2%	62%/36%/0%/2%	59%/41%	60%/40%	0%
SoFi	No Fee on first $10k invested: 0.25% anually on funds above $10k: no fee if client also has a SoFi loan	$100	60%/40%/0%/0%	61%/39%/0%/0%	33%/67%	66%/34%	83%
TD Ameritrade	0.30% annually	$5,000	65%/33%/0%/2%	69%/29%/0%/2%	65%/35%	59%/41%	0%
TIAA	0.30% annually	$5,000	61%/37%/0%/3%	61%/37%/0%/1%	61%/29%	61%/29%	0%
Vanguard	0.30% annually for the first $5 million; lower at different tiers over $5 million	$50,000	59%/41%/0%/0%	61%/39%/0%/0%	61%/39%	60%/40%	100%
WealthFront	0.25% on accounts above $10K in assets. Accounts with less than 10K in assets there is no management fee.	$500	58%/41%/0%/1%	62%/37%/0%/1%	69%/31%	70%/30%	87%
WealthSimple	0.50% fee on accountsless than $100k; 0.40% on accounts greater than $100k annually	No minimum	61%/39%/0%/0%	61%/39%/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%

**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 (formerly TradeKing)	0.30% annually	500	96%/3%/0%/1%	93%/5%/0%/2%	62%/38%	60%/40%
Betterment IRA	Digital Only: 0.25%; "Plus" (unlimited chat, 1 call/year with advisor): 0.40%; "Premium" (unlmited 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%	46%/54%
E*Trade (ETF) IRA	0.30% (promo – fee waived for 2016)	$5,000	98%/0%/0%/2%	98%/0%/0%/2%	75%/25%	74%/26%
E*Trade (Hybrid) IRA	0.30% (promo – fee waived for 2016)	$5,000	98%/0%/0%/2%	97%/0%/0%/3%	75%/25%	73%/27%
Fidelity Go IRA	0.35% annually	$5,000	85%/15%/0%/1%	85%/14%/0%/0%	71%/29%	70%/30%
Hedgeable	0.75% for first $50k decreasing in tiers to 0.30% for $1 million and above	$1	87%/10%/0%/3%	63%/34%/0%/3%	100%/0%	100%/0%
Merrill Edge IRA	0.45% Annually	$5,000	89%/8%/0%/3%	89%/8%/0%/3%	62%/38%	62%/38%
Personal Capital IRA	0.89% annually for the first $1 million; lower at different tiers over $1 million	$25,000	91%/3%/2%/4%	95%/3%/2%/1%	70%/30%	69%/31%
Schwab IRA	No fee	$5,000	94%/0%/0%/6%	94%/0%/0%/6%	54%/46%	52%/48%
SigFig IRA	No fee for the first $10K; 0.25% annually over $10K	$2,000	91%/9%/0%/0%	90%/10%/0%/0%	45%/55%	44%/56%
TD Ameritrade IRA	0.30% annually	$5,000	83%/15%/0%/2%	84%/14%/0%/2%	65%/35%	60%/40%
TIAA IRA	0.30% annually	$5,000	88%/11%/0%/2%	88%/11%/0%/2%	72%/28%	72%/28%
WealthSimple IRA	0.50% fee on accountsless than $100K; 0.40% on accounts greater than $100k annually	No minimum	80%/20%/0%/0%	80%/19%/0%/0%	66%/34%	66%/34%
WiseBanyan IRA	No fee	No minimum	92%/8%/0%/0%	92%/8%/0%/0%	60%/40%	60%/40%

