

June 30, 2019

**Pennsylvania SERS 457(b)**



**Investment Measurement Service  
Quarterly Review**

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**U.S. EQUITY**

Markets continued to march upward, and U.S. equities neared record highs. Growth outpaced value, as the dovish stance of the Fed was a headwind for valuation-sensitive stocks. Small cap stocks lagged large caps, possibly from economic weakness.

**Large Cap U.S. Equity** (S&P 500: +4.3%; Russell 1000: +4.2%)

- U.S. equity showed strong gains as market participants anticipated another round of monetary easing from the Fed.
- Financials (+8.0%) was the best-performing sector; Energy (-2.8%) was the only sector to experience negative returns over the quarter.
- Trade rhetoric weighed on U.S. stocks in May followed by a June rebound.
- Given the increase in risk appetite, cyclicals outperformed while defensive sectors such as Utilities underperformed.

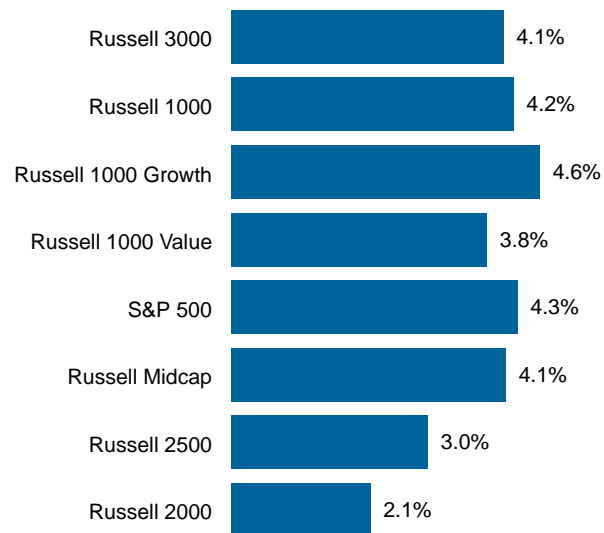
**Growth vs. Value** (Russell 1000 Growth: +4.6%; Russell 1000 Value: +3.8%)

- Value factors (P/B, P/E trailing, and yield) were mixed while growth factors (EPS growth, sales growth) were positive in the quarter.

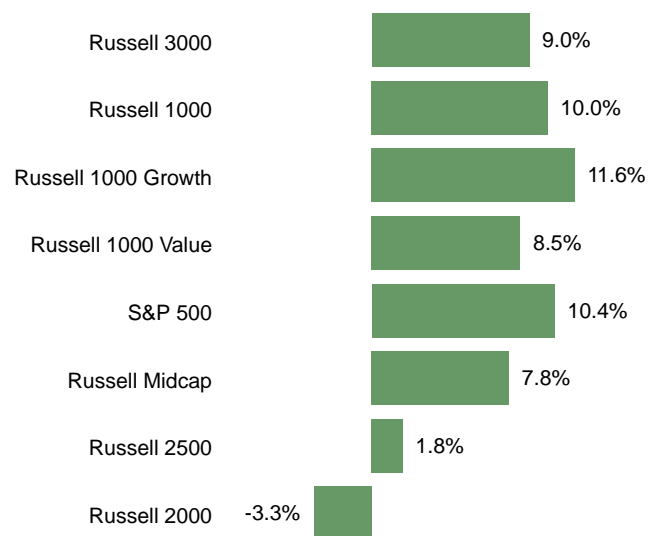
**Small Cap** (Russell 2000: +2.1%)

- Market conditions (e.g., more dovish Fed, strong U.S. dollar, trade tensions) should have benefited small cap companies, but did not.
- A slowing economy may explain weakness for small caps. Large caps tend to have stronger balance sheets and are more capable of weathering downturns.

**U.S. Equity: Quarterly Returns**

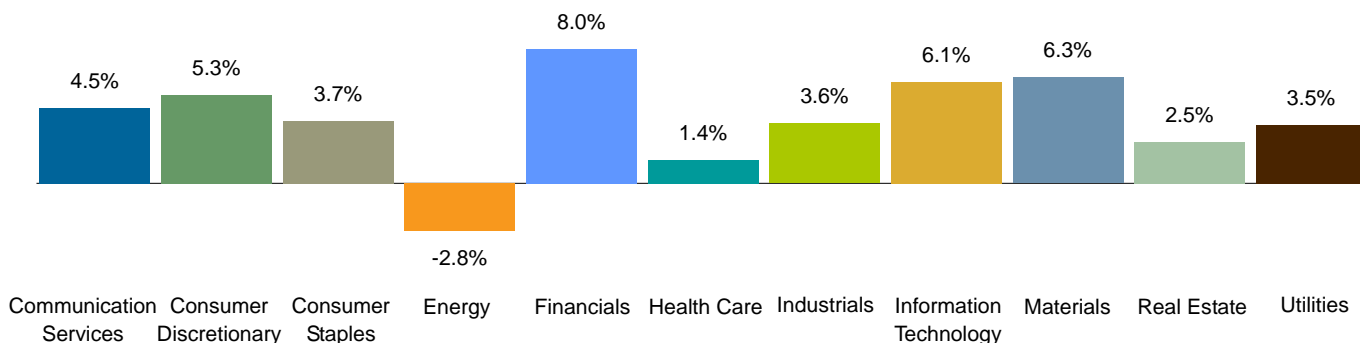


**U.S. Equity: One-Year Returns**



Sources: FTSE Russell, Standard & Poor's

**S&P Sector Returns, Quarter Ended June 30, 2019**



Source: Standard & Poor's

**NON-U.S./GLOBAL EQUITY**

Global equity markets were largely positive in the second quarter although investor sentiment was fairly muted as both U.S./China tariff fatigue and Brexit uncertainty continued. Some non-U.S. markets benefited from a weakening U.S. dollar relative to local currencies. Global equities were boosted by dovish central bank commentary that led to lower interest rates around the globe.

**Global/Non-U.S. Developed** (MSCI EAFE: +3.7%; MSCI World ex USA: +3.8%; MSCI ACWI ex USA: +3.0%; MSCI Europe: +4.5%; MSCI Japan: +1.0%)

- Developed markets rallied as central banks around the world expressed more accommodative paths with interest rates and quantitative easing.
- U.K. equities finished the quarter slightly up (+0.9%) as Brexit uncertainty continues. Prime Minister Theresa May announced her resignation during the quarter.
- Relative to other developed non-U.S. markets, Europe had a strong quarter fueled by robust returns from Germany, France, and Switzerland (30% combined weight), which benefited from declining bond yields.
- EAFE sector performance was positive across the board with the exception of real estate. Cyclical drove the majority of returns as these are highly correlated with U.S. cyclical, which benefited from declining interest rates.
- Factor performance in non-U.S. developed markets favored growth over value, large caps over small caps, and cyclical over defensives.

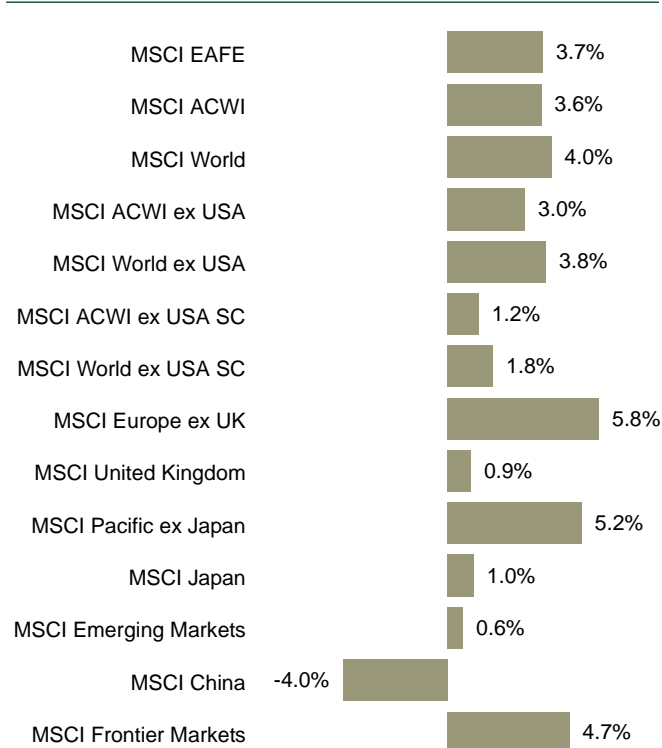
**Emerging Markets** (MSCI Emerging Markets Index: +0.6%)

- Emerging market returns were lackluster although, regionally, returns were bar-belled as many Asian countries were held back by trade concerns while EM ex-Asia tended to perform well. Russia (+16.9%) performed strongly with the help of the ruble appreciating by 4.2% relative to the U.S. dollar. Brazil (+7.2%) was also a top contributor due to the initial success of keeping pension reforms on track. China (-4.0%) faltered on tariff concerns.
- Argentina (+31.7%) was the top country performer, aided by MSCI's announcement of its inclusion in the MSCI Emerging Markets Index at the end of May (eight stocks in total).
- The MSCI EM Value Index outperformed the MSCI EM Growth Index as many growth-oriented sector and country returns were impacted by trade disputes.

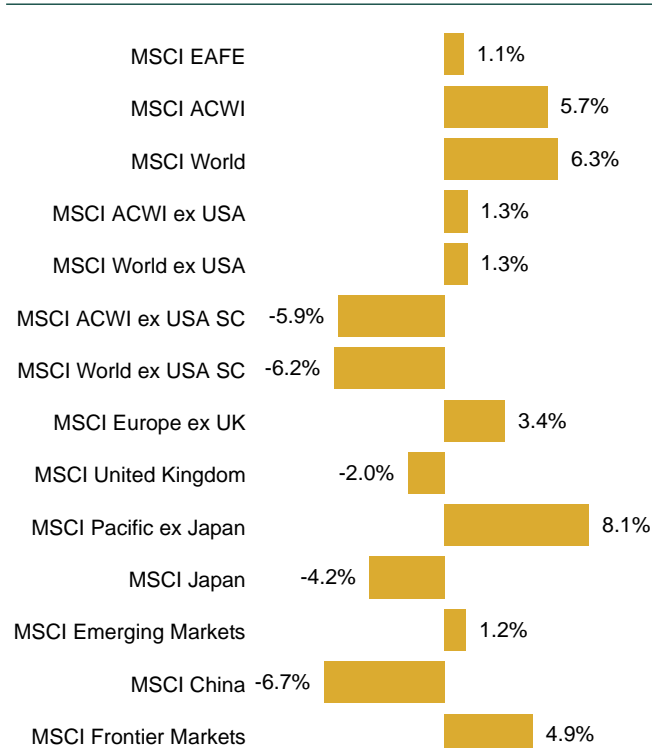
**Non-U.S. Small Cap** (MSCI World ex USA Small Cap: +1.8%; MSCI EM Small Cap: +1.0%; MSCI ACWI ex USA Small Cap: +1.2%)

- Non-U.S. small caps lagged large caps as investors preferred lower earnings risk and higher earnings momentum. Emerging market small caps lagged large caps as investors searched for a combination of lower volatility and higher growth that was absent in smaller companies as tariff uncertainty persisted.

