BRINGING TRANSPARENCY TO ROBO INVESTING

Robo Report™ Second Quarter 2017

We are proud to publish the fourth edition of *Robo Report*™, covering the 2nd quarter 2017. This is a continuation of an ongoing study that monitors the most well-known Robo advisors. We strive to provide a reliable resource for investors who are considering, or currently invest with, digital and automated investment products. In light of the recent emergence of algorithm- and automation-backed investment solutions, we think it is important to understand what their characteristics are in order to provide transparency for investors. That is why we believe the proprietary *Robo Report*™ is an innovative and go-to resource.

To get a first-hand understanding about 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. 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. 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 the trends. We also included a Robo News section highlighting news stories and announcements in the Robo Investing world.

The Executive Summary

This quarter we are excited to publish our first results from Robos at Merrill Edge and Hedgeable. Next quarter we will report our first results from portfolios at WealthSimple, SoFi, and TIAA-CREF. Additionally, last quarter TradeKing transitioned their portfolios to the Ally Financial platform following last year's acquisition. What was labeled as TradeKing Core in previous reports is now labeled Ally. The momentum and core strategies now both follow the same strategy under Ally, and we will no longer be reporting what was our TradeKing Momentum portfolio.

We are also introducing reviews of the service and user experience of the various Robo platforms. This report will be reviewing Vanguard, Schwab, Betterment, Personal Capital, Merrill Edge, and Hedgeable.

The performance of the taxable accounts varied considerably for the 2nd quarter. The following table illustrates the best-performing equity-only returns, fixed income-only returns, and total portfolios. The returns for the quarter ranged between 3.22% and 2.13% in our taxable accounts and 3.88% and 2.71% in our IRA accounts.

	Best	2nd	3rd
Equity	FutureAdvisor	E*Trade (Hybrid)	WiseBanyan
Fixed Income	E*Trade (Hybrid)	Schwab	Fidelity Go and E*Trade (ETF) Tied
Total Portfolio	E*Trade (Hybrid)	Vanguard	Betterment

In the 2nd quarter of 2017 we saw very little tax-loss harvesting, but this can be expected as the markets continued to show a strong period of growth. We did see what appeared to be some modest rebalancing trades. In a continuing trend from last quarter, international equities outpaced domestic ones, while large cap growth led the way domestically. Fixed income portfolios with a "risk-on" outlook owning corporate and international debt, as well as those holding longer maturities, fared the best, while Treasury Inflation Protected Securities (TIPS) holdings performed poorly.

Robo News

This quarter has been a busy one in the Robo advising industry, as we continue to see new entrants to the marketplace and M&A activity, both in the US and abroad. Amid the changing landscape one thing remains constant: Assets continue to flow into these automated investing platforms. Vanguard's Robo has continued to lead the field in bringing assets onto its platform, recently announcing they breached $65 billion in total assets under management in the first quarter of 2017. This was an increase of $15 billion which translates to a staggering $5 billion a month. This puts Vanguard's Robo at more than four times the size of Schwab's, the next largest Robo by assets under management. Schwab's and Vanguard's growth undoubtedly represents some cannibalization of assets already on their platforms. With Betterment approaching $10 billion in assets and new Robo offerings being announced regularly, one thing is clear: The Robo advising industry is growing rapidly and is here to stay.

In contradiction to the fantastic growth numbers seen thus far, ING Group recently published results from their annual international survey showing that many people in Europe and the United States are wary of computer algorithms making their investment decisions for them. The survey found only 7% of US respondents, “Would like a computer to conduct financial activities without approval.” While a larger number of US respondents want a computer program to give them advice, or would be willing to let a computer make decisions pending a personal, final approval. Additionally, 34% of US respondents did “not want automated financial activities at all.” Meanwhile, a survey conducted by Investing Media Solutions had 47% of respondents say they were aware of the term “Robo advisor,” up from 31% a year ago. 18% of those who said they were aware of one, also said they would consider adding a Robo advisor to manage some of their money.

One trend in Robo advising that accelerated in the 1st quarter of 2017 was the global expansion of Robos. Canadian firm Wealthsimple reached $1 billion under management in May, grabbing headlines when Prime Minister Justin Trudeau highlighted the achievement as part of a broader push for technological innovation in the country. London-based Investec debuted its own service, describing it as an “actively managed Robo.” Larger, more traditional financial institutions in Europe made headlines as well, with both Credit Suisse and HSBC joining UBS by opening their own Robo products. HSBC explained their decision as a response to the so-called advice gap, providing a lower-fee investment option for entry level investors, while Credit Suisse’s move comes as the bank undertakes a larger modernization and digitalization effort.

BlackRock acquired a significant stake in Scalable Capital in late June, building on its 2015 acquisition of FutureAdvisor. The investment allows the multi-trillion dollar asset manager to expand its Robo business into Europe, where Scalable Capital is based. With more than 6,000 clients throughout Britain, Germany, and Austria, Scalable Capital is actually larger than FutureAdvisor was at the time of the 2015 deal, providing BlackRock with a significant European foothold. Blackrock also made an investment in iCapital in late 2016, which is a marketplace for alternative investments with the goal of expanding access to alternatives.

Pension giant TIAA-CREF unveiled its own Robo advisor in the 2nd quarter as well. Their offering has a 0.30% management fee and a $5,000 minimum, including options for low-cost passive investments, an actively managed strategy, as well as a socially responsible investing (SRI) theme. Meanwhile, Morgan Stanley is integrating digital solutions on two fronts. They are introducing algorithmic-based tools to their traditional advisors in a program called “next best action” that will leverage machine learning and algorithms to help advisors automate tasks, help trade, and enhance client engagement. They are also beginning to roll out a direct to consumer Robo solution called Morgan Stanley Access Investing that is currently being tested by bank employees. We anticipate it will have an account minimum of $5,000 and will charge a fee of 0.45% of assets annually.

Morgan Stanley’s offering will also include an option for SRIs following similar options at Motif and TIAA-CREF, which both launched Robos with SRI options earlier in the year. We know of three smaller Robos: Earthfolio, OpenInvest, and Grow Invest, that focus on SRI. We are also aware of a new smaller Robo from a firm called Validea Capital that launched in April of this year which employs some more active strategies to their portfolios.

SoFi, which started out as a fintech company focused on lending, is expanding to banking, insurance, and wealth management. They rolled out a Robo offering this quarter with a 0.25% fee, $500 minimum investment, and access to live advisors. We look forward to including SoFi in next quarter’s report.

Moving in the reverse direction of SoFi, Wealthfront announced this quarter a product called Portfolio Line of Credit, allowing you to borrow 30% of your account value for those with $100,000 or more in an account through a streamlined sign up process. In other Wealthfront-related news, Adam Nash, former Wealthfront CEO, joined the board at Acorns this quarter.

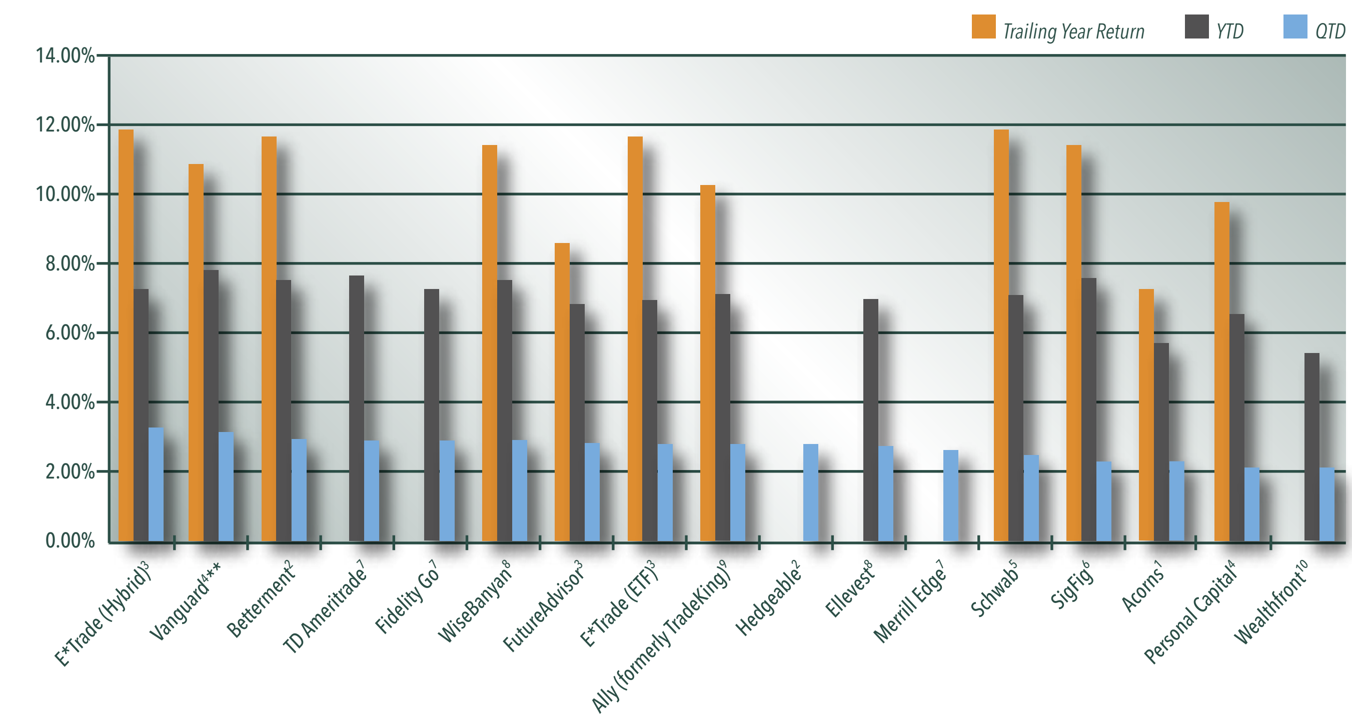
Another new and different entrant into the market is Fundrise, which launched an unconventional Robo advisor focused exclusively on real estate. The company invests solely in private real estate holdings, with the stated goal of connecting average investors to an area of the market that has traditionally been difficult for them to reach. It's specialized approach makes it different than most Robo advisors, which generally try to provide investors with a broader, more comprehensive investment strategy.

