Callan

March 31, 2019

Pennsylvania SERS 457(b)

Investment Measurement Service
Quarterly Review

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U.S. EQUITY

Equity markets dramatically snapped back in the first quarter, driven by the Fed's unexpected dovish comments in January, solid corporate fundamentals, and low unemployment.

Large Cap U.S. Equity (S&P 500: +13.6%; Russell 1000: +14.0%)

- All sectors delivered double-digit gains with the exception of Financials (+8.6%) and Health Care (+6.6%).
- Consumers remain in good shape, with household debt service as a percentage of disposable income at the lowest level in decades.
- The risk-on market was highlighted by low quality (S&P ratings B or lower) outperforming high quality (B+ or higher) by 440 basis points.
- Surprisingly, Utilities and REITs produced double-digit returns; investors sought yield in the face of a flattening yield curve and the end to rate hikes in the first quarter.

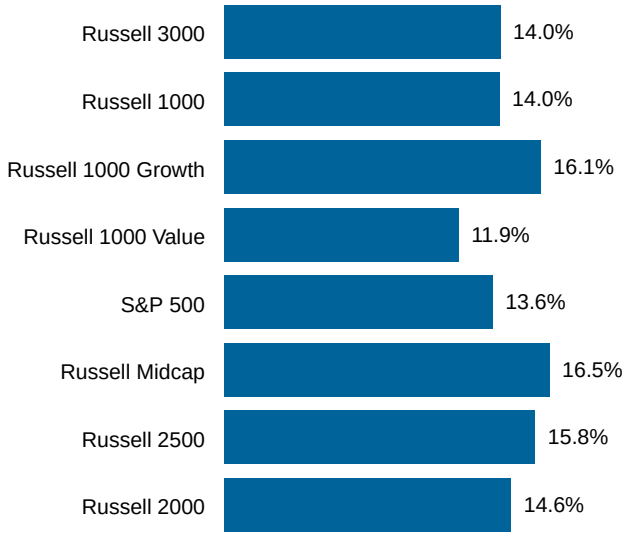
Growth vs. Value (Russell 1000 Growth: +16.1%; Russell 1000 Value: +11.9%)

- The sharp change in Fed rhetoric influenced the stronger performance of growth stocks over value stocks during the quarter. Investors favored companies with stronger earnings prospects to counter a softer economic environment.
- Technology produced strong results, while the outlook for Financials weakened as the yield curve flattened.

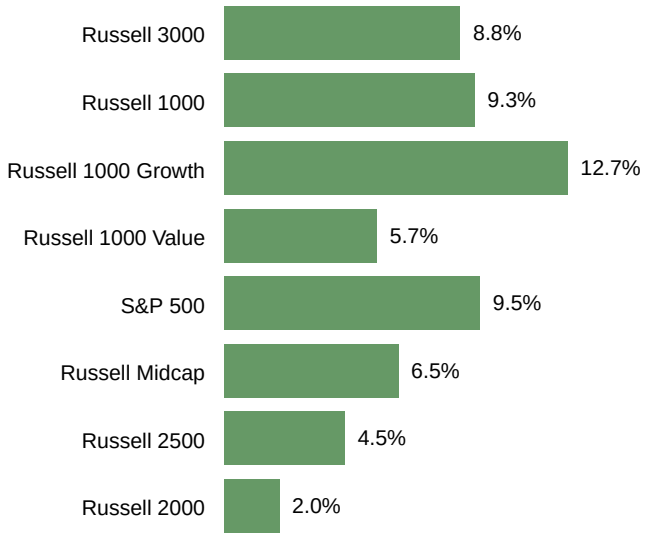
Small Cap (Russell 2000: +14.6%; Russell 2000 Growth: +17.1%; Russell 2000 Value: +11.9%)

- Within the Russell 2000 Growth Index, the three largest sectors (Health Care, Consumer Discretionary, and Technology) surged 19%, 17%, and 23%, respectively. Software and biotechnology both posted 25% gains in the quarter; combined they are more than 23% of the benchmark weight.
- Influenced by excessive fourth quarter tax-loss selling, the market experienced a strong "January effect"—where last year's losers became January 2019's winners.

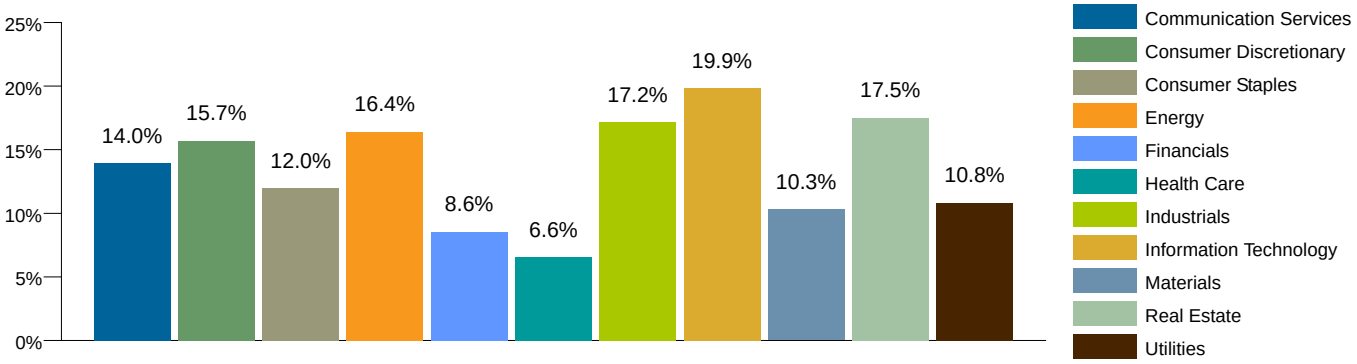
U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns



S&P Sector Returns, Quarter Ended March 31, 2019



Source: Standard & Poor's

NON-U.S./GLOBAL EQUITY

Global equity markets were positive in the first quarter following a sharp sell-off to end 2018. Investors resumed a risk-on outlook as central banks telegraphed more accommodative positioning. Delayed outcomes regarding U.S./China trade talks and Brexit negotiations allowed markets to stabilize, although uncertain outcomes remain a future risk.

Global/Non-U.S. Developed (MSCI EAFE: +10.0%; MSCI World ex USA: +10.4%; MSCI ACWI ex USA: +10.3%; MSCI Europe: +10.8%; MSCI Japan: +6.7%)

- Developed markets rallied as central banks around the world expressed more accommodative paths with interest rates and quantitative easing.
- Brexit negotiations continue and a "no-deal" Brexit remains a possibility, but with an extended deadline. The potential for investment paralysis drags on.
- European PMI continued to deteriorate, falling to 47.7 in March from 49.4.
- The currency effect was mixed as the U.S. dollar rose against the euro and yen, by 1.8% and 0.9%, but fell against the British pound by 2.3% as a delay in Brexit allowed for a temporary bounce.
- EAFE sector performance was mixed. Information Technology (+15.3%) and Materials (+13.2%) led economically sensitive sectors; Consumer Staples (+12.4%) led defensive sectors. Interest rate-sensitive Financials (+6.9%) and Utilities (+9.0%) trailed the broad index.
- Factor performance favored growth (historical and projected) while value factors were generally negative.

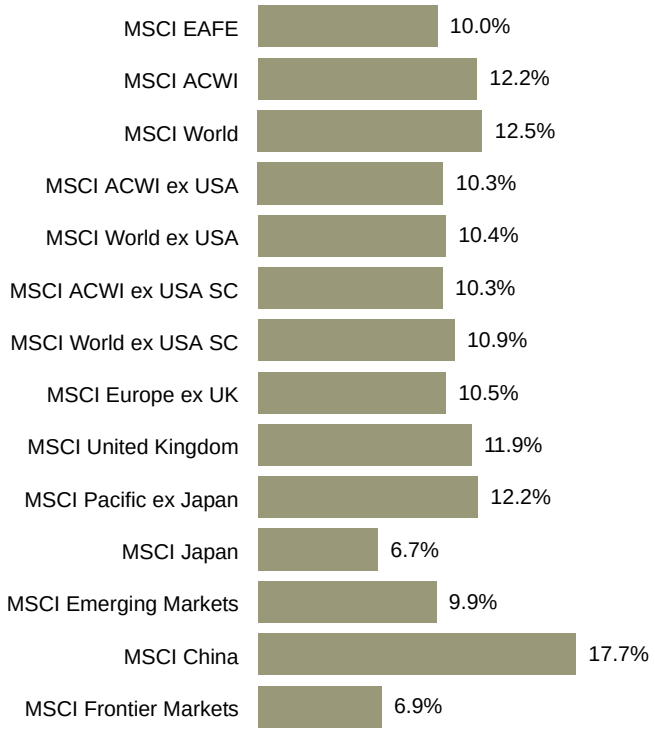
Emerging Markets (MSCI Emerging Markets Index: +9.9%)

- In a big reversal from the fourth quarter, China led emerging markets with MSCI China gaining 17.7% and MSCI China A up 30.9%.
- Trade talks continue but positive indications for a deal buoyed markets; uncertainty on the outcome remains.
- Asian Information Technology rebounded nicely with Chinese IT (+27.6%) leading the sector. An improving outlook on Chinese consumption positively influenced EM Consumer Discretionary (+20.8%), which was the top-performing sector.
- Growth led value with MSCI EM Growth gaining 12.0% and EM Value up 7.8%.

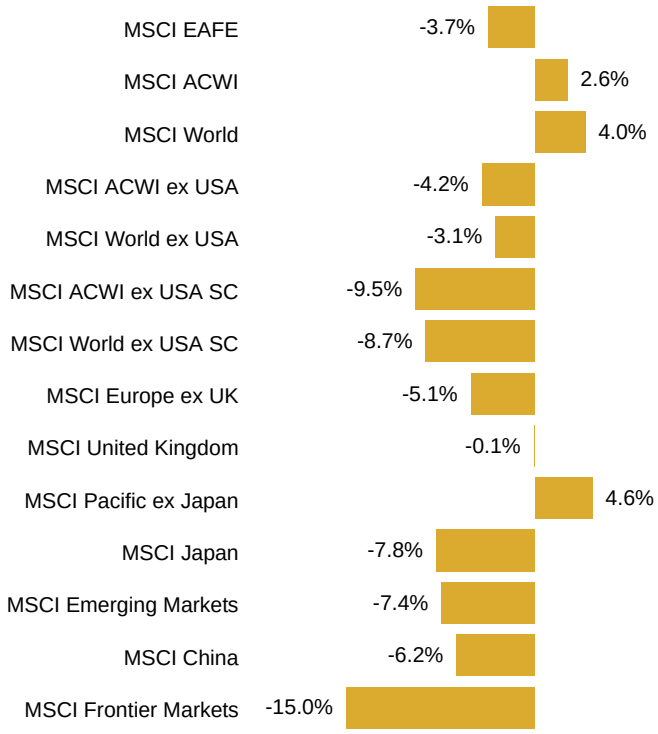
Non-U.S. Small Cap (MSCI World ex USA Small Cap: +10.9%; MSCI EM Small Cap: +7.8%; MSCI ACWI ex USA Small Cap: +10.3%)

- Within developed markets, small cap performed in line with large cap.
- EM Small Cap trailed EM as MSCI China Small Cap has less exposure to IT, which led the risk-on rally.

Global Equity: Quarterly Returns



Global Equity: One-Year Returns



Source: MSCI

U.S. FIXED INCOME

Risk markets sharply reversed from the fourth quarter sell-off supported by the Fed's unexpected dovish comments, relatively solid U.S. economic growth data, and tempered concern over a slowing China. This quarter's strong results recaptured most of the loss experienced in the prior quarter.

U.S. Fixed Income (Bloomberg Barclays US Aggregate: +2.9%)

- U.S. Treasuries rose 2.1% as the yield curve shifted lower across maturities as growth and inflation expectations declined.
- The shape of the yield curve did not materially change during the quarter. The yield differential between the 10-year and 2-year key rates remained positive and traded around a range of +12 to +20 bps. However, the front-end of the curve inverted, with the 5-year offering less yield than the 2-year.
- TIPS outperformed nominal Treasuries as the Fed's balanced stance and unexpected wage pressures stoked higher inflation expectation.

Investment-Grade Corporates (Bloomberg Barclays Corporate: +5.1%)

- Credit spreads rallied on the back of a softer Fed stance, positive economic news, and better than expected corporate earnings.
- Net new corporate issuance during the first quarter of $117 billion was roughly on par with a year ago.
- Surprisingly, Aaa-rated corporates (+5.0%) outperformed Aa- (+3.7%) and single A-rated issuers (+4.7%). BBB-rated issuers were the best performers (+5.7%).

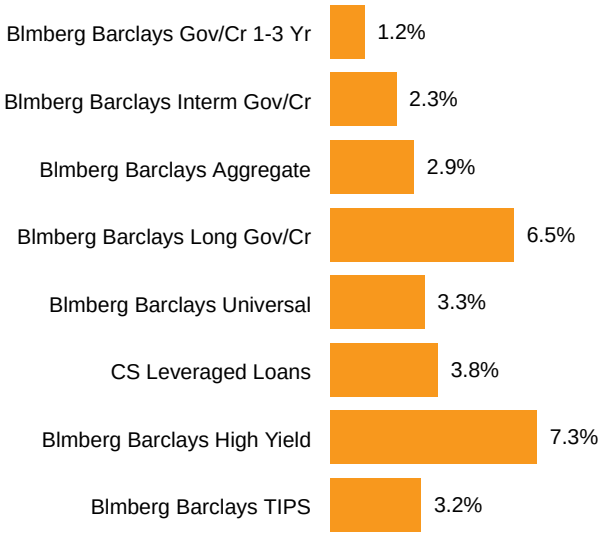
High Yield (Bloomberg Barclays Corporate High Yield: +7.3%)

- Given the risk-on environment, below-investment grade issuers were the best performers, aided by strong asset inflows.
- Ba/B sectors (+7.2%) marginally outpaced CCC by 6 bps; this was an unusual occurrence given that the dispersion between high-quality and low-quality is typically wide during these periods of absolute returns.

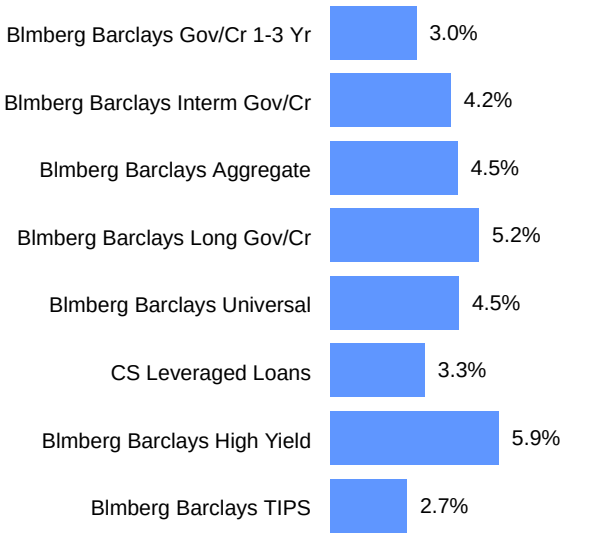
Leveraged Loans (Credit Suisse Leveraged Loans Index: +3.8%)

- Leveraged loans participated in the rally but lagged both longer duration investment grade and high yield corporates. The sector was negatively impacted by the Fed's pause, retail outflows, and a slow-developing CLO pipeline.
- Bank loans have less sensitivity to interest rates but may have a similar spread duration profile to that of their high yield bond counterparts.

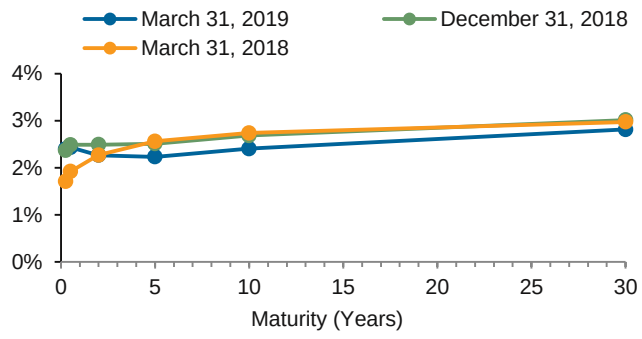
U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: One-Year Returns



U.S. Treasury Yield Curves



Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

NON-U.S. FIXED INCOME

Global Fixed Income (Bloomberg Barclays Global Aggregate (unhedged): +2.2%)

– Developed market sovereign bonds rallied in tandem with Treasuries. The U.S. dollar appreciated modestly versus the euro and yen, but lost ground versus the British pound and Canadian dollar.

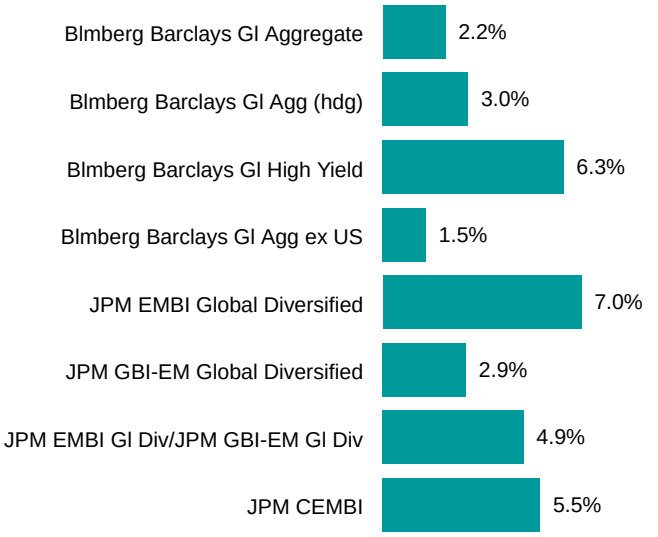
U.S. dollar-denominated emerging market debt (JPM EMBI Global Diversified: +7.0%), **Local currency-denominated EMD** (JPM GBI-EM Global Diversified: +2.9%)

– Country returns within the EMBI Global Diversified Index were all positive for the quarter.

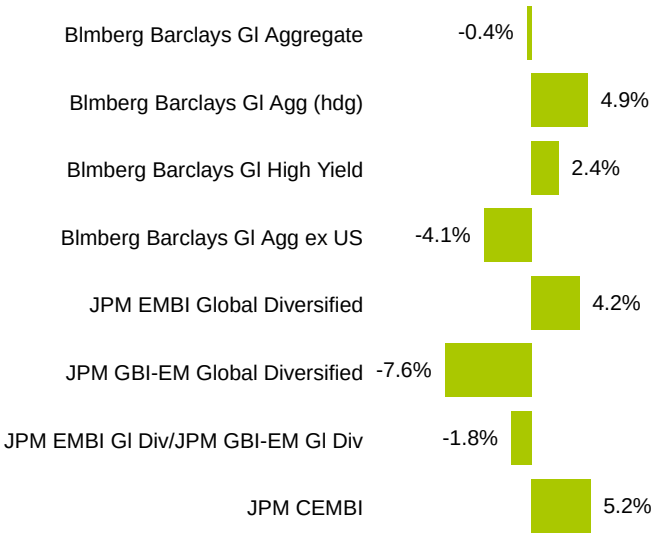
– Turkey (-10.2%) and Argentina (-10.5%) were notable underperformers in the local currency index.

– Positive net inflows into the EM universe continued through quarter-end.

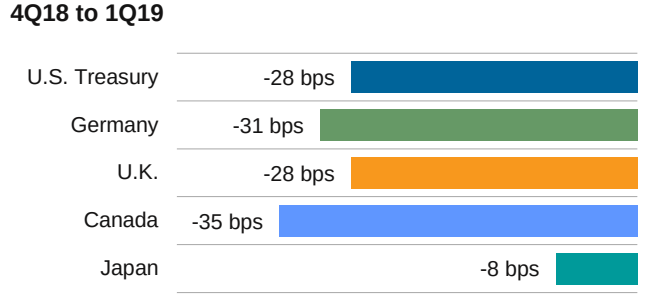
Global Fixed Income: Quarterly Returns



Global Fixed Income: One-Year Returns



Change in 10-Year Global Government Bond Yields



Sources: Bloomberg, Bloomberg Barclays, JP Morgan

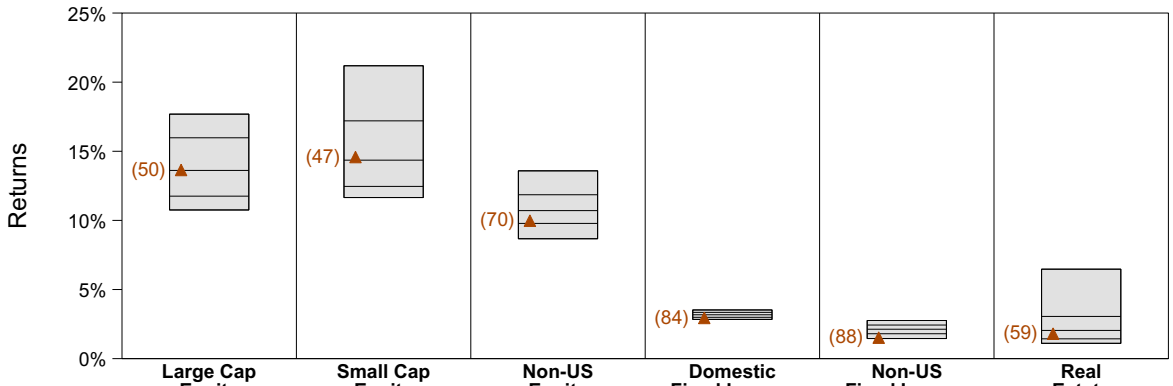
Active Management
Overview

Market Overview
Active Management vs Index Returns

Market Overview

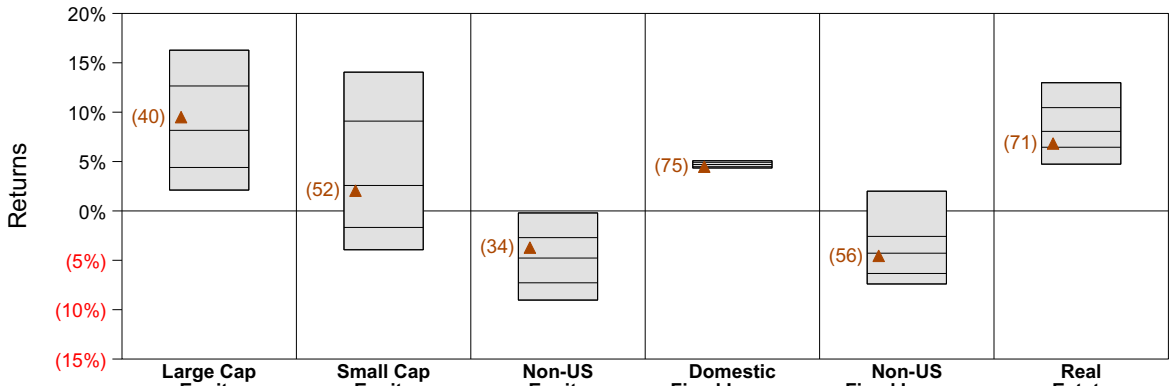
The charts below illustrate the range of returns across managers in Callan's Separate Account database over the most recent one quarter and one year time periods. The database is broken down by asset class to illustrate the difference in returns across those asset classes. An appropriate index is also shown for each asset class for comparison purposes. As an example, the first bar in the upper chart illustrates the range of returns for domestic equity managers over the last quarter. The triangle represents the S&P 500 return. The number next to the triangle represents the ranking of the S&P 500 in the Large Cap Equity manager database.

Range of Separate Account Manager Returns by Asset Class
One Quarter Ended March 31, 2019



	Large Cap Equity vs S&P 500	Small Cap Equity vs Russell 2000	Non-US Equity vs MSCI EAFE	Domestic Fixed Income vs Blmbg Aggr Bd	Non-US Fixed Income vs Citi Non-US Govt	Real Estate vs NCREIF Index
10th Percentile	17.69	21.19	13.59	3.52	2.76	6.47
25th Percentile	15.98	17.20	11.86	3.35	2.43	3.05
Median	13.61	14.36	10.71	3.17	2.13	2.04
75th Percentile	11.75	12.46	9.78	2.99	1.80	1.43
90th Percentile	10.75	11.65	8.67	2.84	1.45	1.11
Index ▲	13.65	14.58	9.98	2.94	1.52	1.80

Range of Separate Account Manager Returns by Asset Class
One Year Ended March 31, 2019



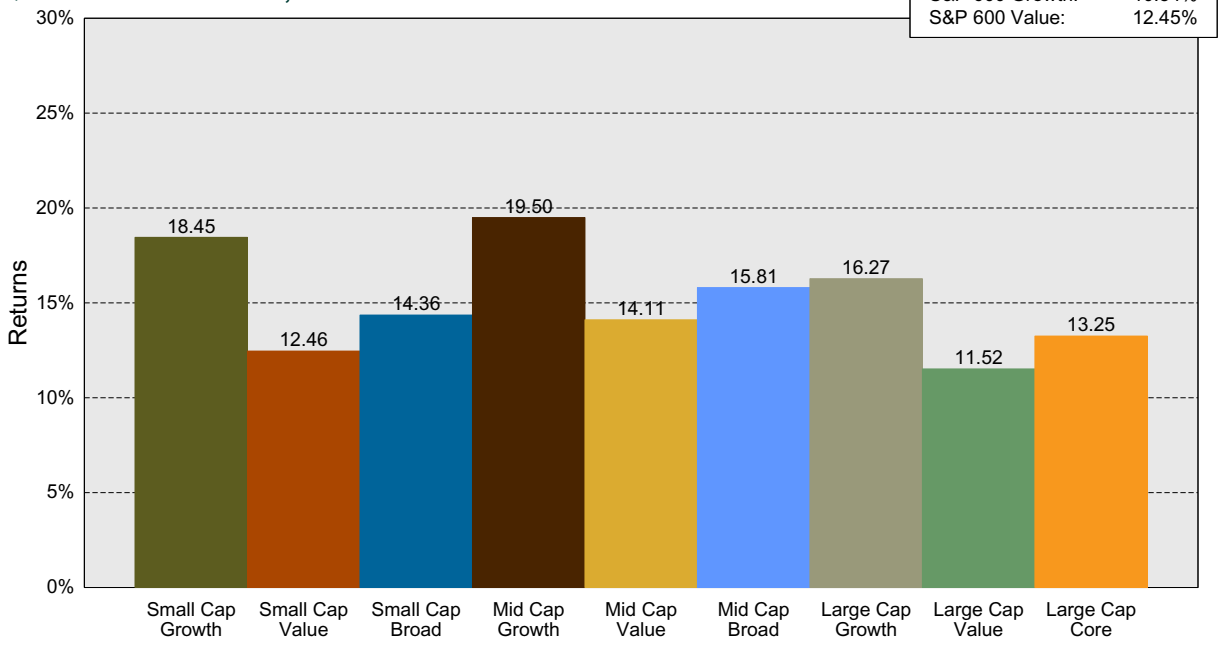
	Large Cap Equity vs S&P 500	Small Cap Equity vs Russell 2000	Non-US Equity vs MSCI EAFE	Domestic Fixed Income vs Blmbg Aggr Bd	Non-US Fixed Income vs Citi Non-US Govt	Real Estate vs NCREIF Index
10th Percentile	16.28	14.05	(0.20)	5.08	2.00	12.98
25th Percentile	12.66	9.09	(2.70)	4.92	(2.58)	10.46
Median	8.16	2.58	(4.77)	4.70	(4.28)	8.05
75th Percentile	4.40	(1.67)	(7.28)	4.48	(6.33)	6.45
90th Percentile	2.11	(3.93)	(9.03)	4.35	(7.40)	4.74
Index ▲	9.50	2.05	(3.71)	4.48	(4.55)	6.83

Domestic Equity
Active Management Overview

U.S. equity markets had no problem erasing the pain of the fourth quarter as the S&P 500 rose 13.7% with double-digit gains across cap and style spectrums. On a relative basis, Growth outperformed Value (R1000 Growth: +16.1% vs. R1000 Value: +11.9%), Small Cap outperformed Large Cap (R2000: +14.6% vs. R1000: +14.0%), and virtually all sectors delivered double-digit results with the exceptions being Financials (+8.6%) and Health Care (+6.6%). Volatility returned to more normalized levels, with just a few trading days seeing market movement of more than 2% in either direction (versus nearly 20% in the fourth quarter.)