**Global Equity: Quarterly Returns**



**Global Equity: One-Year Returns**



Source: MSCI

**FIXED INCOME**

U.S. economic data continued to be mixed as a strong labor market and rising personal income offset waning business confidence and declining industrial production. The Federal Reserve’s dovish statements and announced policy objective to “sustain the expansion” caused risk assets and U.S. Treasury yields to rally. Uncertainty surrounding trade policy and muted inflation data provided the Fed with additional cover for its rationale to potentially cut rates later this year.

**U.S. Fixed Income** (Bloomberg Barclays US Aggregate Bond Index: +3.1%)

- U.S. Treasuries gained 3.0% as the U.S. Treasury yield curve shifted lower across maturities, most dramatically at the 2-year key rate, as traders priced in expectations for the Fed to pre-emptively ease in order to boost domestic economic growth.
- The overall 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 widened 11 basis points during the quarter to close at 25 bps. However, the front-end of the curve remained inverted, with the 5-year offering less yield than the 2-year key rate.
- Nominal Treasuries outperformed TIPS as inflation expectations fell; the 10-year breakeven spread was only 1.69% as of quarter-end versus 1.88% at the end of the first quarter.

**Investment Grade Corporates** (Bloomberg Barclays Corporate: +4.5%)

- Credit spreads rallied on the back of dovish Fed policy.
- Gross new corporate supply this quarter was \$290.5 billion, which was 14% lower than a year ago. Year-to-date supply was 18% lower than in the first half of 2018. New issuance favored the 6-12 year maturities relative to last year.
- AAA-rated corporates (+5.0%) were the best performers in absolute return terms. BBB-rated lagged AAA by 18 bps, but posted a positive excess return over the index (+1.4%).

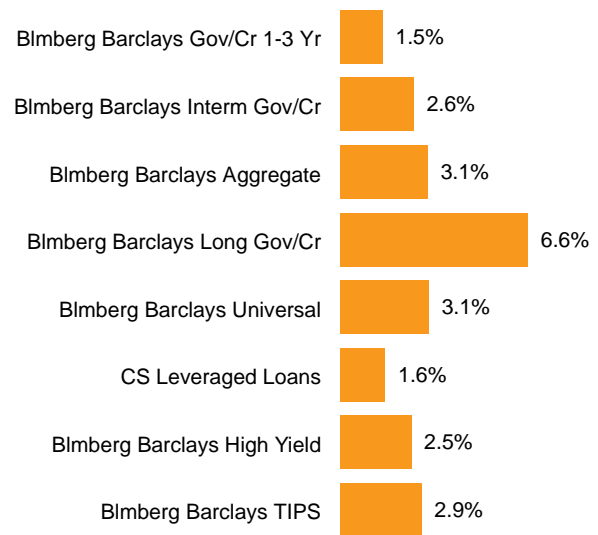
**High Yield** (Bloomberg Barclays Corporate High Yield: +2.5%)

- High yield corporates posted positive results for the quarter, but lagged investment grade corporates on both absolute and excess returns. High yield gained 9.9% for the first half of 2019.
- Interest rate sensitive BB-rated issues posted the highest return (+3.1%) while CCC-rated issues rose 0.3%.

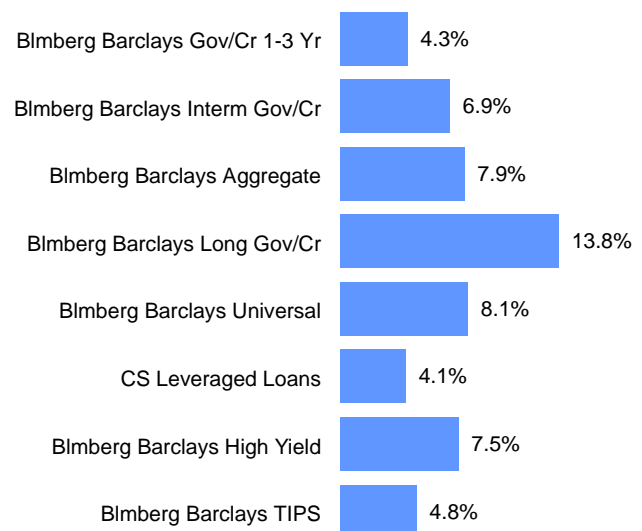
**Leveraged Loans** (CS Leveraged Loans: +1.6%)

- Bank loans participated in the risk-on rally, but lagged both longer duration IG and HY corporates as interest rates declined.

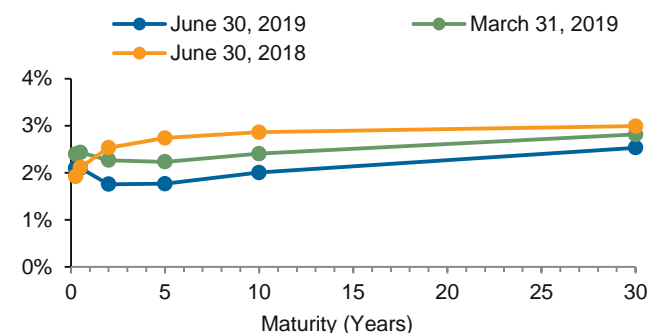
**U.S. Fixed Income: Quarterly Returns**



**U.S. Fixed Income: One-Year Returns**



**U.S. Treasury Yield Curves**



Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

- Retail outflows remain unabated as the Fed’s dovish tone dampened enthusiasm for floating rate assets. New CLO issuance running ahead of expectations has also put technical pressure on the sector as investors absorbed the new float.
- Bank loans have less sensitivity to interest rates, but may have a similar spread duration profile to that of high yield bonds.

**NON-U.S. FIXED INCOME**

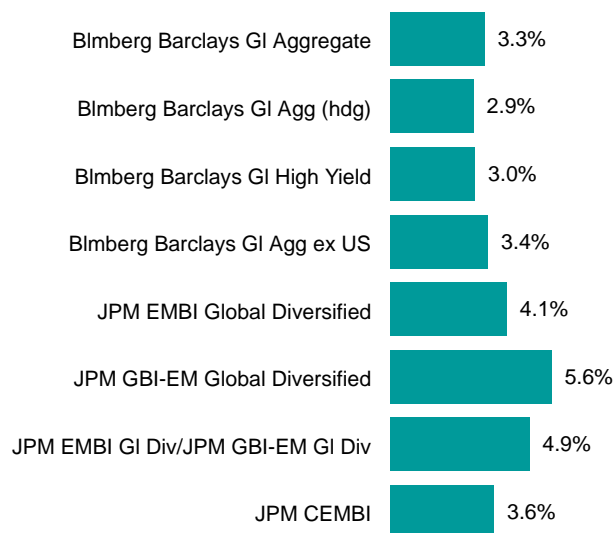
**Global Fixed Income** (Bloomberg Barclays Global Aggregate: +3.3%, unhedged)

- Other developed market sovereign bonds rose in tandem with the rally in Treasuries and have pushed European sovereigns further into negative yields. The U.S. dollar depreciated modestly versus the euro and yen, but gained versus the U.K. pound.

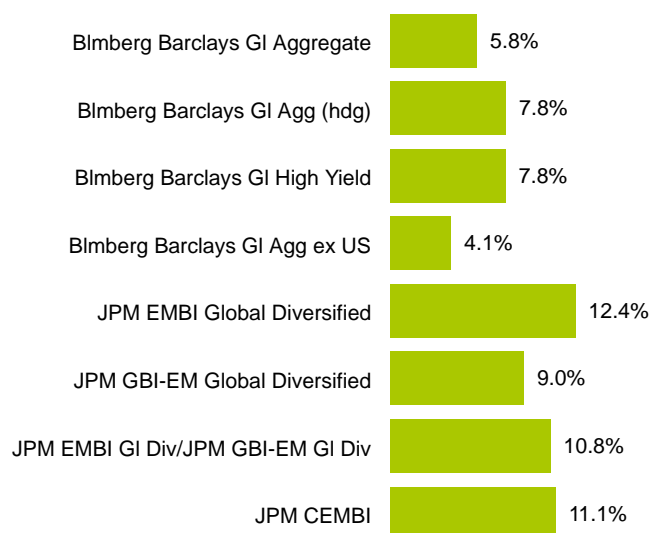
**US\$ EMD** (JPM EMBI Global Diversified: +4.1%), **Local Currency EMD** (JPM GBI-EM Global Diversified: +5.6%)

- Most emerging market currencies appreciated against the U.S. dollar.
- Top performers included Russia (+10.4%) and Turkey (+10.1%), while Argentina was the worst performer (-5.0%), and one of the few countries to post a negative result this quarter.