Fiserv, a large financial services technology provider, announced a partnership with Goldbean, a fintech startup that provides digital advice and education. Goldbean is designed to help inexperienced investors find their footing through education and advice. Their technology can analyze bank or credit card transaction histories, making investment suggestions based on companies and brands the customer is already familiar with. Fiserv plans on providing the features of Goldbean, alongside its existing feature set, to institutional clients looking to expand their digital or automated investment advice services.

Additionally, we look forward to seeing a Robo offering from Cetera and Wells Fargo later this year, and we are interested to see if Goldman Sachs officially confirms rumors that they are building a Robo solution. We also saw Personal Capital raise their minimum investment from $25,000 to $100,000.

It has been a busy quarter in the Robo advising world. For more regular and up to date news on the Robo industry, please follow us on social media, @theroboreport.

Performance Commentary

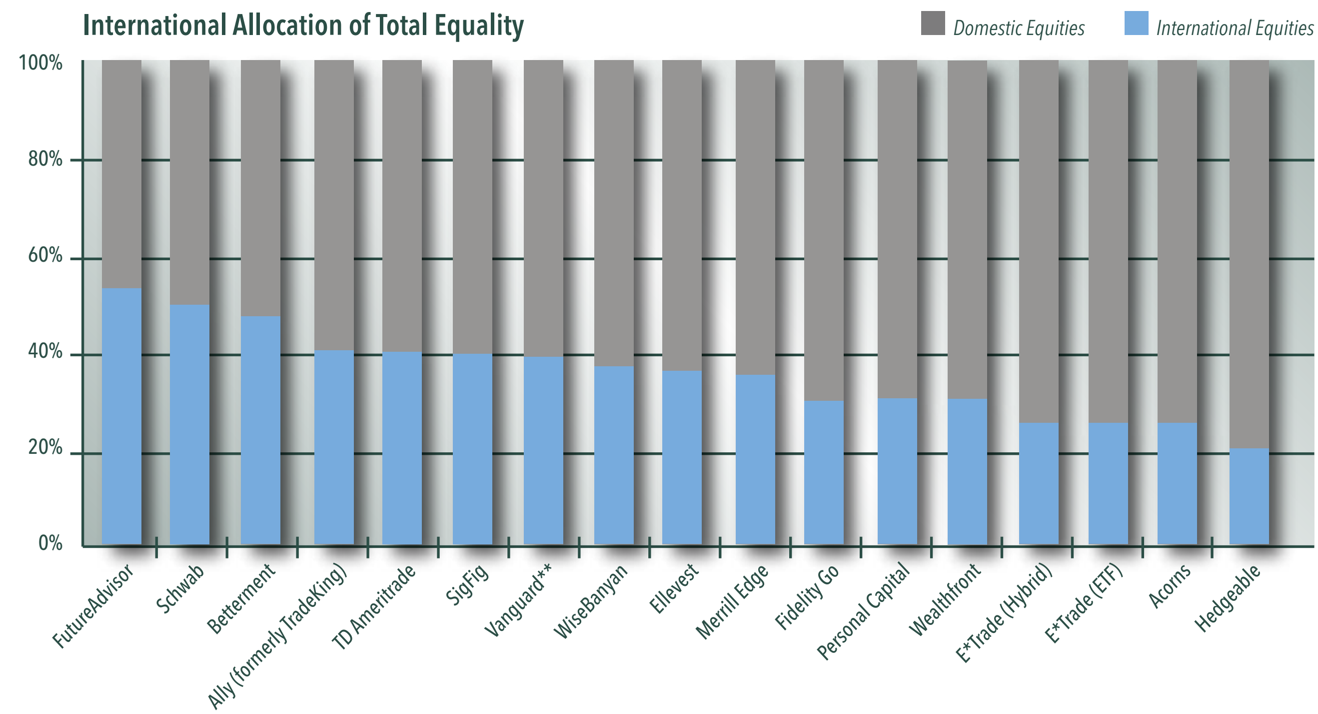


The story of the market in the 2nd quarter was an increase in both risk and growth. The global shift towards populism has proven difficult to size and price in the markets. Investors have been hesitant with their dollars as they try to evaluate impacts caused by the flood of President Trump's new policy initiatives. Political uncertainty is expected to continue until there is more visibility on issues including healthcare and tax reform.

US trade regulation, immigration policy, and European electoral risk are looming threats to the current market uptrend. Inflation, which has been at record lows so far in 2017, is another threat that is beginning to resurface amid growing wage, healthcare, and energy costs. Investors will keep a close eye on the influence of both high Chinese debt levels and monetary tightening both in the US and abroad. Despite monetary normalization efforts, 10-year US Treasury yields fell 9.3 basis points, while 2-year yields rose 12.8 basis points in response to Fed action on rates and long-term uncertainty around inflation.

Economic growth continued its 8-year expansion in the US. It is anticipated that the current administration's growth-focused fiscal policy may help extend this rally. The US-lagging economies of Europe and Japan have started to accelerate. The four major global economic indicators: manufacturing, consumer, labor, and housing have all had positive contributions to the aggregate economy, implying global GDP growth of 4.6%. Congruently, during the quarter, we observed more record highs in market indices. The S&P 500 reached its record high in mid-June, but leveled out amid underperforming consumer staples, financials, and energy sectors. The healthcare sector, which underperformed in 2016, rallied after the US Government's latest stalled effort on healthcare reform.

Market Commentary



International Over Domestic

The 2nd quarter added to 1st quarter gains in both domestic and international equity markets. That said, international equities led their domestic counterparts for the second consecutive quarter. While US markets generally posted solid positive returns, foreign holdings again led the way, with foreign small- and mid-cap stocks performing notably well.

Internationally, there was a reversal from the 1st quarter, with developed economies generally outperforming diversified emerging markets. China as a notable outlier outpacing most other nations.

Europe had a particularly strong quarter amid large capital inflows and the alleviation of a variety of political and macroeconomic worries. France eschewed the nationalist Marine Le Pen for a more free trade-favoring candidate, while political developments in Britain reassured investors that the country may take a "softer" approach to Brexit. Measures taken to avoid crises in Italian banks and Greek debt obligations were notable positives as well.

The recent run-up in US equities has become a continual tailwind for international equities more recently. As P/E ratios for American companies have approached historic highs, the valuations of foreign firms have become increasingly attractive to investors.

Although both developed and emerging markets performed well, regional turmoil held back broad-based emerging market funds. With the exception of Mexico, Latin America was one of the worst-performing regions worldwide, which is being driven by chaos in the Venezuelan economy, the ever-growing corruption scandal in Brazil, and the decline in oil prices. Russian markets also performed poorly due to slumping oil prices and, to a lesser extent, continued concern over sanctions. Given most of the Robos we cover follow a passive, low-cost indexing type approach, the largest driver of returns is their asset allocation strategies. Some of the largest differences in asset allocations between portfolios is how much is allocated to international markets. This makes the interaction of allocation decisions and relative performance in international markets potentially the largest factor driving returns.

So far this year, international markets as a whole have outpaced domestic markets, with the FTSE USA Index returning 9.6% YTD and the FTSE All World Ex-US returning 14.3% YTD. Our taxable Robo accounts have a wide range of international allocations, with Hedgeable at the low end with 21% of total equity in international funds, to FutureAdvisor at 54% of total equity. Within international, the split between emerging markets and developed markets also plays a role in performance. In addition to FutureAdvsior, both Schwab and Betterment stand out by allocating around half of their equity to international stocks. On the low end, Hedgeable has 21% while both E*Trade and Acorns portfolios have 26% of total equity allocated to international. The remaining Robos all fall between 30% and 41% in international funds within their equity allocation.