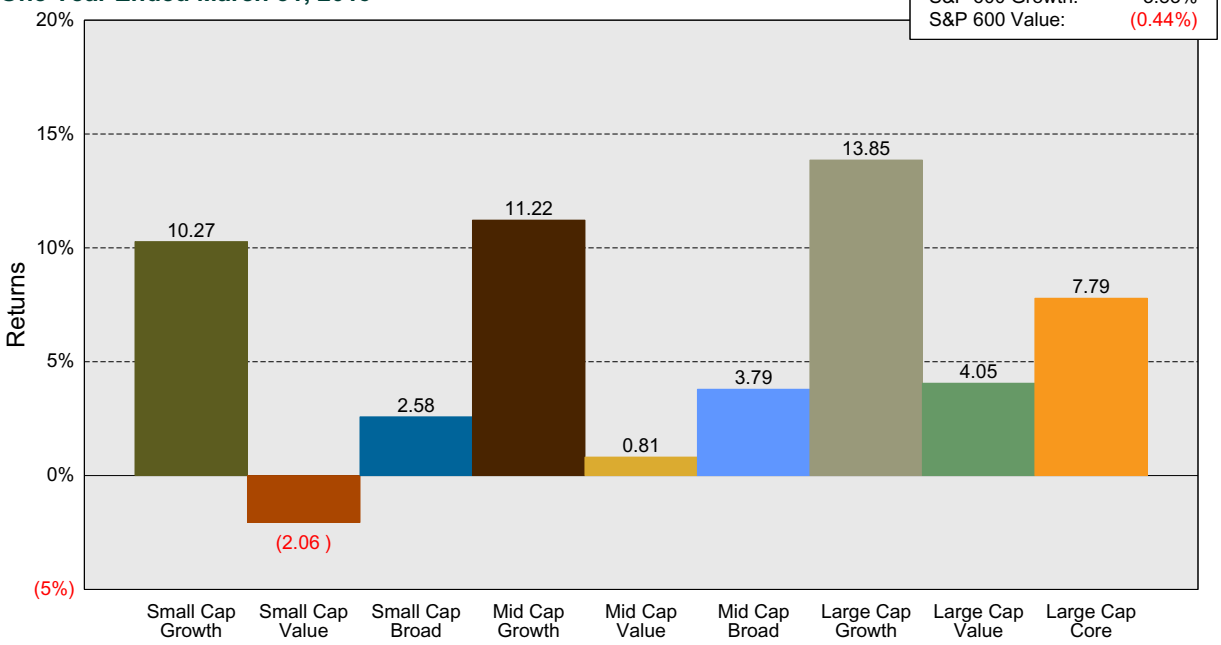
Separate Account Style Group Median Returns for Quarter Ended March 31, 2019

S&P 500:	13.65%
S&P 500 Growth:	14.95%
S&P 500 Value:	12.19%
S&P Mid Cap:	14.49%
S&P 600:	11.61%
S&P 600 Growth:	10.84%
S&P 600 Value:	12.45%



Separate Account Style Group Median Returns for One Year Ended March 31, 2019

S&P 500:	9.50%
S&P 500 Growth:	12.77%
S&P 500 Value:	5.93%
S&P Mid Cap:	2.59%
S&P 600:	1.57%
S&P 600 Growth:	3.83%
S&P 600 Value:	(0.44%)

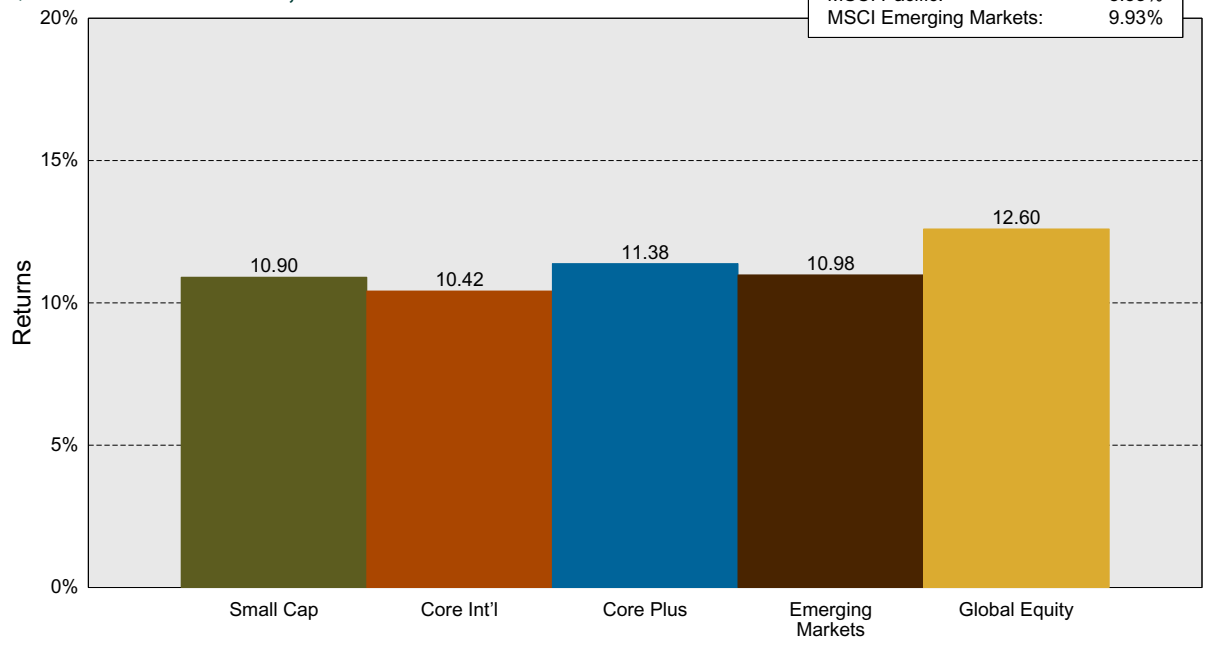


International Equity
Active Management Overview

Non-U.S. developed (MSCI EAFE: 10.0%) and emerging market equities (MSCI Emg Mkts: +9.9%) also rebounded strongly in the first quarter, but trailed their U.S. counterparts (and failed to make up for the pain felt in the fourth quarter). The U.K. (+11.9%), Canada (+15.4%), and Italy (+14.6%) were among the standout performers, while Japan (+6.7%) was a laggard but positive nonetheless. Similarly, emerging market performance was robust across the board with all the BRIC countries up strongly: China (+17.7%), India (+7.2%), Russia (+12.2%), and Brazil (+8.1%). Turkey's GDP dropped 3% y-o-y in the fourth quarter amid economic and political woes and was the worst-performing country (-3.2%).

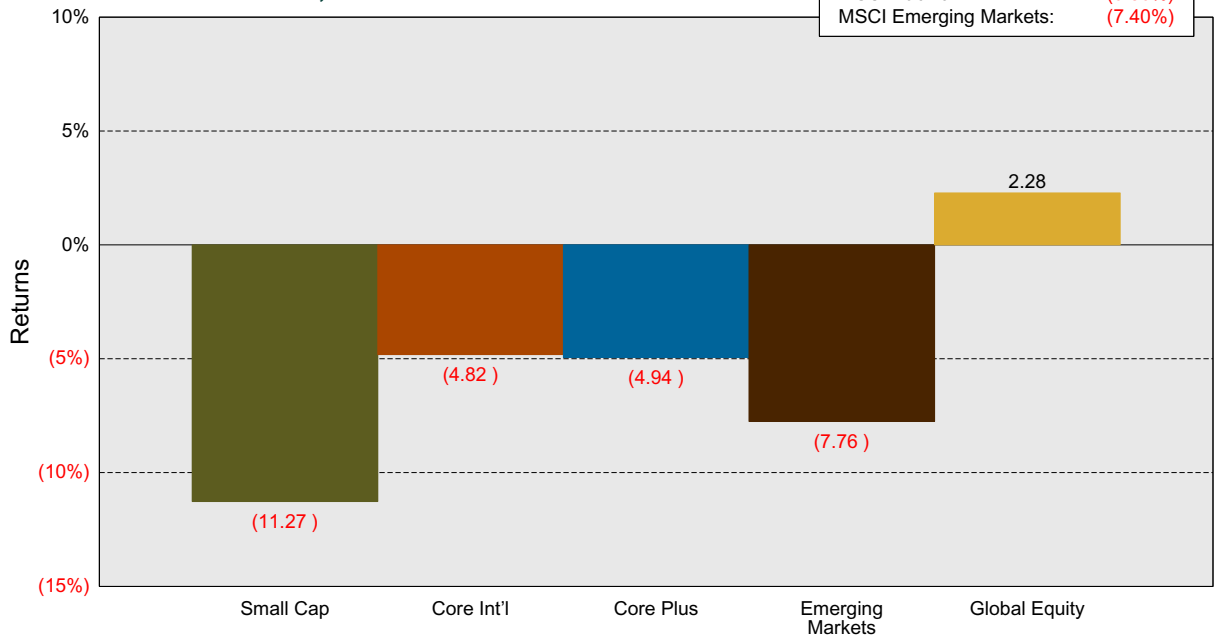
Separate Account Style Group Median Returns for Quarter Ended March 31, 2019

MSCI AC World Index	12.33%
MSCI ACW ex US Free:	10.31%
MSCI EAFE:	9.98%
MSCI Europe:	10.84%
MSCI Pacific:	8.53%
MSCI Emerging Markets:	9.93%



Separate Account Style Group Median Returns for One Year Ended March 31, 2019

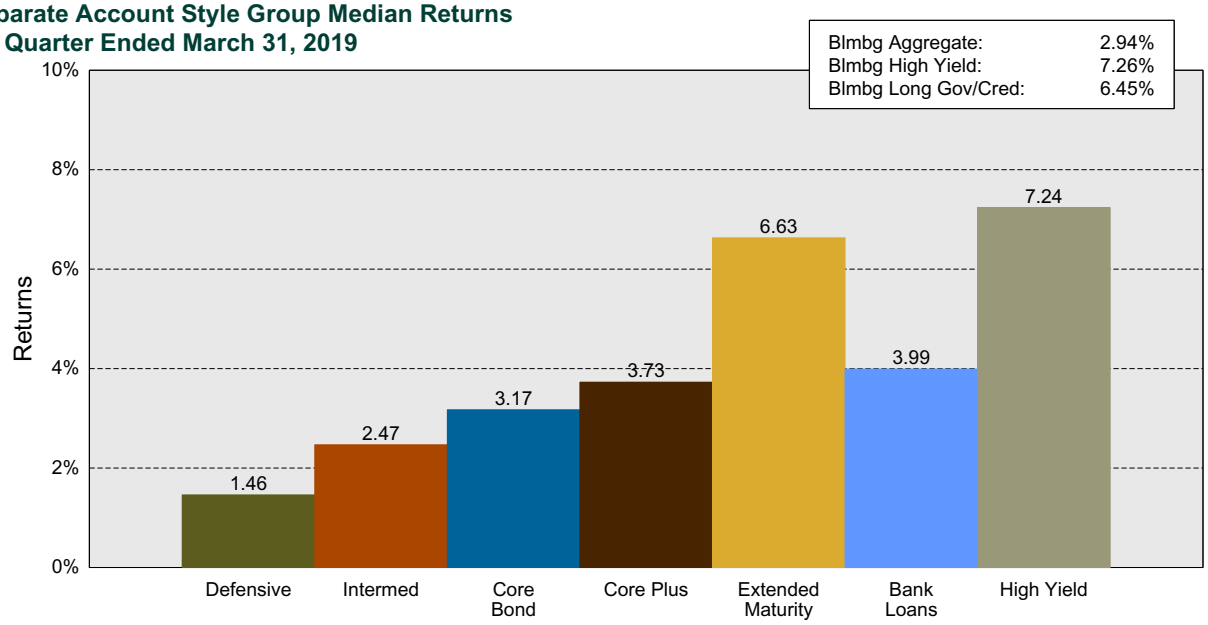
MSCI AC World Index	3.17%
MSCI ACW ex US Free:	(4.21%)
MSCI EAFE:	(3.71%)
MSCI Europe:	(3.72%)
MSCI Pacific:	(3.86%)
MSCI Emerging Markets:	(7.40%)



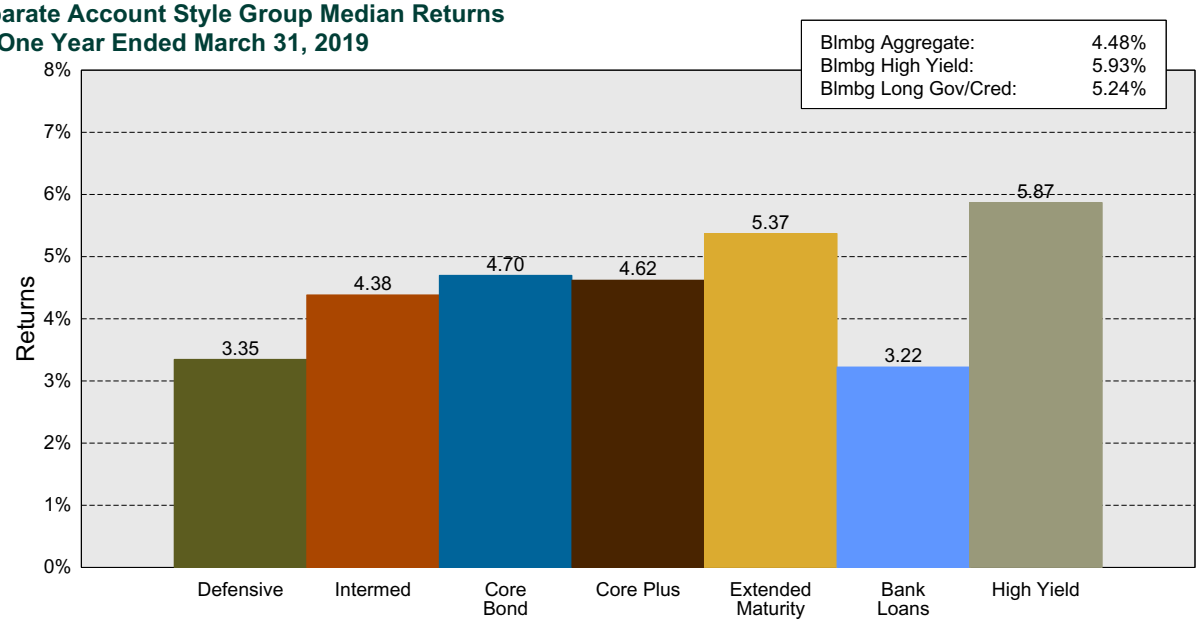
Domestic Fixed Income
Active Management Overview

In the U.S., the Bloomberg Barclays US Aggregate Bond Index rose 2.9% for the quarter, with investment grade corporates (Bloomberg Barclays Corporate: +5.1%) up the most. Yields fell sharply in March as the market digested unexpectedly dovish comments from the Fed. The 10-year U.S. Treasury returned 2.8% and its yield closed the quarter at 2.41%, down nearly 30 bps from year-end and significantly from the multi-year high of 3.24% hit in early November. Portions of the yield curve inverted, but the widely watched spread between the 2- and 10-year Treasury note remained positive at 14 bps. The high yield corporate bond market (Bloomberg Barclays High Yield: +7.3%) soared and the sector's yield-to-worst ended the quarter at 6.4% after surging to nearly 8% in the fourth quarter. Similarly, leveraged loans were up 4.0% after falling 3.5% (S&P LSTA) in the fourth quarter. While the fundamental picture for corporations remains intact, these returns were driven primarily by a strong technical tailwind on the back of a very weak December. Municipal bonds (Bloomberg Barclays Municipal Bond: +2.9%) outperformed U.S. Treasuries and were also helped by a favorable supply/demand backdrop. Municipal mutual funds absorbed roughly $24 billion in inflow, the best first quarter since data collection began in 1992.

Separate Account Style Group Median Returns for Quarter Ended March 31, 2019



Separate Account Style Group Median Returns for One Year Ended March 31, 2019

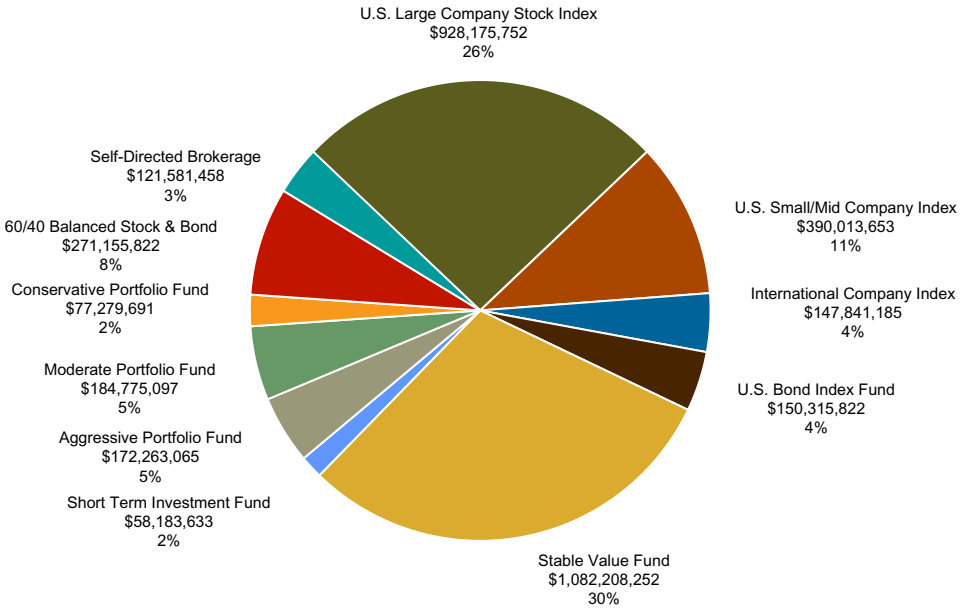


Plan Assets and
Performance

Changes in Investment Fund Balances
Period Ended March 31, 2019

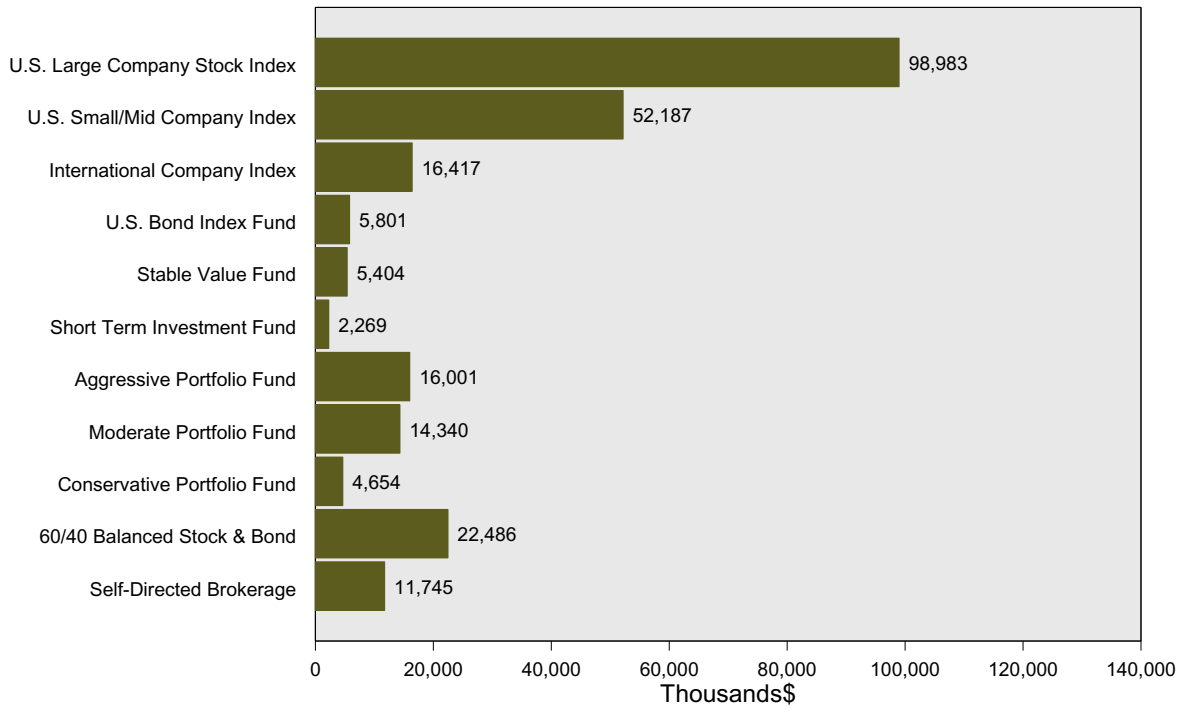
Allocation Across Investment Options

The chart below illustrates the allocation of the aggregate fund assets across the various investment options for the quarter ended March 31, 2019.



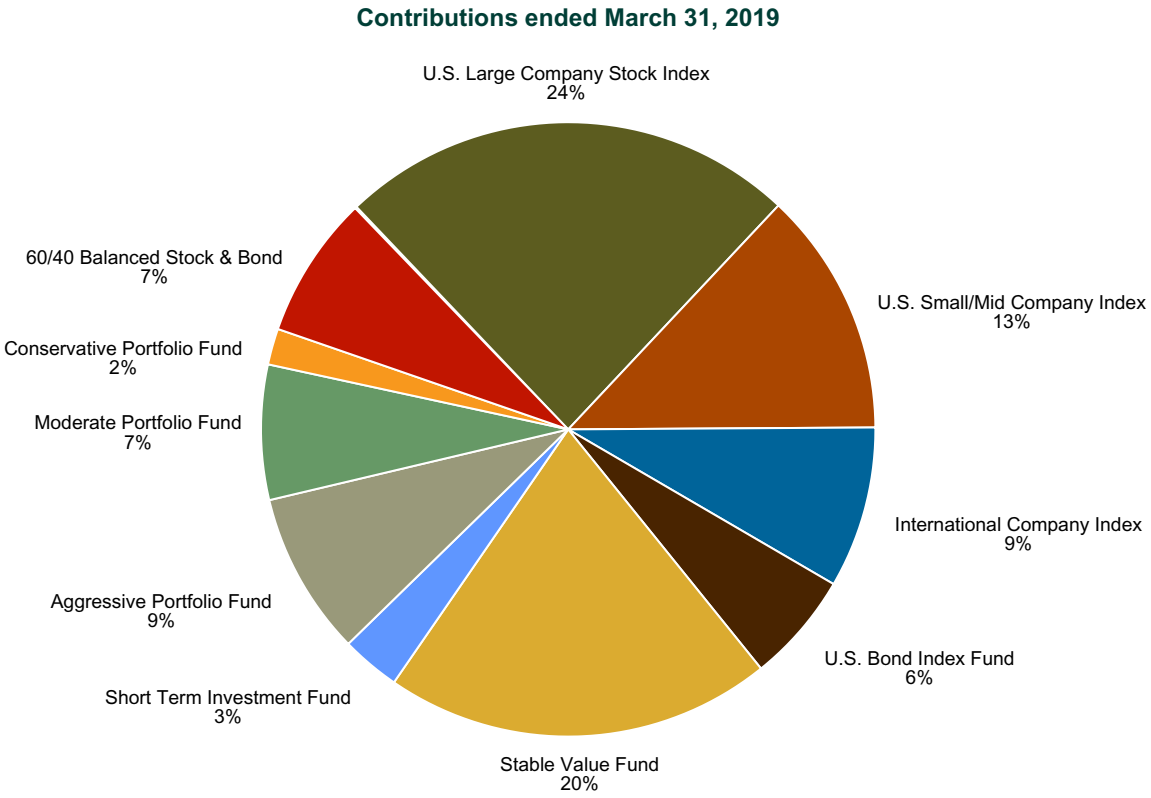
Changes in Fund Values

The chart below shows the net change in fund values across the various investment options for the quarter ended March 31, 2019. The change in value for each fund is the result of a combination of 3 factors: 1) market movements; 2) contributions or disbursements into or out of the funds by the participants (and any matching done by the company); and 3) transfers between funds by the participants.



Contributions

The chart below illustrates the contributions for the fund for the past quarter.



Investment Fund Balances

The table below compares the fund's investment fund balances as of March 31, 2019 with that of December 31, 2018. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

Asset Distribution Across Investment Funds

	March 31, 2019				December 31, 2018	
	Market Value $(000)	Weight Weight	Net New Inv. $(000)	Inv. Return $(000)	Market Value $(000)	Weight Weight
Risk-Based Funds						
60/40 Balanced Stock & Bond Fund	271,156	7.57%	(607)	23,093	248,670	7.46%
Conservative Portfolio Fund	77,280	2.16%	615	4,039	72,626	2.18%
Moderate Portfolio Fund	184,775	5.16%	(1,056)	15,396	170,435	5.11%
Aggressive Portfolio Fund	172,263	4.81%	(1,299)	17,301	156,262	4.69%
Domestic Equity						
U.S. Large Company Stock Index	928,176	25.90%	(13,601)	112,584	829,193	24.87%
U.S. Small/Mid Company Stock Index	390,014	10.88%	(1,938)	54,125	337,827	10.13%
International Equity						
International Company Stock Fund	147,841	4.13%	2,878	13,539	131,424	3.94%
Domestic Fixed Income						
Short Term Investment Fund	58,184	1.62%	1,953	316	55,914	1.68%
Stable Value Fund	1,082,208	30.20%	(512)	5,915	1,076,804	32.30%
U.S. Bond Index Fund	150,316	4.19%	1,649	4,152	144,515	4.34%
Self-Directed Brokerage Account	121,581	3.39%	(974)	12,718	109,837	3.29%
Total Fund	**$3,583,793**	**100.0%**	**$(12,891)**	**$263,179**	**$3,333,506**	**100.0%**

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended March 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended March 31, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Net Performance					
Risk-Based Funds					
60/40 Balanced Stock & Bond Fund	9.37%	8.09%	9.03%	7.76%	8.75%
60% S&P 500/ 40% Aggregate Bond	9.37%	8.01%	9.01%	7.75%	8.77%
Callan Dom Balanced MFs	9.24%	5.02%	8.30%	6.32%	8.12%
Conservative Portfolio Fund	5.54%	4.75%	4.99%	4.14%	4.68%
Conservative Portfolio Custom Index(3)	5.51%	4.65%	4.90%	4.07%	4.64%
Callan MA Tgt All Cons MF	5.90%	3.24%	5.04%	3.59%	4.75%
Moderate Portfolio Fund	9.09%	5.68%	8.19%	6.30%	7.65%
Moderate Portfolio Custom Index(2)	9.03%	5.57%	8.08%	6.22%	7.61%
Callan MA Tgt All Mod MF	8.36%	3.55%	7.17%	4.83%	6.41%
Aggressive Portfolio Fund	11.14%	5.71%	10.17%	7.40%	9.33%
Aggressive Portfolio Custom Index(1)	11.05%	5.59%	10.03%	7.29%	9.25%
Callan MA Tgt All AgGr MF	12.31%	2.25%	10.08%	6.35%	8.77%
Domestic Equity					
U.S. Large Company Stock Idx Fund	13.66%	9.51%	13.53%	10.92%	12.86%
S&P 500 Index	13.65%	9.50%	13.51%	10.91%	12.85%
Callan Lg Cap Broad MF	13.74%	8.42%	13.22%	9.88%	12.11%
U.S. Small/Mid Company Stock Idx Fun	16.04%	5.05%	13.34%	7.90%	11.53%
Dow Jones US Completion	15.99%	4.76%	13.12%	7.71%	11.33%
Callan SMID Broad MFs	16.11%	3.22%	11.59%	7.09%	10.90%
International Equity					
International Company Stock Fund	10.33%	(3.57%)	7.76%	2.66%	5.93%
MSCI EAFE	9.98%	(3.71%)	7.27%	2.33%	5.63%
Callan Intl Eq Dev Mkt MF	10.78%	(5.91%)	7.28%	2.26%	5.38%
Domestic Fixed Income					
Short Term Investment Fund	0.61%	2.31%	1.42%	0.93%	0.72%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Cash Database	0.79%	2.49%	1.54%	1.08%	1.00%
Stable Value Fund	0.61%	2.62%	2.37%	2.45%	2.60%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Stable Value	0.62%	2.36%	2.07%	1.91%	1.93%
U.S. Bond Index Fund	2.94%	4.49%	2.02%	2.73%	2.46%
Blmbg Aggregate	2.94%	4.48%	2.03%	2.74%	2.48%
Callan Core Bond MFs	3.23%	4.38%	2.33%	2.69%	2.61%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index
(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index
(3) Consists of: 50% Bloomberg Agg., 20% 3 Month T-Bill, 17% S&P 500, 8% MSCI EAFE, and 5% Dow Jones U.S. Mkt Completion

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	12/2018-3/2019	2018	2017	2016	2015
Net Performance					
Risk-Based Funds					
60/40 Balanced Stock & Bond Fund	9.37%	(2.19%)	14.25%	8.16%	1.20%
60% S&P 500/ 40% Aggregate Bond	9.37%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	9.24%	(4.56%)	14.32%	7.30%	(0.54%)
Conservative Portfolio Fund	5.54%	(1.58%)	8.37%	4.35%	0.48%
Conservative Portfolio Custom Index(3)	5.51%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	5.90%	(3.34%)	8.82%	5.48%	(1.12%)
Moderate Portfolio Fund	9.09%	(4.07%)	14.46%	7.00%	0.55%
Moderate Portfolio Custom Index(2)	9.03%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	8.36%	(5.06%)	13.20%	6.59%	(1.38%)
Aggressive Portfolio Fund	11.14%	(5.66%)	18.29%	8.49%	0.45%
Aggressive Portfolio Custom Index(1)	11.05%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	12.31%	(8.91%)	20.65%	7.67%	(1.42%)
Domestic Equity					
U.S. Large Company Stock Idx Fund	13.66%	(4.38%)	21.84%	11.98%	1.39%
S&P 500 Index	13.65%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	13.74%	(4.54%)	23.56%	8.43%	1.50%
U.S. Small/Mid Company Stock Idx Fun	16.04%	(9.34%)	18.19%	16.05%	(3.32%)
Dow Jones US Completion	15.99%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	16.11%	(8.69%)	17.14%	13.80%	(2.80%)
International Equity					
International Company Stock Fund	10.33%	(13.39%)	25.53%	1.71%	(0.43%)
MSCI EAFE	9.98%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	10.78%	(15.06%)	26.64%	0.39%	(0.73%)
Domestic Fixed Income					
Short Term Investment Fund	0.61%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	0.60%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database	0.79%	2.00%	1.19%	0.95%	0.40%
Stable Value Fund	0.61%	2.61%	2.16%	2.31%	2.51%
3-month Treasury Bill	0.60%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	0.62%	2.21%	1.97%	1.89%	1.77%
U.S. Bond Index Fund	2.94%	0.01%	3.54%	2.62%	0.53%
Blmbg Aggregate	2.94%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	3.23%	(0.35%)	3.71%	3.03%	0.10%

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(3) Consists of: 50% Bloomberg Agg., 20% 3 Month T-Bill, 17% S&P 500, 8% MSCI EAFE, and 5% Dow Jones U.S. Mkt Completion