**Global Fixed Income: Quarterly Returns**

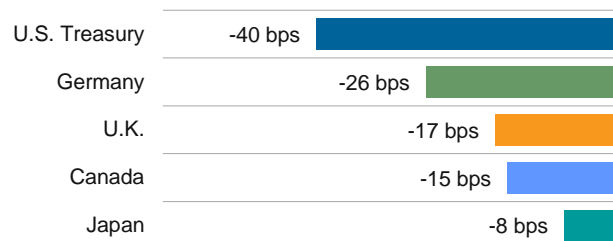


**Global Fixed Income: One-Year Returns**



**Change in 10-Year Global Government Bond Yields**

**1Q19 to 2Q19**



Sources: Bloomberg, Bloomberg Barclays, JP Morgan





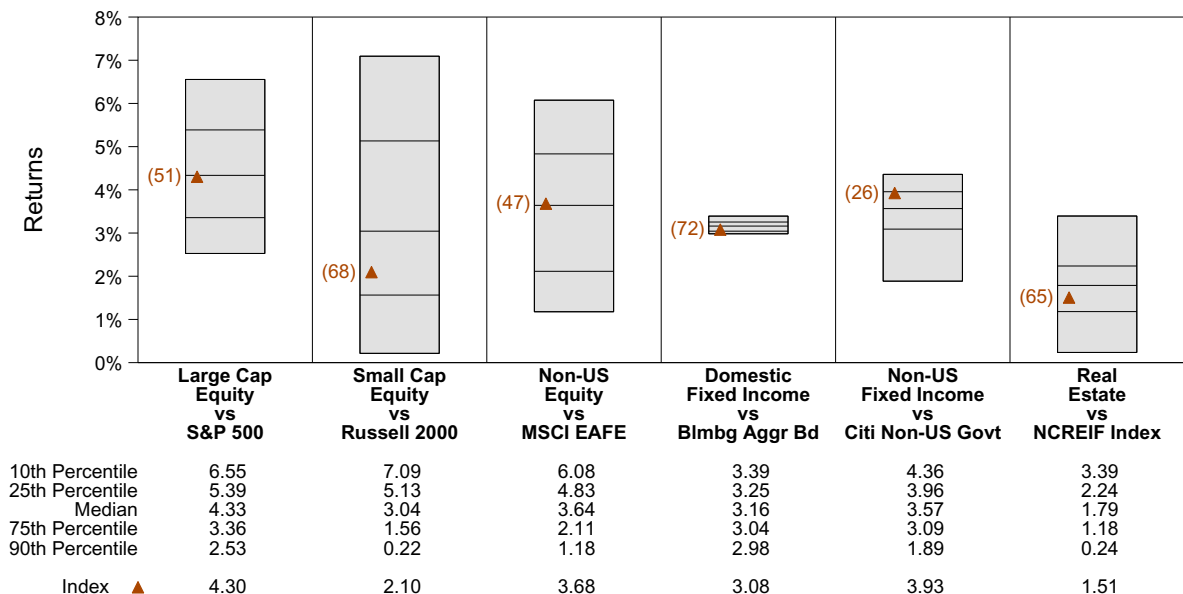
## Market Overview

### Active Management vs Index Returns

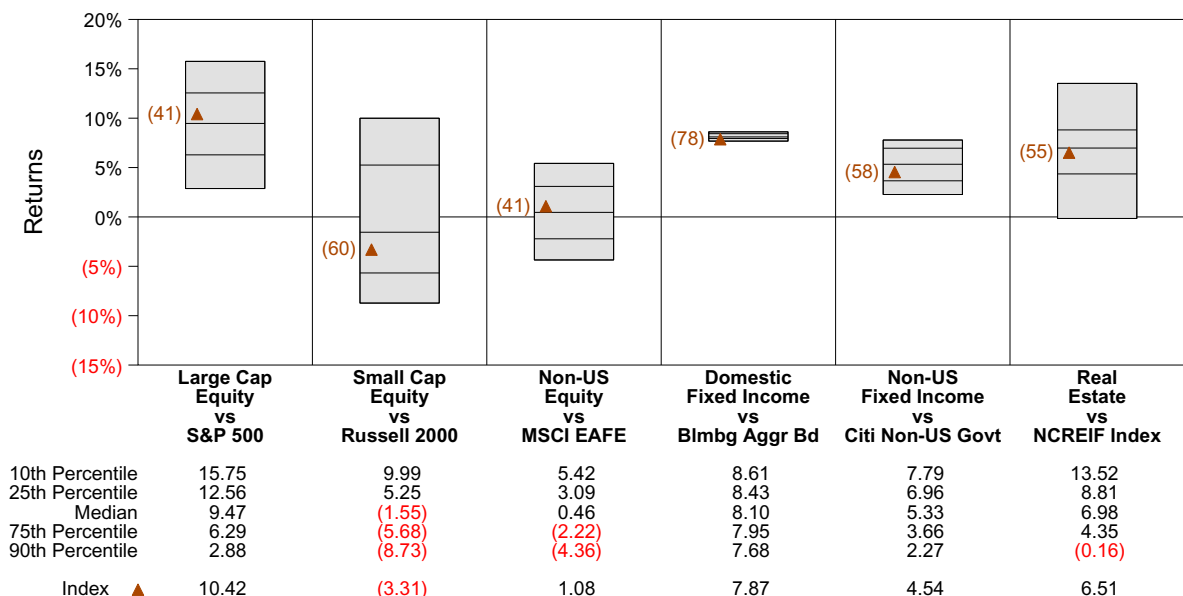
#### Market Overview

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 June 30, 2019



#### Range of Separate Account Manager Returns by Asset Class One Year Ended June 30, 2019

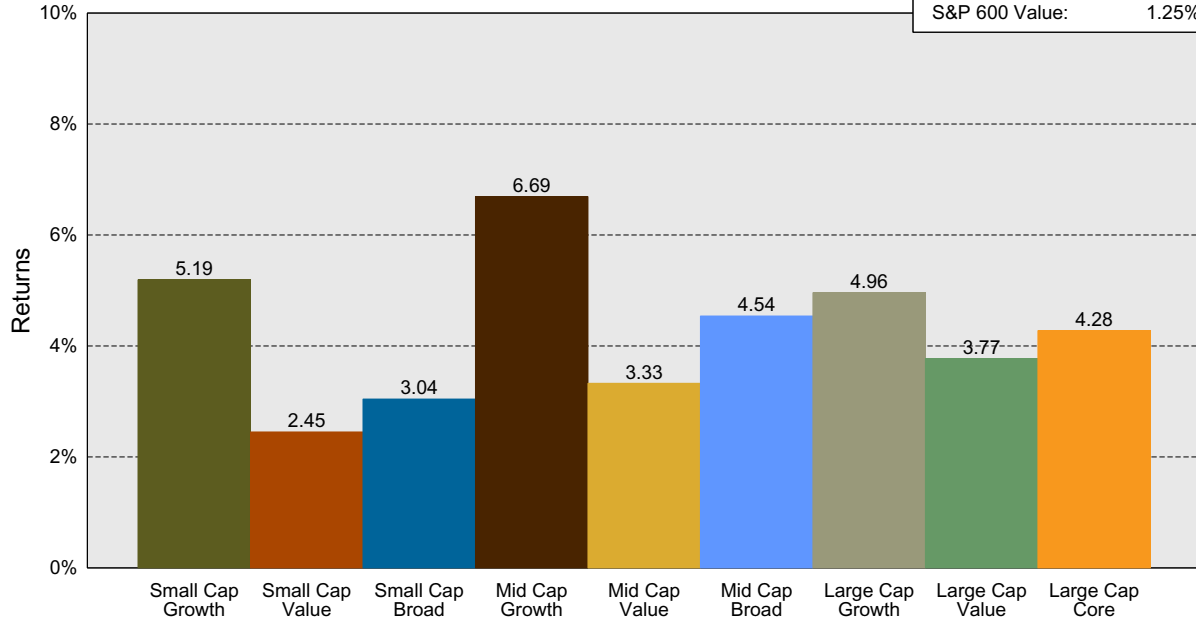


## Domestic Equity Active Management Overview

U.S. equity markets approached record levels as investors were heartened by the potential for imminent Fed rate cuts. The S&P 500 Index rose 4.3%, bringing its ytd return to 18.5%. With a forward P/E for the S&P 500 at 16.7x, equity multiples are slightly above their 25-year average of 16.2x. Financials (+8.0%) were the best performers while Energy (-2.8%) was the only sector with a negative return. Small cap stocks (R2000: 2.1%) underperformed large (R1000: 4.2%) and growth continued its trend of outperformance across the capitalization spectrum, albeit only modestly in Q2. In a reversal from Q1, quality factors such as operating margin and return on equity contributed to performance. Value factors (P/B, P/E trailing, and yield) were mixed while growth factors (EPS growth, sales growth) were positive.

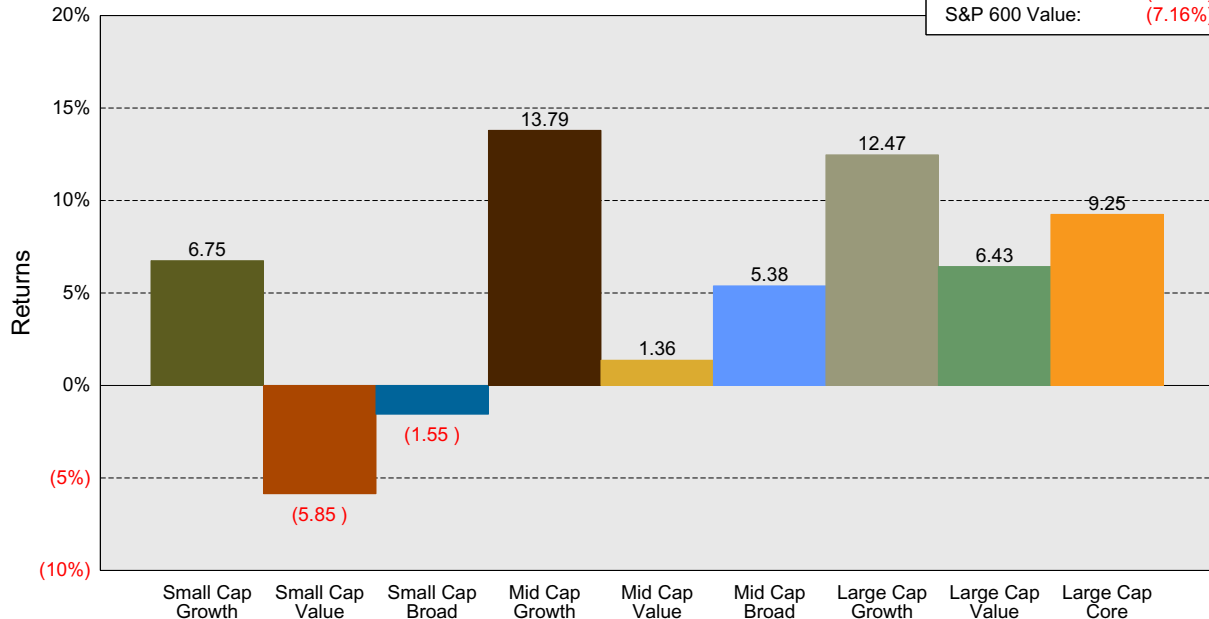
S&P 500:	4.30%
S&P 500 Growth:	4.56%
S&P 500 Value:	4.02%
S&P Mid Cap:	3.05%
S&P 600:	1.87%
S&P 600 Growth:	2.50%
S&P 600 Value:	1.25%