YTD emerging markets have outperformed markets in developed countries, but developed markets outpaced them this quarter, which has nearly caught them up for the year. Fidelity Go and Vanguard both rely on a single international Global Ex-Us Equity fund for their entire allocation, and those two funds have more than 80% in developed markets. The large weight on developed markets helped them this quarter. Betterment and Wise Banyan had similar 80/20 weightings between developed and emerging markets.

Acorns, despite having a relatively small weight to international as a whole, benefited YTD with nearly half of their international equities in emerging markets. They also benefited from increasing their international holdings this quarter by introducing a developed international equity fund. SigFig had a high allocation to international with half of that allocation in emerging markets. E*Trade and FutureAdvisor also came in on the high end for emerging market allocations.

The Robo IRAs have a more aggressive risk tolerance mandate and thus have much higher percentages of total equities. Within the equities portion of the IRA and taxable accounts there is typically a close match of the percentage allocated to international equities. There is one notable exception: Hedgeable's IRA is made up of individual stocks, while their taxable accounts are made up of low-cost ETFs. The individual stocks held in the IRA are all domestic-based companies and there are no foreign companies owned.

Large Growth Is the Winner

Looking at sector performance helps explain why larger growth stocks outperformed and smaller value stocks tended to underperform relative to total market performance. The best performing sector over the quarter was healthcare, with the S&P 500 Healthcare Index returning 7.10%. The healthcare sector's results were driven by its giant-cap growth companies, including Johnson & Johnson and United Health Group which returned 6.91% and 13.52% respectively. Information technology, another sector dominated by giant/large-growth stocks, was another top performer this quarter with the S&P 500 Information Technology Index returning 4.14%. Its major contributors this quarter were Amazon, and Alphabet/Google, which returned 9.19% and 9.54%, respectively.

The two worst performing sectors were telecommunication services and energy. The S&P 500 Telecommunication Services Index fell 7.05%, as it becomes a less attractive area for investment due to shrinking profit margins in an increasingly competitive landscape. Additionally, energy was the next worst-performing sector, with the S&P 500 Energy index falling 6.36%. The sector's main indicator, WTI crude oil prices, fell 9.01% over the quarter. As production and rig counts grow, investors are becoming increasingly skeptical of OPEC's ineffective efforts to cut back global reserves of crude oil.

Large Cap Over Small Cap

The theme in the 2nd quarter was the larger the stock, the better it performed. The Russell 1000, comprised of the largest 1000 stocks, returned 3.1% over the quarter while the Russell 2000 made up of small cap companies returned 2.5%. The S&P 500 outperformed at 3.09%. Last, the Dow Jones Industrial Average, which holds the 30 of some of the largest US companies, outperformed with a 3.95% return. These numbers indicate that giant caps performed better than large caps, which returned more than smaller cap stock indices.

Large, outperforming small- and mid-cap US equities is a trend we saw in the 1st quarter that continued through the 2nd quarter. Impact of this trend on our Robos is somewhat limited, as many of our Robos have a market or close to market weighting between their large-, mid-, and small-cap allocations. In fact, quite a few Robos rely entirely on the Vanguard Total Stock Market ETF or a similar total stock market index for their entire domestic equity exposure. These total-market ETFs commonly have around 70% to 80% of their holdings in large-cap.

WiseBanyan, Vanguard, SigFig, TD Ameritrade, and the taxable Hedgeable portfolio use a single all-market domestic equity fund. Acorns sets itself apart in the universe as more than 34% of its equity allocation is in a small-cap fund that has detracted from gains this year. Both E*Trade portfolios were held back by holding around 20% of their equity allocations in a small-cap fund. Robos that had a positive impact from the outperformance of large-cap securities include FutureAdvisor and Fidelity Go. FutureAdvisor is positioned towards large-caps, holding 3% of their equity allocation in a small-cap fund, while relying on S&P tracking ETFs for the remainder of their domestic equity allocation. Fidelity Go also has slightly underweighted small- and mid-cap funds compared to their large holding in a S&P 500 tracking ETF impacting portfolio performance for the better. The remaining Robo portfolios do not exhibit large over- or underweighting based on market capitalization.

Growth Over Value

Growth outperformed value again this quarter by about 3% on average. The Russell 1000 Growth returned 4.7% during the quarter compared to 1.3% for the Russell 1000 Value. Additionally, the S&P 500 Growth at 4.42% outperformed its value counterpart at 1.51%.

Value has historically outperformed growth and the Robo portfolio managers have taken note. None of our Robo portfolios are overweight growth equities, while many show a weighting towards value. Although value has historically outperformed over the long run, there have been cycles where growth outpaces value. So far this year, growth has been outperforming value, a trend that that has had a negative impact on performance in many of the Robo portfolios.

Both Betterment and Schwab have significant weightings towards value investing, with more than 50% of their domestic equity allocations in value-oriented funds, while FutureAdvisor has 34% of its domestic equity allocation in a value-oriented fund. Ellevest and Merrill Edge also show a weighting towards value, but to a smaller degree. It is worth mentioning that Betterment, Schwab, and FutureAdvisor have some of the smallest allocations in domestic equity due to large international holdings, making their value weightings less impactful on total performance. Personal Capital holds a series of sector-specific indices all together making up around 10% of their portfolio. Many of the sector-specific funds held are value-heavy sectors, and poor performance in these sectors help explain why value underperformed as a whole. Their holdings in an energy fund and telecom fund returned -7.88% and -3.20%, respectively, while their holdings in materials and utilities had gains but underperformed the general market. Wealthfront also holds an energy sector specific ETF at 5% of total assets that performed poorly this quarter.

Fixed Income

The Federal Reserve Bank has increasingly become a focal point for fixed income investors in recent quarters. The Fed raised interest rates for the third consecutive quarter in its June meeting and shows no signs of backing off from its plan for another increase before year end. This was one key catalyst for the move higher in the short end of the yield curve. Although the central bank has begun to deliberate more seriously on the possibility of unwinding its balance sheet, markets have yet to react significantly to this.

Flattening of the yield curve drove longer-duration fixed income to be one of the top performing segments in the 2nd quarter. Because bond yields and prices move in opposite directions, falling yields at the long end of the curve sent these securities' prices higher. Short-duration bonds, on the other hand, suffered as shorter-term yields rose. While international debt holdings again generated positive returns in the 2nd quarter, they tracked domestic fixed income much more closely than in the 1st quarter, when we saw debt from emerging markets significantly outperform domestic debt issuances.

As with other areas of fixed income, longer-term municipal securities were generally the top performers in the group. High-yield municipal offerings were among the quarter's top performers as well. In comparison to taxable corporate bonds, municipal bond returns were generally lower at the short and intermediate end of the yield curve, though the difference was small in most cases when comparing tax-equivalent yields.

TIPS underperformed other bond categories this quarter. A fall in oil and gas prices reduced inflation expectations and the rise of shorter-term interest rates combined to make the returns on TIPS disappointing.

E*Trade's Hybrid led the group in fixed income returns by employing active managers in the two municipal bond funds that make up the fixed income portion of their portfolio. This appears to be an area where eTrade Hybrid has created value by using active funds, both outperforming the E*Trade ETF strategy and the group as a whole. The average maturity of these funds were in the middle-to-long range. This strategy helped avoid losses due to short-term rate increases. E*Trade ETF was also a strong performer, with half of their bond portfolio in an investment-grade intermediate bond fund and the iShares Core U.S. Aggregate Bond ETF, capitalizing on a low allocation to short-term bonds, which suffered this quarter. Schwab fixed income also performed well this quarter partially due to an emerging market bond ETF that performed particularly well. Their other holdings in two municipal bond funds and a high-yield fund all had above-average returns.

Ally Financial had a large allocation within their fixed income sleeve to a total international bond fund and an intermediate-term mortgage-backed securities fund, both of which performed poorly. SigFig invested nearly three quarters of their bonds in a TIPS fund, which significantly impacted performance of their fixed-income strategy for the worse. This large allocation to a poorly performing fund led them to be the bottom performer in fixed income.

Alternatives and Real Estate

Many of the portfolios have real estate holdings. Domestic exposure is typically achieved through a Real Estate Income Trust (REIT), while the Vanguard Ex US Real Estate ETF is seen in many of the portfolios for international real estate exposure. Domestic REITs have shown lackluster gains this quarter and YTD have created a drag on portfolios that have significant REIT holdings. Exposure through the Vanguard international real estate fund has had the opposite effect, rewarding those that hold it with 6.14% gains this quarter, making the YTD return 14.09%. Personal Capital, Schwab, and Ellevest all owned this Vanguard fund but at less than 2% allocations. The owners of domestic REITs is a much larger group with Schwab, Betterment, SigFig, WiseBanyan, Personal Capital, Acorns, FutureAdvisor, and Ellevest all holding domestic REITs. FutureAdvisor and Acorns REIT holdings stand out as having a 7.78% allocation and 9.87% allocation of their total assets in the taxable portfolio, respectively.