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended March 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended March 31, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Risk-Based Funds					
60/40 Balanced Stock & Bond Fund	9.37%	8.10%	9.04%	7.78%	8.76%
60% S&P 500/ 40% Aggregate Bond	9.37%	8.01%	9.01%	7.75%	8.77%
Callan Dom Balanced MFs	9.24%	5.02%	8.30%	6.32%	8.12%
Conservative Portfolio Fund	5.55%	4.77%	5.00%	4.16%	4.69%
Conservative Portfolio Custom Index(3)	5.51%	4.65%	4.90%	4.07%	4.64%
Callan MA Tgt All Cons MF	5.90%	3.24%	5.04%	3.59%	4.75%
Moderate Portfolio Fund	9.09%	5.69%	8.21%	6.32%	7.67%
Moderate Portfolio Custom Index(2)	9.03%	5.57%	8.08%	6.22%	7.61%
Callan MA Tgt All Mod MF	8.36%	3.55%	7.17%	4.83%	6.41%
Aggressive Portfolio Fund	11.14%	5.72%	10.19%	7.41%	9.35%
Aggressive Portfolio Custom Index(1)	11.05%	5.59%	10.03%	7.29%	9.25%
Callan MA Tgt All AgGr MF	12.31%	2.25%	10.08%	6.35%	8.77%
Domestic Equity					
U.S. Large Company Stock Idx Fund	13.65%	9.52%	13.53%	10.93%	12.87%
S&P 500 Index	13.65%	9.50%	13.51%	10.91%	12.85%
Callan Lg Cap Broad MF	13.74%	8.42%	13.22%	9.88%	12.11%
U.S. Small/Mid Company Stock Idx Fund	16.04%	5.06%	13.36%	7.92%	11.55%
Dow Jones US Completion	15.99%	4.76%	13.12%	7.71%	11.33%
Callan SMID Broad MFs	16.11%	3.22%	11.59%	7.09%	10.90%
International Equity					
International Company Stock Idx Fund	10.33%	(3.55%)	7.78%	2.68%	5.95%
MSCI EAFE	9.98%	(3.71%)	7.27%	2.33%	5.63%
Callan Intl Eq Dev Mkt MF	10.78%	(5.91%)	7.28%	2.26%	5.38%
Domestic Fixed Income					
Short Term Investment Fund	0.61%	2.31%	1.42%	0.93%	0.72%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Cash Database	0.79%	2.49%	1.54%	1.08%	1.00%
Stable Value Fund	0.69%	2.70%	2.40%	2.46%	2.61%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Stable Value	0.62%	2.36%	2.07%	1.91%	1.93%
U.S. Bond Index Fund	2.94%	4.51%	2.04%	2.75%	2.48%
Blmbg Aggregate	2.94%	4.48%	2.03%	2.74%	2.48%
Callan Core Bond MFs	3.23%	4.38%	2.33%	2.69%	2.61%

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(3) Consists of: 50% Bloomberg Agg., 20% 3 Month T-Bill, 17% S&P 500, 8% MSCI EAFE, and 5% Dow Jones U.S. Mkt Completion

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended March 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended March 31, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Risk-Based Funds					
60/40 Balanced Stock & Bond Fund	9.37%	8.10%	9.04%	7.78%	8.76%
60% S&P 500/ 40% Aggregate Bond	9.37%	8.01%	9.01%	7.75%	8.77%
Callan Dom Balanced MFs	9.24%	5.02%	8.30%	6.32%	8.12%
Conservative Portfolio Fund	5.55%	4.77%	5.00%	4.16%	4.69%
Conservative Portfolio Custom Index(3)	5.51%	4.65%	4.90%	4.07%	4.64%
Callan MA Tgt All Cons MF	5.90%	3.24%	5.04%	3.59%	4.75%
Moderate Portfolio Fund	9.09%	5.69%	8.21%	6.32%	7.67%
Moderate Portfolio Custom Index(2)	9.03%	5.57%	8.08%	6.22%	7.61%
Callan MA Tgt All Mod MF	8.36%	3.55%	7.17%	4.83%	6.41%
Aggressive Portfolio Fund	11.14%	5.72%	10.19%	7.41%	9.35%
Aggressive Portfolio Custom Index(1)	11.05%	5.59%	10.03%	7.29%	9.25%
Callan MA Tgt All AgGr MF	12.31%	2.25%	10.08%	6.35%	8.77%
Domestic Equity					
U.S. Large Company Stock Idx Fund	13.65%	9.52%	13.53%	10.93%	12.87%
S&P 500 Index	13.65%	9.50%	13.51%	10.91%	12.85%
Callan Lg Cap Broad MF	13.74%	8.42%	13.22%	9.88%	12.11%
U.S. Small/Mid Company Stock Idx Fund	16.04%	5.06%	13.36%	7.92%	11.55%
Dow Jones US Completion	15.99%	4.76%	13.12%	7.71%	11.33%
Callan SMID Broad MFs	16.11%	3.22%	11.59%	7.09%	10.90%
International Equity					
International Company Stock Idx Fund	10.33%	(3.55%)	7.78%	2.68%	5.95%
MSCI EAFE	9.98%	(3.71%)	7.27%	2.33%	5.63%
Callan Intl Eq Dev Mkt MF	10.78%	(5.91%)	7.28%	2.26%	5.38%
Domestic Fixed Income					
Short Term Investment Fund	0.61%	2.31%	1.42%	0.93%	0.72%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Cash Database	0.79%	2.49%	1.54%	1.08%	1.00%
Stable Value Fund	0.69%	2.70%	2.40%	2.46%	2.61%
3-month Treasury Bill	0.60%	2.12%	1.19%	0.74%	0.56%
Callan Stable Value	0.62%	2.36%	2.07%	1.91%	1.93%
U.S. Bond Index Fund	2.94%	4.51%	2.04%	2.75%	2.48%
Blmbg Aggregate	2.94%	4.48%	2.03%	2.74%	2.48%
Callan Core Bond MFs	3.23%	4.38%	2.33%	2.69%	2.61%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index
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Pennsylvania SERS
Investment Manager Performance Monitoring Summary Report
March 31, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
Gross of Fee Performance									
Risk-Based Funds									
60/40 Balanced Stock & Bond Fund	**9.4** 47	**8.1** 13	**9.0** 31	**7.8** 8	**8.8** 24	**11.2** 28			**0.01** 98
Callan Dom Balanced MFs									
60% S&P 500/ 40% Aggregate Bond	9.4 48	8.0 13	9.0 33	7.7 8	8.8 24	11.2 29			
Conservative Portfolio Fund	**5.5** 69	**4.8** 14	**5.0** 52	**4.2** 28	**4.7** 54	**6.4** 68			**0.01** 100
Callan MA Tgt All Cons MF									
Conservative Portfolio Custom Index	5.5 70	4.6 15	4.9 57	4.1 31	4.6 56	6.4 68			
Moderate Portfolio Fund	**9.1** 29	**5.7** 21	**8.2** 19	**6.3** 12	**7.7** 17	**10.4** 20			**0.02** 100
Callan MA Tgt All Mod MF									
Moderate Portfolio Custom Index	9.0 30	5.6 22	8.1 22	6.2 16	7.6 17	10.3 22			
Aggressive Portfolio Fund	**11.1** 84	**5.7** 6	**10.2** 46	**7.4** 20	**9.3** 23	**12.5** 43			**0.02** 100
Callan MA Tgt All AgGr MF									
Aggressive Portfolio Custom Index	11.1 84	5.6 7	10.0 51	7.3 22	9.2 26	12.3 54			
Domestic Equity									
U.S. Large Company Stock Index	**13.7** 51	**9.5** 41	**13.5** 44	**10.9** 41	**12.9** 34	**16.0** 32			**0.01** 99
Callan Lg Cap Broad MF									
S&P 500 Index	13.6 51	9.5 41	13.5 45	10.9 41	12.8 34	15.9 33			
U.S. Small/Mid Company Stock Index	**16.0** 51	**5.1** 47	**13.4** 44	**7.9** 42	**11.6** 32	**16.6** 30			**0.02** 100
Callan SMID Broad MFs									
Dow Jones US Completion	16.0 51	4.8 47	13.1 45	7.7 43	11.3 38	16.4 31			
International Equity									
International Company Stock Fund	**10.3** 61	**-3.6** 26	**7.8** 34	**2.7** 39	**6.0** 32	**9.3** 51			**0.02** 99
Callan Intl Eq Dev Mkt MF									
MSCI EAFE	10.0 82	-3.7 27	7.3 52	2.3 47	5.6 40	9.0 57			
Domestic Fixed Income									
Short Term Investment Fund	**0.6** 93	**2.3** 75	**1.4** 76	**0.9** 81	**0.7** 82	**0.6** 84			**0.00** 100
Callan Cash Database									
3-month Treasury Bill	0.6 94	2.1 91	1.2 95	0.7 95	0.6 97	0.4 96			

Returns:
- above median
- third quartile
- fourth quartile

Return Consistency:
- above median
- third quartile
- fourth quartile

Risk Quadrant:

Expense Ratio:
- below median
- second quartile
- first quartile

Pennsylvania SERS
Investment Manager Performance Monitoring Summary Report
March 31, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
Stable Value Fund	**0.7** 2	**2.7** 1	**2.4** 1	**2.5** 1	**2.6** 1	**3.0** 1			
Callan Stable Value									
3-month Treasury Bill	0.6 59	2.1 89	1.2 98	0.7 100	0.6 100	0.4 100			
U.S. Bond Index Fund	**2.9** 72	**4.5** 42	**2.0** 84	**2.8** 37	**2.5** 74	**3.8** 90			**0.02** 96
Callan Core Bond MFs									
Blmbg Aggregate	2.9 71	4.5 44	2.0 85	2.7 38	2.5 74	3.8 91			

Returns:
- above median
- third quartile
- fourth quartile

Return Consistency:
- above median
- third quartile
- fourth quartile

Risk Quadrant:

Expense Ratio:
- below median
- second quartile
- first quartile

60/40 Balanced Stock & Bond Fund
Period Ended March 31, 2019

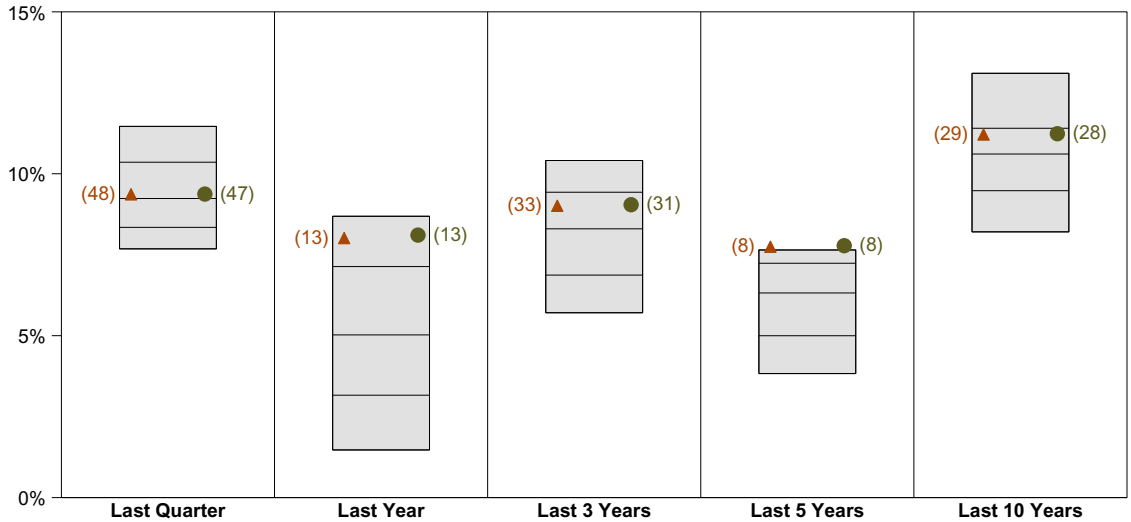
Investment Philosophy

The 60/40 Balanced Stock & Bond Fund seeks to provide current income and long-term capital growth by investing in a combination of stocks and bonds. The fund is comprised of two of the 457 plan's core index funds (60% U.S. Large Company Stock Index Fund and 40% U.S. Bond Index Fund). This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

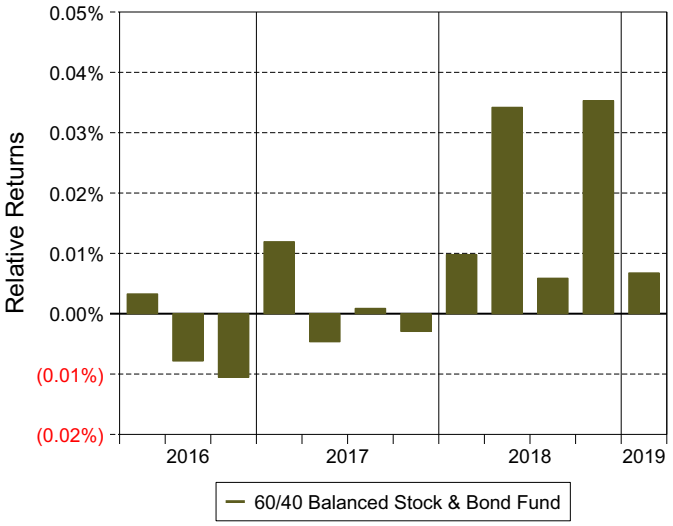
- 60/40 Balanced Stock & Bond Fund's portfolio posted a 9.37% return for the quarter placing it in the 47 percentile of the Callan Domestic Balanced Mutual Funds group for the quarter and in the 13 percentile for the last year.
- 60/40 Balanced Stock & Bond Fund's portfolio outperformed the 60% S&P 500/ 40% Aggregate Bond by 0.01% for the quarter and outperformed the 60% S&P 500/ 40% Aggregate Bond for the year by 0.09%.

Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)

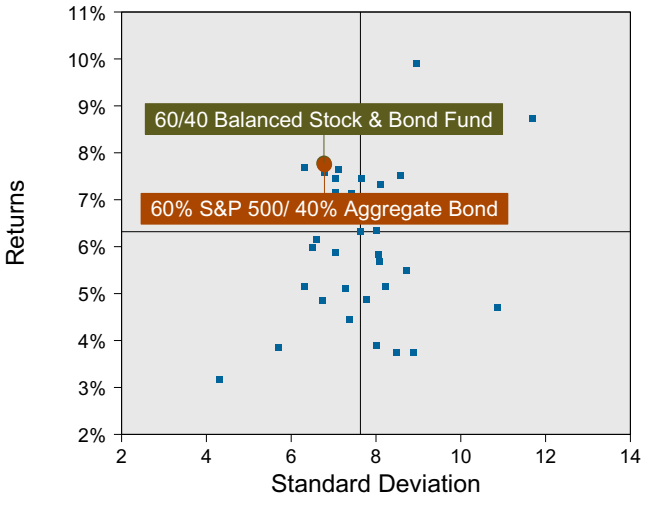


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	11.46	8.69	10.41	7.65	13.10
25th Percentile	10.36	7.13	9.43	7.24	11.40
Median	9.24	5.02	8.30	6.32	10.61
75th Percentile	8.35	3.16	6.87	5.00	9.48
90th Percentile	7.68	1.47	5.71	3.83	8.21
60/40 Balanced Stock & Bond Fund ●	9.37	8.10	9.04	7.78	11.24
60% S&P 500/ 40% Aggregate Bond ▲	9.37	8.01	9.01	7.75	11.21

Relative Returns vs 60% S&P 500/ 40% Aggregate Bond



Callan Domestic Balanced Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

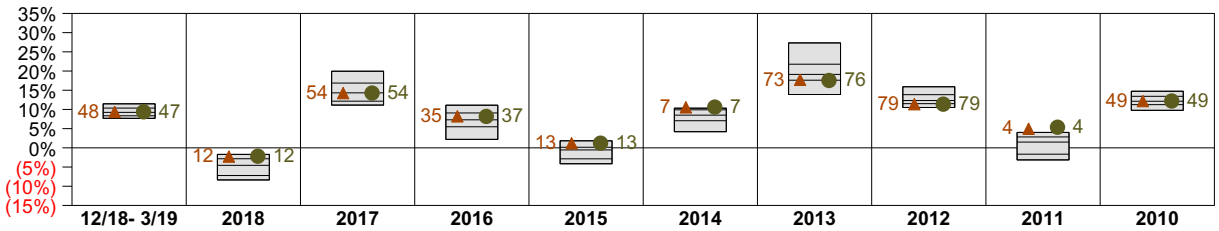


60/40 Balanced Stock & Bond Fund
Return Analysis Summary

Return Analysis

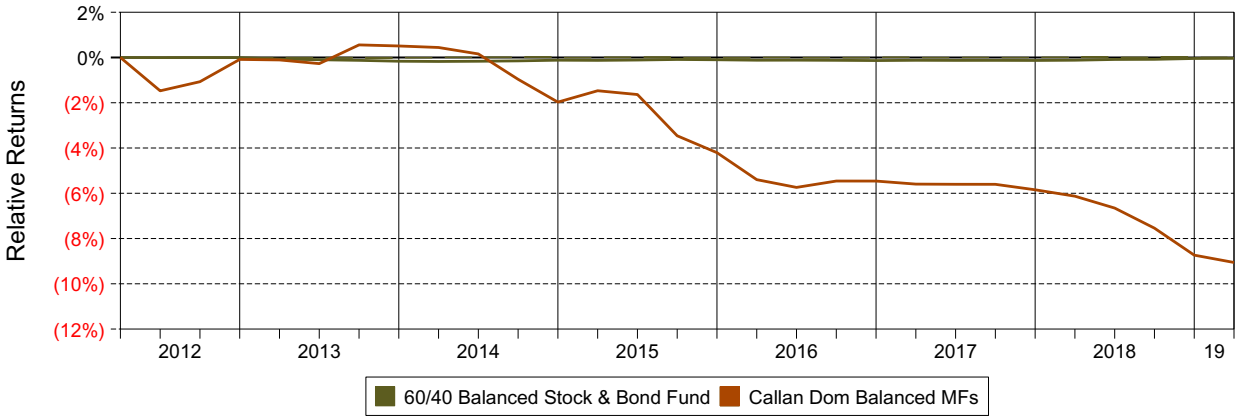
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)

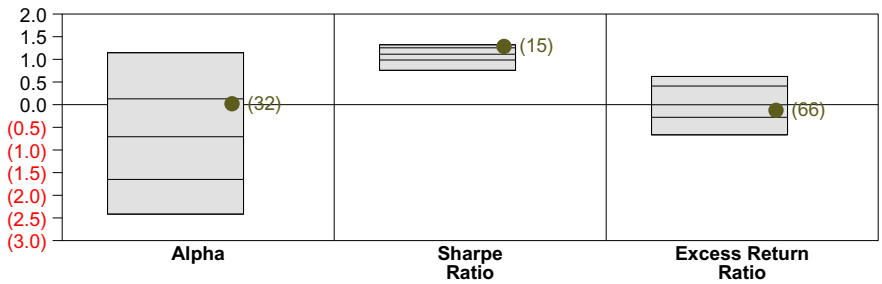


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	11.46	(1.71)	19.95	11.10	1.83	10.33	27.33	15.91	4.02	14.74
25th Percentile	10.36	(2.84)	16.87	9.08	0.15	9.90	21.78	13.85	2.84	13.42
Median	9.24	(4.56)	14.32	7.30	(0.54)	8.51	19.12	12.32	1.50	12.13
75th Percentile	8.35	(7.21)	12.16	5.48	(2.86)	7.07	17.61	11.51	(1.66)	11.25
90th Percentile	7.68	(8.36)	11.13	2.20	(4.14)	4.20	13.89	10.51	(3.15)	9.77
60/40 Balanced Stock & Bond Fund	9.37	(2.18)	14.27	8.18	1.21	10.61	17.54	11.37	5.36	12.20
60% S&P 500/ 40% Aggregate Bond	9.37	(2.26)	14.26	8.21	1.20	10.56	17.73	11.37	4.98	12.19

Cumulative and Quarterly Relative Return vs 60% S&P 500/ 40% Aggregate Bond



Risk Adjusted Return Measures vs 60% S&P 500/ 40% Aggregate Bond
Rankings Against Callan Domestic Balanced Mutual Funds (Institutional Net)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.15	1.32	0.62
25th Percentile	0.13	1.25	0.41
Median	(0.71)	1.11	(0.00)
75th Percentile	(1.65)	0.99	(0.28)
90th Percentile	(2.42)	0.76	(0.67)
60/40 Balanced Stock & Bond Fund	0.02	1.29	(0.13)

Conservative Portfolio Fund
Period Ended March 31, 2019

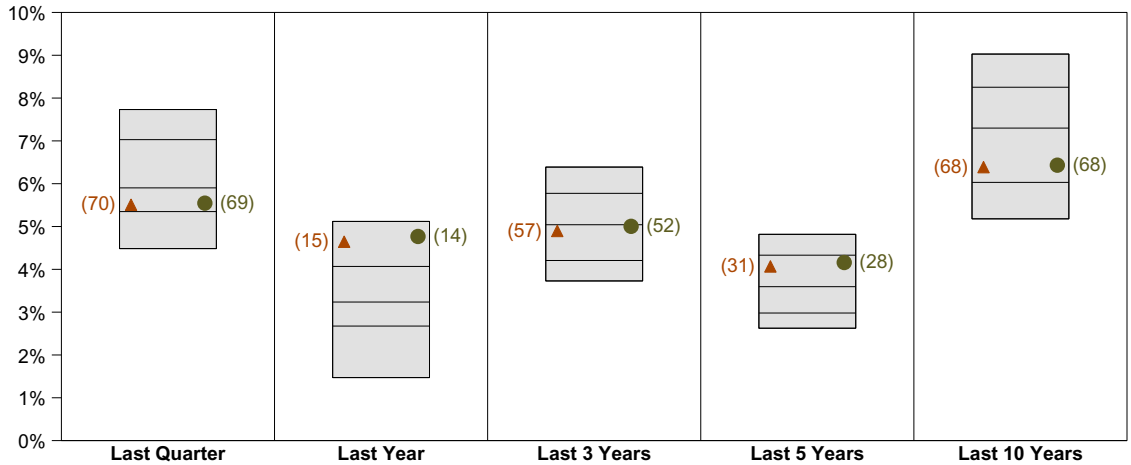
Investment Philosophy

The Commonwealth of Pennsylvania Conservative Portfolio Fund seeks a high total return on investment through long-term capital appreciation, and to a lesser extent, income. This fund is comprised of 5 of the plan's core funds (50% U.S. Bond Index Fund, 20% Short-Term Investment Fund, 17% U.S. Large Company Stock Index Fund, 8% International Company Stock Index Fund and 5% U.S. Small/Mid Company Stock Index Fund). This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

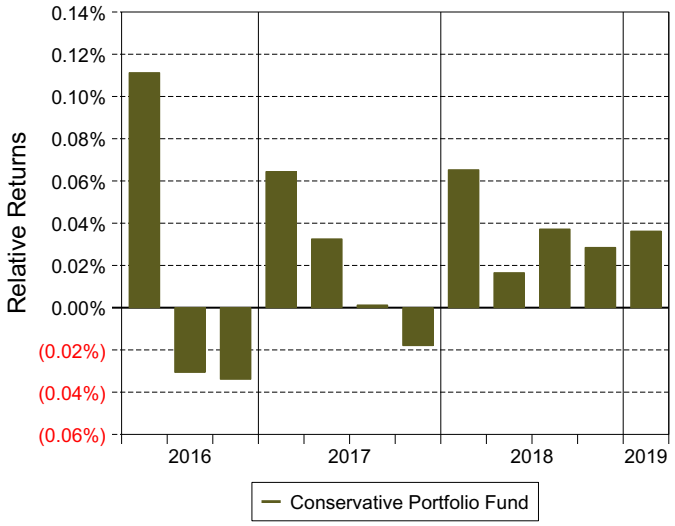
- Conservative Portfolio Fund's portfolio posted a 5.55% return for the quarter placing it in the 69 percentile of the Callan Mixed-Asset Target Alloc Cons MFs group for the quarter and in the 14 percentile for the last year.
- Conservative Portfolio Fund's portfolio outperformed the Conservative Portfolio Custom Index by 0.04% for the quarter and outperformed the Conservative Portfolio Custom Index for the year by 0.12%.

Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)

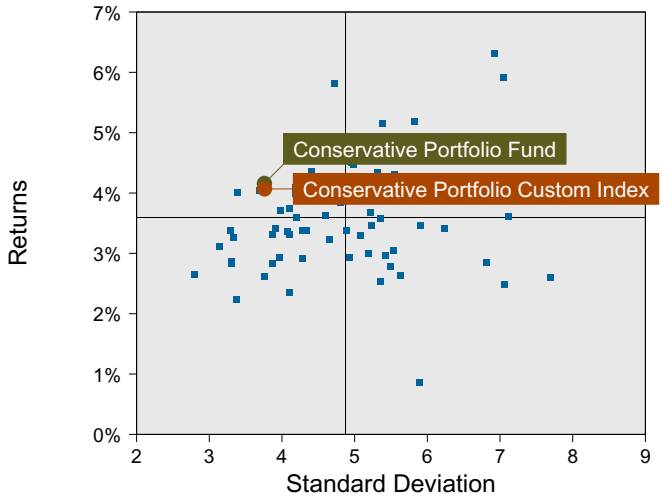


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	7.73	5.12	6.39	4.82	9.03
25th Percentile	7.03	4.07	5.77	4.33	8.25
Median	5.90	3.24	5.04	3.59	7.30
75th Percentile	5.35	2.67	4.21	2.98	6.03
90th Percentile	4.48	1.47	3.73	2.62	5.18
Conservative Portfolio Fund ●	5.55	4.77	5.00	4.16	6.43
Conservative Portfolio Custom Index ▲	5.51	4.65	4.90	4.07	6.39

Relative Returns vs Conservative Portfolio Custom Index



Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net) Annualized Five Year Risk vs Return

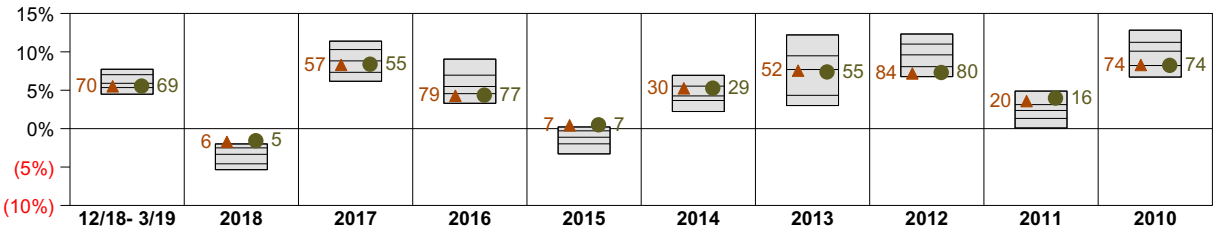


Conservative Portfolio Fund
Return Analysis Summary

Return Analysis

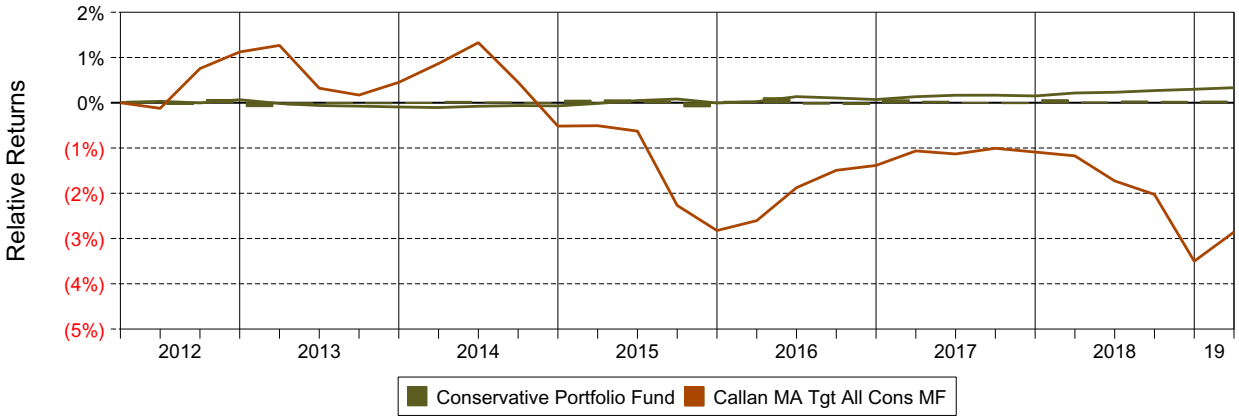
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)

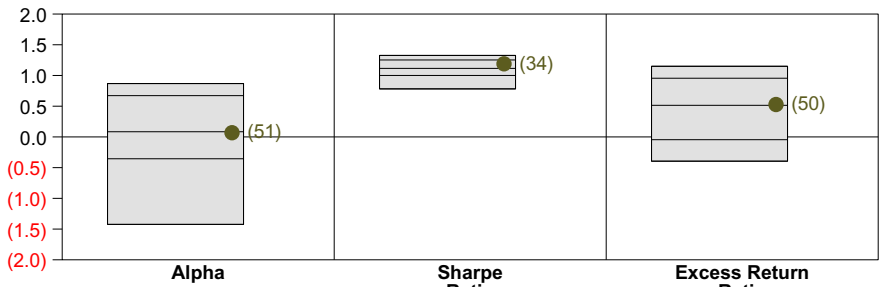


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	7.73	(1.99)	11.39	9.05	0.22	6.94	12.21	12.32	4.89	12.82
25th Percentile	7.03	(2.50)	10.30	6.96	(0.28)	5.53	9.48	11.01	3.13	11.24
Median	5.90	(3.34)	8.82	5.48	(1.12)	4.26	7.70	9.61	2.37	10.08
75th Percentile	5.35	(4.58)	7.33	4.56	(1.98)	3.66	4.34	8.07	1.33	8.22
90th Percentile	4.48	(5.34)	6.17	3.30	(3.29)	2.23	3.01	6.77	0.08	6.71
Conservative Portfolio Fund ●	5.55	(1.57)	8.39	4.36	0.50	5.27	7.38	7.31	3.98	8.24
Conservative Portfolio Custom Index ▲	5.51	(1.72)	8.31	4.28	0.44	5.25	7.56	7.19	3.58	8.29

Cumulative and Quarterly Relative Return vs Conservative Portfolio Custom Index



Risk Adjusted Return Measures vs Conservative Portfolio Custom Index
Rankings Against Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.87	1.33	1.15
25th Percentile	0.67	1.25	0.96
Median	0.08	1.12	0.51
75th Percentile	(0.36)	1.00	(0.05)
90th Percentile	(1.42)	0.78	(0.39)
Conservative Portfolio Fund ●	0.07	1.19	0.53

Moderate Portfolio Fund
Period Ended March 31, 2019

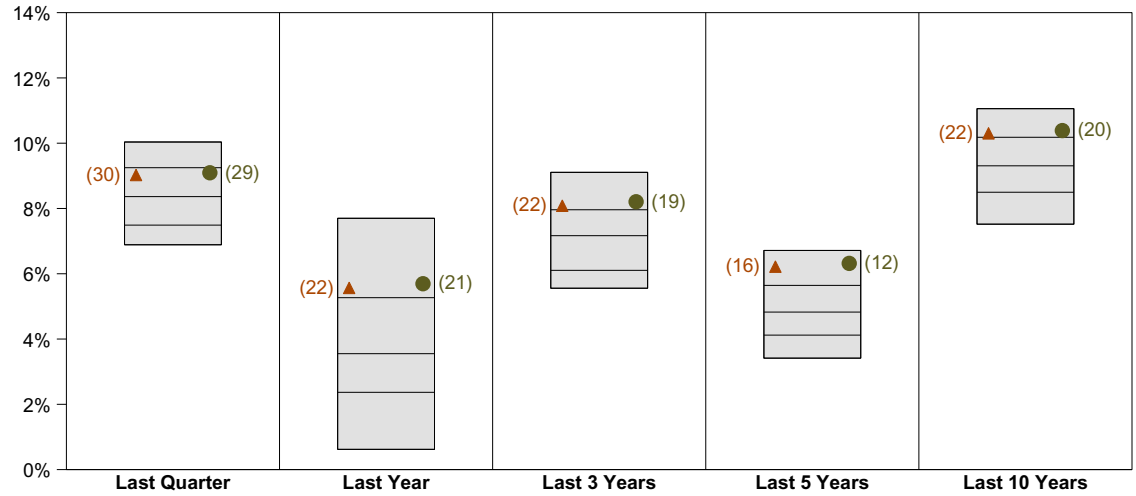
Investment Philosophy

The Commonwealth of Pennsylvania Moderate Portfolio Fund seeks a high total return on investment through long-term capital appreciation, and to a lesser extent, income. This fund is comprised of 4 of the plan's core funds (40% U.S. Bond Index Fund, 36% U.S. Large Company Stock Index Fund, 15% International Company Stock Index Fund and 9% U.S. Small/Mid Company Stock Index Fund). This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

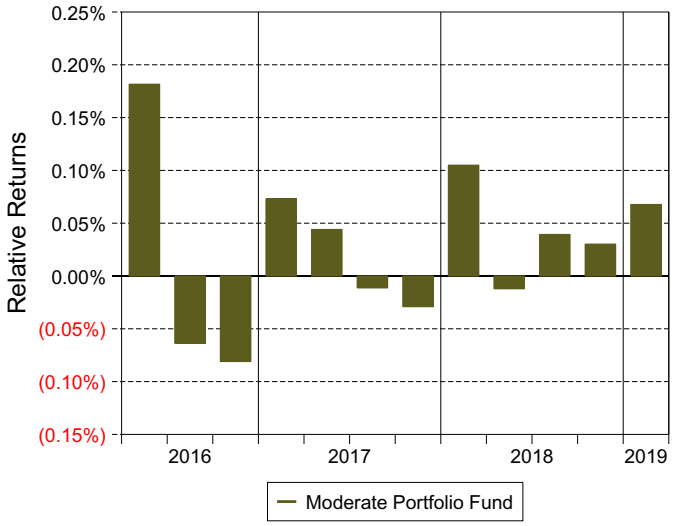
- Moderate Portfolio Fund's portfolio posted a 9.09% return for the quarter placing it in the 29 percentile of the Callan Mixed-Asset Target Alloc Mod MF group for the quarter and in the 21 percentile for the last year.
- Moderate Portfolio Fund's portfolio outperformed the Moderate Portfolio Custom Index by 0.07% for the quarter and outperformed the Moderate Portfolio Custom Index for the year by 0.13%.