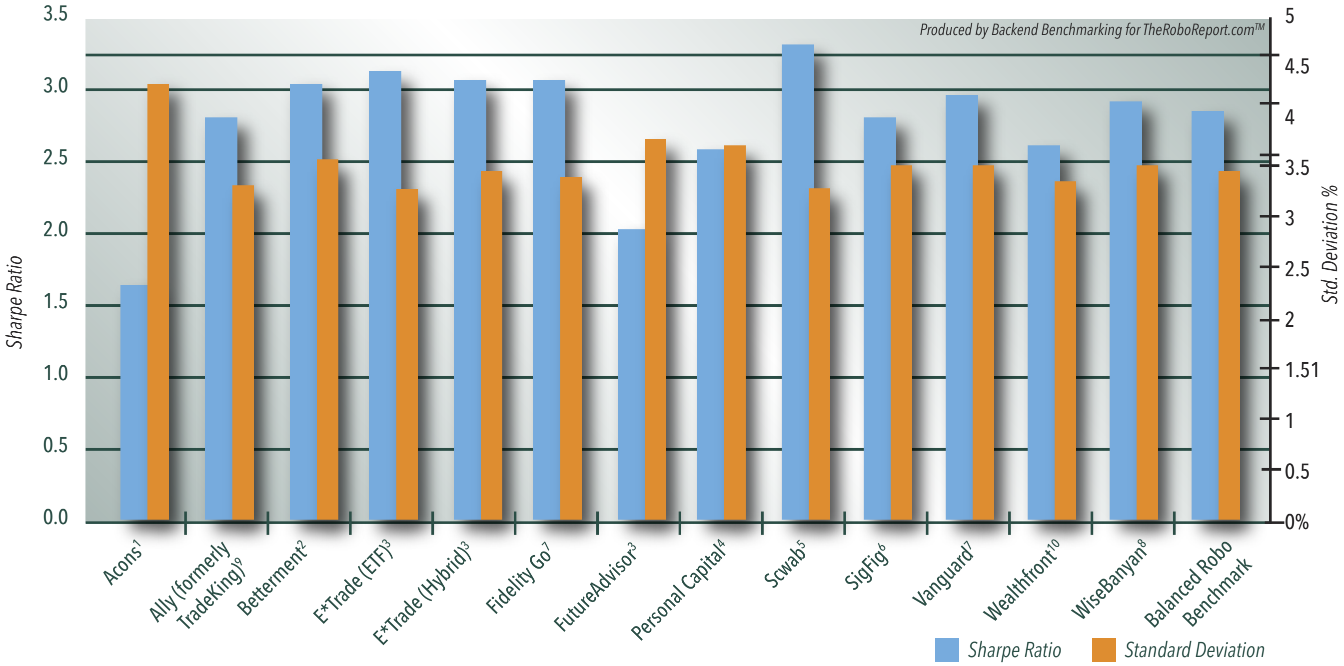
Due to rounding, may not add to 100%

Risk Return

Performance and risk go hand in hand. When comparing robo portfolios, it is important for investors to also understand the risk in the portfolios. Last quarter we introduced our risk/return analysis section. This quarter we are expanding our analysis to include upside and downside capture ratios in addition to the Sharpe Ratio and standard deviation metrics. Analysis is based on 12-month trailing returns ending 09/30/2017. An equal-weighted blended benchmark of the robos with a full year's returns is used as the benchmark for the upside/downside capture ratios. For those not familiar with upside/downside capture ratios, a basic explanation is a portfolio is desirable if it has a high upside and low downside capture ratio, and will plot to the lower right side of our the chart below.

Two portfolios immediately stand out in our risk/return analysis. The first is Schwab, which tied for the lowest standard deviation (risk), but also achieved a close second in the one-year return. This has given Schwab's portfolio the highest Sharpe Ratio in the group. We still reserve judgement on Schwab's portfolio until we see it perform in a downmarket. Their fixed-income allocation in particular is invested heavily in historically riskier assets. Acorns' portfolio also stands out with a high downside capture ratio of 153% and a low upside capture ratio of 84%. We believe this is due, in part, to their high allocation to small caps, which have whipsawed on political news throughout the year and their shifting international allocation. Acorns has also adjusted their allocation in international and small-cap equities at inopportune times over the past year. This data also implies that Personal Capital and FutureAdvisor may not offer the best risk-adjusted returns. We also want to remind our readers that, although risk is important, it can be difficult to measure, especially over a time frame as short as one year, and the utility of our data will grow with time.