### Separate Account Style Group Median Returns for Quarter Ended June 30, 2019



S&P 500:	10.42%
S&P 500 Growth:	12.02%
S&P 500 Value:	8.67%
S&P Mid Cap:	1.36%
S&P 600:	(4.88%)
S&P 600 Growth:	(2.33%)
S&P 600 Value:	(7.16%)

### Separate Account Style Group Median Returns for One Year Ended June 30, 2019

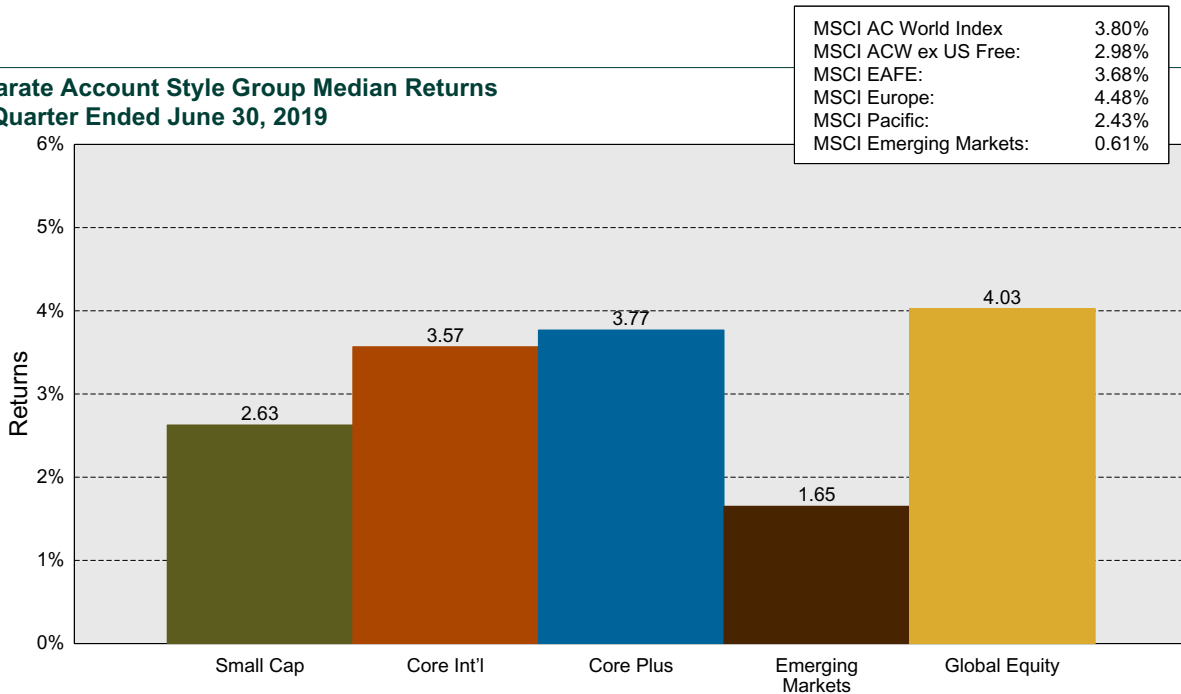


## International Equity Active Management Overview

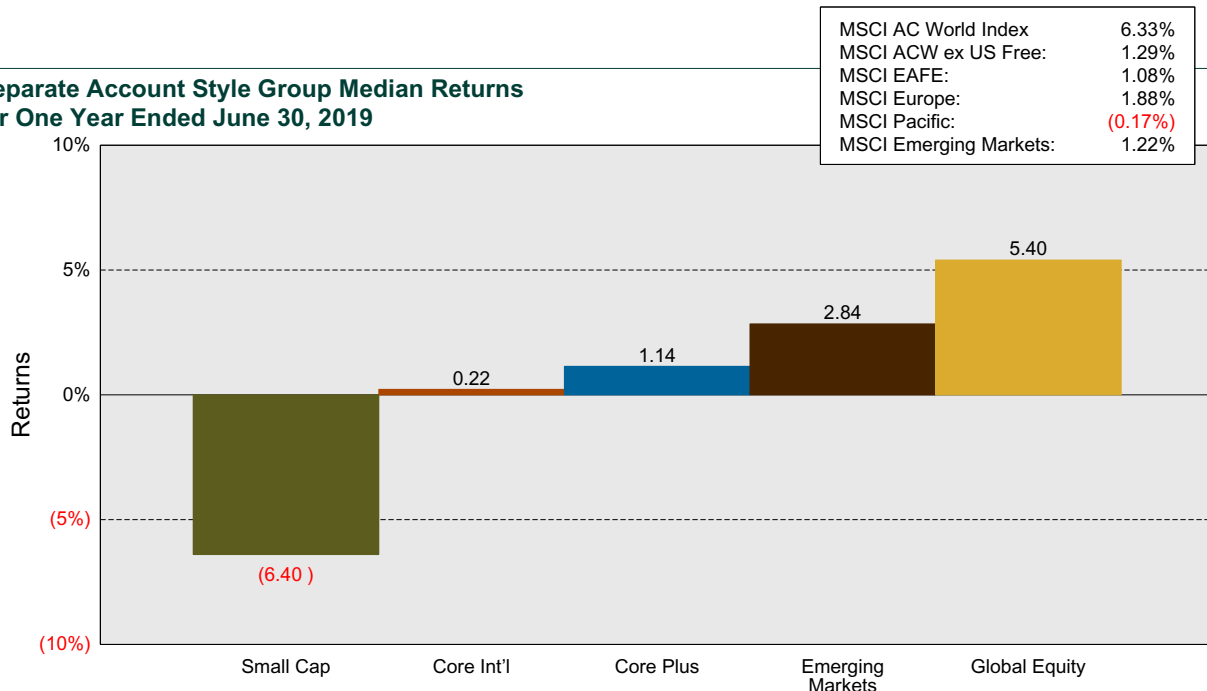
Developed markets were also buoyed by optimism for rate cuts. The MSCI ACWI ex-USA Index rose 3.0%, with Canada (+4.9%), Pacific ex-Japan (+5.2%) and Europe ex-UK (+5.8%) leading the way. Japan (+1.0%) and the UK (+0.9%), at the lower end of the group, were able to eke out small positive returns. The Canadian dollar, yen and euro appreciated versus the U.S. dollar while the British pound and Australian dollar lost ground. Industrials (+5.2%); Financials (+4.4%) and Technology (+4.0%) were the best performing sectors while Real Estate (-1.6%) and Energy (+0.5%) trailed.

Emerging markets (MSCI Emg Mkts:+0.6%) underperformed developed but returns across countries varied. Argentina (+31.7%) was the best performing country where political developments boosted sentiment, but Russia (+16.9%) was also a strong performer. China (-4.0%) finished in negative territory; but the market was able to recover after May's sharp pull-back thanks to the pause in tariff hikes following the G20 Osaka summit. Also worth mentioning is the performance of the two other BRICs; Brazil (+7.2%) and India (+0.5%).

### Separate Account Style Group Median Returns for Quarter Ended June 30, 2019



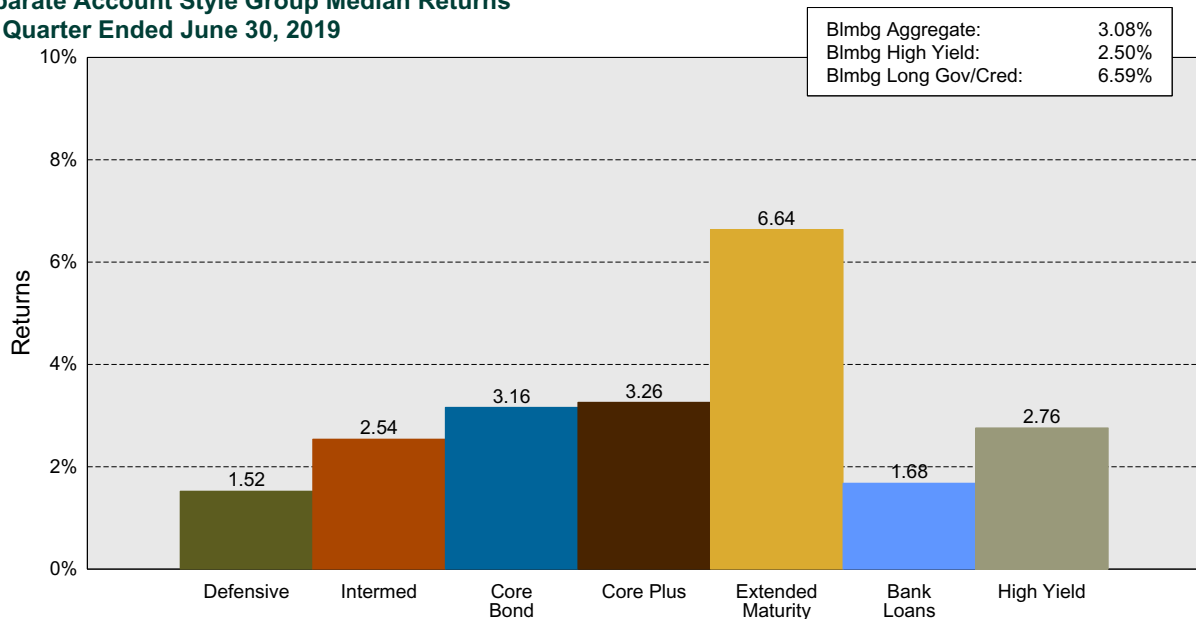
### Separate Account Style Group Median Returns for One Year Ended June 30, 2019