Performance vs Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)

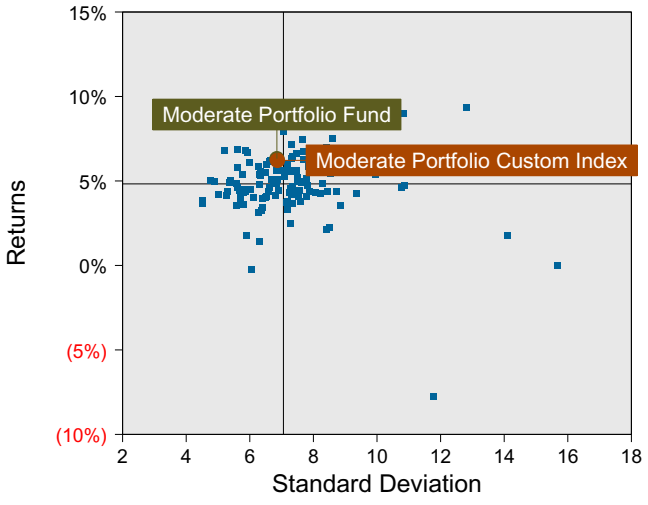


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	10.04	7.70	9.11	6.71	11.06
25th Percentile	9.25	5.27	7.96	5.64	10.18
Median	8.36	3.55	7.17	4.83	9.31
75th Percentile	7.49	2.37	6.10	4.12	8.50
90th Percentile	6.89	0.62	5.56	3.41	7.52
Moderate Portfolio Fund ●	9.09	5.69	8.21	6.32	10.39
Moderate Portfolio Custom Index ▲	9.03	5.57	8.08	6.22	10.30

Relative Returns vs Moderate Portfolio Custom Index



Callan Mixed-Asset Target Alloc Mod MF (Institutional Net) Annualized Five Year Risk vs Return

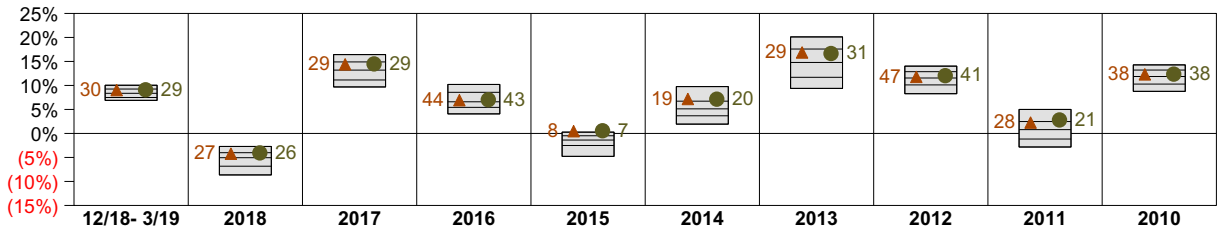


Moderate Portfolio Fund
Return Analysis Summary

Return Analysis

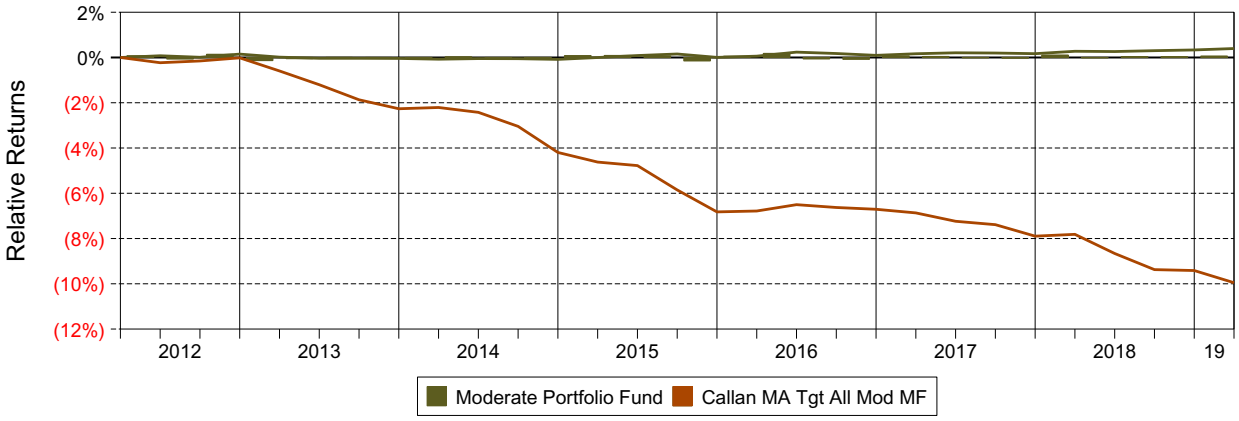
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)

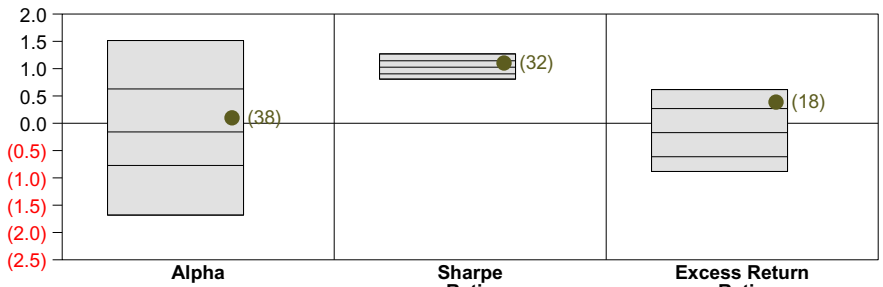


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	10.04	(2.71)	16.43	10.21	0.27	9.76	20.11	14.02	5.00	14.28
25th Percentile	9.25	(4.01)	14.90	8.57	(0.49)	6.72	17.59	12.87	2.48	13.20
Median	8.36	(5.06)	13.20	6.59	(1.38)	5.12	14.79	11.55	0.79	11.86
75th Percentile	7.49	(6.83)	11.14	5.43	(2.51)	3.68	11.69	10.11	(1.16)	10.28
90th Percentile	6.89	(8.64)	9.68	4.07	(4.78)	1.94	9.39	8.28	(2.83)	8.77
Moderate Portfolio Fund ●	9.09	(4.06)	14.48	7.02	0.56	7.14	16.65	12.03	2.81	12.35
Moderate Portfolio Custom Index ▲	9.03	(4.21)	14.40	6.92	0.47	7.18	16.87	11.79	2.27	12.31

Cumulative and Quarterly Relative Return vs Moderate Portfolio Custom Index



Risk Adjusted Return Measures vs Moderate Portfolio Custom Index
Rankings Against Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.52	1.27	0.62
25th Percentile	0.63	1.14	0.27
Median	(0.16)	1.03	(0.17)
75th Percentile	(0.77)	0.90	(0.61)
90th Percentile	(1.68)	0.81	(0.88)
Moderate Portfolio Fund ●	0.10	1.10	0.39

Aggressive Portfolio Fund
Period Ended March 31, 2019

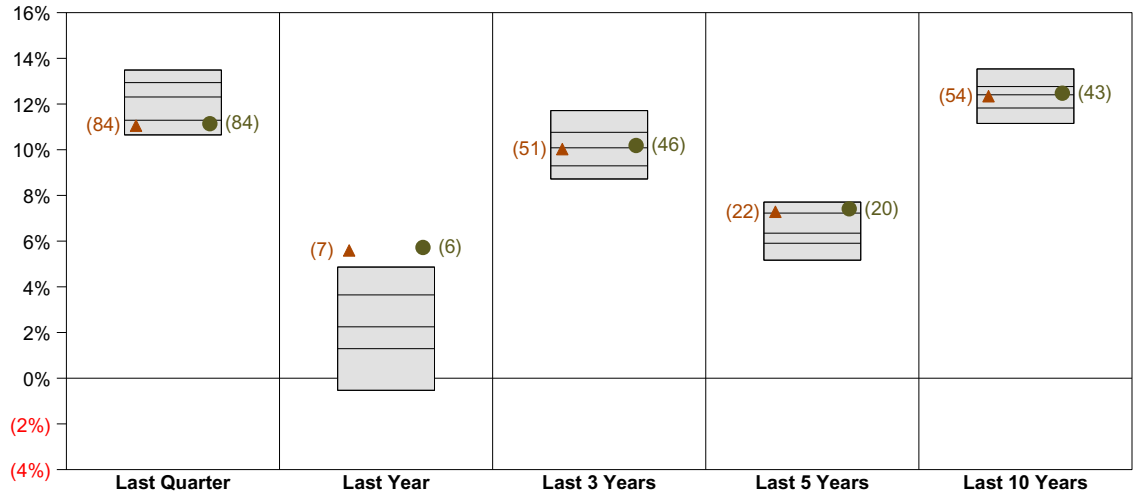
Investment Philosophy

The Commonwealth of Pennsylvania Aggressive Portfolio Fund seeks a high total return on investment through long-term capital appreciation. This fund is comprised of 4 of the plans core funds (48% U.S. Large Company Stock Index Fund, 20% U.S. Bond Index Fund, 20% International Company Stock Index Fund and 12% U.S. Small/Mid Company Stock Index Fund). The fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

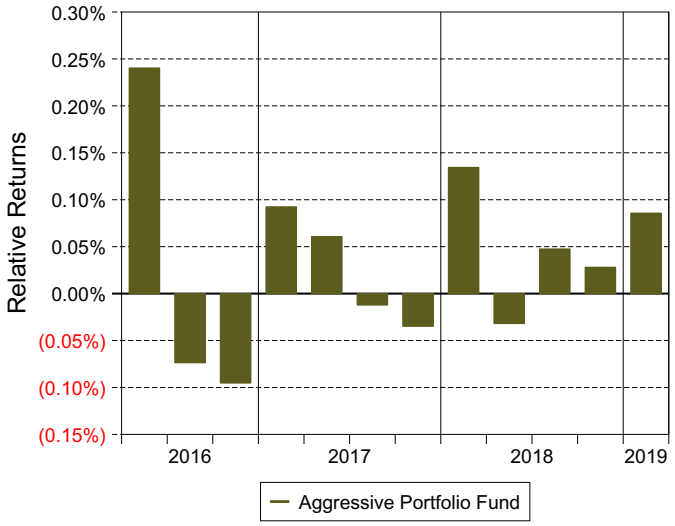
- Aggressive Portfolio Fund's portfolio posted a 11.14% return for the quarter placing it in the 84 percentile of the Callan Mix-Asst Tgt Alloc Aggr Grwth MF group for the quarter and in the 6 percentile for the last year.
- Aggressive Portfolio Fund's portfolio outperformed the Aggressive Portfolio Custom Index by 0.09% for the quarter and outperformed the Aggressive Portfolio Custom Index for the year by 0.13%.

Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)

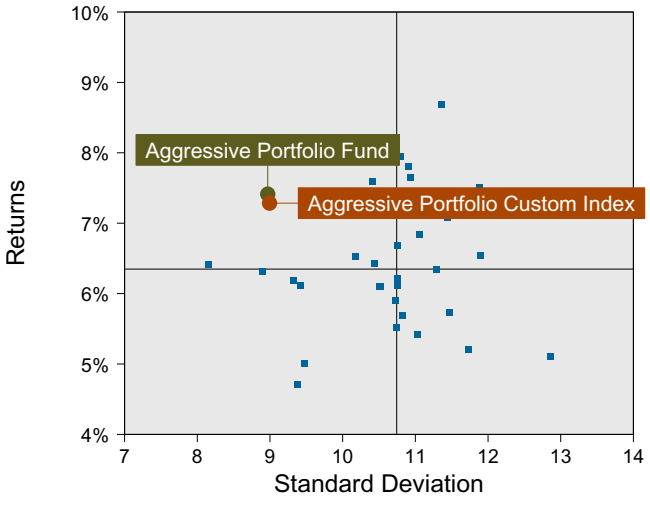


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	13.49	4.86	11.71	7.71	13.54
25th Percentile	12.94	3.65	10.76	7.23	12.76
Median	12.31	2.25	10.08	6.35	12.40
75th Percentile	11.29	1.29	9.30	5.91	11.83
90th Percentile	10.65	(0.53)	8.72	5.17	11.15
Aggressive Portfolio Fund ●	11.14	5.72	10.19	7.41	12.47
Aggressive Portfolio Custom Index ▲	11.05	5.59	10.03	7.29	12.34

Relative Returns vs Aggressive Portfolio Custom Index



Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net) Annualized Five Year Risk vs Return

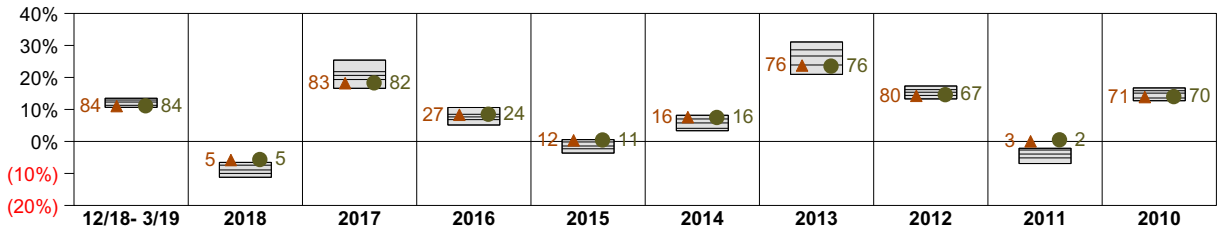


Aggressive Portfolio Fund
Return Analysis Summary

Return Analysis

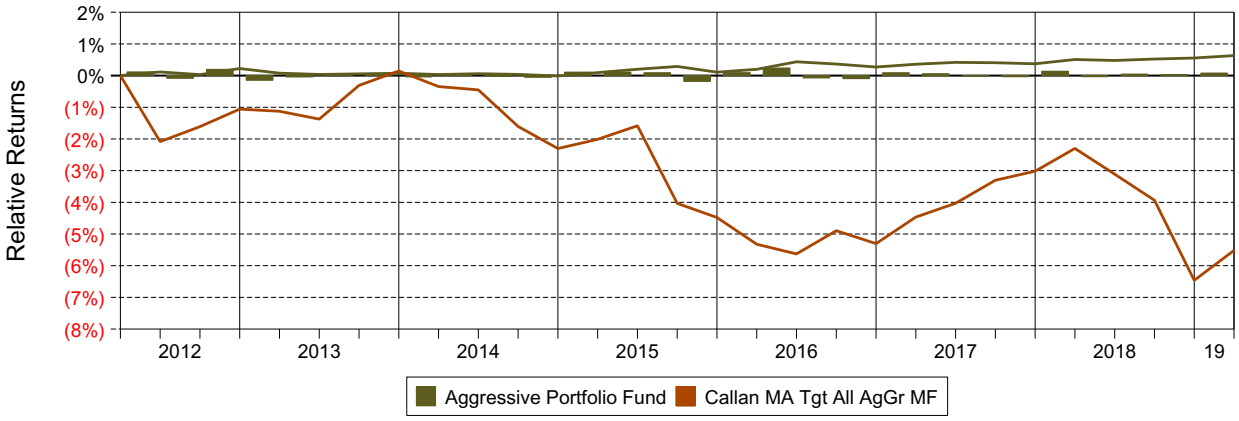
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)

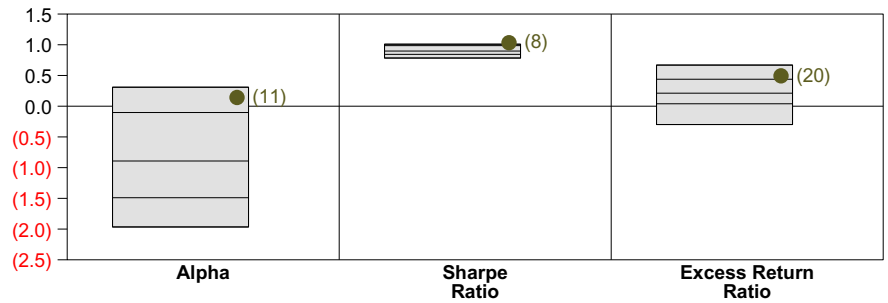


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	13.49	(6.55)	25.41	10.60	0.56	8.18	31.08	17.33	(2.15)	16.73
25th Percentile	12.94	(7.42)	21.80	8.49	(0.16)	7.02	28.62	16.19	(2.69)	15.85
Median	12.31	(8.91)	20.65	7.67	(1.42)	5.78	26.70	15.38	(3.94)	15.10
75th Percentile	11.29	(9.99)	19.34	6.81	(2.30)	4.10	23.90	14.38	(5.14)	13.58
90th Percentile	10.65	(11.20)	16.60	5.13	(3.64)	3.35	20.96	13.29	(6.91)	12.72
Aggressive Portfolio Fund ●	11.14	(5.65)	18.31	8.51	0.46	7.49	23.54	14.62	0.51	14.01
Aggressive Portfolio Custom Index ▲	11.05	(5.82)	18.19	8.33	0.34	7.58	23.72	14.25	0.03	13.86

Cumulative and Quarterly Relative Return vs Aggressive Portfolio Custom Index



Risk Adjusted Return Measures vs Aggressive Portfolio Custom Index
Rankings Against Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.31	1.01	0.67
25th Percentile	(0.10)	0.99	0.44
Median	(0.89)	0.90	0.21
75th Percentile	(1.49)	0.84	0.04
90th Percentile	(1.97)	0.78	(0.30)
Aggressive Portfolio Fund ●	0.14	1.03	0.49

U.S. Large Company Stock Index Fund
Period Ended March 31, 2019

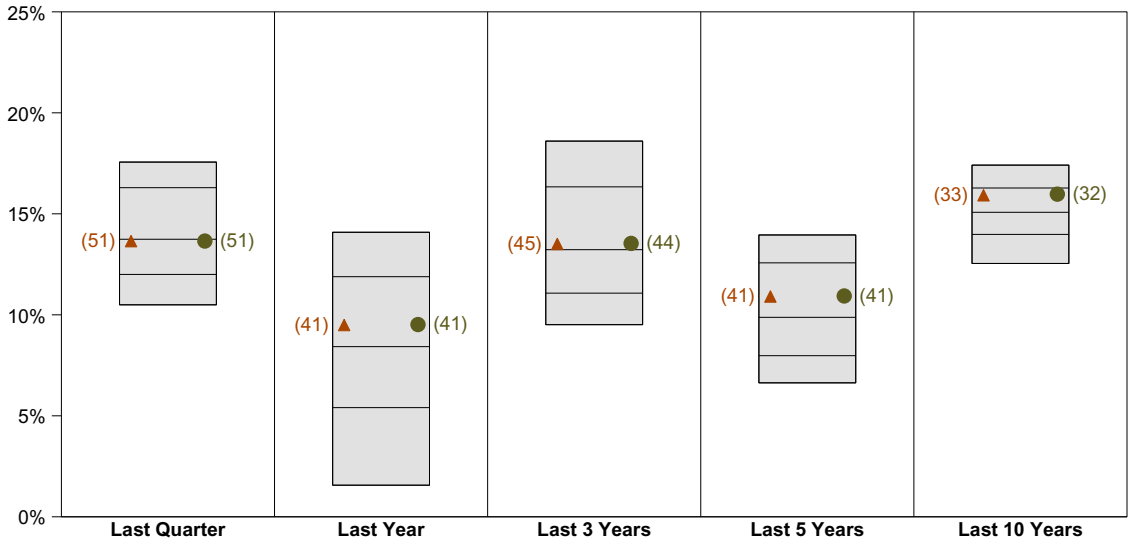
Investment Philosophy

The strategy seeks to replicate the performance and characteristics of the S&P 500 Index with minimal tracking error. Mellon Capital uses full replication to construct the portfolio, holding each security in the index in its proportionate weight. This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

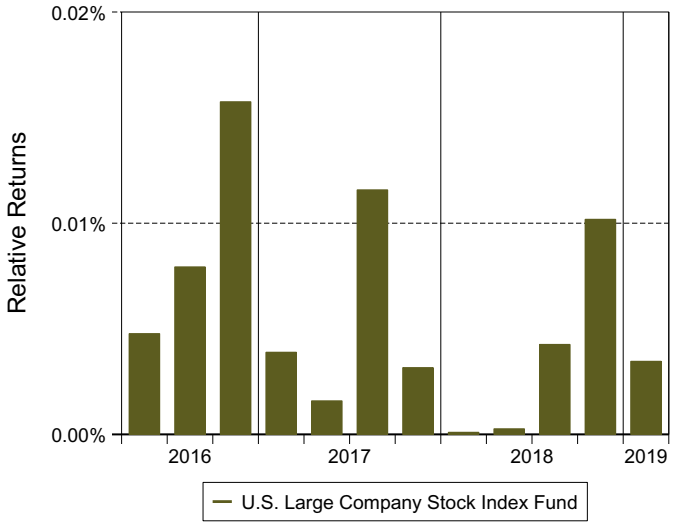
- U.S. Large Company Stock Index Fund's portfolio posted a 13.65% return for the quarter placing it in the 51 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 41 percentile for the last year.
- U.S. Large Company Stock Index Fund's portfolio outperformed the S&P 500 Index by 0.00% for the quarter and outperformed the S&P 500 Index for the year by 0.02%.

Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)

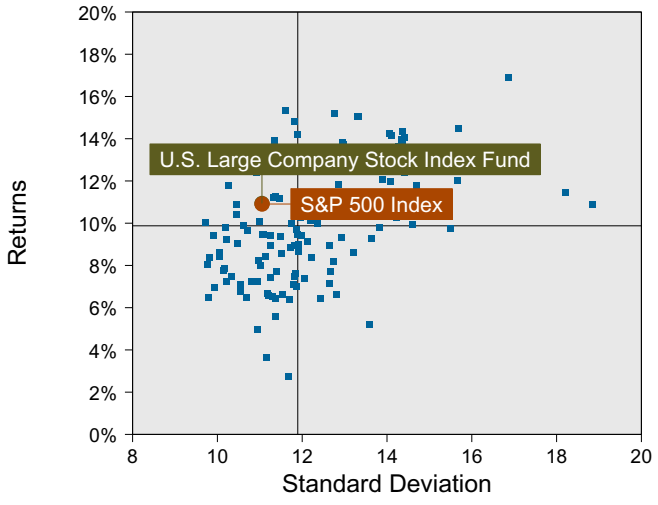


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	17.56	14.09	18.60	13.95	17.41
25th Percentile	16.29	11.89	16.33	12.57	16.28
Median	13.74	8.42	13.22	9.88	15.08
75th Percentile	12.00	5.40	11.07	7.98	13.98
90th Percentile	10.50	1.57	9.51	6.63	12.54
U.S. Large Company Stock Index Fund ●	13.65	9.52	13.53	10.93	15.97
S&P 500 Index ▲	13.65	9.50	13.51	10.91	15.92

Relative Return vs S&P 500 Index



Callan Large Cap Broad Equity Mut Funds (Institutional Net) Annualized Five Year Risk vs Return

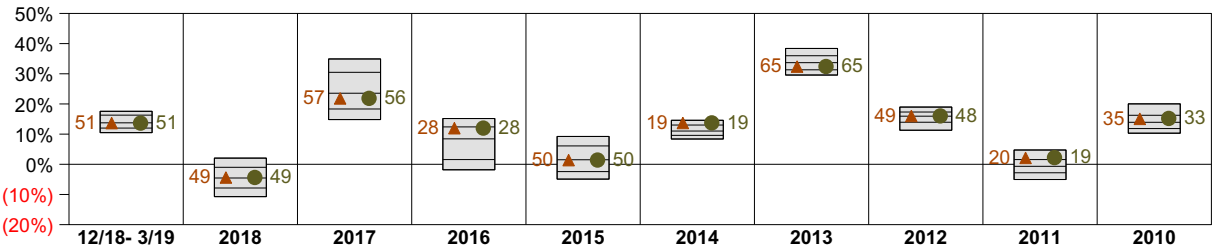


U.S. Large Company Stock Index Fund
Return Analysis Summary

Return Analysis

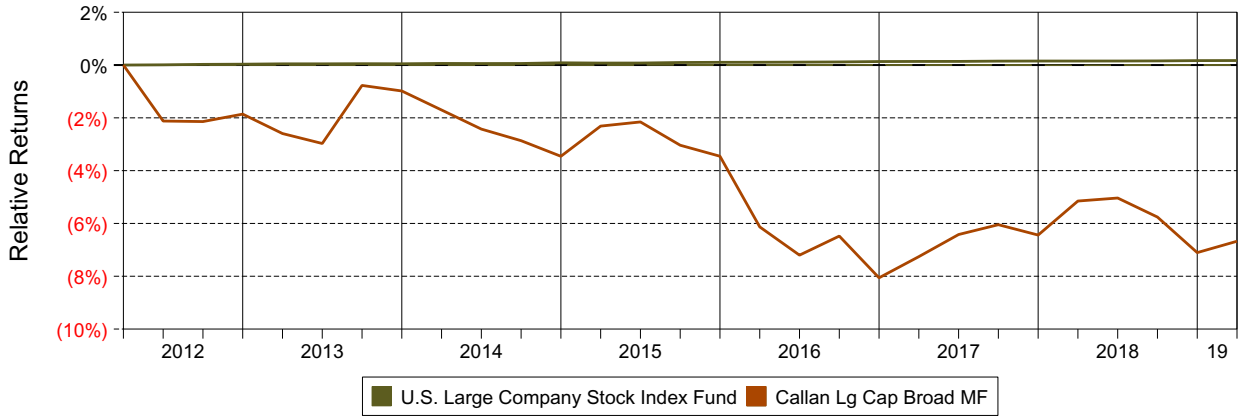
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)