Risk/Return (Sharpe Ratio and Standard Deviation)



	Acorns[1]	Ally (formerly TradeKing)[9]	Better-ment[2]	E*Trade (ETF)[3]	E*Trade (Hybrid)[3]	Fidelity Go[7]	Future-Advisor[3]	Personal Capital[4]	Schwab[5]	SigFig[6]	Van-guard[7]	Wealth-front[10]	Wise-Banyan[8]	Balanced Robo Benchmark
Annualized StdDev, %	4.33	3.3	3.58	3.28	3.44	3.39	3.77	3.72	3.28	3.56	3.52	3.34	3.53	3.46
Sharpe Ratio	1.63	2.81	3.03	3.11	3.06	3.05	2.01	2.56	3.29	2.81	2.94	2.63	2.9	2.83
1 year	7.84%	10.29%	11.96%	11.29%	11.62%	11.45%	8.40%	10.54%	11.93%	11.04%	11.40%	9.72%	11.32%	10.83%

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

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Upside/Downside Capture Ratio

	Acorns[1]	Ally (formerly TradeKing)[9]	Betterment[2]	E*Trade (ETF)[3]	E*Trade (Hybrid)[3]	Fidelity Go[7]	Future-Advisor[3]	Personal Capital[4]	Schwab[5]	SigFig[6]	Vanguard[7]	Wealthfront[10]	Wise-Banyan[8]	Balanced Robo Benchmark
Up Mkt Capture Ratio, %	84.58	94.45	107.74	102.47	106.14	103.4	82.77	99.28	105.04	98.69	102.83	89.33	104.01	100
Down Mkt Capture Ratio, %	153.26	92.19	92.19	92.75	98.97	90.49	113.11	109.72	76.92	80.87	89.36	88.23	100.67	100

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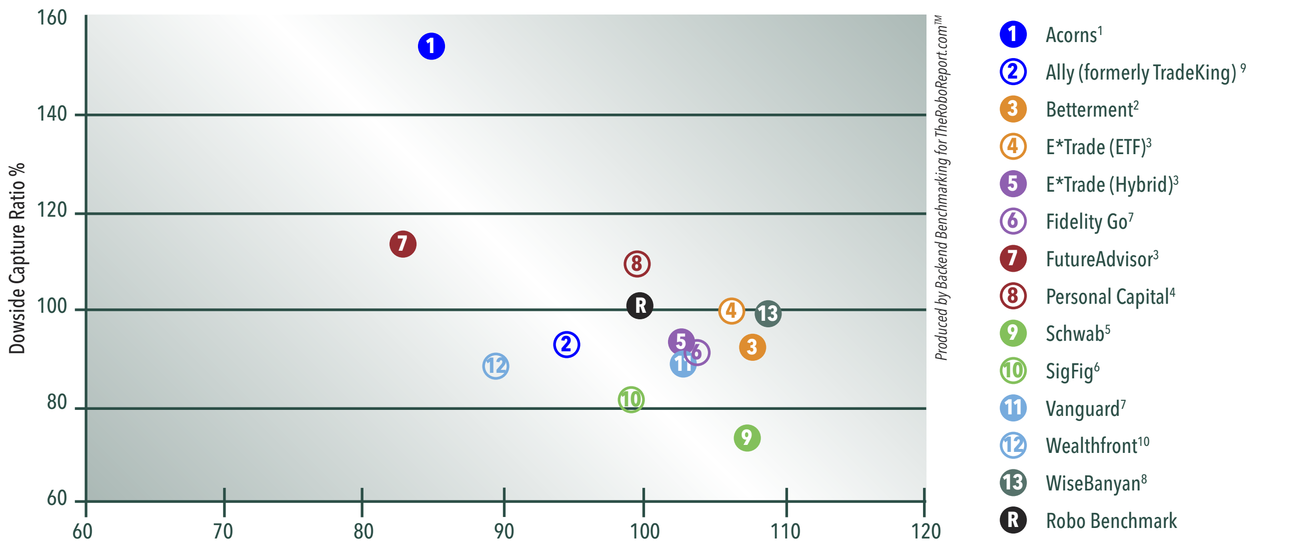

This analysis produced with the help of Markov Process International, Inc.