Gold assets ended the quarter slightly down, following gains of 8% last quarter. Personal Capital, Schwab, and Hedgeable all have exposure to the precious metal at allocations in the taxable account of 2.28%, 4.26%, and hefty 7.76%, respectively, of total assets.

Personal Capital is the only Robo with commodity exposure, holding a commodity ETF at 1.97% of total assets. That holding is down more than 5% for the quarter, and down 8% for the year. That being said, when looking at alternative holdings, often the goal of the manager is to introduce assets with low correlations to other holdings, reducing the risk of the portfolio.

Taxable Returns

	Total			Equity			FixedIncome		
	QTD	YTD	1Year	QTD	YTD	1Year	QTD	YTD	1Year
Acorns[1]	2.32%	5.88%	7.30%	2.80%	8.16%	12.64%	1.43%	2.02%	-1.10%
Ally (formerly TradeKing)[9]	2.63%	7.15%	10.23%	3.81%	10.52%	17.24%	1.00%	2.21%	0.19%
Betterment[2]	2.99%	7.63%	11.68%	3.75%	10.24%	18.42%	1.47%	2.57%	-0.39%
Ellevest[8]	2.55%	7.00%	-	3.41%	9.73%	-	1.25%	2.85%	-
E*Trade (ETF)[3]	2.63%	6.81%	11.60%	3.23%	9.27%	19.11%	1.79%	2.90%	0.29%
E*Trade (Hybrid)[3]	3.22%	7.33%	11.92%	4.01%	9.73%	20.58%	2.11%	3.58%	-1.11%
Fidelity Go[7]	2.98%	7.35%	-	3.79%	10.29%	-	1.79%	3.09%	-
FutureAdvisor[3]	2.80%	6.70%	8.34%	4.04%	10.33%	15.58%	1.14%	1.97%	-1.09%
Hedgeable[2]	2.61%	-	-	3.13%	-	-	1.75%	-	-
Merrill Edge[7]	2.51%	-	-	3.25%	-	-	1.54%	-	-
Personal Capital[4]	2.13%	6.45%	9.90%	2.53%	7.84%	13.07%	1.06%	2.59%	1.18%
Schwab[5]	2.49%	7.12%	11.94%	3.06%	9.21%	16.81%	1.97%	4.41%	3.89%
SigFig[6]	2.34%	7.67%	11.41%	3.78%	11.33%	18.91%	0.10%	2.12%	0.34%
TD Ameritrade[7]	2.98%	7.78%	-	3.81%	10.88%	-	1.42%	2.07%	-
Vanguard[4]**	3.10%	7.86%	10.92%	3.99%	10.97%	18.79%	1.53%	2.80%	-0.58%
Wealthfront[10]	2.13%	5.66%	-	2.57%	7.69%	-	1.49%	2.62%	-
WiseBanyan[8]	2.97%	7.64%	11.40%	4.00%	10.73%	17.82%	1.16%	2.30%	0.62%

**Some accounts have not been open long enough for year-to-date or 1 year trailing returns*

IRA Returns

	Total			Equity			FixedIncome		
	QTD	YTD	1Year	QTD	YTD	1Year	QTD	YTD	1Year
Ally IRA (formerly TradeKing)[9]	3.56%	9.77%	16.58%	3.79%	10.37%	17.52%	0.92%	0.57%	0.68%
Betterment IRA[2]	3.51%	9.40%	15.96%	3.83%	10.49%	18.50%	1.41%	2.29%	0.18%
E*Trade (ETF) IRA[3]	3.32%	9.25%	-	3.38%	9.43%	-	-	-	-
E*Trade (Hybrid) IRA[3]	3.86%	9.58%	-	3.97%	9.83%	-	-	-	-
Fidelity Go IRA[7]	3.39%	9.13%	-	3.79%	10.43%	-	1.26%	2.17%	-
Hedgeable IRA[2]	2.71%	-	-	2.05%	-	-	1.68%	-	-
Personal Capital IRA[4]	2.72%	8.08%	13.61%	2.80%	8.32%	14.35%	0.81%	3.05%	0.28%
Schwab IRA[7]	2.92%	8.23%	17.10%	3.11%	8.79%	18.32%	-	-	-
SigFig IRA[6]	3.75%	11.10%	16.35%	4.03%	11.84%	17.91%	1.32%	4.82%	2.77%
TD Ameritrade IRA[7]	3.36%	9.32%	-	3.78%	10.90%	-	1.41%	2.01%	-
WiseBanyan IRA[8]	3.88%	10.46%	17.40%	4.14%	11.23%	19.03%	1.14%	2.53%	1.07%

*Some accounts have not been open long enough for YTD or YoY 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 up to $5k; 0.25% annually over $5k	No minimum	62%/ 38%/ 0%/ 0%	70%/ 30%/ 0%/ 0%	84%/ 16%	74%/ 26%	0%
Ally (formerly TradeKing)	0.30% annually	$2,500	59%/ 38%/ 2%/ 1%	59%/ 38%/ 0%/ 3%	69%/ 31%	59%/ 41%	0%
Betterment	"Digital Only": 0.25%; "Plus" (unlimited chat,1 call/year w/advisor): 0.40%; "Premium" (unlmited chat and calls w/advisor): 0.50%; stop paying any fee onmoney above $2MM	"Digital Only": No minmum; "Plus" and "Premium": $100k minimum	65%/ 35%/ 0%/ 0%	67%/ 33%/ 0%/ 0%	49%/ 51%	50%/ 50%	59%
Ellevest	0.50% annually	No minimum	62%/ 36%/ 0%/ 2%	61%/ 37%/ 0%/ 2%	71%/ 29%	63%/ 37%	84%
E*Trade (ETF)	0.30% (promo – fee waived for 2016)	$5,000	60%/ 39%/ 0%/ 1%	60%/ 38%/ 0%/ 2%	75%/ 25%	74%/ 26%	0%
E*Trade (Hybrid)	0.30% (promo – fee waived for 2016)	$5,000	60%/ 39%/ 0%/ 1%	61%/ 38%/ 0%/ 1%	75%/ 25%	74%/ 26%	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%	58%/ 41%/ 0%/ 1%	49%/ 51%	46%/ 54%	0%
Hedgeable	0.75% for first $50k decreasing in tiers to 0.30% for $1 million and above.	$1	56%/ 34%/ 8%/ 2%	57%/ 34%/ 8%/ 1%	79%/ 21%	79%/ 21%	100%
Merrill Edge	0.45% annually for the first $1 million; lower at different tiers over $1 million	$5,000	60%/ 39%/ 0%/ 1%	58%/ 38%/ 0%/ 3%	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%	69%/ 25%/ 4%/ 1%	70%/ 30%	71%/ 29%	0%
Schwab	No fee	$5,000	62%/ 23%/ 5%/ 10%	64%/ 21%/ 4%/ 11%	51%/ 49%	49%/ 51%	31%
SigFig	No fee for the first $10k; 0.25% annually over $10k	$2,000	61%/ 37%/ 0%/ 2%	61%/ 38%/ 0%/ 1%	59%/ 41%	60%/ 40%	0%
TD Ameritrade	0.30% annually	$5,000	65%/ 33%/ 0%/ 2%	68%/ 30%/ 0%/ 2%	65%/ 35%	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%	60%/ 40%/ 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%	61%/37%/0%/2%	69%/31%	70%/30%	86%
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%	92%/ 5%/ 0%/ 3%	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 minmum; "Plus" and "Premium": $100k minimum	87%/ 13%/ 0%/ 0%	87%/ 13%/ 0%/ 0%	47%/ 53%	47%/ 53%
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%	98%/ 0%/ 0%/ 2%	75%/ 25%	73%/ 27%
Fidelity Go IRA	0.35% annually	$5,000	85%/ 15%/ 0%/ 1%	85%/ 14%/ 0%/ 1%	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%	65%/ 32%/ 0%/ 3%	100%/ 0%	100%/ 0%
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%/ 3%/ 2%/ 1%	70%/ 30%	70%/ 30%
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%
WiseBanyan IRA	No fee	No minimum	92%/ 8%/ 0%/ 0%	91%/ 8%/ 0%/ 0%	60%/ 40%	60%/ 40%