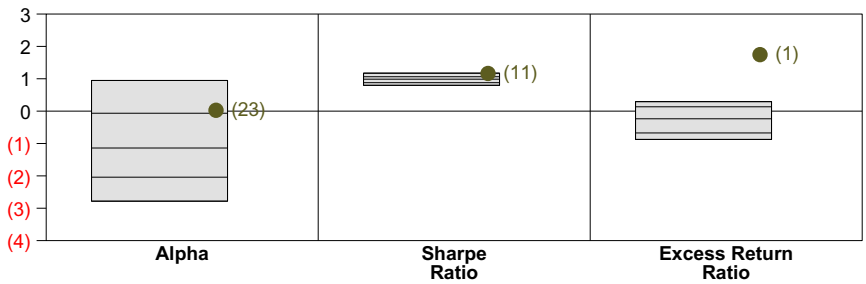


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	17.56	2.05	34.91	15.17	9.23	14.58	38.40	18.96	4.74	20.03
25th Percentile	16.29	(1.00)	30.48	12.39	6.09	13.01	35.98	17.33	1.57	16.25
Median	13.74	(4.54)	23.56	8.43	1.50	11.02	33.69	15.94	(0.67)	13.92
75th Percentile	12.00	(7.86)	18.33	1.56	(2.42)	9.59	31.31	13.94	(2.81)	11.84
90th Percentile	10.50	(10.72)	14.82	(1.82)	(4.91)	8.38	29.58	11.29	(5.04)	10.31
U.S. Large Company Stock Index Fund ●	13.65	(4.37)	21.86	11.99	1.40	13.73	32.41	16.03	2.21	15.20
S&P 500 Index ▲	13.65	(4.38)	21.83	11.96	1.38	13.69	32.39	16.00	2.11	15.06

Cumulative and Quarterly Relative Return vs S&P 500 Index



Risk Adjusted Return Measures vs S&P 500 Index
Rankings Against Callan Large Cap Broad Equity Mut Funds (Institutional Net)
Seven Years Ended March 31, 2019



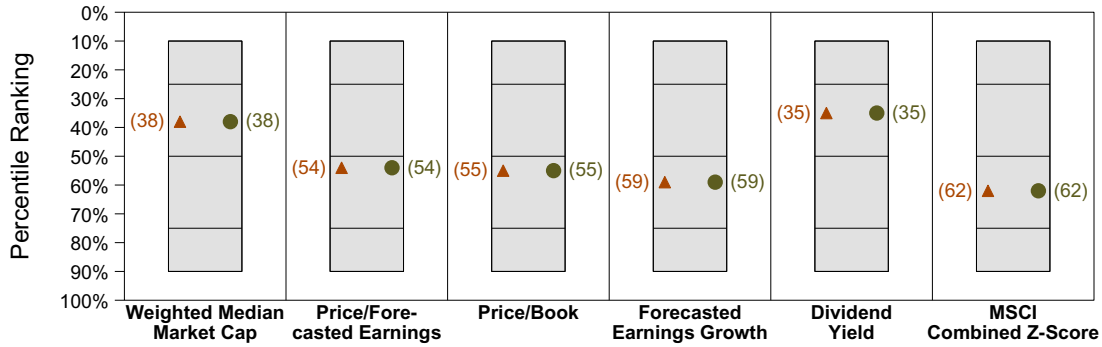
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.95	1.17	0.29
25th Percentile	(0.06)	1.06	0.13
Median	(1.14)	0.99	(0.24)
75th Percentile	(2.04)	0.88	(0.67)
90th Percentile	(2.78)	0.80	(0.87)
U.S. Large Company Stock Index Fund ●	0.03	1.16	1.75

U.S. Large Company Stock Index Fund
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Large Cap Broad Equity Mut Funds
as of March 31, 2019

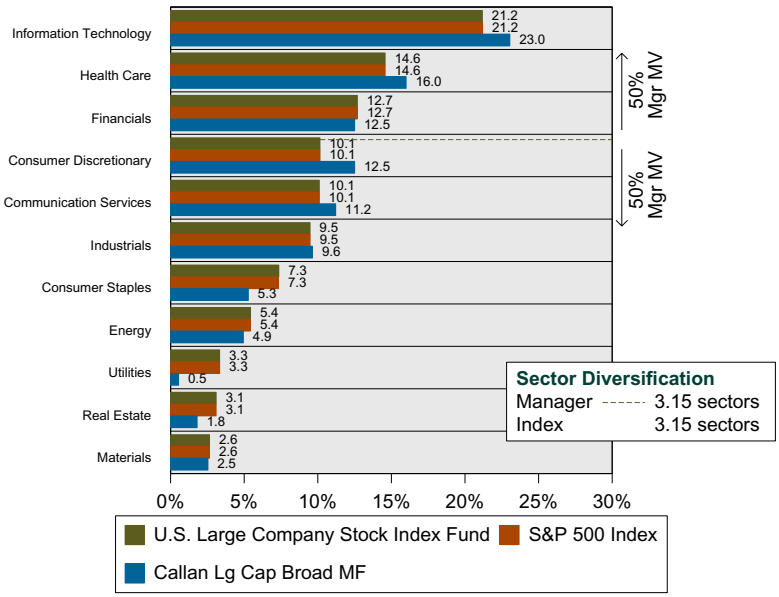


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	141.13	26.33	6.97	21.19	2.67	1.33
25th Percentile	121.91	23.10	5.80	19.51	2.32	1.13
Median	97.84	17.28	3.34	15.44	1.70	0.16
75th Percentile	58.40	13.79	2.35	12.64	0.84	(0.50)
90th Percentile	44.81	12.76	1.97	10.77	0.72	(0.81)
U.S. Large Company Stock Index Fund ●	118.02	16.60	3.12	13.96	2.00	(0.04)
S&P 500 Index ▲	118.03	16.59	3.12	13.97	2.00	(0.04)

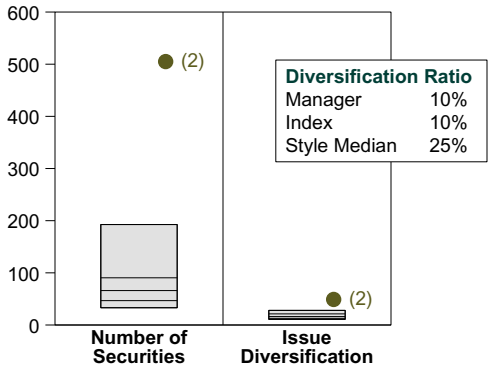
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
March 31, 2019



Diversification
March 31, 2019



	Number of Securities	Issue Diversification
10th Percentile	193	28
25th Percentile	91	21
Median	66	16
75th Percentile	47	13
90th Percentile	33	11
U.S. Large Company Stock Index Fund ●	505	49
S&P 500 Index ▲	505	49

U.S. Large Company Stock Index Fund
Top 10 Portfolio Holdings Characteristics
as of March 31, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	$35,523,789	3.8%	16.62%	904.86	24.33	1.56%	13.50%
Apple Inc	Information Technology	$33,408,361	3.6%	20.94%	895.67	15.71	1.54%	13.00%
Amazon.Com	Consumer Discretionary	$28,848,304	3.1%	18.56%	874.71	58.29	0.00%	52.83%
Facebook Inc Cl A	Communication Services	$15,614,128	1.7%	27.16%	397.64	21.13	0.00%	14.10%
Berkshire Hathaway Inc Del Cl B New	Financials	$15,338,063	1.7%	(1.61)%	275.56	19.22	0.00%	23.30%
Johnson & Johnson	Health Care	$14,618,627	1.6%	9.04%	372.23	16.03	2.58%	6.37%
Alphabet Inc Cl C	Communication Services	$14,163,822	1.5%	13.30%	409.83	23.98	0.00%	17.41%
Alphabet Inc Cl A	Communication Services	$13,836,610	1.5%	12.63%	352.31	24.09	0.00%	17.41%
Exxon Mobil Corp	Energy	$13,443,492	1.4%	19.81%	342.17	17.54	4.06%	18.00%
JPMorgan Chase & Co	Financials	$13,014,233	1.4%	4.55%	331.45	10.19	3.16%	9.63%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Coty Inc Com Cl A	Consumer Staples	$203,207	0.0%	77.29%	8.64	16.08	4.35%	7.65%
Chipotle Mexican Grill Inc	Consumer Discretionary	$677,738	0.1%	64.50%	19.69	53.98	0.00%	24.00%
Xerox Corp	Information Technology	$252,511	0.0%	63.11%	7.35	8.37	3.13%	(5.30)%
Hess Corp	Energy	$601,008	0.1%	49.35%	18.25	(336.48)	1.66%	(17.73)%
Xilinx	Information Technology	$1,258,305	0.1%	49.35%	32.10	33.12	1.14%	11.50%
Arista Networks Inc	Information Technology	$644,143	0.1%	49.25%	23.81	32.64	0.00%	18.52%
Celgene Corp	Health Care	$2,598,874	0.3%	47.20%	66.26	8.45	0.00%	16.30%
Cadence Design System Inc	Information Technology	$698,621	0.1%	46.07%	17.86	30.65	0.00%	12.00%
Hanesbrands Inc	Consumer Discretionary	$254,485	0.0%	43.84%	6.46	10.12	3.36%	(0.28)%
Ulta Salon Cosmetcs & Frag I	Consumer Discretionary	$770,279	0.1%	42.43%	20.51	26.53	0.00%	17.89%

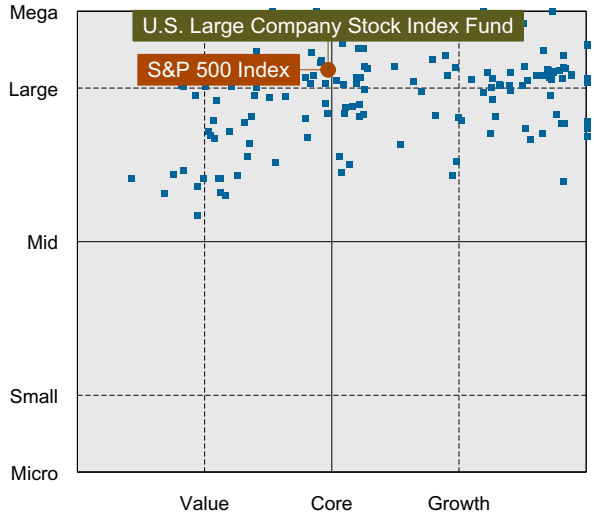
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
The Kraft Heinz Company	Consumer Staples	$795,997	0.1%	(23.19)%	39.81	11.50	4.90%	(4.16)%
Biogen Inc	Health Care	$1,824,497	0.2%	(21.45)%	46.50	8.21	0.00%	4.00%
Centurylink Inc	Communication Services	$446,977	0.0%	(19.25)%	12.95	9.82	8.34%	11.44%
Macys Inc	Consumer Discretionary	$294,353	0.0%	(18.02)%	7.39	7.78	6.28%	(5.53)%
Cvs Health Corp	Health Care	$2,743,311	0.3%	(17.06)%	69.95	7.78	3.71%	6.40%
Newell Brands Inc	Consumer Discretionary	$233,908	0.0%	(16.33)%	6.49	9.92	6.00%	(31.60)%
Cigna Corp New	Health Care	$2,398,539	0.3%	(15.30)%	61.06	9.47	0.02%	14.60%
Abiomed Inc	Health Care	$505,603	0.1%	(12.14)%	12.88	57.59	0.00%	65.38%
Cme Group Inc	Financials	$2,309,723	0.2%	(12.13)%	58.89	23.02	1.82%	5.60%
Abbvie Inc Com	Health Care	$4,669,152	0.5%	(11.48)%	119.13	9.08	5.31%	8.77%

Historical Holdings Based Style Analysis
U.S. Large Company Stock Index Fund
For Three Years Ended March 31, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The next two style exposure charts illustrate the actual quarterly cap/style and style only segment exposures of the portfolio through history.

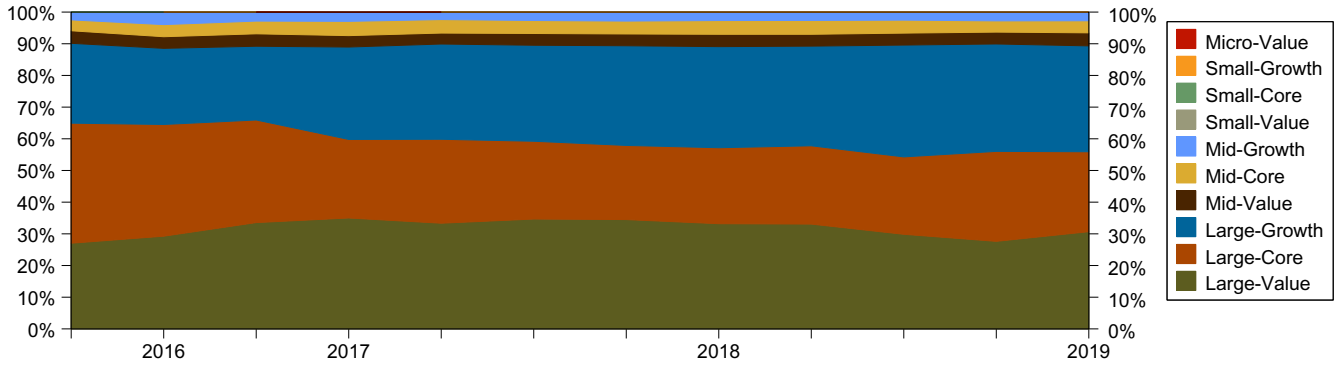
Average Style Map vs Callan Lg Cap Broad MF
Holdings for Three Years Ended March 31, 2019



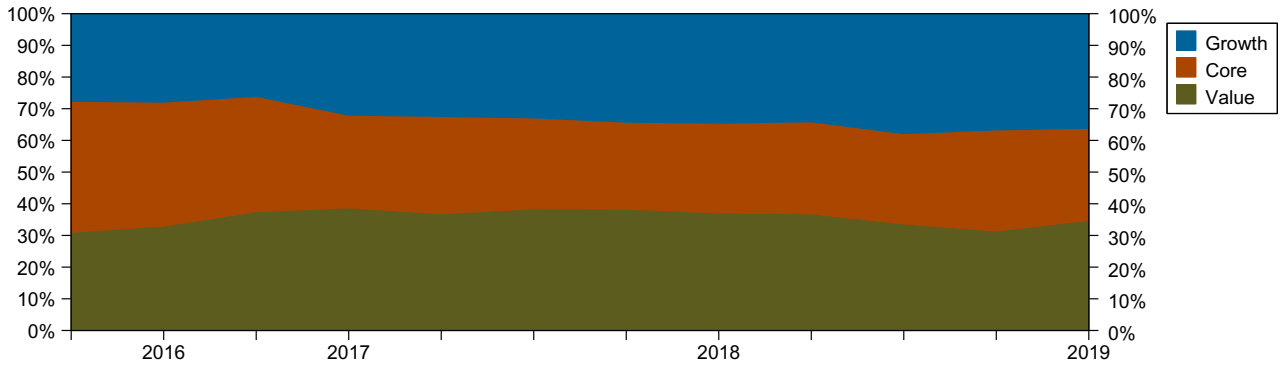
Average Style Exposure Matrix
Holdings for Three Years Ended March 31, 2019

	Value	Core	Growth	Total
Large	31.8% (103) 31.8% (103)	27.6% (95) 27.6% (95)	30.0% (87) 30.0% (88)	**89.4% (285)** **89.4%** (286)
Mid	3.8% (81) 3.8% (81)	4.0% (81) 4.0% (81)	2.7% (52) 2.7% (52)	**10.5% (214)** **10.5%** (214)
Small	0.0% (2) 0.0% (3)	0.0% (1) 0.0% (1)	0.0% (1) 0.0% (1)	**0.1% (4)** **0.1%** (5)
Micro	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (0)** **0.0%** (0)
Total	**35.6% (186)** **35.6% (187)**	**31.7% (177)** **31.7% (177)**	**32.7% (140)** **32.7% (141)**	**100.0% (503)** **100.0%** (505)

U.S. Large Company Stock Index Fund Historical Cap/Style Exposures



U.S. Large Company Stock Index Fund Historical Style Only Exposures



U.S. Small/Mid Company Stock Idx. Fund
Period Ended March 31, 2019

Investment Philosophy

The U.S. Small/Mid Company Stock Index Fund seeks to match the performance and overall characteristics of the Dow Jones U.S. Completion Total Stock Market Index in a risk-controlled, cost-effective manner. The Fund's approach to quality indexing aims to minimize tracking error, manage transaction costs and replicate the majority of the index and sample from the remaining smaller securities. This fund is managed by Mellon Capital Management.

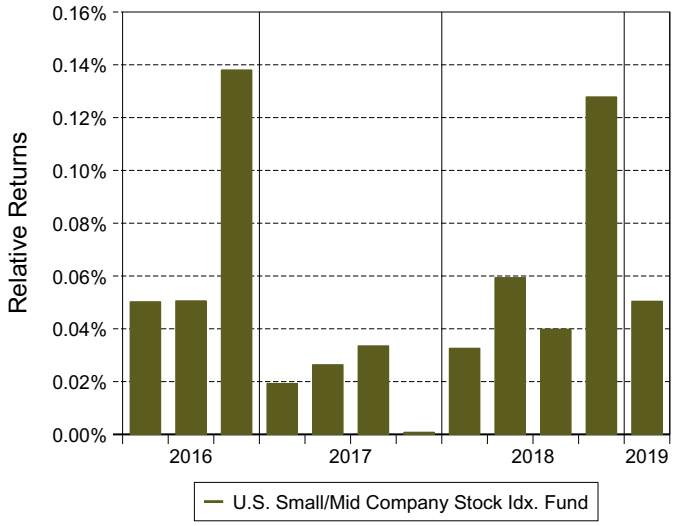
Quarterly Summary and Highlights

- U.S. Small/Mid Company Stock Idx. Fund's portfolio posted a 16.04% return for the quarter placing it in the 51 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 47 percentile for the last year.
- U.S. Small/Mid Company Stock Idx. Fund's portfolio outperformed the Dow Jones US Completion by 0.05% for the quarter and outperformed the Dow Jones US Completion for the year by 0.31%.

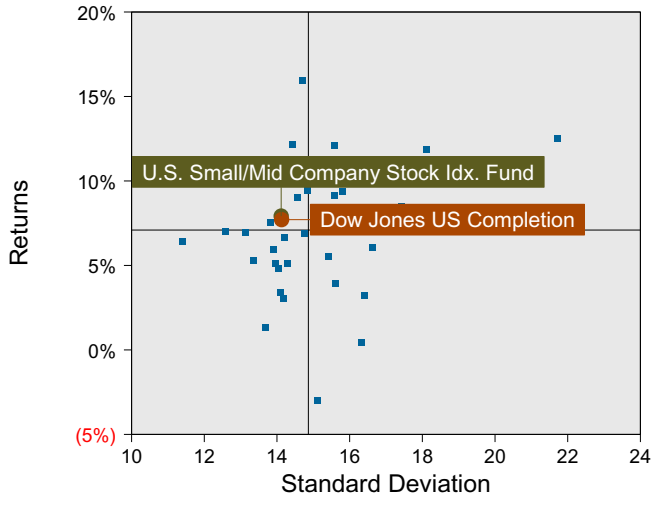
Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)

	Last Year	Last Quarter	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	11.75	21.59	18.66	12.13	18.69
25th Percentile	9.40	18.85	16.05	9.57	17.17
Median	3.22	16.11	11.59	7.09	15.93
75th Percentile	(0.80)	13.79	8.49	5.13	14.21
90th Percentile	(3.72)	12.42	6.01	2.86	12.92
U.S. Small/Mid Company Stock Idx. Fund ●	5.06	16.04	13.36	7.92	16.62
Dow Jones US Completion ▲	4.76	15.99	13.12	7.71	16.36

Relative Return vs Dow Jones US Completion



Callan Small/MidCap Broad Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

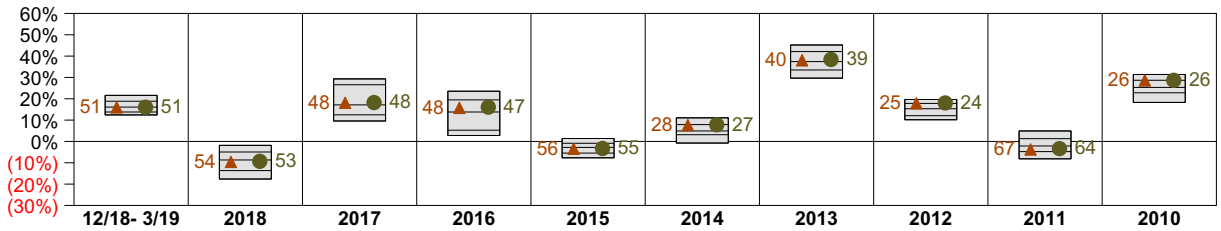


U.S. Small/Mid Company Stock Idx. Fund
Return Analysis Summary

Return Analysis

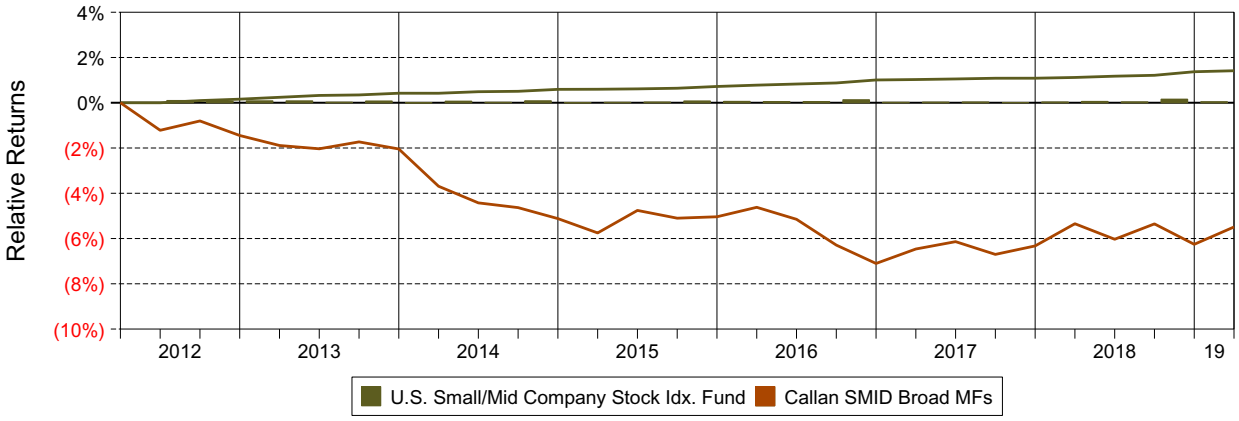
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)

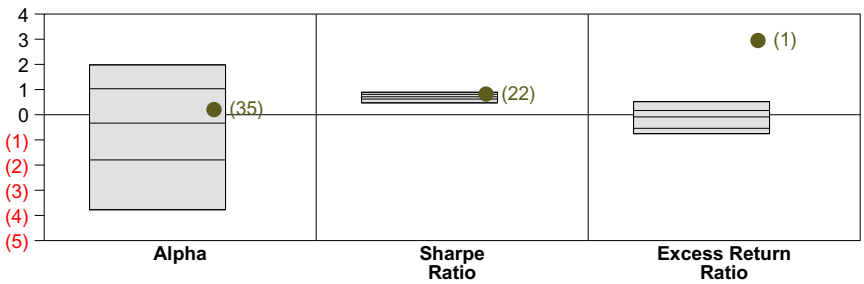


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	21.59	(1.83)	29.31	23.54	1.38	11.06	45.21	19.66	4.92	31.38
25th Percentile	18.85	(4.95)	26.58	19.48	(0.87)	7.90	42.13	17.83	1.30	28.67
Median	16.11	(8.69)	17.14	13.80	(2.80)	4.92	37.43	15.32	(2.13)	25.33
75th Percentile	13.79	(13.66)	12.47	5.26	(5.46)	3.15	33.50	12.08	(4.76)	22.82
90th Percentile	12.42	(17.62)	9.57	2.79	(7.67)	(0.76)	29.67	10.16	(8.15)	18.29
U.S. Small/Mid Company Stock Idx. Fund ●	16.04	(9.32)	18.21	16.08	(3.30)	7.81	38.41	18.04	(3.37)	28.65
Dow Jones US Completion ▲	15.99	(9.57)	18.12	15.75	(3.42)	7.63	38.05	17.89	(3.76)	28.62

Cumulative and Quarterly Relative Return vs Dow Jones US Completion



Risk Adjusted Return Measures vs Dow Jones US Completion
Rankings Against Callan Small/MidCap Broad Mutual Funds (Institutional Net)
Seven Years Ended March 31, 2019



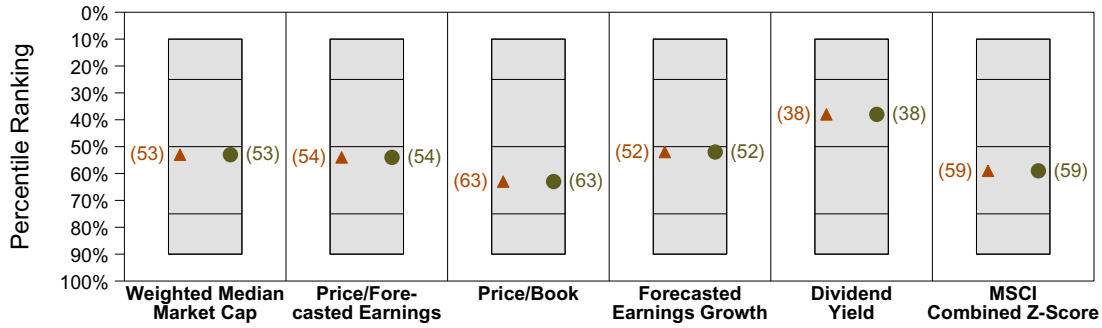
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.98	0.89	0.52
25th Percentile	1.03	0.81	0.17
Median	(0.33)	0.71	(0.09)
75th Percentile	(1.79)	0.62	(0.54)
90th Percentile	(3.77)	0.47	(0.75)
U.S. Small/Mid Company Stock Idx. Fund ●	0.20	0.82	2.95

U.S. Small/Mid Company Stock Idx. Fund
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Small/MidCap Broad Mutual Funds
as of March 31, 2019

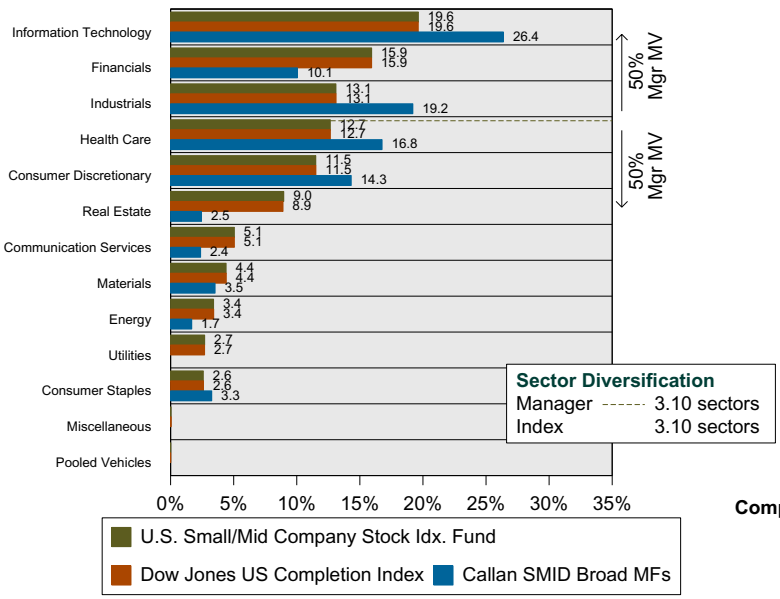


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	11.62	34.60	5.73	21.63	2.13	1.02
25th Percentile	7.70	27.48	4.55	18.09	1.78	0.83
Median	5.20	22.21	3.44	15.70	0.77	0.42
75th Percentile	3.25	14.49	1.72	11.76	0.51	(0.49)
90th Percentile	2.08	12.79	1.52	7.41	0.29	(0.59)
U.S. Small/Mid Company Stock Idx. Fund ●	4.59	21.36	2.25	15.11	1.46	0.11
Dow Jones US Completion Index ▲	4.61	21.31	2.25	15.10	1.46	0.11

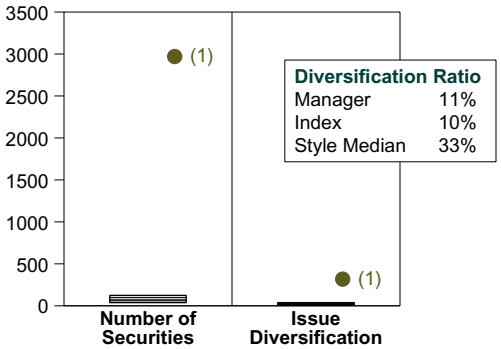
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
March 31, 2019



Diversification
March 31, 2019



	Number of Securities	Issue Diversification
10th Percentile	125	39
25th Percentile	98	30
Median	71	24
75th Percentile	60	17
90th Percentile	37	10
U.S. Small/Mid Company Stock Idx. Fund ●	2970	318
Dow Jones US Completion Index ▲	3259	317

U.S. Small/Mid Company Stock Idx. Fund
Top 10 Portfolio Holdings Characteristics
as of March 31, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Servicenow Inc	Information Technology	$3,566,451	0.9%	38.44%	44.49	72.43	0.00%	32.95%
Tesla Mtrs Inc	Consumer Discretionary	$3,080,627	0.8%	(15.91)%	48.34	47.30	0.00%	-
Worldpay Inc Cl A	Information Technology	$2,764,452	0.7%	48.50%	34.10	23.62	0.00%	14.74%
Workday Inc Cl A	Information Technology	$2,349,519	0.6%	20.77%	30.28	110.26	0.00%	32.10%
Square Inc Cl A	Information Technology	$1,859,654	0.5%	33.57%	24.52	89.94	0.00%	56.02%
Palo Alto Networks Inc	Information Technology	$1,859,059	0.5%	28.95%	22.77	39.78	0.00%	26.82%
Las Vegas Sands Corp	Consumer Discretionary	$1,810,260	0.5%	18.64%	47.25	18.36	5.05%	4.43%
T Mobile Us Inc	Communication Services	$1,752,795	0.4%	8.63%	58.75	17.05	0.00%	(3.10)%
Splunk Inc	Information Technology	$1,485,247	0.4%	18.84%	18.70	70.20	0.00%	31.00%
Lululemon Athletica Inc	Consumer Discretionary	$1,393,138	0.4%	34.75%	20.20	35.00	0.00%	18.44%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Conformis Inc	Health Care	$9,216	0.0%	704.47%	0.20	(7.06)	0.00%	-
Bio Path Holdings Inc	Health Care	$844	0.0%	482.57%	0.05	(1.83)	0.00%	-
Axsome Therapeutics Inc.	Health Care	$21,162	0.0%	404.61%	0.47	(14.99)	0.00%	-
Microbot Med Inc	Health Care	$7,174	0.0%	350.58%	0.03	(10.31)	0.00%	-
Diebold Inc	Information Technology	$73,965	0.0%	344.58%	0.85	29.44	3.61%	3.00%
Vermillion Inc	Health Care	$878	0.0%	283.33%	0.09	(9.83)	0.00%	-
Trevena Inc	Health Care	$15,044	0.0%	262.79%	0.14	(4.77)	0.00%	-
Cinedigm Corp	Communication Services	$1,504	0.0%	247.99%	0.07	14.62	0.00%	-
Plx Pharma Inc	Health Care	$340	0.0%	243.14%	0.05	(3.90)	0.00%	-
Avinger Inc	Health Care	$25	0.0%	218.67%	0.04	(1.86)	0.00%	-

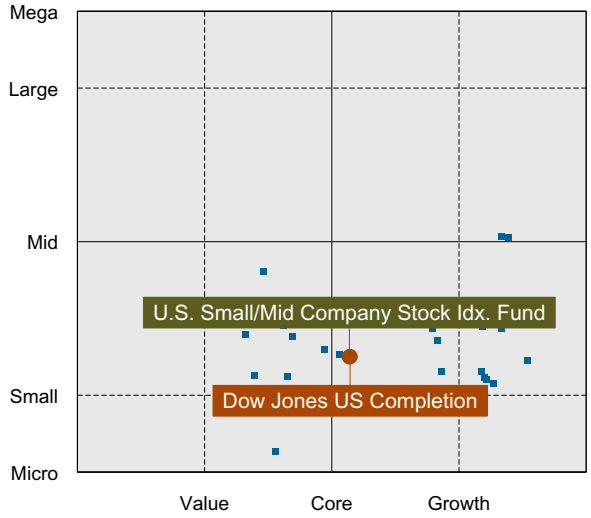
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Taronis Technologies Inc	Materials	$1	0.0%	(87.13)%	0.01	(0.50)	0.00%	-
Proteon Therapeutics Inc	Health Care	$175	0.0%	(77.84)%	0.01	(0.56)	0.00%	-
Aptinyx Inc	Health Care	$2,028	0.0%	(75.51)%	0.14	(1.75)	0.00%	-
Contrafect Corp	Health Care	$2,240	0.0%	(73.99)%	0.03	(1.00)	0.00%	-
Alta Mesa Res Inc Cl A	Energy	$2,920	0.0%	(73.50)%	0.05	(3.59)	0.00%	-
Aevi Genomic Medicine Inc	Health Care	$639	0.0%	(72.00)%	0.01	(0.40)	0.00%	-
Novavax Inc	Health Care	$16,954	0.0%	(70.05)%	0.26	(1.51)	0.00%	-
Atlas Financial Holdings Inc	Financials	$2,782	0.0%	(69.59)%	0.03	2.14	0.00%	19.08%
Global Eagle Entmt Inc	Communication Services	$3,593	0.0%	(68.21)%	0.07	(0.58)	0.00%	-
Camber Energy Inc	Energy	$0	0.0%	(67.90)%	0.00	(0.00)	0.00%	-

Historical Holdings Based Style Analysis
U.S. Small/Mid Company Stock Idx. Fund
For Three Years Ended March 31, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The next two style exposure charts illustrate the actual quarterly cap/style and style only segment exposures of the portfolio through history.