Trades

Acorns had another quarter of significant shifts to their asset allocation. They further reduced their REIT holding from 9.9% to 5.9%, and cut their dedicated small-cap exposure by more than half, from 23.9% to 10.3%. Reductions in these areas funded both a shift from small to large cap, as well as accomplishing rebalancing. The account was brought from a 70/30 equity-to-bond split at the end of last quarter, to a 60/40 split by the end of this quarter. Additionally, international exposure has changed significantly over the year. Acorns started the year with 9.6% in emerging markets with no other international equity exposure. At the end of the 2nd quarter, they had increased total international equities to 18.3% while reducing emerging markets exposure to 8.1%. By the end of this quarter, they pulled back emerging markets to just 2.9% of the total portfolio, landing on total international equity exposure of 14.9%.

The Hedgeable IRA, which is our most actively traded account, made quite a few trades this quarter. Our Hedgeable IRA holds all individual securities in their equity allocation. Hedgeable removed Kraft Heinz Co and Comcast from their allocation and added Intel. They also made significant cuts to Amazon and Alphabet Inc. allocations while adding to their positions in Apple and Cisco. Their fixed income allocation remained similar, starting the quarter at 32.2% and ending at 34.3%

Taxable E*Trade, Fidelity Go, Schwab, and WiseBanyan portfolios experienced some slight rebalancing. Most rebalancing trades sold international holdings and purchased fixed income.

WealthFront made some tax loss harvesting trades, swapping their Vanguard and SPDR energy ETF.

WealthSimple Overview:					
Fee	Account Minimum	Our Taxable Accountant's Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.5% for accounts less than $100,000 0.4% for accounts more than $100,000	$0	0.13%	Access to customer support for basic questions and guidence at basic level.	Yes	Yes

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WealthSimple

WealthSimple is the largest Canadian robo that has recently expanded their market to include US and UK investors. They focus on keeping their offerings easy to understand and easy to use, making them a great place for a beginner investor.

Sign up and Onboarding ★★★★

Onboarding involves a basic questionnaire asking about demographics, assets, income, and reactions to the market. There are no questions asking about the client's emotional outlook towards money and investments. After completing the online process, WealthSimple provides an introductory phone call to review the investment strategy and answer any questions. The sign up was simple, quick, and in line with other robo onboarding processes.

User Interface and Online Tools ★★★

The user interface reflects WealthSimple's desire to keep things simple for the client. The dashboard gives clear information about the accounts, including account performance, total earnings, and the amount of reinvested dividends. They also provide time value of money projections to show you what your account could be worth from now until age 70. Aside from their time value of money chart, there are no additional online tools to help users visualize their investments, set budgets, or address other financial topics. Their user interface does not give the client the ability to aggregate third-party accounts. WealthSimple also does not provide any benchmarking on their online interface to help users understand how their portfolio is performing compared to the general market.

Financial Planning ★★★★ (Black) ★★★(Basic)

WealthSimple does offer support for accounts at all levels. Customer service is available by phone to help clients with their accounts, investment decisions, or basic financial planning questions. At the Basic level, comprehensive financial planning is not offered. At their premium level of service, Black, users have access to financial planners and receive a formal financial plan.

Advice and Education ★★★

Users have access to a library of articles ranging from more serious topics like "The Totally-Not-Boring Guide to Life Insurance" to less serious ones like "How to Invest in Legos and Make a Bazillion Dollars." There are many articles on the more common personal finance topics, but very few on the intricacies of investing. That being said, WealthSimple is a place for people to come to delegate their investment and portfolio decisions, not get a crash course on how to be a self-directed investor.

Tax Loss Harvesting and Other Features ★★★★

Tax loss harvesting is provided automatically with WealthSimple Black. Upon request, clients can initiate tax loss harvesting at the Basic level. WealthSimple does have two offerings with specialized investment themes. One is for those interested in socially responsible investing. The other is a portfolio that "complies with Islamic investing principles." WealthSimple Black customers also receive a one-year pass to a network of VIP airline lounges.