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

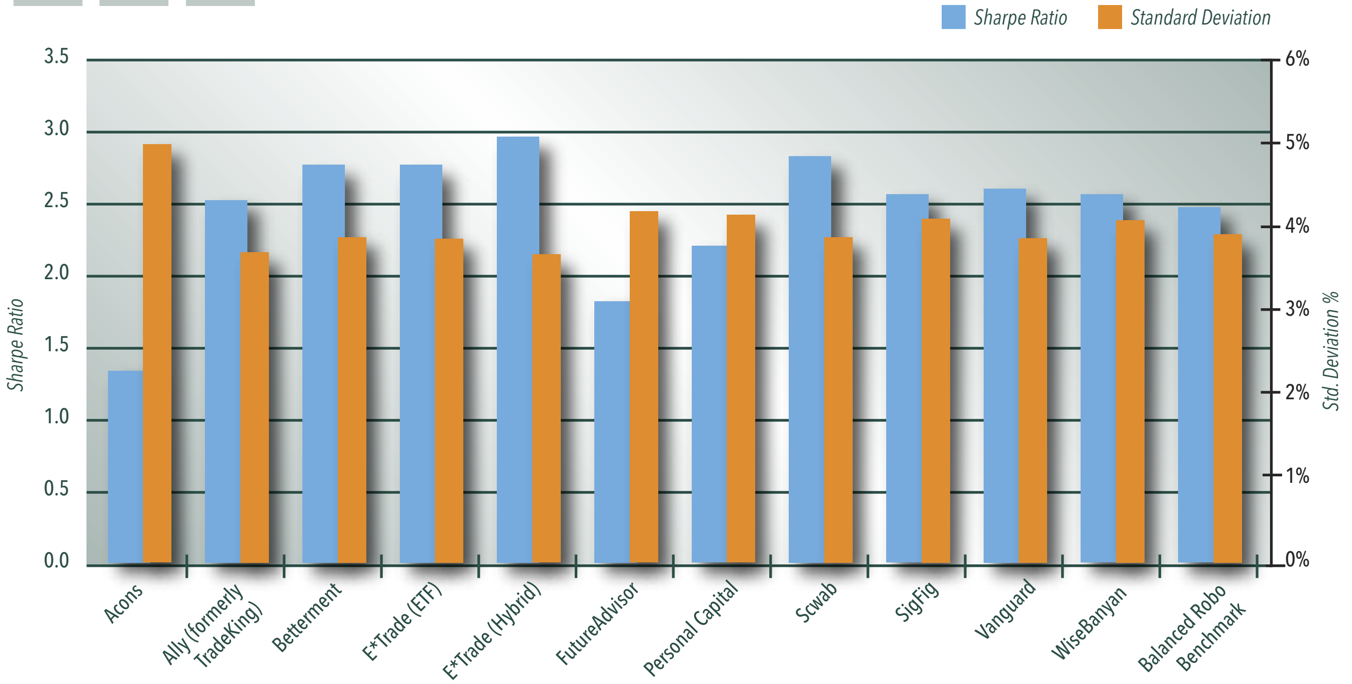
Risk Return (Sharpe Ratio and Standard Deviation)

When looking at returns only, an investor is only seeing part of the performance picture. To truly understand performance, investors must also look at the underlying risk of the portfolios. This can be measured by the standard deviation of the portfolio, which is a measurement of volatility. Also, investors commonly use the Sharpe Ratio as a metric, which is a measurement of the risk-adjusted returns. A higher Sharpe Ratio implies higher returns for each unit of risk. We performed the risk-adjusted analysis for our individual portfolios that have been open for one year or more. We are pleased to announce inclusion of both of E*Trade's ETF and Hybrid models, as well as FutureAdvisor, as they became data eligible this quarter. The analysis is based on 12 month returns ending 6-30-2017.

As we look at our collection of taxable portfolios, we see mostly what we would expect: a general correlation between performance and standard deviation (risk), meaning that as portfolios increase risk, they also increase return. However, there are a few outliers worth noting. FutureAdvisor's standard deviation was near the top of the group at 4.19%, but was the second worst performer with a return of 8.34% over the last 12 months. Acorns also bucked the trend with the highest standard deviation and the lowest return. To no surprise, those two funds had the lowest Sharpe Ratios of 1.83 and 1.34, respectively.

E*Trade Hybrid had the highest Sharpe Ratio of the group and second highest 1-year trailing return. This may be due, in part, to a couple of their actively managed funds outperforming this year, adding positive active return. Schwab was again a strong performer in risk-adjusted returns with the second highest Sharpe Ratio and highest 1-year trailing return.

Risk/Return (Sharpe Ratio and Standard Deviation)



	Acorns	Ally (formerly TradeKing)	Betterment	E*Trade (ETF)	E*Trade (Hybrid)	Future-Advisor	Personal Capital	Schwab	SigFig	Vanguard	WiseBanyan	Balanced Robo Benchmark
Standard Deviation %	5.00%	3.71%	3.87%	3.86%	3.68%	4.19%	4.15%	3.87%	4.09%	3.85%	4.08%	3.92%
Sharpe Ratio	1.34	2.53	2.77	2.75	2.97	1.83	2.20	2.83	2.56	2.60	2.57	2.48
1 Year Trailing Return	7.30%	10.23%	11.68%	11.60%	11.92%	8.34%	9.90%	11.94%	11.41%	10.92%	11.40%	10.60%

Trades

During this quarter we saw an increase in trading when compared to previous quarters. Rebalancing of portfolios accounted for much of this increase and involved only slight moves.

Certain Robos made decisions to swap out similar funds in the same category. As expected during a quarter with strong performance, there was little tax-loss harvesting. Two portfolios, Acorns and Hedgeable, made some changes in strategy that was reflected in their trading behavior.

Acorns adjusted its asset allocation this quarter, resulting in significant trading activity. The timing and movement of the trades benefited performance, but also affected the level of risk in the portfolio. Acorns reduced their REIT holdings from 15% to 10%, and reduced their total bond allocation by nearly 7%. Additionally, Acorns introduced an international developed markets fund, resulting in an increase in the diversification of their international holdings while significantly increasing their total international exposure. They also increased domestic equity allocations while slightly increasing their weighting of small-cap securities. Their move to increase international exposure with an emphasis on developed markets was timed well, as developed markets were one of the strongest performing areas over the quarter.

The most active trading Robo in our study was Hedgeable. This was especially observed in their IRA strategy, which holds mostly individual equities. Hedgeable promotes the fact that it is designed to move assets to lower risk holdings as it perceives higher risk in the markets. Since opening the account, we have primarily seen trades out of equities into fixed income holdings, thereby increasing the fixed income exposure from approximately 10% to over 30% during the quarter in the IRA. Although other assets were sold, the technology sector accounted for the majority of the trades to fund the increase in fixed income holdings. Significantly less activity was seen in the Hedgeable taxable account that is made up of low-cost ETFs.

Some portfolios swapped out one fund for another in the same category. Betterment IRA's largest trade involved the sale of Vanguard Emerging Markets Fund for JP Morgan's Emerging Markets Fund. Personal Capital's only significant trade was the sale of Vanguard's Small Cap ETF, which was replaced with the iShares Russell 2000 ETF. Both IRA and taxable portfolios of E*Trade Hybrid swapped the Harbor international fund for two other actively managed international funds, the Templeton Foreign ADV Fund and the Harding Loevner International Equities fund. Wealthfront chalked up some small tax losses by exchanging a Vanguard Energy ETF for a similar SPDR Energy fund as the US energy sector had a difficult quarter.

Ellevest changed their allocation slightly while rebalancing from equities to fixed income. Ellevest made a small increase in its international exposure in both equities and fixed income while trimming their REIT exposure. Fidelity Go, WiseBanyan, and SigFig also engaged in light rebalancing this quarter. TD Ameritrade slightly altered its international funds, swapping some of their Vanguard Total International Bond Fund for a Vaneck JP Morgan Emerging Market Bond Fund, and made a slight allocation adjustment from domestic to international funds.

Betterment

Betterment is one of the pioneers in Robo advising and continues to be one of the most successful. Betterment offers a full suite of services with an easy sign-up process and intuitive interface. Combined with low fees and no minimum balance, Betterment is a leader in the Robo advising space.

Sign up and Onboarding

Sign up and onboarding was simple and quick. One aspect noticeably lacking in the onboarding questionnaire was any questions about experience with investments and emotional attitude towards risk, which is found in most risk tolerance questionnaires. An asset allocation suggestion is only available after giving all of one's personal information and filling in the questionnaire.

Dashboard and Interface

Betterment has an easy-to-use and understandable interface. The dashboard has the ability to add outside accounts so you can see balances and information on your third-party accounts. Although you cannot see an asset allocation across all of your combined internal and external accounts, it does give asset allocations per individual external account and delivers some automated suggestions, like highlighting higher fee mutual funds. Overall, the dashboard and interface is intuitive and has features to help you see beyond your Betterment accounts.

Financial Planning

For financial planning, Betterment provides a digital tool called RetireGuide to help users visualize their retirement goal, and a Portfolio Projections tool to help users visualize and quantify their goals. On the surface, RetireGuide is simple, allowing for quick adjustments to retirement age and contribution amounts and their resulting effect on the retirement projections. Digging a little deeper, the user can change assumptions on other factors including inflation, wage growth, mortality, and taxes. We also like that the portfolio assumptions include a decreasing risk tolerance resulting in lower-return assumptions over time. Although RetireGuide falls short of being able to build a robust multi-goal financial plan, we think it is a well constructed, easy-to-understand tool to help people formulate and track their retirement goals.