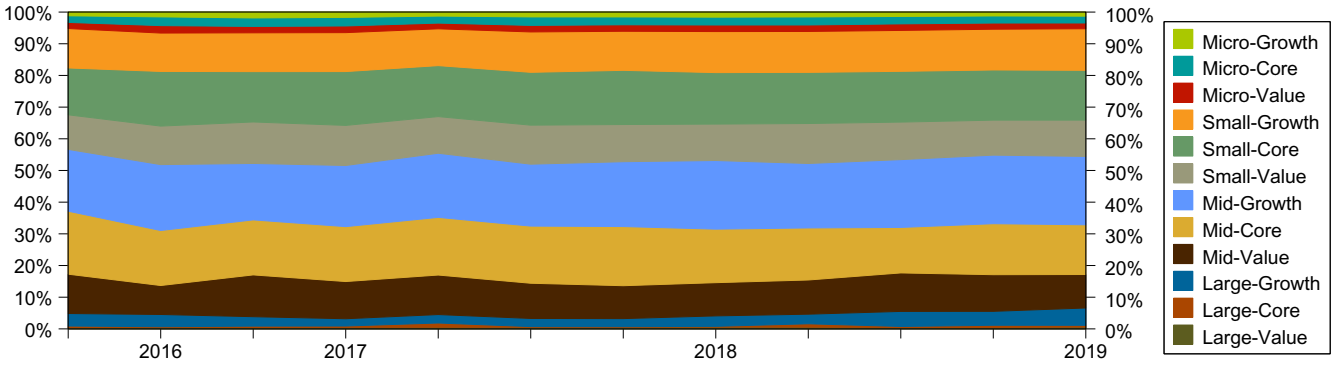
Average Style Map vs Callan SMID Broad MFs
Holdings for Three Years Ended March 31, 2019



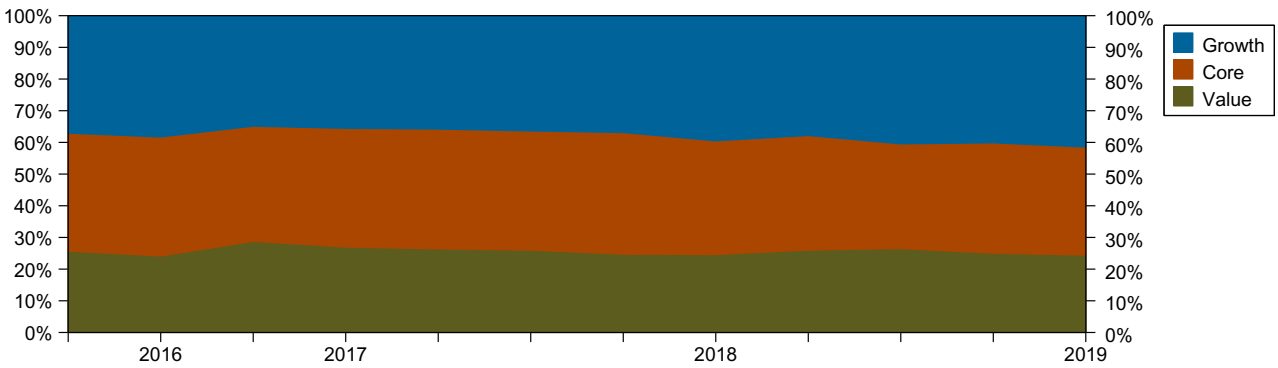
Average Style Exposure Matrix
Holdings for Three Years Ended March 31, 2019

	Value	Core	Growth	Total
Large	0.5% (1) 0.5% (1)	0.5% (3) 0.4% (2)	3.5% (8) 3.4% (8)	**4.5% (12)** **4.4%** (11)
Mid	11.3% (94) 11.4% (95)	17.2% (139) 17.3% (141)	20.4% (151) 20.3% (152)	**48.9% (384)** **48.9%** (388)
Small	11.9% (330) 11.8% (330)	16.2% (478) 16.2% (481)	12.5% (376) 12.6% (379)	**40.7% (1184)** **40.7%** (1190)
Micro	2.0% (440) 2.0% (523)	2.4% (684) 2.5% (879)	1.5% (269) 1.5% (302)	**5.9% (1393)** **6.0%** (1704)
Total	**25.8% (865)** **25.6%** (949)	**36.4% (1304)** **36.5%** (1503)	**37.9% (804)** **37.9%** (841)	**100.0% (2973)** **100.0%** (3293)

U.S. Small/Mid Company Stock Idx. Fund Historical Cap/Style Exposures



U.S. Small/Mid Company Stock Idx. Fund Historical Style Only Exposures



International Equity

International Company Stock Index Fund
Period Ended March 31, 2019

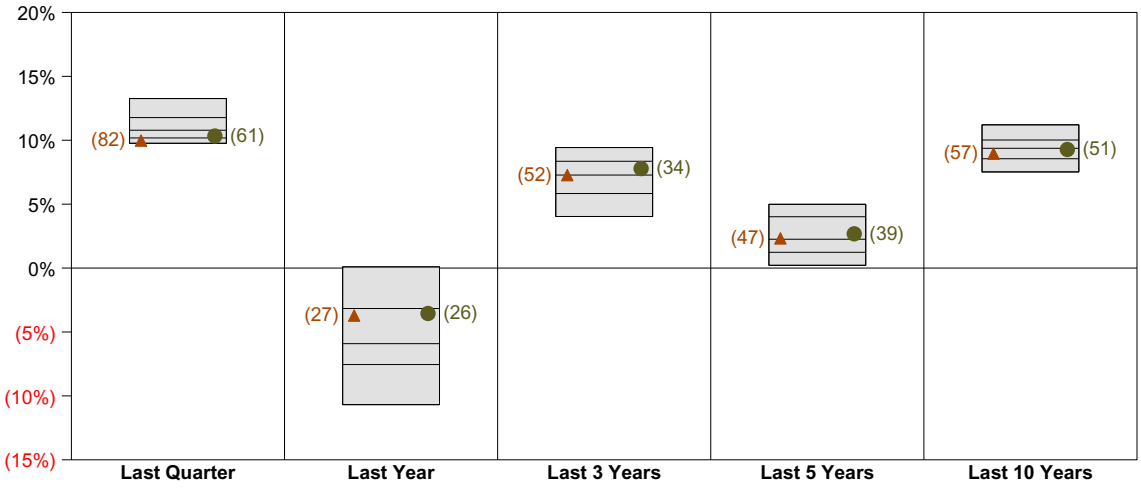
Investment Philosophy

The International Company Stock Index Fund seeks to track the performance of the MSCI EAFE Index. Within each country, full replication is used, holding each security in proportion to its market capitalization weight in the Index. The Fund may use over-the-counter foreign currency forward contracts to maintain the approximate currency exposure of the Index. Derivatives may be used to gain exposure, to provide liquidity for cash flows, to equitize dividend accruals, or for other purposes that facilitate meeting the Fund's objective. This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

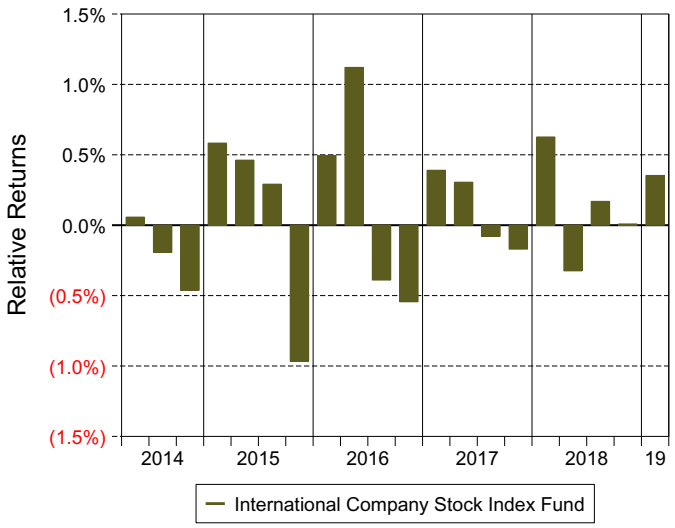
- International Company Stock Index Fund's portfolio posted a 10.33% return for the quarter placing it in the 61 percentile of the Callan Intl Eq Developed Mkts MFs group for the quarter and in the 26 percentile for the last year.
- International Company Stock Index Fund's portfolio outperformed the MSCI EAFE by 0.35% for the quarter and outperformed the MSCI EAFE for the year by 0.16%.

Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)

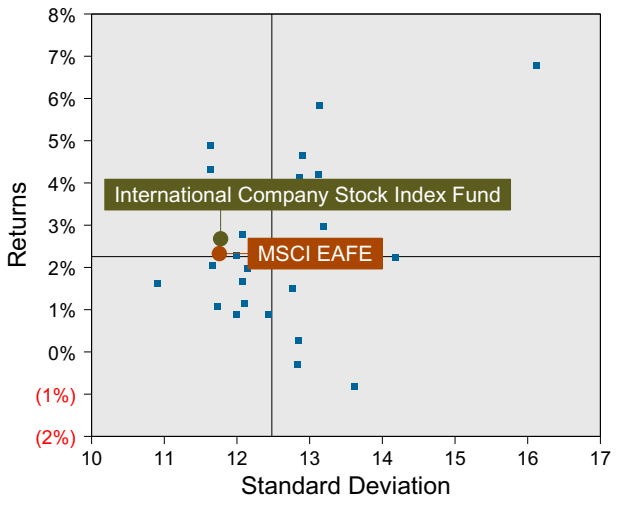


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	13.26	0.09	9.43	4.99	11.21
25th Percentile	11.77	(3.16)	8.36	4.02	10.02
Median	10.78	(5.91)	7.28	2.26	9.37
75th Percentile	10.18	(7.55)	5.83	1.23	8.56
90th Percentile	9.76	(10.69)	4.03	0.22	7.52
International Company Stock Index Fund ●	10.33	(3.55)	7.78	2.68	9.28
MSCI EAFE ▲	9.98	(3.71)	7.27	2.33	8.96

Relative Return vs MSCI EAFE



Callan Intl Eq Developed Mkts MFs (Institutional Net) Annualized Five Year Risk vs Return

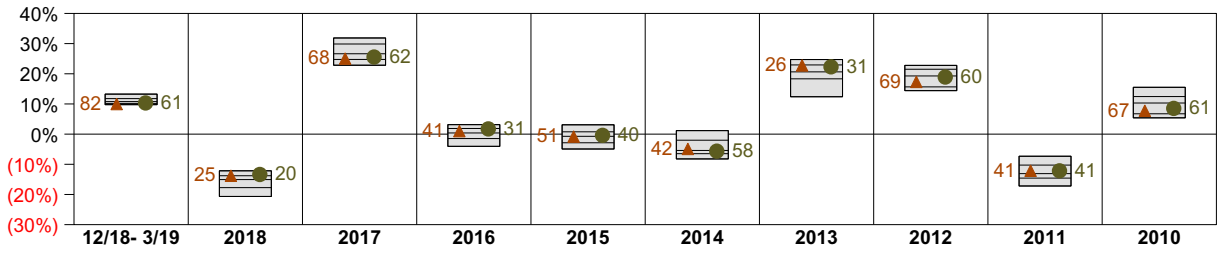


International Company Stock Index Fund
Return Analysis Summary

Return Analysis

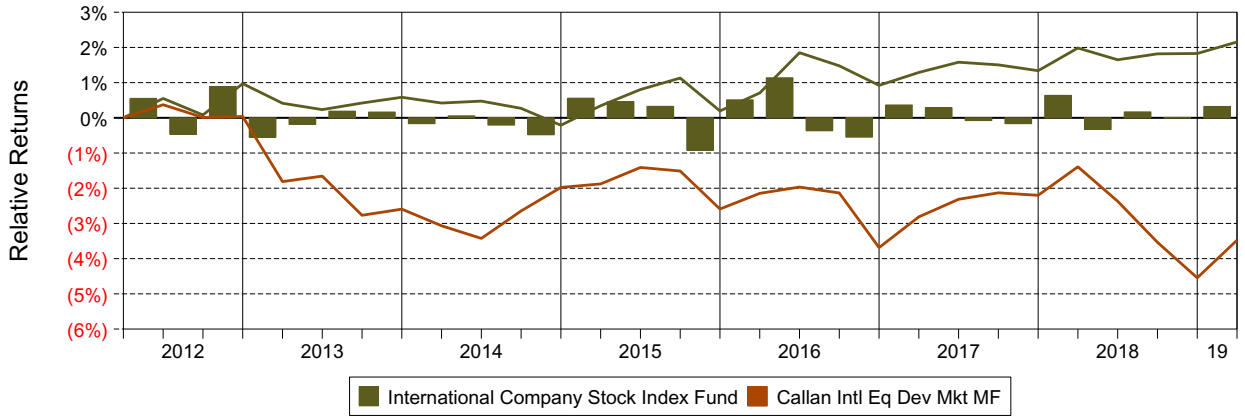
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)

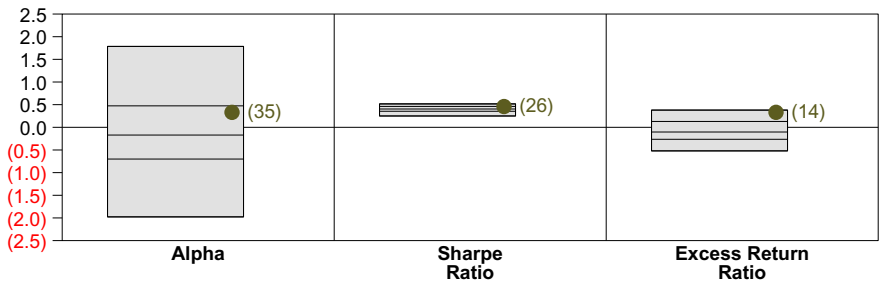


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	13.26	(12.16)	31.87	3.15	3.09	1.17	24.72	22.78	(7.33)	15.51
25th Percentile	11.77	(13.79)	29.87	1.87	0.76	(2.02)	22.94	21.50	(10.27)	12.45
Median	10.78	(15.06)	26.64	0.39	(0.73)	(5.41)	20.64	19.28	(13.09)	10.31
75th Percentile	10.18	(17.73)	24.76	(1.47)	(2.86)	(6.48)	18.33	15.66	(14.58)	6.74
90th Percentile	9.76	(20.66)	22.83	(4.05)	(4.93)	(8.23)	12.38	14.42	(17.19)	5.40
International Company Stock Index Fund ●	10.33	(13.37)	25.55	1.73	(0.41)	(5.65)	22.31	18.92	(12.17)	8.52
MSCI EAFE ▲	9.98	(13.79)	25.03	1.00	(0.81)	(4.90)	22.78	17.32	(12.14)	7.75

Cumulative and Quarterly Relative Return vs MSCI EAFE



Risk Adjusted Return Measures vs MSCI EAFE
Rankings Against Callan Intl Eq Developed Mkts MFs (Institutional Net)
Seven Years Ended March 31, 2019



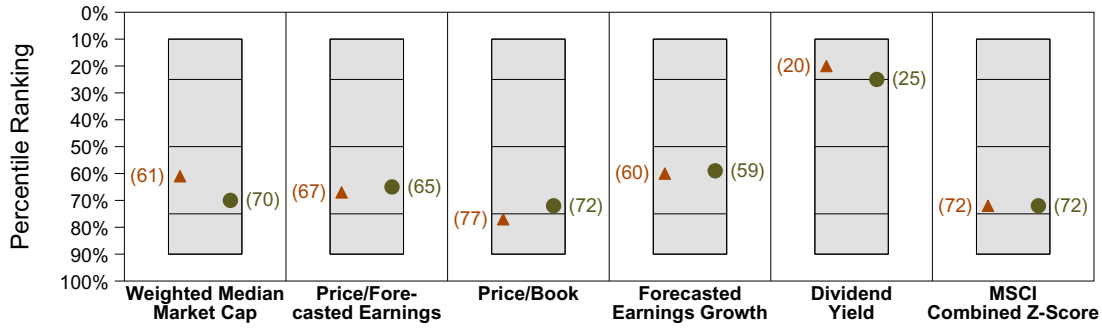
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.79	0.52	0.38
25th Percentile	0.47	0.46	0.13
Median	(0.17)	0.40	(0.10)
75th Percentile	(0.70)	0.35	(0.26)
90th Percentile	(1.98)	0.25	(0.52)
International Company Stock Index Fund ●	0.33	0.46	0.33

International Company Stock Index Fund
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Intl Eq Developed Mkts MFs
as of March 31, 2019

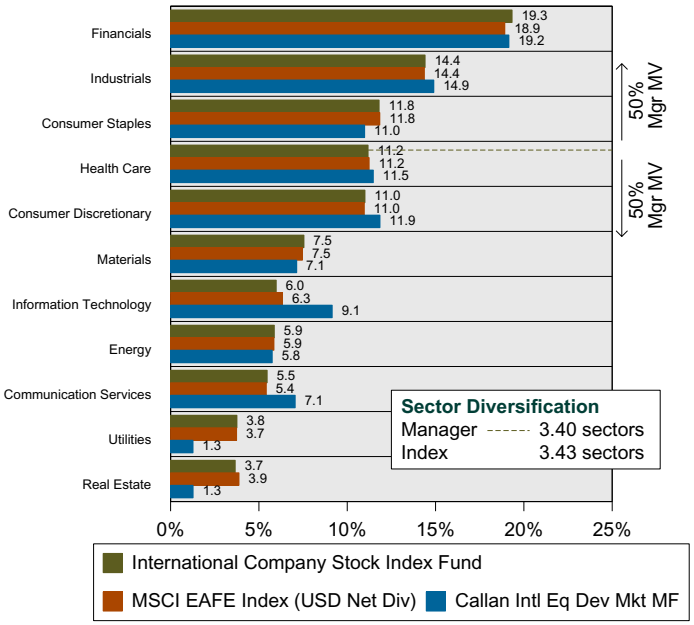


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	59.01	18.87	3.03	14.45	3.72	0.76
25th Percentile	46.35	16.23	2.33	13.39	3.25	0.51
Median	37.80	14.37	1.80	9.65	2.92	0.16
75th Percentile	30.26	12.97	1.60	8.50	2.41	(0.04)
90th Percentile	19.68	11.31	1.42	7.97	1.71	(0.32)
International Company Stock Index Fund ●	34.63	13.42	1.61	9.03	3.26	(0.01)
MSCI EAFE Index (USD Net Div) ▲	36.34	13.37	1.59	8.97	3.41	(0.02)

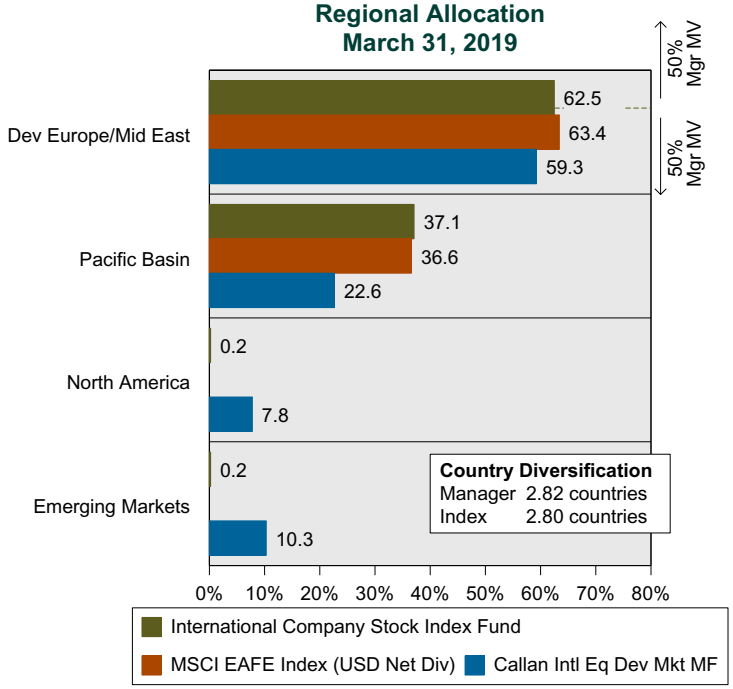
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.

Sector Allocation
March 31, 2019



Regional Allocation
March 31, 2019

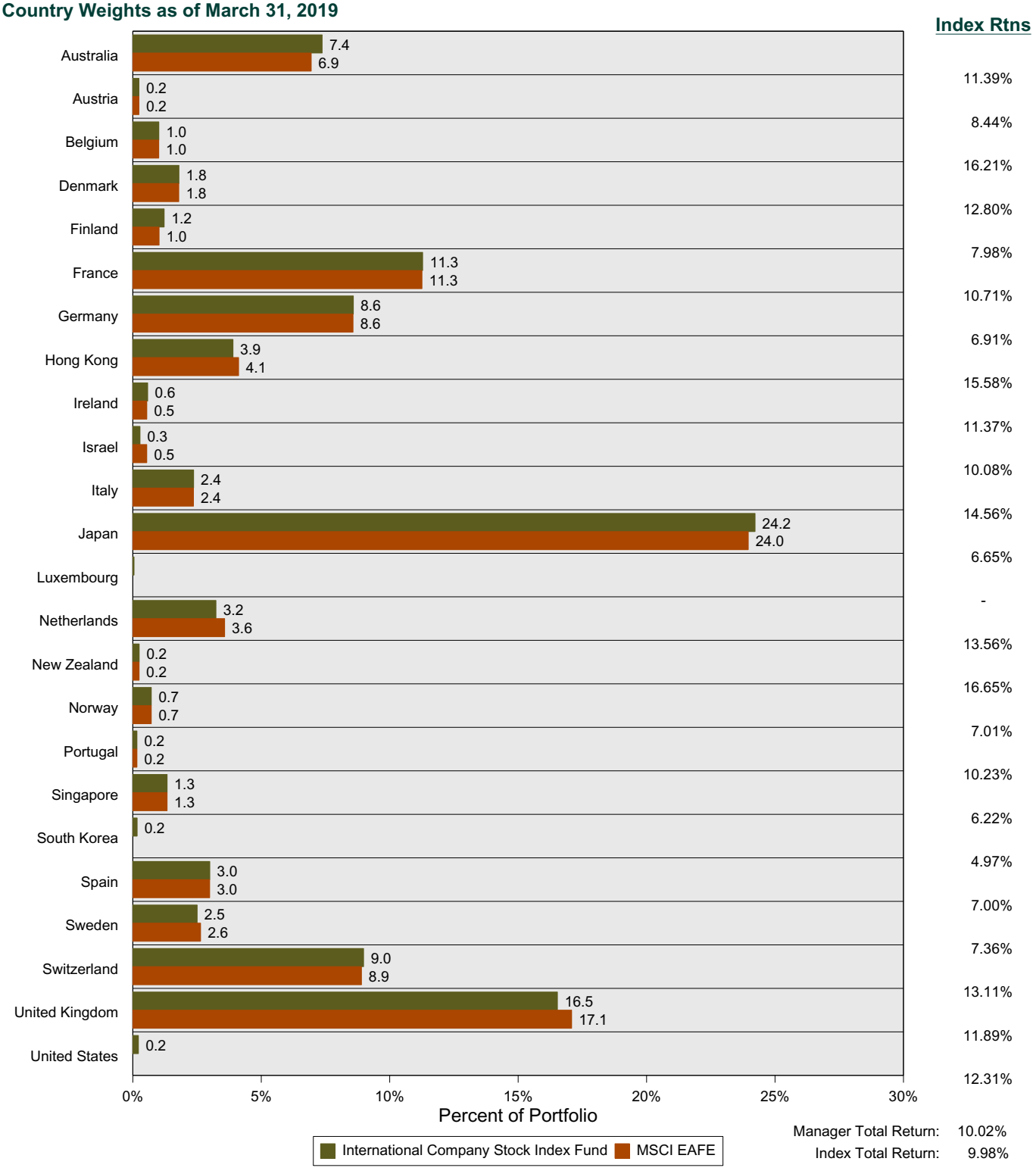


Country Allocation
International Company Stock Index Fund VS MSCI EAFE Index (USD Net Div)

Country Allocation

The chart below contrasts the portfolio's country allocation with that of the index as of March 31, 2019. This chart is useful because large deviations in country allocation relative to the index are often good predictors of tracking error in the subsequent quarter. To the extent that the portfolio allocation is similar to the index, the portfolio should experience more "index-like" performance. In order to illustrate the performance effect on the portfolio and index of these country allocations, the individual index country returns are also shown.