Wealthfront *Overview:*					
Fee	Account Minimum	Our Taxable Accountant's (passive strategy) Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
No fee on the first $10k invested and 0.25% an all assets above $10k	$500	0.12%	None	Yes	Yes

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Wealthfront

Wealthfront is one of the pioneers of the robo investment industry. They have one of the simplest online questionnaires before opening an account and an intuitive interface. They excel in tax loss harvesting, especially for those with account sizes larger than $100,000. For those looking for a low cost, no frills, pure robo experience, Wealthfront is a compelling option.

Sign up and Onboarding ★★★

Sign up and onboarding is quick, simple and easy at Wealthfront. After collecting information on age, income, account goals, they ask just two questions about your returns goal and how you would react to a 10% decline in the market before suggesting an asset allocation.

User Interface and Online Tools ★★★★

The user interface is simple and clean. It offers a high quality retirement and education savings planner to help users visualize their long-term goals. Wealthfront also allows its clients to aggregate information from third-party accounts to give the user a more comprehensive view. There are no personal finance or budgeting tools available to users. There are also no benchmarking features to help users understand how their accounts are performing compared to the general markets.

Financial Planning ★★★

Wealthfront offers a single online retirement planner that is easy to use but lacks the ability to create a multi-goal comprehensive plan. Wealthfront's planner is designed to make assumptions about social security, life expectancy, and other factors allowing users to create a quick plan. The planner also allows users to easily change factors, such as their monthly savings goals or retirement age, in order to see how these changes affect their financial plan. Wealthfront also offers an education savings planner along with their 529 plan that helps users determine estimated costs, financial aid, and other factors to produce a quick and simple plan. There is no access to live advisors for questions about retirement.

Advice and Education ★★

Wealthfront offers in-depth and understandable information on how their investment methodology and different asset management techniques are used. Outside of this, there is no information to educate users on investing.

Tax Loss Harvesting and Other Features ★★★★

Wealthfront offers daily tax loss harvesting on all accounts. Accounts with more than $100,000 in assets are eligible for direct indexing, and accounts over $500,000 are eligible for what they call "advanced indexing" (check their website for a more in depth explanation on their advanced indexing strategy). Both direct and advanced indexing hold individual securities over a similarly composed ETF, which increases the opportunities for tax loss harvesting. Wealthfront is also one of the few robo advisors to offer a 529 plan. Additionally, Wealthfront offers the ability to open a line of credit secured by the client's investment portfolio.

***WiseBanyan** Overview:* Fee	Account Minimum	Our Taxable Accountant's (passive strategy) Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
Free for basic online package	None	0.10%	No	Yes	Yes

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WiseBanyan

WiseBanyan's commitment to offering basic automated investing at no cost makes it a compelling choice for those looking to invest with a robo advisor. Even if a client chooses to add tax-efficient features, they are competitively priced at an approximate annual fee of 0.25%. For those who are willing to forgo live advice, WiseBanyan has quality online tools and resources to help clients navigate basic financial planning and investing. WiseBanyan's $1 minimum investment makes them particularly well-suited for those just starting out with investing.

Sign up and Onboarding ★★★★

WiseBanyan has an easy sign-up process. WiseBanyan asks you basic demographic questions and goals. Initial inquiries are followed up with questions about the client's attitudes towards risk. The onboarding process is simple, quick, and includes some indicators of the client's emotional response to risk.

User Interface and Online Tools ★★★★

WiseBanyan has a user friendly and simple interface. All the basic information, such as asset allocation, trades, and performance, are easily and readily accessible. Their milestones feature allows you to set and track progress towards goals. The financial planning tool asks questions and makes recommendations. We like that there is a wide set of topics covered from budgeting to mortgages and life insurance, and the advice is communicated in an easy and understandable way.

Financial Planning ★★★★

WiseBanyan does not offer access to live financial planners but does have one of the better online financial planning tools we have seen. Their online financial planning covers more topics, like mortgages and life insurance, than we typically see in online financial tools provided by robo advisors. Combined with their milestones feature, investors can set and track progress towards multiple goals. For online financial planning that does not involve a live planner, we think WiseBanyan has a strong offering.