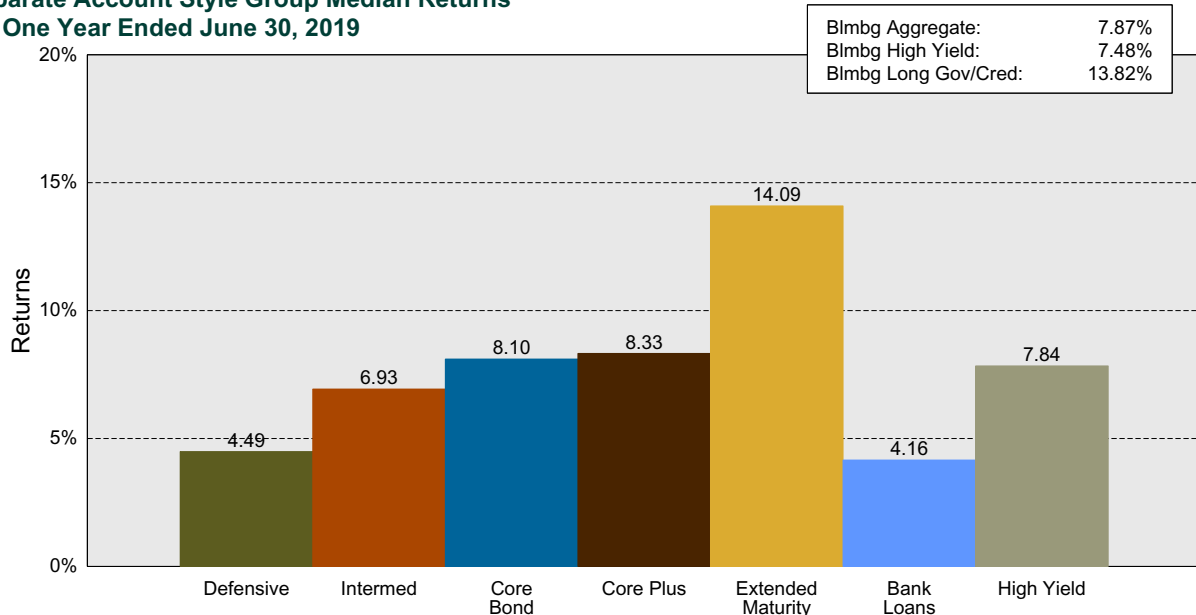
## Domestic Fixed Income Active Management Overview

In the U.S., the Bloomberg Barclays US Aggregate Bond Index rose 3.1% for the quarter. U.S. Treasury yields hit multi-year lows in June, and the 10-year closed the quarter at 2.0% (lowest since 11/2016). The curve remained inverted between the 90-day T-bill and the 10-year U.S. Treasury, but the more widely watched spread between the 2- and 10-year widened during the quarter to 25 bps. Investment grade corporate bonds performed best (Blmbg Barclays Corp: +4.5%) with US Treasuries following (+3.0%). Agency mortgages trailed (Blmbg Barclays MBS: +2.0%) as lower rates raised concerns around prepayment risk. TIPS (Blmbg Barclays TIPS: +2.9%) underperformed as inflation expectations fell; the 10-year breakeven spread was only 1.69% as of quarter-end versus 1.88% as of 3/31/2019. The high yield corporate bond market (Blmbg Barclays High Yield: +2.5%) underperformed investment grade but is up nearly 10% ytd. Leveraged loans (S&P LSTA: +1.7%) held their own in spite of negative press and falling rates. Municipal bonds (Blmbg Barclays Municipal Bond: +2.1%) underperformed U.S. Treasuries in Q2.

### Separate Account Style Group Median Returns for Quarter Ended June 30, 2019



### Separate Account Style Group Median Returns for One Year Ended June 30, 2019

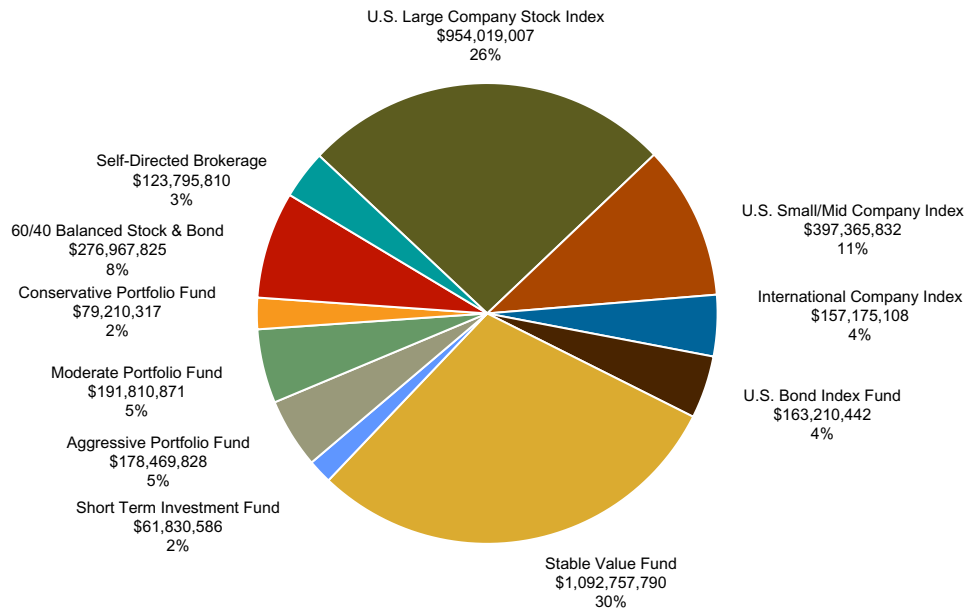




## Changes in Investment Fund Balances Period Ended June 30, 2019

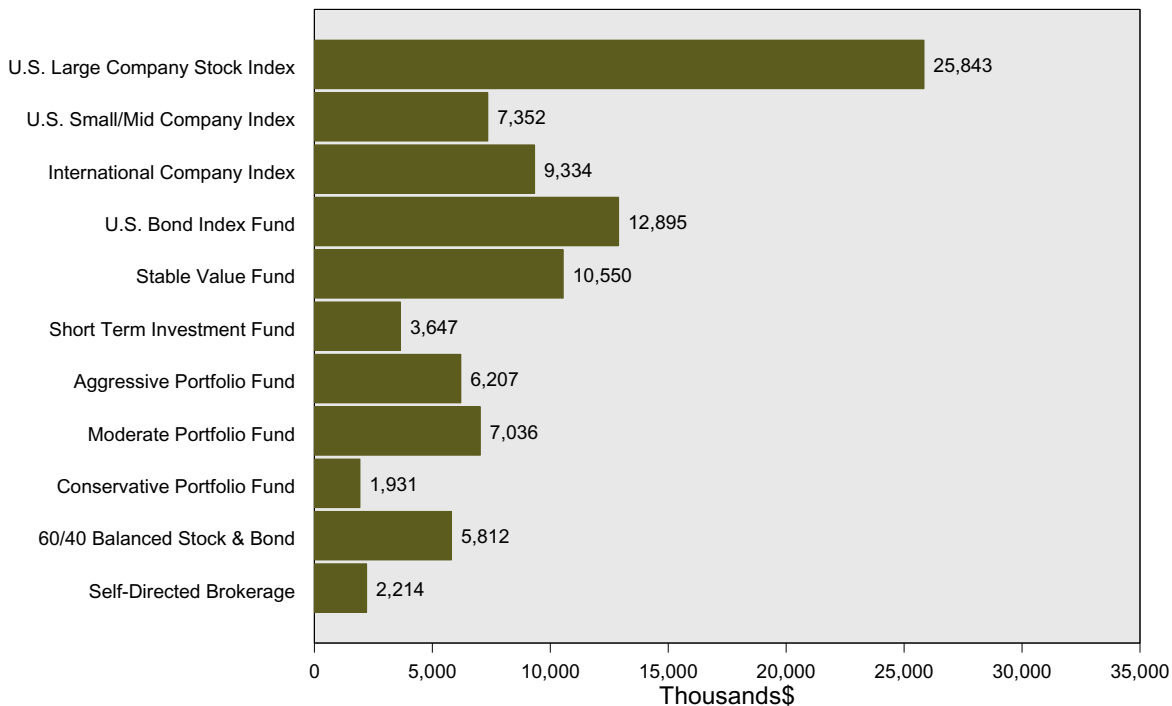
### Allocation Across Investment Options

The chart below illustrates the allocation of the aggregate fund assets across the various investment options for the quarter ended June 30, 2019.



### Changes in Fund Values

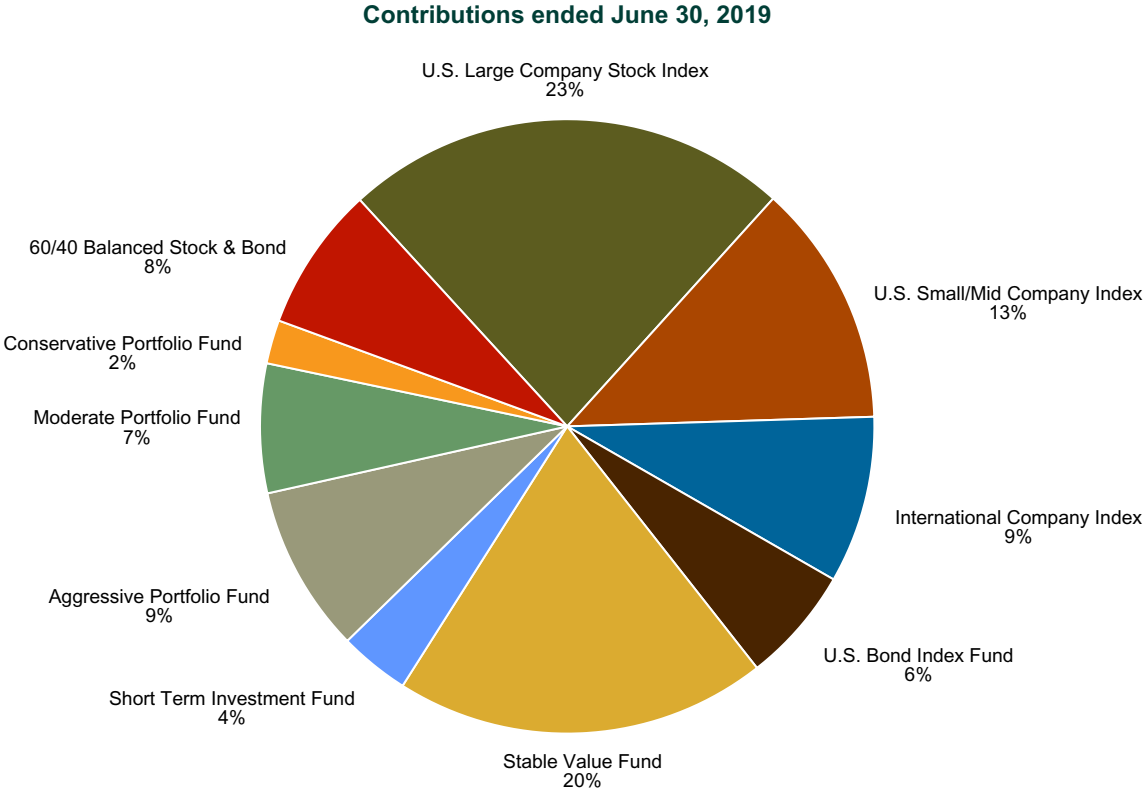
The chart below shows the net change in fund values across the various investment options for the quarter ended June 30, 2019. The change in value for each fund is the result of a combination of 3 factors: 1) market movements; 2) contributions or disbursements into or out of the funds by the participants (and any matching done by the company); and 3) transfers between funds by the participants.