The Portfolio Projections are another straight-forward and user-friendly tool that allows users to see the effects of changing portfolio risk. We like that the output shows both the projected return and a probability distribution of the returns, highlighting both an average and a poor market return number. If these tools are not satisfying or sufficient for a financial plan, Betterment recently rolled out the ability to upgrade your account to include access to live financial advisors in exchange for a higher fee. Having the option of live financial advisors in addition to their online planning tools allows Betterment to provide quality service to both clients with basic and more complex planning needs.

Advice and Education

Educational materials are readily available along the way for those who want to better understand financial markets and how Betterment comes to its conclusions. We like the transparency in the methods they use to make their projections, as well as the ability for a user with an appetite for greater understanding to learn about investing and planning.

Tax-Loss Harvesting and Other Special Features

Betterment does offer tax-loss harvesting on all accounts. Also, their Smart Transfer feature allows you to set a minimum dollar level in your bank account and Betterment will automatically transfer any amount above that level at the end of the week. We are always a fan of automatic saving, and this is a great tool that is a little more flexible than a recurring fixed dollar amount contribution.

Vanguard

Sign up and Onboarding

The initial onboarding process with Vanguard walks the user through a typical risk profile questionnaire, collecting information about age, wealth, income, and attitude towards risks. After the completion of the initial questionnaire, Vanguard requests more in depth information about goals, accounts, income, and family. We like that they not only ask multiple choice questions on risk, but also have an open-ended dialogue box for inputting any other risk concerns. Additionally, they ask about the stability of each client's income, which can be an important factor when considering emergency funds and risk tolerance. Following the completion of the online information gathering, a call is scheduled with a financial planner. Overall, Vanguard's online information gathering process is thorough. Furthermore, they require a conversation with a live financial planner, making the Vanguard onboarding experience personal and comprehensive.

Dashboard and Interface

Vanguard's interface reflects the fact that they are a traditional, large asset management company that has adapted to new technology. The main features one would expect are all present: being able to access performance charts, asset allocation pie charts, and both internal and third-party account values. The site communicates vital information about the user's account, but falls short on tools that can help users understand their portfolio and how investment decisions can impact outcomes. The site as whole is expansive, as Vanguard has many other products and features outside of their Personal Advisor Services, which, at times, can make it more difficult to navigate the site.

Financial Planning

Vanguard represents a more traditional, hands-on approach to financial planning. What Vanguard lacks in user-driven online tools and slick interfaces, it more than makes up with a hands-on approach to financial planning. Vanguard's onboarding process involves communicating with a live financial planner, the delivery of a plan, and the acknowledgment of the plan by the user. Their active approach to financial planning helps make Vanguard a compelling low-cost option for those with planning needs.

Advice and Education

Vanguard has a lot of information available on financial planning and investment topics. These resources include both articles and videos discussing a wide variety of concepts and strategies. For a knowledge-hungry investor, Vanguard has a robust library to learn from.

Tax-Loss Harvesting and Other Special Features

Vanguard does not offer automated tax loss harvesting but tax loss harvesting may be something that can be done manually through the live advisor.

Schwab

Sign up and Onboarding

Schwab has a sleek and easy sign up process consisting of a questionnaire, similar to other Robos, but with a couple of extra features that we like. As the client works through the questionnaire, they are presented with an asset allocation chart. The chart changes the suggested allocation after selecting an answer to each question, allowing the user to directly see how each choice they make affects the portfolio recommendation in real time. We liked this feature, as the user can see how different answers have different effects on their risk profile and portfolio. The final page of the questionnaire also has interactive features helping users understand how they can expect their investment to grow and how their investments can fluctuate in value.

Dashboard and Interface

Schwab's dashboard is simple and easy to navigate. Asset allocation is shown clearly,with the ability to click through to see underlying assets by category along with descriptions of each asset class. The performance page allows the user to add benchmarks for comparison, which we strongly advocate as a method to help investors understand their returns. While Schwab provides simplified views of portfolio holdings, goals, transactions, and performance they do not offer the ability for greater in-depth analysis for those seeking a deeper understanding of their portfolios. Schwab also does not offer the ability to pull in information from third-party accounts. This is a common feature in other Robos that provide their clients with the ability to see all of their finances in one place. As a whole, we like Schwab's interface for its simplicity and ease of navigation.

Financial Planning

Schwab's financial planning tool, Goal Tracker, only allows investors to formulate projections for a single financial goal. The Goal Tracker displays results from a Monte Carlo projection giving the client a projected, average, and worse-case scenario at a future date. These charts help users understand if they are on track to reach their goals. We believe showing a range of likely outcomes is a positive feature to help clients understand risk. Outside of the free Goal Tracker service, clients have the option to upgrade to Schwab's Intelligent Advisory Service. The upgrade introduces a .28% management fee, a live financial planner, and additional online planning tools.

Advice and Education

Schwab as an institution has significant resources for investors looking for research and information on investing. The research is not available directly through the portal for Intelligent Portfolios, but can be found on the main Schwab website.

Tax-Loss Harvesting and Other tools

Schwab does provide automated tax-loss harvesting on accounts of $50,000 or more.

Personal Capital

Personal Capital is a hybrid Robo, meaning it includes access to live advisors. In addition to advisors, they provide a very strong user interface. Personal Capital offers a quality product, and their online tools can assist users with the management of their outside investments and cash flows alongside their Personal Capital portfolio. Drawbacks for this quality service include their relatively high fee and account minimum.

Sign up and Onboarding

Personal Capital makes many of the features on the site available for free and keeps the initial onboarding to a minimum, allowing you quick access to their free digital tool set. After linking an outside account and giving some basic information, Personal Capital directs clients to its dashboard. A short onboarding process allows new users to quickly start using and exploring their platform.

Dashboard and Interface

Personal Capital has one of the best user interfaces available. If a client is willing to spend the necessary time linking their accounts, Personal Capital's analytical tools can give them real insights into their personal finances and investments. Their Investment Checkup and Retirement Fee Analyzer gives clients a quick synopsis of their accounts and ideas on how to improve them. Although their portfolio analysis can be insightful on how to better manage existing accounts, it invariably includes the suggestion to transfer assets to Personal Capital. There are areas on the site that can help clients understand both third party and internal account performance, asset allocation, risk/return tradeoffs and financial planning. They also have features to help users create and manage budgets. Personal Capital has an interface that can truly help clients manage their portfolios and personal finances, regardless of where their assets are held, making it a stand out among its competitors .

Financial Planning

Personal Capital has financial planning features built into the site that can help users build a financial plan without outside help. We like this financial planning tool, as it can handle multiple goals, and is easy to use, modify, and understand. Additionally, as a hybrid Robo, Personal Capital comes with access to financial advisors, giving their entire service an ability to create and follow quality financial plans.

Advice and Education

Personal Capital has many articles on many different financial planning topics. For those that want to learn, there are many articles to read on a wide variety of topics. The information could be better organized to help users looking for specific topics, but with the ability to pick up the phone and talk to a live advisor, this is less important than services without live advice.

Tax-Loss Harvesting and Other Special Features

Personal Capital does offer automated tax loss harvesting.

Hedgeable

We are excited to bring Hedgeable into our universe of Robos. Hedgeable sets itself apart by offering a diverse set of features and management techniques not seen in other offerings. The main difference in Hedgeable's offering is their approach to rebalancing. Hedgeable employs a strategy that uses computer models to shift risky assets to less risky assets, or cash, when markets fall or increase in volatility. Alternately, when markets are rising or the model predicts lower risk, cash and low-risk assets are shifted back to equities or other risky assets. This strategy is based on what is often called the constant proportion portfolio insurance strategy, as opposed to what is called a constant mix rebalancing strategy, which we believe is used in most other Robo offerings. This is one of the primary differences we see in the Hedgeable offering compared to other Robos, but Hedgeable differentiates their offering in many other ways. Their combined features feel fresh and different in a universe of very similar offerings. That said, we always encourage investors to do research and understand the investment strategy before investing money anywhere, and this is particularly important with Hedgeable, as they are employing strategies that will be less familiar to many investors.

Dashboard and Interface

Hedgeable has a strong interface with many features to help a user analyze their portfolio. As a user with some knowledge of portfolio analysis, The Robo Report™ was excited to see more statistical measurements provided for the portfolio, including alpha and upside/downside capture ratios to name a few. Additionally, Hedgeable makes a clear effort to measure their performance against a benchmark, with the ability for the user to pick different benchmarks. Although Hedgeable does offer account aggregation to see outside accounts, it does not have any personal finance features, like budget tracking or financial planning tools. Their platform focuses on portfolio analytics and has a great toolset within that focus.

Sign up and Onboarding

One of the features about the Hedgeable sign-up process that we liked is they give you a sample asset allocation and an informative graphic on the risk of the portfolio. The questionnaire had typical risk tolerance questions, including one on feelings towards risk and markets. Their questionnaire process was slightly longer than typical, but was still quick and seamless.