Advice and Education ★★★★

WiseBanyan has some quality articles on a wide range of financial topics. They tackle less widely covered topics, including how to save for a down paymente, buy a first car, or handle finances with a romantic partner. The articles are well written, easy to understand, and informative.

Tax Loss Harvesting and Other Features ★★★★

For an added fee of 0.02% per month capped at $20 a month clients can turn on a tax protection package. This package offers tax loss harvesting, selective trading, and Roth IRA conversion features. Selective trading allows you to exclude certain ETFs that the user owns in outside accounts from their asset allocation with the idea of inadvertently triggering a wash sale. Although these features were not suggested on our account, likely due to how we answered financial planning questions. WiseBanyan also can help users buy life insurance, refinance mortgages, and consolidate student loans.

TIAA Personal Portfolios Overview:

Fee	Account Minimum	Our Taxable Accountant's (passive strategy) Weighted Expense Ratio	Live Advisors	Automatic Rebalancing	Automatic Deposits
0.30%	$5000	0.13%	Unlimited phone access to financial consultants	Yes	Yes

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TIAA Personal Portfolios

TIAA has joined the other established advice players now offering a robo solution. TIAA Personal Portfolios has a goal-based approach to asset allocation and a competitive fee of 0.30%. For those seeking active management, TIAA has an active strategy that sets itself apart from many other providers. Outside of investment style choices, their platform is similar to many other incumbent players'.

Sign up and Onboarding ★★★★

Signing up for TIAA Personal Portfolios is easy and intuitive. The signup process helps investors set goals and investment parameters after collecting basic demographic and income information. As part of the process, new clients are provided with information about historical results of portfolios on different risk tolerances. They are then prompted to make choices about their own risk tolerance based on this information, largely leaving the comfort level of risk up to them. TIAA is also transparent about their proposed asset allocation by breaking down the allocation at the fund level so investors can see exactly what their portfolio will look like before entering their personal information. Many other robo advisors hold this level of detail back until after a social security number and other information is provided.

User Interface and Online Tools ★★★

TIAA's user interface allows the user to easily navigate around basic functions and information including account balances, asset allocation, statements, and transfers. Outside of these functions, navigation to other tools and features are less intuitive. TIAA does offer a variety of tools to help a user set and track financial goals. The tools use intuitive wizards to help users quickly work through basic planning functions to set long-term goals. Budgeting and other personal finance tools were lacking; for example, the tool to help users build a budget consists only of a PDF worksheet. TIAA does allow users to link outside accounts to gain a complete view of their financial situation, and while there are many features available to users, there is an overall lack of cohesive intuitive integration. There is no benchmarking feature available to help users understand the comparative performance of their accounts.

Financial Planning ★★★

TIAA offers unlimited access to their financial consultants and has a robust set of calculators to help users navigate long-term planning needs. For those with complex financial situations or a need for a comprehensive multi-goal financial plan, they will likely need to upgrade to TIAA's traditional financial advisors.

Advice and Education ★★★★

In addition to live access to financial consultants, TIAA has a good library of information on the basics of investing as well as capital markets research. The information is well designed to help beginner investors understand investing concepts.

Tax Loss Harvesting and Other Features ★★★

TIAA has three investment styles to choose from: passive, active, and socially responsible investing. As most robos pursue a mostly passive strategy, TIAA can be a good fit for those investors seeking to outperform the market. Additionally, upon request, TIAA will allow further customization to exclude or change funds in the portfolio on a case-by-case basis. TIAA does not provide any tax loss harvesting features.

Our 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. For taxable accounts, we sought a moderate allocation of approximately 60% stocks and 40% bonds for an investor in a high tax bracket. As for the 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. Our knowledge of the underlying assets held in our portfolios helps us understand the structure of the portfolio, the risk, and what is driving or holding back performance. We could think of no better way to understand the different robo advice providers than to open up accounts and see for ourselves how they behave.