# Pennsylvania SERS Summary of Contributions

## 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 June 30, 2019 with that of March 31, 2019. 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

	June 30, 2019		Net New Inv. \$(000)	Inv. Return \$(000)	March 31, 2019	
	Market Value \$(000)	% of Total Weight			Market Value \$(000)	% of Total Weight
<b>SERS Risk-Based Funds</b>	<b>\$726,459</b>	<b>19.76%</b>	<b>\$(4,689)</b>	<b>\$25,674</b>	<b>\$705,474</b>	<b>19.69%</b>
SERS 60/40 Stock & Bond Fund	276,968	7.53%	(4,397)	10,209	271,156	7.57%
SERS Conservative Portfolio Fund	79,210	2.15%	(277)	2,208	77,280	2.16%
SERS Moderate Portfolio Fund	191,811	5.22%	323	6,713	184,775	5.16%
SERS Aggressive Portfolio Fund	178,470	4.85%	(338)	6,545	172,263	4.81%
<b>SERS U.S. Equity</b>	<b>\$1,351,385</b>	<b>36.76%</b>	<b>\$(17,825)</b>	<b>\$51,021</b>	<b>\$1,318,189</b>	<b>36.78%</b>
SERS U.S. Large Company Index	954,019	25.95%	(13,484)	39,328	928,176	25.90%
SERS U.S. SMID Company Index	397,366	10.81%	(4,341)	11,693	390,014	10.88%
<b>SERS International Equity</b>						
SERS Intl Company Idx Fund	157,175	4.27%	3,672	5,662	147,841	4.13%
<b>SERS Fixed Income</b>	<b>\$1,317,799</b>	<b>35.84%</b>	<b>\$15,635</b>	<b>\$11,456</b>	<b>\$1,290,708</b>	<b>36.02%</b>
SERS Short Term Investment Fund	61,831	1.68%	3,314	333	58,184	1.62%
SERS Stable Value Fund	1,092,758	29.72%	4,154	6,396	1,082,208	30.20%
SERS U.S. Bond Index Fund	163,210	4.44%	8,168	4,727	150,316	4.19%
<b>Self-Directed Brokerage</b>						
Self-Directed Brokerage Account	123,796	3.37%	(1,972)	4,187	121,581	3.39%
<b>SERS 457(b) Total Fund</b>	<b>\$3,676,613</b>	<b>100.0%</b>	<b>\$(5,180)</b>	<b>\$98,000</b>	<b>\$3,583,793</b>	<b>100.0%</b>



## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended June 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
<b>Net Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	3.85%	10.02%	9.56%	7.74%	9.46%
60% S&P 500/ 40% Aggregate Bond	3.81%	9.94%	9.53%	7.72%	9.48%
Callan Dom Balanced MFs	3.67%	7.17%	9.03%	6.39%	9.04%
SERS Conservative Portfolio Fund	2.89%	6.92%	5.40%	4.24%	5.14%
Conservative Portfolio Custom Index(3)	2.84%	6.78%	5.33%	4.16%	5.10%
Callan MA Tgt All Cons MF	2.71%	5.76%	4.90%	3.45%	4.94%
SERS Moderate Portfolio Fund	3.67%	7.93%	8.77%	6.31%	8.45%
Moderate Portfolio Custom Index(2)	3.61%	7.73%	8.70%	6.22%	8.41%
Callan MA Tgt All Mod MF	3.00%	5.83%	7.34%	4.75%	7.23%
SERS Aggressive Portfolio Fund	3.84%	7.57%	10.84%	7.33%	10.37%
Aggressive Portfolio Custom Index(1)	3.78%	7.35%	10.76%	7.21%	10.29%
Callan MA Tgt All AgGr MF	3.31%	4.13%	10.81%	6.23%	10.01%

(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 ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	Returns for Periods Ended June 30, 2019		
	Last 10 Years	Last 15 Years	Last 20 Years
<b>Net Performance</b>			
<b>Risk-Based Funds</b>			
SERS 60/40 Stock & Bond Fund	10.57%	-	-
60% S&P 500/ 40% Aggregate Bond	10.55%	7.27%	5.91%
Callan Dom Balanced MFs	9.89%	6.57%	5.35%
SERS Conservative Portfolio Fund	6.05%	5.15%	-
Conservative Portfolio Custom Index(3)	6.00%	5.10%	4.94%
Callan MA Tgt All Cons MF	6.46%	4.98%	4.93%
SERS Moderate Portfolio Fund	9.53%	6.96%	-
Moderate Portfolio Custom Index(2)	9.43%	6.90%	5.90%
Callan MA Tgt All Mod MF	8.54%	6.11%	5.36%
SERS Aggressive Portfolio Fund	11.27%	7.65%	-
Aggressive Portfolio Custom Index(1)	11.14%	7.55%	5.94%
Callan MA Tgt All AgGr MF	10.83%	6.83%	5.59%

(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

(4) Funds not listed do not have longer term history.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended June 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
<b>Net Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	4.30%	10.42%	14.19%	10.72%	13.99%
S&P 500 Index	4.30%	10.42%	14.19%	10.71%	13.98%
Callan Lg Cap Broad MF	4.23%	9.03%	13.88%	9.72%	13.46%
SERSU.S. SMID Company Idx Fund	3.07%	2.15%	13.22%	7.84%	12.80%
Dow Jones US Completion	3.02%	1.87%	13.01%	7.65%	12.59%
Callan SMID Broad MFs	4.14%	3.52%	12.23%	7.70%	12.20%
<b>International Equity</b>					
SERS International Company Idx Fund	3.85%	1.73%	9.25%	2.60%	7.55%
MSCI EAFE	3.68%	1.08%	9.11%	2.25%	7.31%
Callan Intl Eq Dev Mkt MF	3.17%	(0.61%)	8.49%	2.05%	7.08%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.61%	2.40%	1.58%	1.05%	0.80%
3-month Treasury Bill	0.64%	2.31%	1.38%	0.87%	0.65%
Callan Cash Database(1)	0.74%	2.74%	1.73%	1.30%	1.11%
SERS Stable Value Fund	0.61%	2.61%	2.38%	2.44%	2.56%
3-month Treasury Bill	0.64%	2.31%	1.38%	0.87%	0.65%
Callan Stable Value	0.64%	2.46%	2.16%	2.08%	1.97%
SERS U.S. Bond Index Fund	3.09%	7.89%	2.27%	2.91%	2.56%
Blmbg Aggregate	3.08%	7.87%	2.31%	2.95%	2.62%
Callan Core Bond MFs	3.08%	7.80%	2.53%	2.91%	2.77%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	Returns for Periods Ended June 30, 2019		
	Last 10 Years	Last 15 Years	Last 20 Years
<b>Net Performance</b>			
<b>Domestic Equity</b>			
SERS U.S. Large Company Idx Fund	14.72%	8.79%	5.95%
S&P 500 Index	14.70%	8.75%	5.90%
Callan Lg Cap Broad MF	13.81%	8.65%	6.01%
SERS U.S. SMID Company Idx Fund	14.75%	9.63%	8.13%
Dow Jones US Completion	14.53%	9.43%	7.81%
Callan SMID Broad MFs	14.11%	9.24%	8.58%
<b>International Equity</b>			
SERS International Company Idx Fund	7.22%	5.64%	3.97%
MSCI EAFE	6.90%	5.35%	4.00%
Callan Intl Eq Dev Mkt MF	7.20%	5.39%	4.53%
<b>Domestic Fixed Income</b>			
SERS Short Term Investment Fund	0.64%	1.54%	-
3-month Treasury Bill	0.49%	1.38%	1.85%
Callan Cash Database(1)	0.98%	1.82%	2.39%
SERS Stable Value Fund	2.98%	3.63%	-
3-month Treasury Bill	0.49%	1.38%	1.85%
Callan Stable Value	2.28%	2.99%	3.77%
SERS U.S. Bond Index Fund	3.82%	4.21%	4.88%
Blmbg Aggregate	3.90%	4.27%	4.93%
Callan Core Bond MFs	4.39%	4.53%	5.00%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

(2) Funds not listed do not have longer term history.