Country Weights as of March 31, 2019



International Company Stock Index Fund
Top 10 Portfolio Holdings Characteristics
as of March 31, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nestle S A Shs Nom New	Consumer Staples	$3,171,341	2.1%	17.72%	291.88	21.61	2.58%	8.72%
Novartis	Health Care	$2,265,323	1.5%	16.42%	245.31	17.32	2.98%	6.92%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	$2,102,675	1.4%	15.14%	193.54	14.81	3.03%	4.59%
Hsbc Holdings (Gb)	Financials	$1,813,771	1.2%	1.12%	163.20	11.23	6.05%	3.44%
Bp Plc Shs	Energy	$1,585,606	1.1%	16.86%	148.07	12.86	5.58%	27.32%
Royal Dutch Shell A Shs	Energy	$1,539,471	1.0%	8.75%	138.21	11.50	5.85%	16.80%
Toyota Motor Corp	Consumer Discretionary	$1,477,151	1.0%	0.39%	191.24	7.94	3.39%	4.40%
Total Sa Act	Energy	$1,472,318	1.0%	6.64%	146.89	9.96	5.13%	13.61%
Aia Group Ltd Com Par Usd 1	Financials	$1,305,969	0.9%	19.91%	120.23	17.87	1.41%	25.04%
Royal Dutch Shell 'b' Shs	Energy	$1,287,153	0.9%	7.71%	118.50	11.35	5.94%	14.35%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Allied Mining & Proc.	Materials	$85,701	0.1%	73.19%	15.55	9.22	4.36%	(8.71)%
Zalando	Consumer Discretionary	$47,865	0.0%	52.36%	9.82	98.54	0.00%	14.30%
Micro Focus International Pl Ord	Information Technology	$123,402	0.1%	51.27%	10.68	11.77	4.46%	(2.10)%
Hitachi Chemical Co Ltd Shs	Materials	$24,967	0.0%	48.12%	4.62	14.24	2.45%	7.24%
Shimadzu Corp Shs	Information Technology	$70,225	0.0%	46.50%	8.56	26.35	0.81%	10.92%
Softbank Corp Ord	Communication Services	$871,772	0.6%	46.09%	106.85	8.71	0.41%	(26.38)%
Adyen NV Common Stock Eur.01	Information Technology	$88,455	0.1%	44.32%	23.18	101.02	0.00%	38.25%
Aker Bp Asa Shs	Energy	$42,060	0.0%	44.00%	12.84	23.44	4.03%	11.40%
Next Group Plc Shs	Consumer Discretionary	$111,027	0.1%	43.05%	10.00	12.45	2.96%	3.11%
Olympus Corp	Health Care	$138,940	0.1%	42.09%	14.89	23.35	0.58%	11.29%

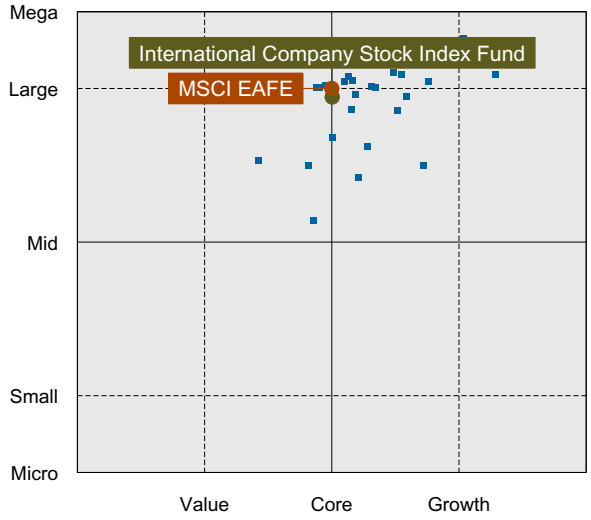
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Foreningssparbanken	Financials	$153,037	0.1%	(29.65)%	16.03	7.21	10.81%	3.13%
Iliad Act	Communication Services	$29,087	0.0%	(28.32)%	5.91	13.95	1.01%	9.35%
Bezeq The Israeli Telecom Cp Ord	Communication Services	$16,184	0.0%	(28.04)%	1.94	7.40	4.51%	(16.15)%
Eisai Co	Health Care	$156,409	0.1%	(26.64)%	16.65	27.75	2.41%	13.85%
Tui	Consumer Discretionary	$45,305	0.0%	(25.66)%	5.73	6.96	8.29%	3.50%
Green Cross Coa Co.	Consumer Staples	$17,238	0.0%	(24.58)%	3.56	18.65	1.12%	9.76%
Yamazaki Baking Co	Consumer Staples	$21,111	0.0%	(22.79)%	3.57	22.86	1.11%	24.49%
Dainippon Sumitomo Pharma Co Ord	Health Care	$42,939	0.0%	(22.06)%	9.84	25.44	0.66%	(1.87)%
Telefonica Deutschland Hldg Ag Npv	Communication Services	$24,772	0.0%	(19.52)%	9.35	(261.92)	9.65%	-
Osram Licht Ag	Industrials	$35,653	0.0%	(19.30)%	3.36	17.11	3.59%	16.30%

Historical Holdings Based Style Analysis
International Company Stock Index Fund
For Three Years Ended March 31, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various region and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The next two style exposure charts illustrate the actual quarterly region/style and style only segment exposures of the portfolio through history.

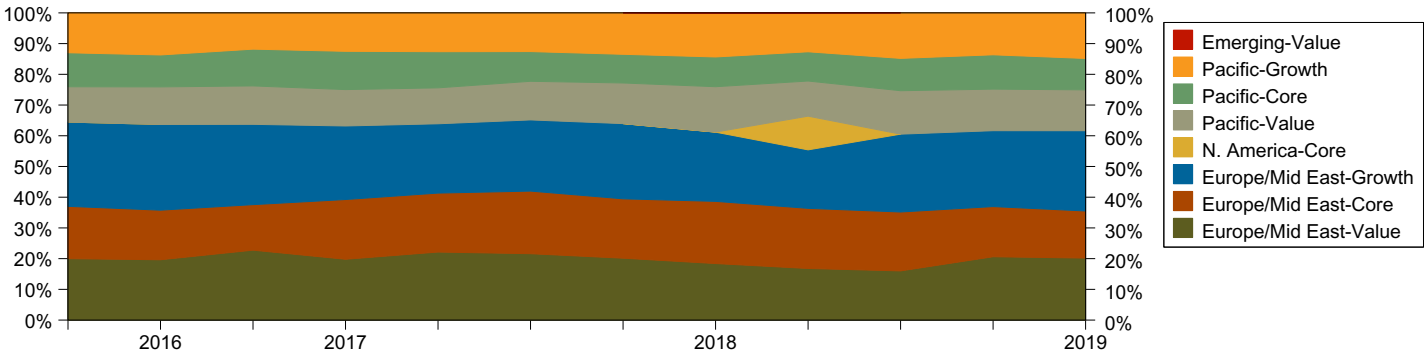
Average Style Map vs Callan Intl Eq Dev Mkt MF
Holdings for Three Years Ended March 31, 2019



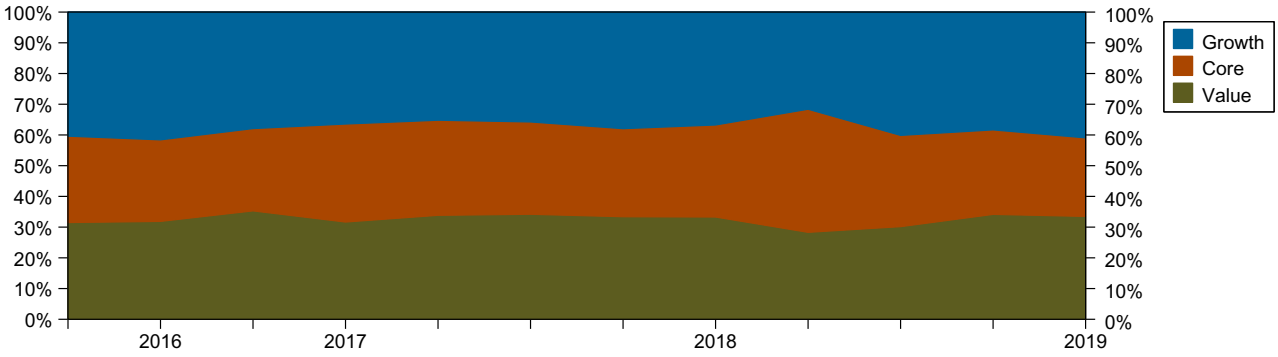
Average Style Exposure Matrix
Holdings for Three Years Ended March 31, 2019

	Value	Core	Growth	Total
Europe/ Mid East	19.8% (128) 20.0% (132)	18.1% (131) 18.3% (133)	24.4% (182) 24.8% (190)	**62.4% (441)** **63.1% (455)**
N. America	0.0% (0) 0.0% (0)	0.9% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.9% (0)** **0.0% (0)**
Pacific	12.7% (143) 13.1% (143)	10.7% (149) 10.6% (149)	13.3% (176) 13.2% (178)	**36.7% (468)** **36.9% (470)**
Emerging	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (0)** **0.0% (0)**
Total	**32.6% (271)** **33.1% (275)**	**29.7% (280)** **28.9% (282)**	**37.8% (358)** **38.0% (368)**	**100.0% (909)** **100.0% (925)**

International Company Stock Index Fund Historical Region/Style Exposures



International Company Stock Index Fund Historical Style Only Exposures



Domestic Fixed Income

Short Term Investment Fund
Period Ended March 31, 2019

Investment Philosophy

The Short Term Investment Fund seeks to achieve the highest current income consistent with maintaining liquidity and safety of principal. This fund is managed by the Pennsylvania State Treasurer.

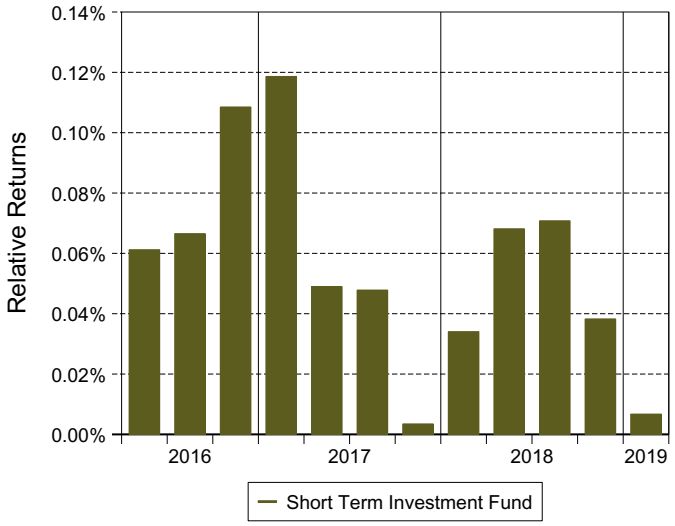
Quarterly Summary and Highlights

- Short Term Investment Fund's portfolio posted a 0.61% return for the quarter placing it in the 93 percentile of the Callan Cash Database group for the quarter and in the 75 percentile for the last year.
- Short Term Investment Fund's portfolio outperformed the 3-month Treasury Bill by 0.01% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.19%.

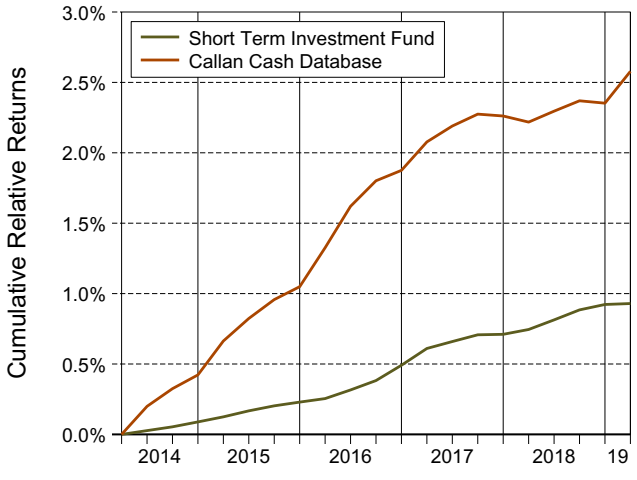
Performance vs Callan Cash Database (Gross)

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.06	2.86	1.95	1.47	1.91
25th Percentile	1.01	2.75	1.67	1.37	1.52
Median	0.79	2.49	1.54	1.08	0.93
75th Percentile	0.67	2.31	1.44	0.99	0.65
90th Percentile	0.61	2.15	1.26	0.81	0.52
Short Term Investment Fund ●	0.61	2.31	1.42	0.93	0.59
3-month Treasury Bill ▲	0.60	2.12	1.19	0.74	0.43

Relative Return vs 3-month Treasury Bill



Cumulative Returns vs 3-month Treasury Bill

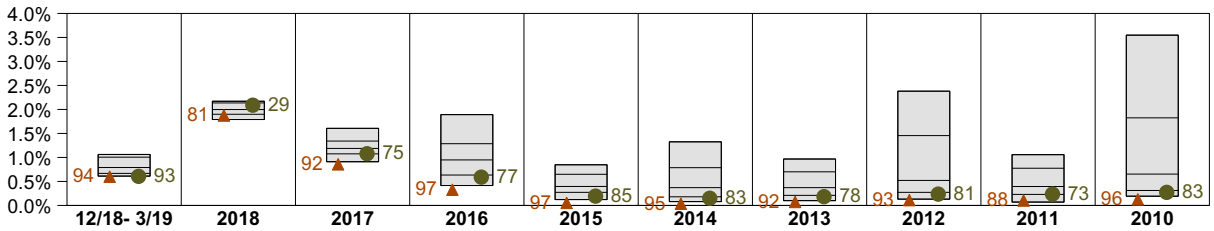


Short Term Investment Fund
Return Analysis Summary

Return Analysis

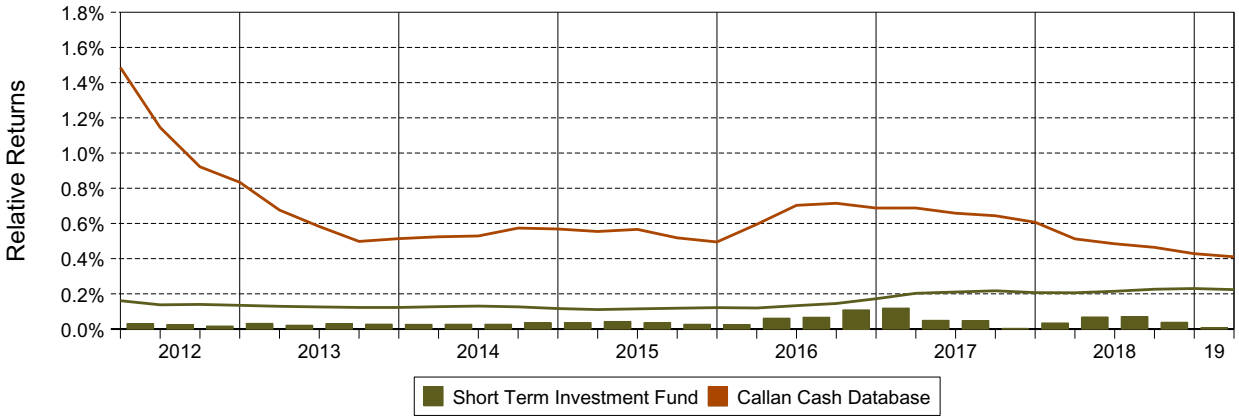
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and 12 quarter rolling manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Cash Database (Gross)

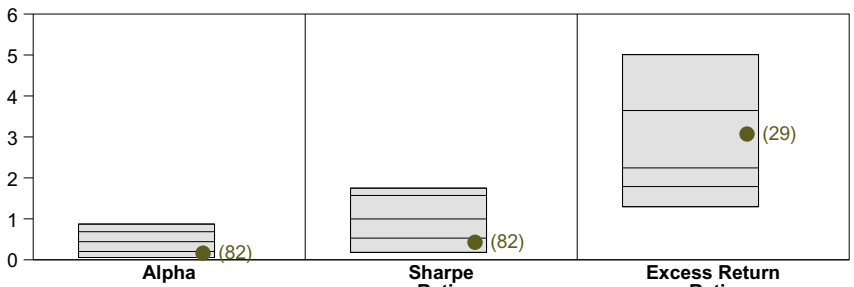


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	1.06	2.17	1.61	1.89	0.85	1.33	0.97	2.38	1.06	3.55
25th Percentile	1.01	2.14	1.34	1.29	0.65	0.79	0.70	1.45	0.78	1.83
Median	0.79	2.00	1.19	0.95	0.40	0.37	0.37	0.52	0.39	0.65
75th Percentile	0.67	1.90	1.08	0.63	0.27	0.18	0.21	0.27	0.23	0.31
90th Percentile	0.61	1.79	0.91	0.41	0.12	0.08	0.10	0.13	0.07	0.19
Short Term Investment Fund ●	0.61	2.09	1.08	0.59	0.19	0.15	0.18	0.24	0.24	0.27
3-month Treasury Bill ▲	0.60	1.87	0.86	0.33	0.05	0.03	0.07	0.11	0.10	0.13

Rolling 12 Quarter and Quarterly Relative Return vs 3-month Treasury Bill



Risk Adjusted Return Measures vs 3-month Treasury Bill
Rankings Against Callan Cash Database (Gross)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.87	1.75	5.01
25th Percentile	0.69	1.57	3.64
Median	0.44	1.00	2.24
75th Percentile	0.20	0.53	1.79
90th Percentile	0.06	0.18	1.30
Short Term Investment Fund ●	0.16	0.43	3.07

Stable Value Fund
Period Ended March 31, 2019

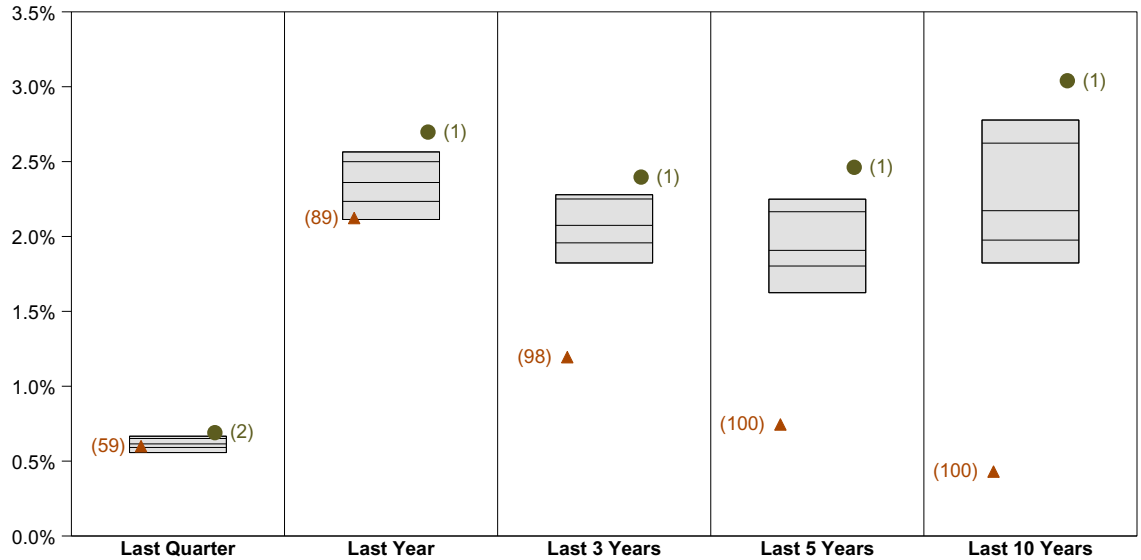
Investment Philosophy

The Stable Value Fund seeks to provide safety of principal and a stable yield consistent with that of a high-quality blend of short and intermediate fixed income securities, with the flexibility to move to cash equivalents to preserve principal. This fund is managed by Invesco.

Quarterly Summary and Highlights

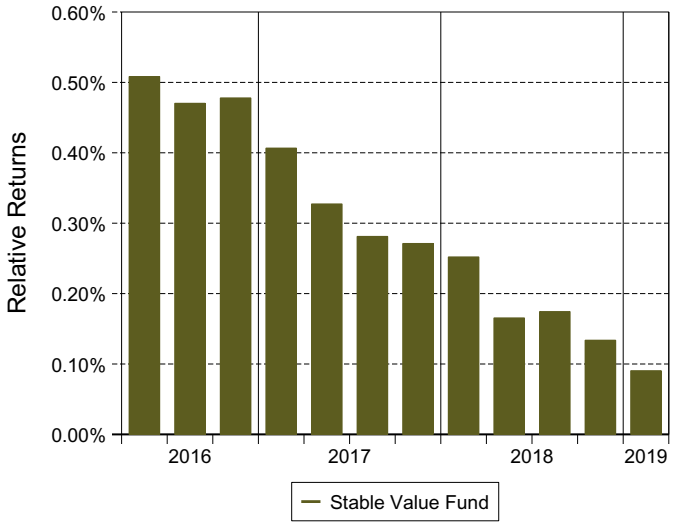
- Stable Value Fund's portfolio posted a 0.69% return for the quarter placing it in the 2 percentile of the Callan Stable Value group for the quarter and in the 1 percentile for the last year.
- Stable Value Fund's portfolio outperformed the 3-month Treasury Bill by 0.09% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.57%.

Performance vs Callan Stable Value (Gross)

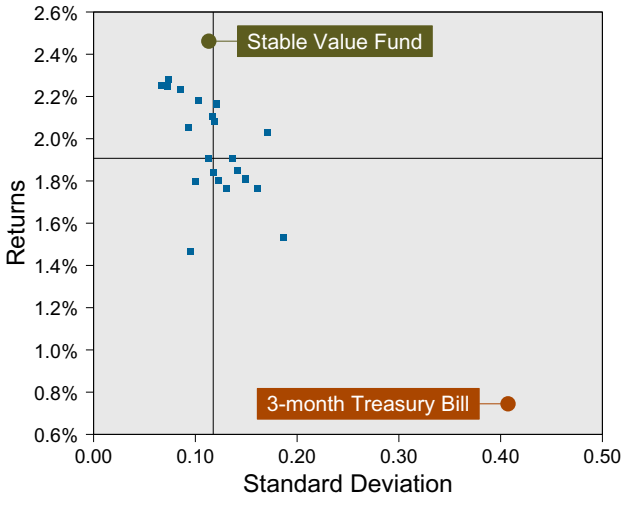


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.67	2.56	2.28	2.25	2.78
25th Percentile	0.65	2.50	2.25	2.17	2.62
Median	0.62	2.36	2.07	1.91	2.17
75th Percentile	0.59	2.23	1.96	1.80	1.98
90th Percentile	0.56	2.11	1.82	1.62	1.82
Stable Value Fund ●	0.69	2.70	2.40	2.46	3.04
3-month Treasury Bill ▲	0.60	2.12	1.19	0.74	0.43

Relative Return vs 3-month Treasury Bill



Callan Stable Value (Gross) Annualized Five Year Risk vs Return

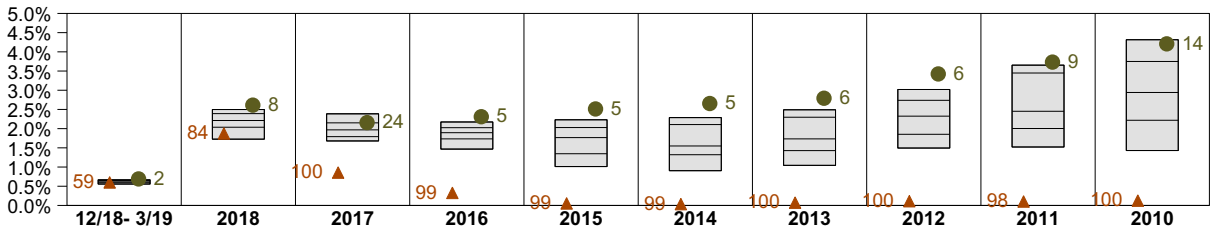


Stable Value Fund
Return Analysis Summary

Return Analysis

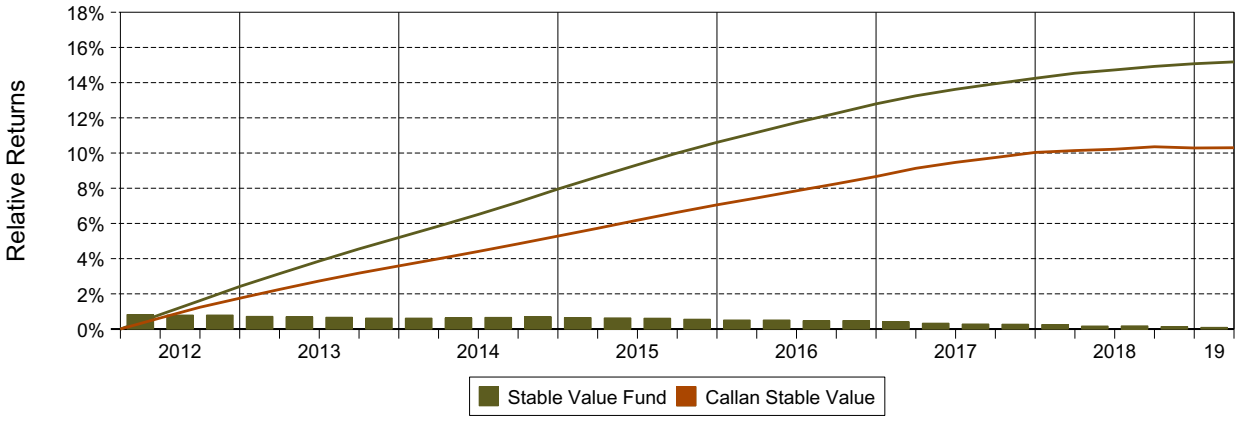
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Stable Value (Gross)

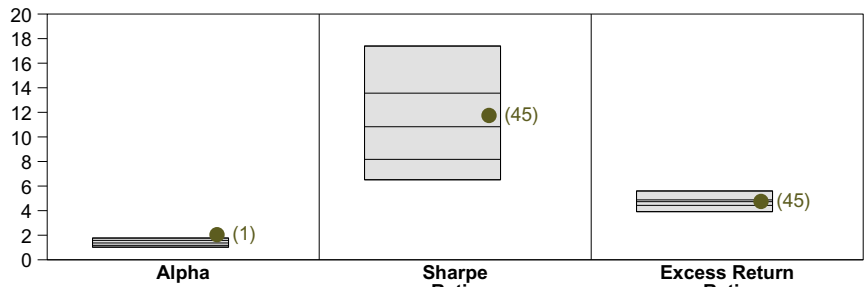


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	0.67	2.50	2.39	2.17	2.23	2.29	2.49	3.02	3.65	4.32
25th Percentile	0.65	2.39	2.15	2.03	2.03	2.11	2.30	2.74	3.45	3.75
Median	0.62	2.21	1.97	1.89	1.77	1.55	1.73	2.32	2.45	2.94
75th Percentile	0.59	2.04	1.79	1.73	1.35	1.32	1.43	1.85	2.00	2.22
90th Percentile	0.56	1.73	1.68	1.47	1.01	0.91	1.04	1.49	1.52	1.43
Stable Value Fund ●	0.69	2.61	2.16	2.31	2.51	2.65	2.79	3.42	3.73	4.21
3-month Treasury Bill ▲	0.60	1.87	0.86	0.33	0.05	0.03	0.07	0.11	0.10	0.13

Cumulative and Quarterly Relative Return vs 3-month Treasury Bill



Risk Adjusted Return Measures vs 3-month Treasury Bill
Rankings Against Callan Stable Value (Gross)
Seven Years Ended March 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.77	17.40	5.60
25th Percentile	1.58	13.56	4.88
Median	1.37	10.83	4.73
75th Percentile	1.18	8.17	4.43
90th Percentile	1.03	6.51	3.92
Stable Value Fund ●	2.04	11.75	4.75

U.S. Bond Index Fund
Period Ended March 31, 2019

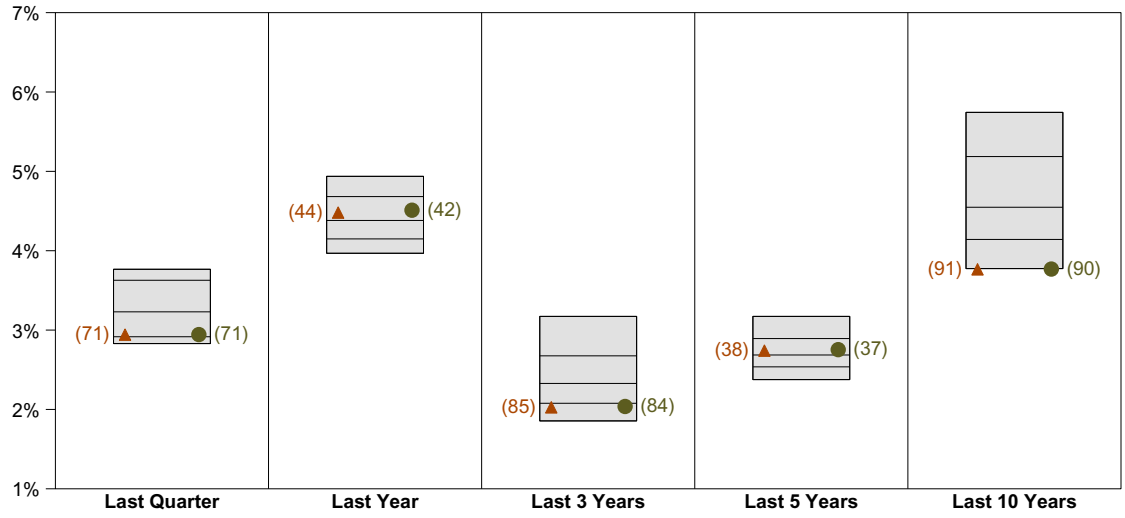
Investment Philosophy

The objective of the Fund is to track the performance of the Bloomberg US Aggregate Bond Index. In meeting this objective, the Fund may invest in securities (including those issued through private placements) and a combination of other collective funds that together are designed to track the performance of the Bloomberg US Aggregate Bond Index. This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

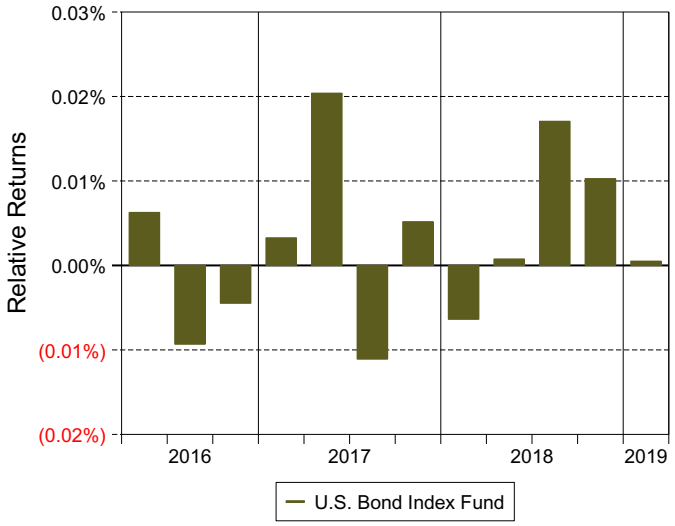
- U.S. Bond Index Fund's portfolio posted a 2.94% return for the quarter placing it in the 71 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 42 percentile for the last year.
- U.S. Bond Index Fund's portfolio outperformed the Blmbg Aggregate by 0.00% for the quarter and outperformed the Blmbg Aggregate for the year by 0.03%.