The Robo Report's™ goal is to be comprehensive in covering the most prominent players in the digital advice landscape. When selecting advice providers to include in our study, we like to see the providers meet a set of criteria to be included in ***The Robo Report™***. First, prospective clients must be able to open an account and be directed towards an asset allocation by using an automated digital interface. This process should involve little to no visible intervention from live employees. Second, we look for either a significant and growing amounts of assets under management, an offering from an existing incumbent financial institution, or an offering with significant venture backing or other funds raised. Third, we consider including offerings that we believe have an innovative approach or product.

Addendum – Previous Periods Performance

	2015 →			2016 →								
Taxable Account Portfolio	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
Acorns[1]	-	-	-	3.17%	2.96%	3.08%	3.78%	2.08%	3.12%	3.76%	0.44%	2.49%
Ally (formally TradeKing)[9]	-	-	-	0.86%	2.93%	1.61%	2.29%	2.75%	2.43%	4.54%	0.83%	3.07%
Betterment[2]	4.95%	1.39%	3.67%	0.39%	2.24%	1.04%	1.77%	2.98%	2.19%	5.32%	0.31%	3.55%
Ellevest[8]	-	-	-	-	-	-	-	-	-	-	-	-
E*Trade (ETF)[3]	-	-	-	-	-	-	-	-	-	5.56%	0.68%	3.63%
E*Trade (Hybrid)[3]	-	-	-	-	-	-	-	-	-	6.19%	-0.37%	3.62%
Fidelity Go[7]	-	-	-	-	-	-	-	-	-	-	-	-
FutureAdvisor[3]	-	-	-	-	-	-	-	-	-	5.05%	0.44%	3.16%
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%
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%
SigFig[6]	-	-	-	1.41%	4.65%	2.58%	2.10%	2.84%	2.33%	5.59%	2.03%	4.13%
TD Ameritrade[7]	-	-	-	-	-	-	-	-	-	-	-	-
Vanguard[7]	-	-	-	0.45%	1.37%	0.82%	1.64%	2.04%	1.80%	5.26%	-0.26%	3.01%
Wealthfront[10]	-	-	-	-	-	-	-	-	-	-	-	-
WiseBanyan[8]	-	-	-	0.83%	3.56%	1.91%	2.07%	2.86%	2.38%	4.89%	0.95%	3.47%

	2016 →						2017 →					
Taxable Account Portfolio *(continued)*	Q4 Equities Return	Q4Fixed Income Return	Q4 Portfolio Return	Fixed Equities Return	Income Return	Portfolio Return	Q1 Equities Return	Q1 Fixed Income Return	Q1 Portfolio Return	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return
Acorns[1]	0.37%	-3.49%	-1.12%	11.51%	1.88%	7.72%	5.21%	0.59%	3.48%	2.80%	1.43%	2.32%
Ally (formally TradeKing)[9]	1.47%	-2.77%	-0.19%	9.45%	3.67%	7.07%	6.47%	1.19%	4.41%	3.81%	1.00%	2.63%
Betterment[2]	1.99%	-3.18%	0.20%	9.74%	2.24%	7.14%	6.25%	1.09%	4.50%	3.75%	1.47%	2.99%
Ellevest[8]	-	-	-	-	-	-	6.11%	1.58%	4.35%	3.41%	1.25%	2.55%
E*Trade (ETF)[3]	3.25%	-3.19%	0.82%	-	-	-	5.85%	1.09%	4.07%	3.23%	1.79%	2.63%
E*Trade (Hybrid)[3]	3.49%	-4.16%	0.64%	-	-	-	5.49%	1.44%	3.98%	4.01%	2.11%	3.22%
Fidelity Go[7]	2.98%	-3.81%	0.31%	-	-	-	6.27%	1.29%	4.24%	3.79%	1.79%	2.98%
FutureAdvisor[3]-	-0.28%	-3.42%	-1.57%	-	-	-	6.05%	0.82%	3.79%	4.04%	1.14%	2.80%
Hedgeable[2]	-	-	-	-	-	-	-	-	-	3.13%	1.75%	2.61%
Merrill Edge[7]	-	-	-	-	-	-	-	-	-	3.25%	1.54%	2.51%
Personal Capital[4]	1.24%	-2.64%	0.29%	11.10%	4.90%	9.41%	5.18%	1.51%	4.23%	2.53%	1.06%	2.13%
Schwab[5]	1.46%	-2.10%	0.50%	14.19%	7.06%	10.75%	5.97%	2.39%	4.52%	3.06%	1.97%	2.49%
SigFig[6]	1.16%	-3.69%	-0.63%	10.60%	5.76%	8.62%	7.27%	2.02%	5.21%	3.78%	0.10%	2.34%
TD Ameritrade[7]	-	-	-	-	-	-	6.81%	0.64%	4.66%	3.81%	1.42%	2.98%
Vanguard[7]	1.70%	-3.04%	-0.17%	9.29%	0.04%	5.55%	6.71%	1.25%	4.62%	3.99%	1.53%	3.10%
Wealthfront[10]	2.49%	-3.26%	0.26%	-	-	-	5.00%	1.11%	3.46%	2.57%	1.49%	2.13%
WiseBanyan[8]	1.45%	-2.57%	0.02%	9.51%	4.78%	7.98%	6.48%	1.12%	4.53%	4.00%	1.16%	2.97%