## 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- 6/2019	2018	2017	2016	2015
<b>Net Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	13.58%	(2.19%)	14.25%	8.16%	1.20%
60% S&P 500/ 40% Aggregate Bond	13.54%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	12.92%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	8.59%	(1.58%)	8.37%	4.35%	0.48%
Conservative Portfolio Custom Index(3)	8.51%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	8.55%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	13.10%	(4.07%)	14.46%	7.00%	0.55%
Moderate Portfolio Custom Index(2)	12.96%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	11.61%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	15.41%	(5.66%)	18.29%	8.49%	0.45%
Aggressive Portfolio Custom Index(1)	15.25%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	15.95%	(8.91%)	20.65%	7.67%	(1.42%)

(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- 6/2019	2018	2017	2016	2015
<b>Net Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	18.54%	(4.39%)	21.84%	11.98%	1.40%
S&P 500 Index	18.54%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.05%	(4.54%)	23.56%	8.43%	1.50%
SERSU.S. SMID Company Idx Fund	19.59%	(9.34%)	18.19%	16.05%	(3.32%)
Dow Jones US Completion	19.49%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	20.96%	(8.69%)	17.14%	13.80%	(2.80%)
<b>International Equity</b>					
SERS International Company Idx Fund	14.57%	(13.39%)	25.53%	1.71%	(0.43%)
MSCI EAFE	14.03%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	14.19%	(15.06%)	26.64%	0.39%	(0.73%)
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	1.22%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.24%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	1.51%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	1.23%	2.61%	2.16%	2.31%	2.51%
3-month Treasury Bill	1.24%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	1.25%	2.21%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	6.11%	0.01%	3.51%	2.57%	0.47%
Bimbg Aggregate	6.11%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	6.47%	(0.35%)	3.71%	3.03%	0.10%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended June 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
<b>Gross Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	3.85%	10.04%	9.57%	7.75%	9.48%
60% S&P 500/ 40% Aggregate Bond	3.81%	9.94%	9.53%	7.72%	9.48%
Callan Dom Balanced MFs	3.67%	7.17%	9.03%	6.39%	9.04%
SERS Conservative Portfolio Fund	2.89%	6.93%	5.41%	4.25%	5.15%
Conservative Portfolio Custom Index(3)	2.84%	6.78%	5.33%	4.16%	5.10%
Callan MA Tgt All Cons MF	2.71%	5.76%	4.90%	3.45%	4.94%
SERS Moderate Portfolio Fund	3.68%	7.95%	8.78%	6.33%	8.47%
Moderate Portfolio Custom Index(2)	3.61%	7.73%	8.70%	6.22%	8.41%
Callan MA Tgt All Mod MF	3.00%	5.83%	7.34%	4.75%	7.23%
SERS Aggressive Portfolio Fund	3.85%	7.58%	10.86%	7.35%	10.39%
Aggressive Portfolio Custom Index(1)	3.78%	7.35%	10.76%	7.21%	10.29%
Callan MA Tgt All AgGr MF	3.31%	4.13%	10.81%	6.23%	10.01%

(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 ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	Returns for Periods Ended June 30, 2019		
	Last 10 Years	Last 15 Years	Last 20 Years
<b>Gross Performance</b>			
<b>Risk-Based Funds</b>			
SERS 60/40 Stock & Bond Fund	10.59%	-	-
60% S&P 500/ 40% Aggregate Bond	10.55%	7.27%	5.91%
Callan Dom Balanced MFs	9.89%	6.57%	5.35%
SERS Conservative Portfolio Fund	6.07%	5.16%	-
Conservative Portfolio Custom Index(3)	6.00%	5.10%	4.94%
Callan MA Tgt All Cons MF	6.46%	4.98%	4.93%
SERS Moderate Portfolio Fund	9.54%	6.98%	-
Moderate Portfolio Custom Index(2)	9.43%	6.90%	5.90%
Callan MA Tgt All Mod MF	8.54%	6.11%	5.36%
SERS Aggressive Portfolio Fund	11.29%	7.66%	-
Aggressive Portfolio Custom Index(1)	11.14%	7.55%	5.94%
Callan MA Tgt All AgGr MF	10.83%	6.83%	5.59%

(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

(4) Funds not listed do not have longer term history.



## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended June 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
<b>Gross Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	4.30%	10.44%	14.21%	10.74%	14.00%
S&P 500 Index	4.30%	10.42%	14.19%	10.71%	13.98%
Callan Lg Cap Broad MF	4.23%	9.03%	13.88%	9.72%	13.46%
SERS U.S. SMID Company Idx Fund	3.07%	2.16%	13.24%	7.86%	12.82%
Dow Jones US Completion	3.02%	1.87%	13.01%	7.65%	12.59%
Callan SMID Broad MFs	4.14%	3.52%	12.23%	7.70%	12.20%
<b>International Equity</b>					
International Company Stock Idx Fund	3.85%	1.75%	9.27%	2.62%	7.57%
MSCI EAFE	3.68%	1.08%	9.11%	2.25%	7.31%
Callan Intl Eq Dev Mkt MF	3.17%	(0.61%)	8.49%	2.05%	7.08%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.61%	2.40%	1.58%	1.05%	0.80%
3-month Treasury Bill	0.64%	2.31%	1.38%	0.87%	0.65%
Callan Cash Database(1)	0.74%	2.74%	1.73%	1.30%	1.11%
SERS Stable Value Fund	0.69%	2.77%	2.43%	2.47%	2.59%
3-month Treasury Bill	0.64%	2.31%	1.38%	0.87%	0.65%
Callan Stable Value	0.64%	2.46%	2.16%	2.08%	1.97%
SERS U.S. Bond Index Fund	3.09%	7.90%	2.29%	2.93%	2.58%
Blmbg Aggregate	3.08%	7.87%	2.31%	2.95%	2.62%
Callan Core Bond MFs	3.08%	7.80%	2.53%	2.91%	2.77%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	Returns for Periods Ended June 30, 2019		
	Last 10 Years	Last 15 Years	Last 20 Years
<b>Gross Performance</b>			
<b>Domestic Equity</b>			
SERS U.S. Large Company Idx Fund	14.73%	8.80%	5.96%
S&P 500 Index	14.70%	8.75%	5.90%
Callan Lg Cap Broad MF	13.81%	8.65%	6.01%
SERS U.S. SMID Company Idx Fund	14.77%	9.65%	8.15%
Dow Jones US Completion	14.53%	9.43%	7.81%
Callan SMID Broad MFs	14.11%	9.24%	8.58%
<b>International Equity</b>			
International Company Stock Idx Fund	7.24%	5.66%	3.99%
MSCI EAFE	6.90%	5.35%	4.00%
Callan Intl Eq Dev Mkt MF	7.20%	5.39%	4.53%
<b>Domestic Fixed Income</b>			
SERS Short Term Investment Fund	0.64%	1.54%	-
3-month Treasury Bill	0.49%	1.38%	1.85%
Callan Cash Database(1)	0.98%	1.82%	2.39%
SERS Stable Value Fund	3.00%	3.65%	-
3-month Treasury Bill	0.49%	1.38%	1.85%
Callan Stable Value	2.28%	2.99%	3.77%
SERS U.S. Bond Index Fund	3.84%	4.23%	4.90%
Blmbg Aggregate	3.90%	4.27%	4.93%
Callan Core Bond MFs	4.39%	4.53%	5.00%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

(2) Funds not listed do not have longer term history.

## 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- 6/2019	2018	2017	2016	2015
<b>Gross Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	13.59%	(2.18%)	14.27%	8.18%	1.21%
60% S&P 500/ 40% Aggregate Bond	13.54%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	12.92%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	8.60%	(1.57%)	8.39%	4.36%	0.50%
Conservative Portfolio Custom Index(3)	8.51%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	8.55%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	13.10%	(4.06%)	14.48%	7.02%	0.56%
Moderate Portfolio Custom Index(2)	12.96%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	11.61%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	15.41%	(5.65%)	18.31%	8.51%	0.46%
Aggressive Portfolio Custom Index(1)	15.25%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	15.95%	(8.91%)	20.65%	7.67%	(1.42%)

(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- 6/2019	2018	2017	2016	2015
<b>Gross Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	18.55%	(4.38%)	21.85%	11.99%	1.41%
S&P 500 Index	18.54%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.05%	(4.54%)	23.56%	8.43%	1.50%
SERS U.S. SMID Company Idx Fund	19.60%	(9.32%)	18.21%	16.08%	(3.30%)
Dow Jones US Completion	19.49%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	20.96%	(8.69%)	17.14%	13.80%	(2.80%)
<b>International Equity</b>					
International Company Stock Idx Fund	14.58%	(13.37%)	25.55%	1.73%	(0.41%)
MSCI EAFE	14.03%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	14.19%	(15.06%)	26.64%	0.39%	(0.73%)
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	1.22%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.24%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	1.51%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	1.38%	2.61%	2.16%	2.31%	2.51%
3-month Treasury Bill	1.24%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	1.25%	2.21%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	6.11%	0.03%	3.53%	2.59%	0.49%
Blmbg Aggregate	6.11%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	6.47%	(0.35%)	3.71%	3.03%	0.10%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

**Pennsylvania SERS  
Investment Manager Performance Monitoring Summary Report  
June 30, 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
<b>Gross of Fee Performance</b>									
<b>Risk-Based Funds</b>									
<b>SERS 60/40 Stock &amp; Bond Fund</b> Callan Dom Balanced MFs	3.9 38	10.0 22	9.6 32	7.8 8	9.5 35	10.6 23			0.01 98
60% S&P 500/ 40% Aggregate Bond	3.8 39	9.9 22	9.5 32	7.7 8	9.5 35	10.5 24			
<b>SERS Conservative Portfolio Fund</b> Callan MA Tgt All Cons MF	2.9 31	6.9 20	5.4 31	4.3 21	5.2 45	6.1 61			0.01 100
Conservative Portfolio Custom Index	2.8 35	6.8 24	5.3 37	4.2 22	5.1 46	6.0 61			
<b>SERS Moderate Portfolio Fund</b> Callan MA Tgt All Mod MF	3.7 15	8.0 17	8.8 20	6.3 18	8.5 24	9.5 26			0.02 100
Moderate Portfolio Custom Index	3.6 17	7.7 18	8.7 21	6.2 19	8.4 25	9.4 28			
<b>SERS Aggressive Portfolio Fund</b> Callan MA Tgt All AgGr MF	3.8 23	7.6 7	10.9 49	7.3 17	10.4 40	11.3 31			0.02 100
Aggressive Portfolio Custom Index	3.8 24	7.3 8	10.8 51	7.2 19	10.3 42	11.1 40			
<b>Domestic Equity</b>									
<b>SERS U.S. Large Company Index</b> Callan Lg Cap Broad MF	4.3 48	10.4 37	14.2 46	10.7 41	14.0 41	14.7 34			0.01 99
S&P 500 Index	4.3 48	10.4 37	14.2 46	10.7 41	14.0 42	14.7 36			
<b>SERS U.S. Small/Mid Company Index</b> Callan SMID Broad MFs	3.1 72	2.2 54	13.2 47	7.9 46	12.8 41	14.8 40			0.02 100
Dow Jones US Completion	3.0 73	1.9 54	13.0 48	7.7 51	12.6 43	14.5 44			
<b>International Equity</b>									
<b>SERS International Company Idx Fund</b> Callan Intl Eq Dev Mkt MF	3.8 27	1.7 31	9.3 28	2.6 35	7.6 32	7.2 50			0.02 99
MSCI EAFE	3.7 35	1.1 34	9.1 31	2.2 44	7.3 45	6.9 58			
<b>Domestic Fixed Income</b>									
<b>SERS Short Term Investment Fund</b> Callan Cash Database	0.6 93	2.4 85	1.6 79	1.0 83	0.8 84	0.6 86			0.00 100
3-month Treasury Bill	0.6 79	2.3 92	1.4 94	0.9 95	0.6 97	0.5 97			
<b>Comments:</b> Callan Cash Database includes STIF, enhanced cash, and money market funds.									