Financial Planning

From our experience, Hedgeable has a responsive customer support team to help with questions about investment strategy, technical problems, or other questions that may arise. Although we have not participated yet, we also think it is great that Hedgeable's CIO has weekly "office hours," where he makes himself available for questions from investors via an interactive screen share. All that said, Hedgeable does not offer financial planning or planning tools, although they did say they are working on adding a financial planning feature set in the future.

Advice and Education

Hedgeable says they strive for transparency in their accounts and strategies and it shows throughout the platform. They have ample documentation on the strategies they employ and the underpinning portfolio theory driving their platform. Outside of documentation on the strategies employed by Hedgeable, an investor looking to educate themselves on common investing strategies or financial planning may be left wanting or seeking information elsewhere.

Tax-Loss Harvesting and Other Special Features

Hedgeable offers a variety of different features to enhance their offering. In addition to their different rebalancing approach discussed above, investors with $100k or more to invest are given the option to employ a core-satellite approach, with a majority of the portfolio being made up of low-cost, broadly diversified funds, while satellite holdings seek out low-correlation assets to reduce risk with the ability to create active returns. Hedgeable also offers the introduction of alternative assets with the ability to introduce a small amount of exposure to Bitcoin, real estate, commodities, and/or a venture capital fund (venture capital exposure is for accredited investors only and has a 7-10 year lock up). Additionally, they offer the option to opt for a socially responsible investing theme, as well as an income-focused option for those who need to generate income from investments. We will also point out that our taxable, moderately aggressive portfolio is made up of low cost ETFs, while our aggressive IRA holds individual stocks making it unique amongst our Robo portfolios. Whether all of these extra features and different strategies will add to long-term performance remains to be seen, but one thing is certain: Hedgeable offers a distinctly different option in a crowded universe.

Merrill Edge Guided Investing

Sign up and Onboarding

The sign up process for Merrill Edge Guided Investing is similar to most other Robos beginning with a risk tolerance questionnaire. The questionnaire has an emphasis on the client's comfort and emotions towards investing. They also provide information in dropdowns to help the client understand why they are asking a question and what affect the answers have on the client's risk profile. We like that Merrill asks about the client's vulnerability to unexpected expenses and wants to know the strength of the client's financial situation. Knowing a client's financial ability to weather market downturns or unexpected life events is an important component of risk tolerance. At the end of the questionnaire Merrill provides a page where the client can see how their investments are expected to grow. They provide average, better, and worse projections along with their respective probabilities. The client can change expected contribution amounts as well as retake the questionnaire if they would like to see how different assumptions affect their return projections. Overall the onboarding process is simple and quick while giving the client the opportunity to see how their account should behave before signing up.

Dashboard and Interface

Merrill Edge has all of the information that can be found on most client portals including asset allocation, transactions, and performance. The performance page has the ability to add benchmark data to compare performance, which we advocate. Clients can also utilize a tool to evaluate their progress towards stated goals. This tool does not have the ability to model one time or regular contributions without linking outside accounts.

If the client navigates out of the Merrill Edge Guided Investing area to the primary Merrill Edge website there are a number of useful tools available to them. These include asset allocation analysis, college and retirement planning among other subjects. The one feature that the Guided Investing site might add is the ability to pull in transactions and balances from third party accounts.

Financial Planning

Within the Merrill Edge Guided Investing area of the site client's needs are reduced to a relatively simple goal projection. Investors can access general investment advice by calling in to Merrill Edge but cannot receive advice that is specific to their accounts. Clients that desire individual planning services would have to consider another more traditional advisor relationship with Merrill Lynch. Clients are given access to a wide array of quality planning tools through the primary Merrill Edge website.

Advice and Education

On the primary Merrill Edge website there is a robust library of research and educational tools including both written and video content. Those looking to keep up to date on markets or expand their knowledge of investment planning have the ability to increase their knowledge through these resources.

Tax-Loss Harvesting and Other tools

Merrill Edge does not offer automated tax loss harvesting.

Portfolio Notes

Ally Financial (formerly TradeKing Core)

- **Portfolio Notes –** The Core portfolio by TradeKing contains large-, mid-, and small cap ETFs. Internationally they split the allocation between a developed markets and emerging markets fund with emphasis on the developed markets fund. In fixed income they diversify their holdings with a mortgage backed securities fund, and international bond fund, a longterm treasuries fund and an intermediate term corporate fund.

E*Trade (ETF)

- **Portfolio Notes –** This portfolio does not undertake any value or growth style bias, instead relying on core/blend ETFs. Furthermore, within the domestic segment, there is no dedicated mid-cap exposure. While there is no dedicated foreign stock ETF, an emerging market ETF is included in the portfolio. As for fixed income, the portfolio does not maintain dedicated exposure to high-yield or foreign bonds.

E*Trade (Hybrid)

- **Portfolio Notes –** As its name implies, the portfolio uses both mutual funds and ETFs. This portfolio does not maintain dedicated mid-cap exposure or a dedicated emerging market stock allocation. Like the E*Trade (ETF) portfolio, there is no specific allocation to high-yield or foreign bonds. Instead, municipal bonds are used for the fixed income sleeve.

FutureAdvisor

- **Portfolio Notes –** This portfolio does not carry a dedicated domestic mid-cap option, though there is a REIT ETF included. To augment the foreign developed and emerging market large-cap equity allocations, the fund invests in a dedicated international developed small-cap ETF, as well. Several fixed income ETFs round out the bond sleeve.

Fidelity Go

- **Portfolio Notes –** The Fidelity Go portfolio refrains from taking on a style bias, instead gaining domestic stock exposure through dedicated large-, mid-, and small-cap ETFs. Additionally, municipal bonds make up the fixed income sleeve, so other areas of the fixed income market are not included.

Hedgeable

- **Portfolio Notes –** The taxable Hedgeable portfolio relies on a total stock market ETF for its domestic equity exposure. Internationally it relies on a single developed markets ETF and has no dedicated emerging markets exposure. For fixed income it holds short and long term municipal bond funds. Hedgeable's only other holding is a large allocation to a gold trust ETF.

Merrill Edge Guided Investing

- **Portfolio Notes –** The Merrill portfolio is weighted towards value in large caps while also holding dedicated small cap exposure. Internationally they have both dedicated developed and emerging markets funds. On the fixed income side Merrill has a diversity of funds including international, corporate, treasuries, and muni funds. They also hold a mortgage backed securities fund which is not found in many other Robo portfolios.

Personal Capital

- **Portfolio Notes –** Personal Capital's portfolio, which consists of nearly 25 holdings, is one of the most diversified in our analysis. Its largest position by a good amount is in the Vanguard Total Stock Market ETF, a fund that in and of itself is diversified across the domestic equity market. One unique aspect of this company's investment strategy is its allocations to multiple sector ETFs, particularly in higher yielding and defensive sectors such as utilities and consumer staples.

Schwab

- **Portfolio Notes –** This portfolio by Schwab contains no dedicated mid-cap exposure, instead relying on small-cap and large-cap investments for its domestic allocation. The portfolio does carry dedicated exposure to REITs as well as small-cap international stocks. The portfolio also maintains exposure to commodities via the iShares Gold Trust ETF. Finally, its fixed income holdings include high-yield corporate, municipal, and international bond funds.

SigFig

- **Portfolio Notes –** This portfolio by SigFig contains no dedicated mid- or small-cap exposure, relying on one total stock market ETF for the full domestic allocation. The portfolio carries dedicated exposure to international developed and international emerging markets ETFs. On the fixed income side, the portfolio owns a TIPS ETF and an ETF that allocates to emerging market sovereign debt.

TD Ameritrade

- **Portfolio Notes –** The account holds several highly diversified ETFs to gain stock and bond exposure across the globe. Specifically, there is one ETF for each of the following categories: domestic stocks, international developed stocks, emerging market stocks, domestic bonds, and foreign bonds.

Vanguard

- **Portfolio Notes –** Vanguard's Robo portfolio only contains five holdings, all of which are mutual funds. Its largest allocation is in a total stock market option, and it has no dedicated or ancillary exposure to US equities otherwise. Additionally, the portfolio contains exposure to international developed markets as its second-largest allocation, though it does not maintain dedicated exposure to emerging market securities. The portfolio's fixed income exposure comes exclusively through three tax-exempt bond mutual funds, specifically limited-, intermediate-, and long-term funds.

Wealthfront

- **Portfolio Notes –** Wealthfront relies on a broad US market index for a large portion of their equity exposure. The remainder of domestic equity exposure comes from a dividend focused US equity fund and a holding in a US energy sector fund. The portfolio holds dedicated developed and emerging market funds for the international allocation. In fixed income Wealthfront relies on two municipal bond funds augmented by a US TIPS fund.

WiseBanyan

- **Portfolio Notes –** This portfolio by WiseBanyan gains the vast majority of its equity exposure through the Vanguard Total Stock Market ETF, thereby avoiding making significant bets. The portfolio also carries dedicated exposure to a variety of bond sectors. Unlike several portfolios in this report, there is no dedicated commodity exposure for investors here.