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Addendum – IRA Previous Periods Performance

Portfolio	2016 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
Ally (formally TradeKing) IRA[9]	-	-	-	4.82%	1.29%	4.67%	1.58%	-1.16%	1.46%
Betterment IRA[2]	-	-	-	5.43%	0.98%	4.84%	1.73%	-3.01%	1.11%
E*Trade (ETF) IRA[3]	-	-	-	-	-	-	-	-	-
E*Trade (Hybrid) IRA[3]	-	-	-	-	-	-	-	-	-
Fidelity Go IRA[7]	-	-	-	-	-	-	-	-	-
Hedgeable IRA[2]									
Personal Capital IRA[4]	-	-	-	3.99%	0.58%	3.71%	1.52%	-3.25%	1.36%
Schwab IRA[7]	2.01%	-	1.89%	5.71%	-	5.36%	2.88%	-	2.69%
SigFig IRA[6]	2.09%	4.84%	2.33%	5.58%	3.87%	5.41%	-0.14%	-5.61%	-0.64%
TD Ameritrade IRA[7]	-	-	-	-	-	-	-	-	-
WiseBanyan IRA[8]	1.82%	3.12%	1.94%	5.26%	1.22%	4.91%	1.67%	-2.61%	1.31%

Portfolio *(continued)*	2017 Q1 Equities Return	Q1 Fixed Income Return	Q1 Portfolio Return	Q2 Equities Return	Q2 Fixed Income Return	Q2 Portfolio Return
Ally (formally TradeKing) IRA[9]	6.34%	-0.35%	6.00%	3.79%	0.92%	3.56%
Betterment IRA[2]	6.42%	0.86%	5.69%	3.83%	1.41%	3.51%
E*Trade (ETF) IRA[3]	5.85%	-	5.74%	3.38%	-	3.32%
E*Trade (Hybrid) IRA[3]	5.63%	-	5.50%	3.97%	-	3.86%
Fidelity Go IRA[7]	6.40%	0.90%	5.55%	3.79%	1.26%	3.39%
Hedgeable IRA[2]				2.05%	1.68%	2.71%
Personal Capital IRA[4]	5.37%	2.22%	5.22%	2.80%	0.81%	2.72%
Schwab IRA[7]	5.51%	-	5.17%	3.11%	-	2.92%
SigFig IRA[6]	7.51%	3.46%	7.08%	4.03%	1.32%	3.75%
TD Ameritrade IRA[7]	6.86%	0.60%	5.77%	3.78%	1.41%	3.36%
WiseBanyan IRA[8]	6.80%	1.37%	6.33%	4.14%	1.14%	3.88%

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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. e 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. e account has less than $10k in assets and is not charged an advisory fee at this level. If the account had more than $10k in assets a management fee would be charged 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.

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* *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.*

** *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.*

*** *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 9/30/2017 the total size of the position is 40,618 shares of Schwab common stock and 38,093 shares of TD Ameritrade common stock.*

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

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