Performance vs Callan Core Bond Mutual Funds (Institutional Net)

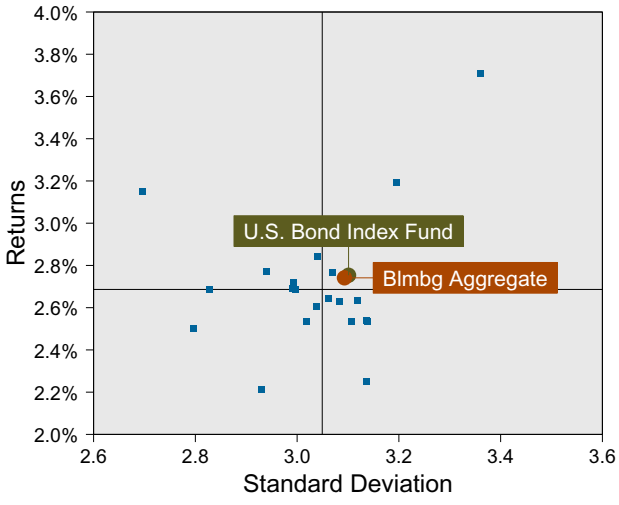


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	3.77	4.94	3.17	3.17	5.74
25th Percentile	3.63	4.68	2.68	2.89	5.19
Median	3.23	4.38	2.33	2.69	4.55
75th Percentile	2.92	4.15	2.08	2.54	4.14
90th Percentile	2.83	3.97	1.86	2.38	3.77
U.S. Bond Index Fund ●	2.94	4.51	2.04	2.75	3.77
Blmbg Aggregate ▲	2.94	4.48	2.03	2.74	3.77

Relative Return vs Blmbg Aggregate



Callan Core Bond Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

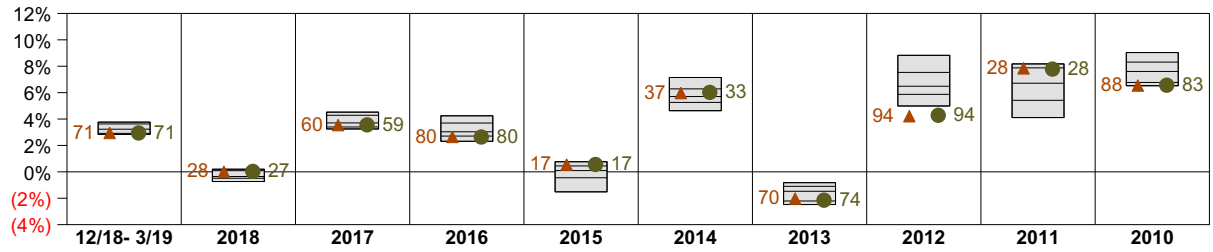


U.S. Bond Index Fund
Return Analysis Summary

Return Analysis

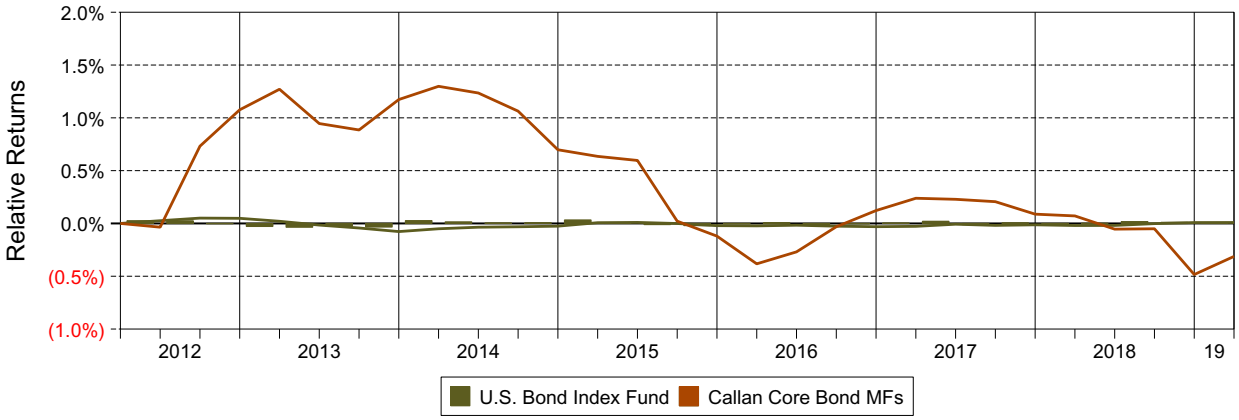
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Core Bond Mutual Funds (Institutional Net)

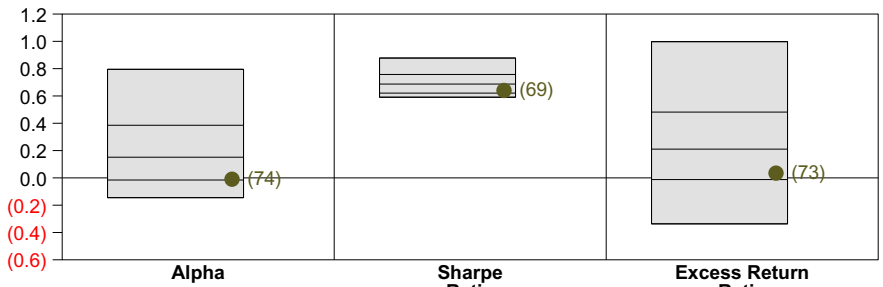


	12/18- 3/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	3.77	0.20	4.52	4.25	0.77	7.15	(0.82)	8.83	8.18	9.04
25th Percentile	3.63	0.09	4.28	3.70	0.45	6.29	(1.10)	7.53	7.88	8.31
Median	3.23	(0.35)	3.71	3.03	0.10	5.71	(1.47)	6.49	6.71	7.61
75th Percentile	2.92	(0.49)	3.40	2.71	(0.45)	5.26	(2.21)	5.87	5.42	6.77
90th Percentile	2.83	(0.73)	3.25	2.31	(1.52)	4.63	(2.48)	4.99	4.11	6.52
U.S. Bond Index Fund ●	2.94	0.03	3.56	2.64	0.55	6.02	(2.15)	4.28	7.78	6.56
Blmbg Aggregate ▲	2.94	0.01	3.54	2.65	0.55	5.97	(2.02)	4.21	7.84	6.54

Cumulative and Quarterly Relative Return vs Blmbg Aggregate



Risk Adjusted Return Measures vs Blmbg Aggregate
Rankings Against Callan Core Bond Mutual Funds (Institutional Net)
Seven Years Ended March 31, 2019



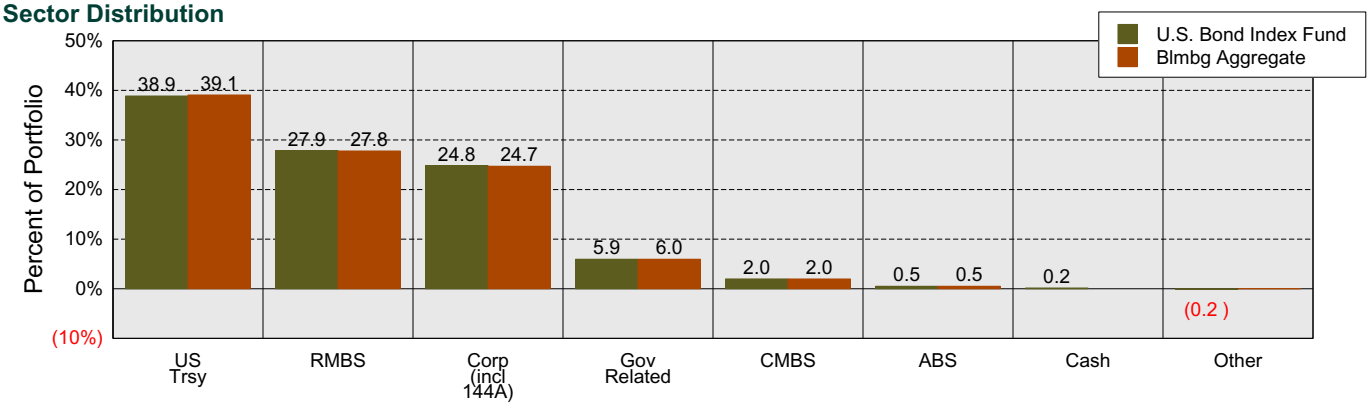
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.80	0.88	1.00
25th Percentile	0.39	0.76	0.48
Median	0.15	0.69	0.21
75th Percentile	(0.02)	0.62	(0.01)
90th Percentile	(0.14)	0.59	(0.34)
U.S. Bond Index Fund ●	(0.01)	0.64	0.03

U.S. Bond Index Fund
Portfolio Characteristics Summary
As of March 31, 2019

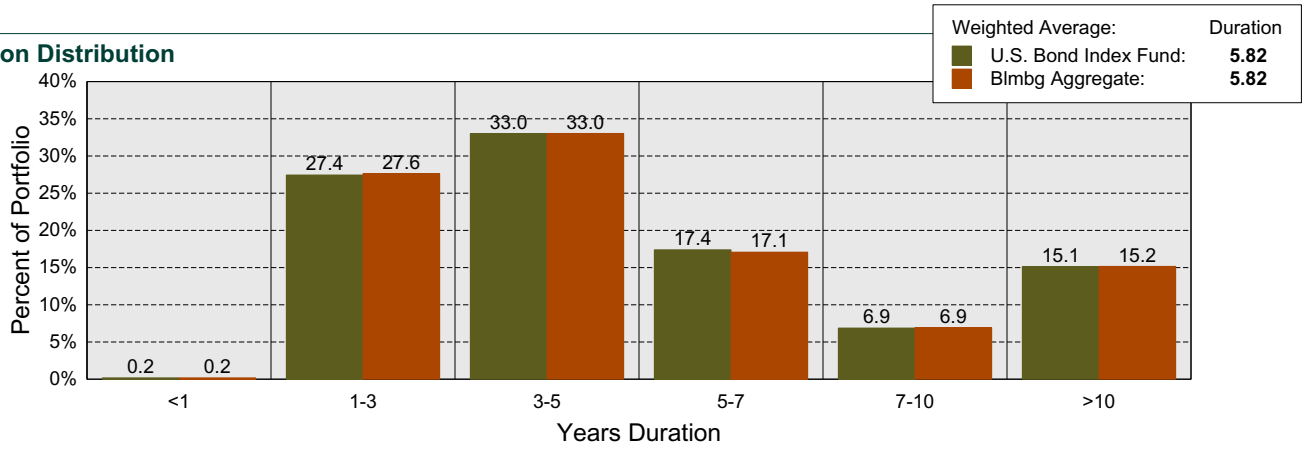
Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

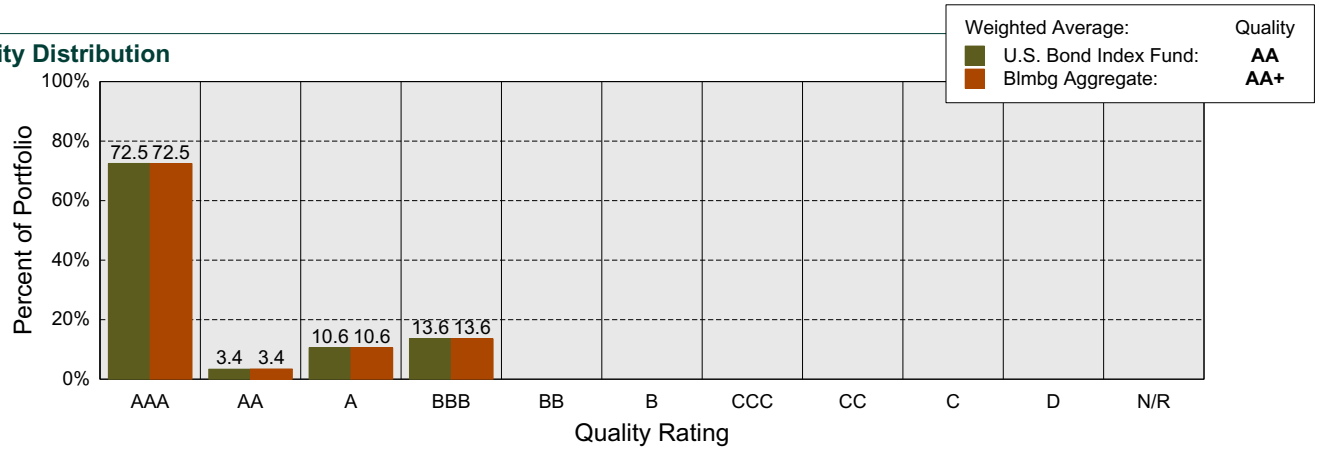
Sector Distribution



Duration Distribution



Quality Distribution

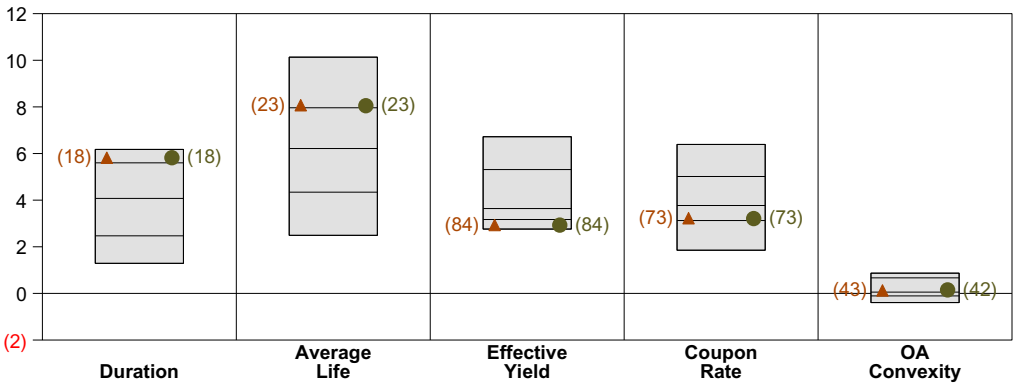


U.S. Bond Index Fund
Bond Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Fixed Income Portfolio Characteristics
Rankings Against Callan Domestic Fixed Income Mut Funds
as of March 31, 2019

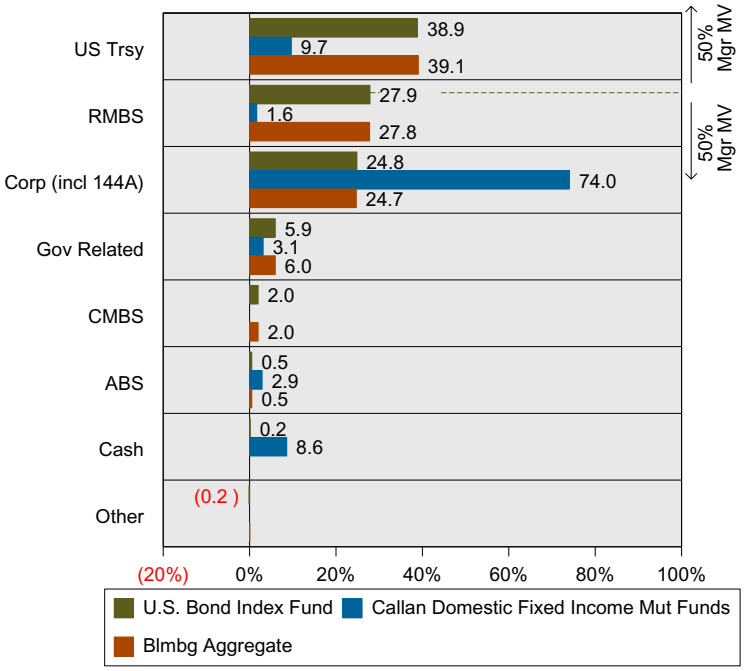


	Duration	Average Life	Effective Yield	Coupon Rate	OA Convexity
10th Percentile	6.18	10.13	6.72	6.39	0.87
25th Percentile	5.60	7.96	5.31	5.02	0.67
Median	4.07	6.22	3.64	3.77	0.06
75th Percentile	2.47	4.34	3.17	3.12	(0.11)
90th Percentile	1.29	2.49	2.76	1.85	(0.39)
U.S. Bond Index Fund ●	5.82	8.05	2.93	3.21	0.15
Blmbg Aggregate ▲	5.82	8.07	2.93	3.23	0.13

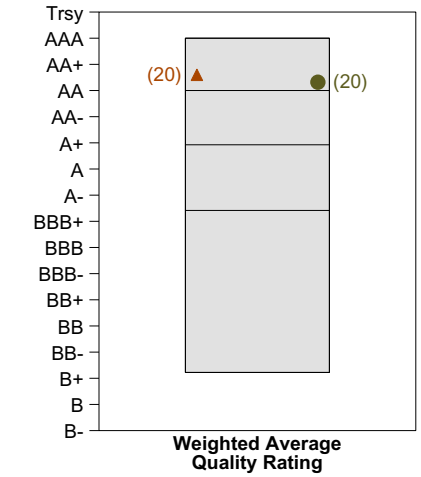
Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.

Sector Allocation
March 31, 2019



Quality Ratings
vs Callan Domestic Fixed Income Mut Funds



10th Percentile	AAA
25th Percentile	AA
Median	A+
75th Percentile	BBB+
90th Percentile	B+
U.S. Bond Index Fund ●	AA
Blmbg Aggregate ▲	AA+

Definitions

Equity Market Indicators

The market indicators included in this report are regarded as measures of equity or fixed income performance results. The returns shown reflect both income and capital appreciation.

Standard & Poor's 500 Index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries. The index is capitalization-weighted, with each stock weighted by its proportion of the total market value of all 500 issues. Thus, larger companies have a greater effect on the index.

Fixed Income Market Indicators

90-Day U.S. Treasury Bills provide a measure of riskless return. The rate of return is the average interest rate available on the beginning of each month for a Treasury Bill maturing in ninety days.

Bloomberg Barclays Aggregate Bond Index is a combination of the Mortgage Backed Securities Index and the intermediate and long-term components of the Government/Credit Bond Index.

International Equity Market Indicators

Morgan Stanley Capital International (MSCI) EAFE Index is composed of approximately 1000 equity securities representing the stock exchanges of Europe, Australia, New Zealand and the Far East. The index is capitalization-weighted and is expressed in terms of U.S. dollars.

Callan Databases

In order to provide comparative investment results for use in evaluating a fund's performance, Callan gathers rate of return data from investment managers. These data are then grouped by type of assets managed and by the type of investment manager. Except for mutual funds, the results are for tax-exempt fund assets. The databases, excluding mutual funds, represent investment managers who handle over 80% of all tax-exempt fund assets.

Equity Funds

Equity funds concentrate their investments in common stocks and convertible securities. The funds included maintain well-diversified portfolios.

Middle Capitalization - Mutual Funds who invest primarily in mid-range companies with market capitalizations between core equity companies and small capitalization companies. The average market capitalization is approximately $7 billion. Invests in securities with greater volatility than the broader market as measured by the risk statistics Beta and Standard Deviation. The Middle Capitalization Style Group consists of the Middle Capitalization Growth Equity and the Middle Capitalization Value Equity Style Groups.

Fixed Income Funds

Fixed Income funds concentrate their investments in bonds, preferred stocks, and money market securities. The funds included maintain well-diversified portfolios.

Core Bond - Mutual Funds that construct portfolios to approximate the investment results of the Bloomberg Barclays Capital Government/Credit Bond Index or the Bloomberg Barclays Capital Aggregate Bond Index with a modest amount of variability in duration around the index. The objective is to achieve value added from sector and/or issue selection.

Balanced Funds

Balanced funds diversify their investments among common stocks, bonds, preferred stocks and money market securities. The funds included maintain well-diversified equity and fixed income portfolios.

Mutual Fund Balanced Funds - The Mutual Fund Balanced Fund Database consists of open-end mutual fund balanced products.

Risk/Reward Statistics

The risk statistics used in this report examine performance characteristics of a manager or a portfolio relative to a benchmark (market indicator) which assumes to represent overall movements in the asset class being considered. The main unit of analysis is the excess return, which is the portfolio return minus the return on a risk free asset (3 month T-Bill).

Alpha measures a portfolio's return in excess of the market return adjusted for risk. It is a measure of the manager's contribution to performance with reference to security selection. A positive alpha indicates that a portfolio was positively rewarded for the residual risk which was taken for that level of market exposure.

Beta measures the sensitivity of rates of portfolio returns to movements in the market index. A portfolio's beta measures the expected change in return per 1% change in the return on the market. If a beta of a portfolio is 1.5, a 1 percent increase in the return on the market will result, on average, in a 1.5 percent increase in the return on the portfolio. The converse would also be true.

Downside Risk stems from the desire to differentiate between "good risk" (upside volatility) and "bad risk" (downside volatility). Whereas standard deviation punishes both upside and downside volatility, downside risk measures only the standard deviation of returns below the target. Returns above the target are assigned a deviation of zero. Both the frequency and magnitude of underperformance affect the amount of downside risk.

Excess Return Ratio is a measure of risk adjusted relative return. This ratio captures the amount of active management performance (value added relative to an index) per unit of active management risk (tracking error against the index.) It is calculated by dividing the manager's annualized cumulative excess return relative to the index by the standard deviation of the individual quarterly excess returns. The Excess Return Ratio can be interpreted as the manager's active risk/reward tradeoff for diverging from the index when the index is mandated to be the "riskless" market position.

Information Ratio measures the manager's market risk-adjusted excess return per unit of residual risk relative to a benchmark. It is computed by dividing alpha by the residual risk over a given time period. Assuming all other factors being equal, managers with lower residual risk achieve higher values in the information ratio. Managers with higher information ratios will add value relative to the benchmark more reliably and consistently.

R-Squared indicates the extent to which the variability of the portfolio returns are explained by market action. It can also be thought of as measuring the diversification relative to the appropriate benchmark. An r-squared value of .75 indicates that 75% of the fluctuation in a portfolio return is explained by market action. An r-squared of 1.0 indicates that a portfolio's returns are entirely related to the market and it is not influenced by other factors. An r-squared of zero indicates that no relationship exists between the portfolio's return and the market.

Relative Standard Deviation is a simple measure of a manager's risk (volatility) relative to a benchmark. It is calculated by dividing the manager's standard deviation of returns by the benchmark's standard deviation of returns. A relative standard deviation of 1.20, for example, means the manager has exhibited 20% more risk than the benchmark over that time period. A ratio of .80 would imply 20% less risk. This ratio is especially useful when analyzing the risk of investment grade fixed-income products where actual historical durations are not available. By using this relative risk measure over rolling time periods one can illustrate the "implied" historical duration patterns of the portfolio versus the benchmark.

Residual Portfolio Risk is the unsystematic risk of a fund, the portion of the total risk unique to the fund (manager) itself and not related to the overall market. This reflects the "bets" which the manager places in that particular asset market. These bets may reflect emphasis in particular sectors, maturities (for bonds), or other issue specific factors which the manager considers a good investment opportunity. Diversification of the portfolio will reduce or eliminate the residual risk of that portfolio.

Risk/Reward Statistics

Rising Declining Periods refer to the sub-asset class cycles vis-a-vis the broader asset class. This is determined by evaluating the cumulative relative sub-asset class index performance to that of the broader asset class index. For example, to determine the Growth Style cycle, the S&P 500 Growth Index (sub-asset class) performance is compared to that of the S&P 500 Index (broader asset class).

Sharpe Ratio is a commonly used measure of risk-adjusted return. It is calculated by subtracting the "risk-free" return (usually 3 Month Treasury Bill) from the portfolio return and dividing the resulting "excess return" by the portfolio's risk level (standard deviation). The result is a measure of return gained per unit of risk taken.

Sortino Ratio is a downside risk-adjusted measure of value-added. It measures excess return over a benchmark divided by downside risk. The natural appeal is that it identifies value-added per unit of truly bad risk. The danger of interpretation, however, lies in these two areas: (1) the statistical significance of the denominator, and (2) its reliance on the persistence of skewness in return distributions.

Standard Deviation is a statistical measure of portfolio risk. It reflects the average deviation of the observations from their sample mean. Standard deviation is used as an estimate of risk since it measures how wide the range of returns typically is. The wider the typical range of returns, the higher the standard deviation of returns, and the higher the portfolio risk. If returns are normally distributed (ie. has a bell shaped curve distribution) then approximately 2/3 of the returns would occur within plus or minus one standard deviation from the sample mean.

Total Portfolio Risk is a measure of the volatility of the quarterly excess returns of an asset. Total risk is composed of two measures of risk: market (non-diversifiable or systematic) risk and residual (diversifiable or unsystematic) risk. The purpose of portfolio diversification is to reduce the residual risk of the portfolio.

Tracking Error is a statistical measure of a portfolio's risk relative to an index. It reflects the standard deviation of a portfolio's individual quarterly or monthly returns from the index's returns. Typically, the lower the Tracking Error, the more "index-like" the portfolio.

Treynor Ratio represents the portfolio's average excess return over a specified period divided by the beta relative to its benchmark over that same period. This measure reflects the reward over the risk-free rate relative to the systematic risk assumed.

Note: Alpha, Total Risk, and Residual Risk are annualized.

Callan Institute

Education

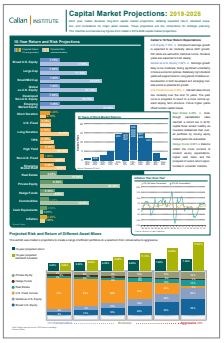
1st Quarter 2019

Research and Educational Programs

The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit www.callan.com/library to see all of our publications, and www.callan.com/blog to view our blog "Perspectives." For more information contact Corry Walsh at 312.346.3536 / institute@callan.com.

New Research from Callan's Experts

Callan's 2019-2028 Capital Market Projections | Callan develops long-term capital market projections at the start of each year, detailing our expectations for return, volatility, and correlation for broad asset classes. For 2019-2028, we made gradual, evolutionary changes to our expectations from our projections last year. We increased our fixed income assumptions to reflect higher starting yields compared to one year ago, including a higher return for cash, but we held constant our equity return premium over cash. As a result, we have narrowed the equity risk premium over bonds.



Two Questions to Help DC Plans Save on Litigation Costs | Executives can monitor whether in-house fiduciaries for their defined contribution plans are on track or need assistance by asking these questions: 1) Are plan administration costs too high? 2) Are participants getting the best "bang for their buck" from investment fees?

The Good, the Bad, and the Ugly: Which Will Your DC Plan Be in 2019? | In this paper, we outline best practices for defined contribution (DC) plan sponsors that aspire to be the Good gunslinger, and flag traps that could ensnare them in Bad or even Ugly territory.

2019 DC Trends Survey | Callan's 12th Annual DC Trends Survey highlights plan sponsors' key themes from 2018 and expectations for 2019.

2019 National Workshop Summary: DC Plans | This workshop by Callan's Ben Taylor, Jana Steele, and Gordon Weightman, "The New Face of DC Plans," provided what plan sponsors and investment managers need to know to stay current on new developments and how they might benefit plans.

2019 National Workshop Summary: Private Equity | In their workshop, "Private Equity: Primary Investment Opportunities and Considerations," Callan's Pete Keliuotis, Jay Nayak, and Weston Lewis demonstrated how a thoughtful approach to program design, strategy allocation, and capital commitment pacing can lead to long-term success in private equity investing.

2019 National Workshop Summary: Strategic Allocations | In this workshop, Callan's Ann O'Bradovich, Ho Hwang, and Gary Chang discussed the trend over the past several decades in which U.S. institutional investors have shifted their public equity portfolios to increase allocations to non-U.S. stocks.

The Callan Periodic Table Collection: Year-End 2018 | The Periodic Table Collection offers versions focused on equity, fixed income, fund sponsors, and alternatives. Other tables compare the performance of key indices to zero and to inflation.

Quarterly Periodicals

Private Equity Trends | A newsletter on private equity activity, covering both the fundraising cycle and performance over time.

Market Pulse Flipbook | A market reference guide covering trends in the U.S. economy, developments for fund sponsors, and the latest data for U.S. and non-U.S. equities and fixed income, alternatives, and defined contribution plans.

Active vs. Passive Charts | This series of charts compares active managers alongside relevant benchmarks over the long term.

Capital Market Review | Provides analysis and a broad overview of the economy and public and private market activity each quarter across a wide range of asset classes.

Events

Miss out on a Callan conference or workshop? Event summaries and speakers' presentations are available on our website: www.callan.com/library/

Please mark your calendar and look forward to upcoming invitations.

June Regional Workshops:
June 4, 2019 – Atlanta
June 5, 2019 – San Francisco

October Regional Workshops:
October 22, 2019 – Denver
October 24, 2019 – Chicago

Invitations have been sent for June and registration is available on our website at www.callan.com/events-reg-workshop-june/

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations for these and also will have registration links on our website at www.callan.com/events.

For more information about events, please contact Barb Gerraty: 415.274.3093 / gerraty@callan.com

The Center for Investment Training Educational Sessions

The Center for Investment Training, better known as the "Callan College," provides a foundation of knowledge for industry professionals who are involved in the investment decision-making process. It was founded in 1994 to provide clients and non-clients alike with basic- to intermediate-level instruction. Our next sessions are:

Introduction to Investments
San Francisco, July 16-17, 2019
Chicago, October 22-23, 2019

This program familiarizes fund sponsor trustees, staff, and asset management advisers with basic investment theory, terminology, and practices. It lasts one-and-a-half days and is designed for individuals who have less than two years of experience with asset-management oversight and/or support responsibilities. Tuition for the Introductory "Callan College" session is $2,350 per person. Tuition includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

"Callan College" on Alternative Investing
Chicago, October 2019—Date TBD

Learn more at www.callan.com/events/callan-college-intro or contact Kathleen Cunnie: 415.274.3029 / cunnie@callan.com

Education: By the Numbers

525	Attendees (on average) of the Institute's annual National Conference	**50+**	Unique pieces of research the Institute generates each year
3,700	Total attendees of the "Callan College" since 1994	**1980**	Year the Callan Institute was founded

"Research is the foundation of all we do at Callan, and sharing our best thinking with the investment community is our way of helping to foster dialogue to raise the bar across the industry."

Greg Allen, CEO and Chief Research Officer

Callan

Quarterly List as of
March 31, 2019

List of Callan's Investment Manager Clients

Confidential – For Callan Client Use Only

Callan takes its fiduciary and disclosure responsibilities to clients very seriously. We recognize that there are numerous potential conflicts of interest encountered in the investment consulting industry and that it is our responsibility to manage those conflicts effectively and in the best interest of our clients. At Callan, we employ a robust process to identify, manage, monitor and disclose potential conflicts on an on-going basis.

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g. attending and educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients. Per company policy, information requests regarding fees are handled exclusively by Callan's Compliance Department.

Manager Name
[redacted]

Manager Name
[redacted]

Manager Name
[redacted]

Manager Name
[redacted]