Ally Financial (Formerly TradeKing Core) IRA

- **Portfolio Notes –** Our IRA by Ally transitioned their account from TradeKing at the end of last quarter and changed many of the funds and asset allocation. Ally contains large-, mid-, and small-cap allocations within the domestic equity realm, staying neutral between value and growth. The international allocation is weighted towards developed markets but does contain an emerging markets fund as well. In the IRA we see around 5% allocated to fixed income split between a mortgage backed securities fund, a broad based international bond fund intermediate corporates and a long term treasury fund.

Betterment IRA

- **Portfolio Notes –** The Betterment IRA noticeably avoids growth-specific ETFs, while using value-based investments to augment a domestic total stock ETF. Of note are a fairly large international developed equity position and a fixed income portfolio that contains domestic taxable and international bonds.

E*Trade (ETF) IRA

- **Portfolio Notes –** This portfolio does not undertake any value- or growth-style bias, instead relying on core/blend ETFs. While there is no dedicated foreign stock ETF, an emerging market ETF is included in the portfolio. As for fixed income, the portfolio does not maintain dedicated exposure to bonds.

E*Trade (Hybrid) IRA

- **Portfolio Notes –** As its name implies, the portfolio uses both mutual funds and ETFs. An actively managed mutual fund is used for domestic large-cap exposure, as well as for the international stock allocation.

Fidelity Go IRA

- **Portfolio Notes –** Five securities provide for exposure to the main areas of the global capital markets. Specifically, dedicated options are in place for the large-, mid-, and small-cap positions, while there is one for foreign stocks and another for the broader US bond market.

Hedgeable IRA

- **Portfolio Notes –** Hedgeables IRA stands out as holding all individual securities for their equity position. Currently consumer discretionary and technology sectors are the vast majority of the equity holdings. There is no international exposure. For fixed income Hedgeable uses a broad based US bond ETF.

Personal Capital IRA

- **Portfolio Notes –** The Personal Capital IRA, which consists of almost twenty holdings, is one of the more diversified in our analysis. Its largest position by a good amount is in the Vanguard Total Stock Market ETF, a fund that in and of itself is diversified across the domestic equity market. One unique aspect of this company's investment strategy is its allocations to multiple sector ETFs, particularly in higher-yielding and defensive sectors, such as utilities and consumer staples.

Schwab IRA

- **Portfolio Notes –** This IRA by Schwab contains no dedicated mid-cap exposure, instead relying on small- and large-cap investments for its domestic allocation. With that said, the portfolio does carry dedicated exposure to REITs, as well as small-cap international stocks.

SigFig IRA

- **Portfolio Notes –** This IRA by SigFig contains no dedicated mid- or small-cap exposure, relying on one total stock market ETF for the full domestic allocation. With that said, the portfolio carries dedicated exposure to international developed and international emerging markets ETFs, as well as domestic REITs. On the fixed income side, there is not a core bond position; instead, the portfolio owns a TIPS ETF and an ETF that allocates to emerging market sovereign debt.

TD Ameritrade IRA

- **Portfolio Notes –** Five securities provide for exposure to the main areas of the global capital markets. A total domestic stock market ETF, alongside dedicated developed market and emerging market ETFs, combine for the overall equity exposure. Meanwhile, for the fixed income portion, the portfolio carries a broad domestic bond ETF and an international bond ETF.

WiseBanyan IRA

- **Portfolio Notes –** This IRA by WiseBanyan gains the vast majority of its equity exposure through the Vanguard Total Stock Market ETF, thereby avoiding making significant bets via style or market cap. Along with a dedicated REIT position, the portfolio holds dedicated foreign developed and emerging market stock positions. The portfolio also carries dedicated exposure to a variety of bond sectors.

Addendum – Previous Periods Performance

Taxable Account Portfolio	2016 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%
Betterment[2]	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%
Personal Capital[4]	2.53%	3.90%	2.85%	3.34%	2.36%	3.04%	3.57%	1.30%	2.95%
Schwab[5]	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]	-	-	-	-	-	-	-	-	-
Ally (formally TradeKing)[9]	0.86%	2.93%	1.61%	2.29%	2.75%	2.43%	4.54%	0.83%	3.07%
Vanguard[4]**	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%

Taxable Account Portfolio *(continued)*	2016 Q4 Equities Return	Q4 Fixed Income Return	Q4Portfolio Return	Equities Return	Fixed Income Return	Portfolio Return	2017 Q1 Equities Return	Q1 Fixed Income Return	Q1Portfoliot Return
Acorns[1]	0.37%	-3.49%	-1.12%	11.51%	1.88%	7.72%	5.21%	0.59%	3.48%
Betterment[2]	1.99%	-3.18%	0.20%	9.74%	2.24%	7.14%	6.25%	1.09%	4.50%
Ellevest[8]	-	-	-	-	-	-	6.11%	1.58%	4.35%
E*Trade (ETF)[3]	3.25%	-3.19%	0.82%	-	-	-	5.85%	1.09%	4.07%
E*Trade (Hybrid)[3]	3.49%	-4.16%	0.64%	-	-	-	5.49%	1.44%	3.98%
Fidelity Go[7]	2.98%	-3.81%	0.31%	-	-	-	6.27%	1.29%	4.24%
FutureAdvisor[3]	-0.28%	-3.42%	-1.57%	-	-	-	6.05%	0.82%	3.79%
Personal Capital[4]	1.24%	-2.64%	0.29%	11.10%	4.90%	9.41%	5.18%	1.51%	4.23%
Schwab[5]	1.46%	-2.10%	0.50%	14.19%	7.06%	10.75%	5.97%	2.39%	4.52%
SigFig[6]	1.16%	-3.69%	-0.63%	10.60%	5.76%	8.62%	7.27%	2.02%	5.21%
TD Ameritrade[7]	-	-	-	-	-	-	6.81%	0.64%	4.66%
Ally (formally TradeKing)[9]	1.47%	-2.77%	-0.19%	9.45%	3.67%	7.07%	6.47%	1.19%	4.41%
Vanguard[4]**	1.70%	-3.04%	-0.17%	9.29%	0.04%	5.55%	6.71%	1.25%	4.62%
Wealthfront[10]	2.49%	-3.26%	0.26%	-	-	-	5.00%	1.11%	3.46%
WiseBanyan[8]	1.45%	-2.57%	0.02%	9.51%	4.78%	7.98%	6.48%	1.12%	4.53%

Addendum – IRA Previous Periods Performance

Portfolio	Q2 2016 Equities Return	Q2 2016 Fixed Income Return	Q2 2016 Portfolio Return	Q3 2016 Equities Return	Q3 2016 Fixed Income Return	Q3 2016 Portfolio Return
Betterment IRA[2]	-	-	-	5.43%	0.98%	4.84%
E*Trade (ETF) IRA[3]	-	-	-	-	-	-
E*Trade (Hybrid) IRA[3]	-	-	-	-	-	-
Fidelity Go IRA[7]	-	-	-	-	-	-
Personal Capital IRA[4]	-	-	-	3.99%	0.58%	3.71%
Schwab IRA[7]	2.01%	-	1.89%	5.71%	-	5.36%
SigFig IRA[6]	2.09%	4.84%	2.33%	5.58%	3.87%	5.41%
TD Ameritrade IRA[7]	-	-	-	-	-	-
Ally (formally TradeKing) IRA[9]	-	-	-	4.82%	1.29%	4.67%
WiseBanyan IRA[8]	1.82%	3.12%	1.94%	5.26%	1.22%	4.91%

Portfolio *(continued)*	Q4 2016 Equities Return	Q4 2016 Fixed Income Return	Q4 2016 Portfolio Return	Q1 2017 Equities Return	Q1 2017 Fixed Income Return	Q1 2017 Portfolio Return
Betterment IRA[2]	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%
Personal Capital IRA[4]	1.52%	-3.25%	1.36%	5.37%	2.22%	5.22%
Schwab IRA[7]	2.88%	-	2.69%	5.51%	-	5.17%
SigFig IRA[6]	-0.14%	-5.61%	-0.64%	7.51%	3.46%	7.08%
TD Ameritrade IRA[7]	-	-	-	6.86%	0.60%	5.77%
Ally (formally TradeKing) IRA[9]	1.58%	-1.16%	1.46%	6.34%	-0.35%	6.00%
WiseBanyan IRA[8]	1.67%	-2.61%	1.31%	6.80%	1.37%	6.33%

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. The fee on our account was grandfathered in and remains at 0.25%. The higher advisory fee would have the result of decreasing reflected performance.

[10] These accounts were funded with more than the minimum amount required to establish an account. The 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.

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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. The returns for the secondary account have been linked to the original primary account. Asset type and allocation between the two accounts at the time of the switch were very close but not identical.*

*** *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 6/30/2017 the total size of the position is 17,804 shares of Schwab common stock and 16,949 shares of TD Ameritrade common stock.*

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

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