Returns:  
■ above median  
■ third quartile  
■ fourth quartile

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

Risk Quadrant:  
  
 Return  
 Risk

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

**Pennsylvania SERS  
Investment Manager Performance Monitoring Summary Report  
June 30, 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
<b>SERS Stable Value Fund</b> Callan Stable Value	0.7 1	2.8 2	2.4 3	2.5 1	2.6 1	3.0 1			
3-month Treasury Bill	0.6 51	2.3 75	1.4 98	0.9 100	0.6 100	0.5 100			
<b>SERS U.S. Bond Index Fund</b> Callan Core Bond MFs	3.1 48	7.9 35	2.3 79	2.9 48	2.6 77	3.8 86			0.02 96
Blmbg Aggregate	3.1 50	7.9 39	2.3 77	2.9 37	2.6 69	3.9 84			

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



# SERS 60/40 Stock & Bond Fund

## Period Ended June 30, 2019

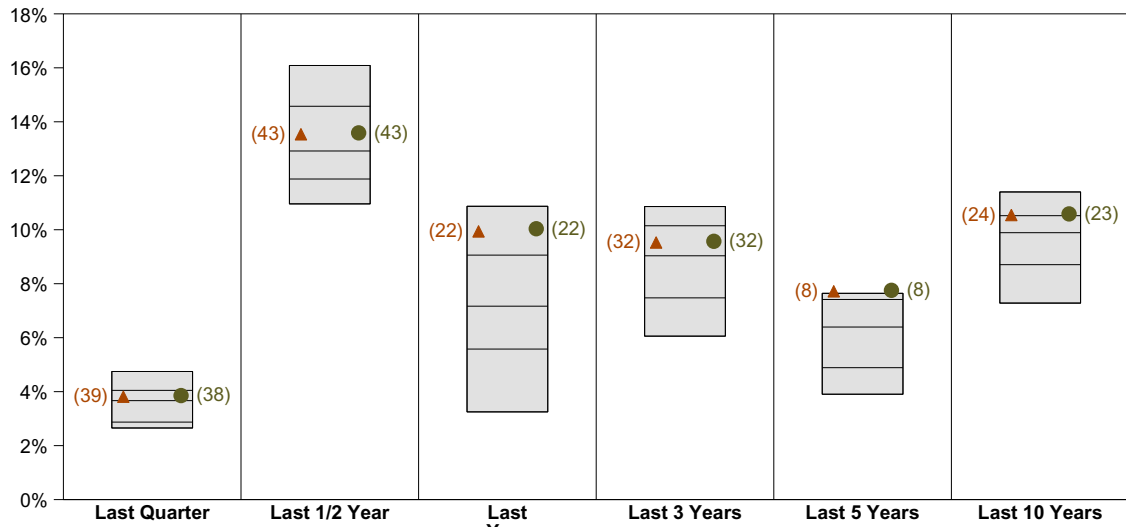
### Investment Philosophy

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

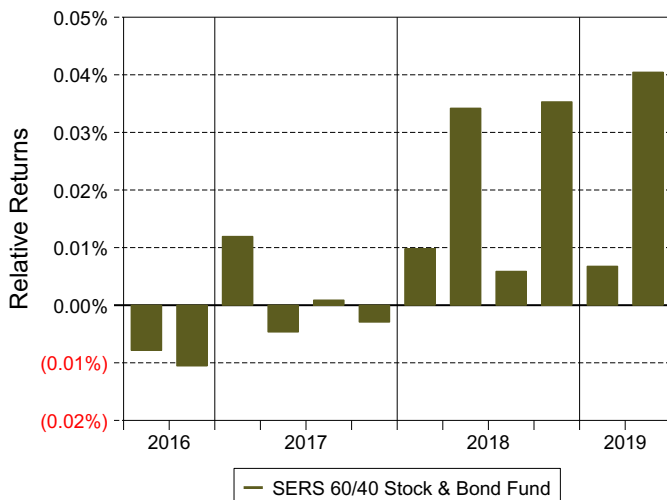
- SERS 60/40 Stock & Bond Fund's portfolio posted a 3.85% return for the quarter placing it in the 38 percentile of the Callan Domestic Balanced Mutual Funds group for the quarter and in the 22 percentile for the last year.
- SERS 60/40 Stock & Bond Fund's portfolio outperformed the 60% S&P 500/ 40% Aggregate Bond by 0.04% for the quarter and outperformed the 60% S&P 500/ 40% Aggregate Bond for the year by 0.10%.

### Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)

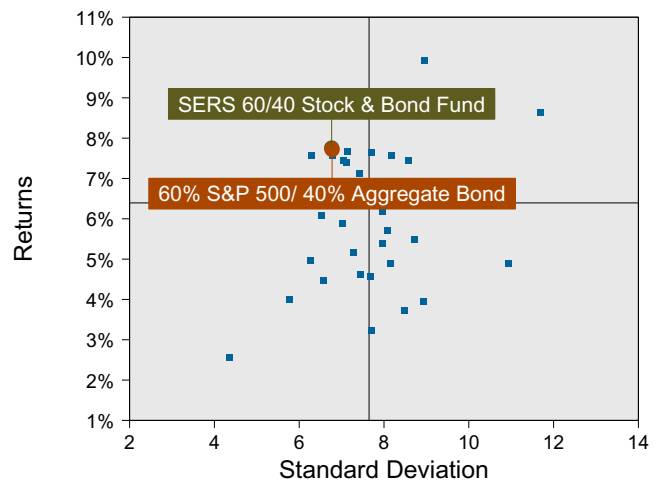


	Last Quarter	Last 1/2 Year	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	4.75	16.09	10.87	10.86	7.64	11.40
25th Percentile	4.05	14.57	9.06	10.15	7.42	10.52
Median	3.67	12.92	7.17	9.03	6.39	9.89
75th Percentile	2.87	11.88	5.58	7.48	4.89	8.71
90th Percentile	2.65	10.96	3.25	6.06	3.90	7.28
<b>SERS 60/40 Stock &amp; Bond Fund</b>	● 3.85	13.59	10.04	9.57	7.75	10.59
60% S&P 500/ 40% Aggregate Bond	▲ 3.81	13.54	9.94	9.53	7.72	10.55

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



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



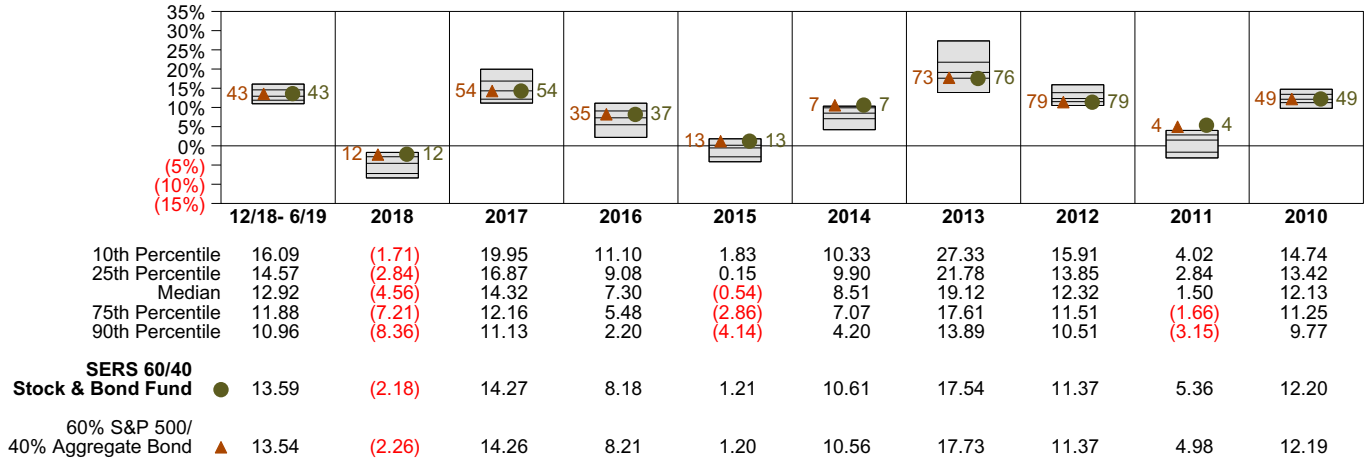


# SERS 60/40 Stock & Bond Fund Return Analysis Summary

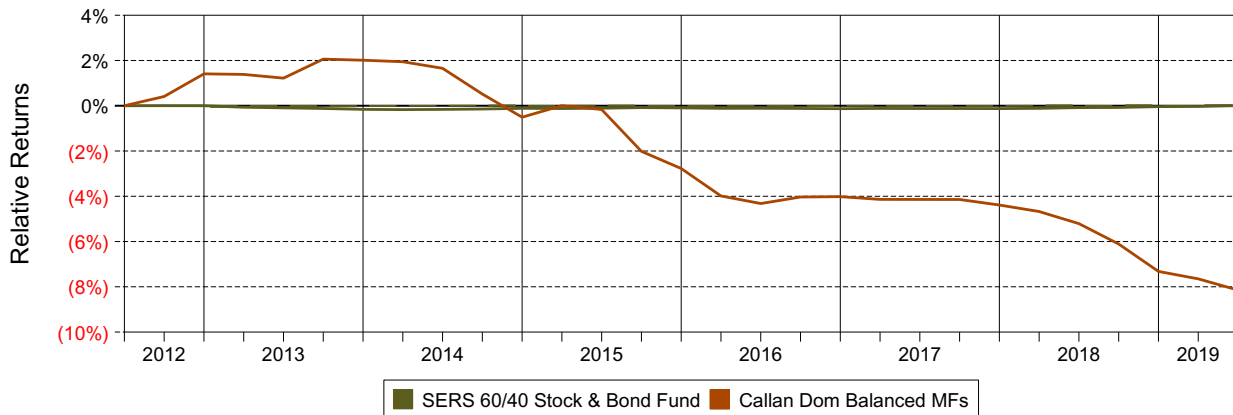
## Return Analysis

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.

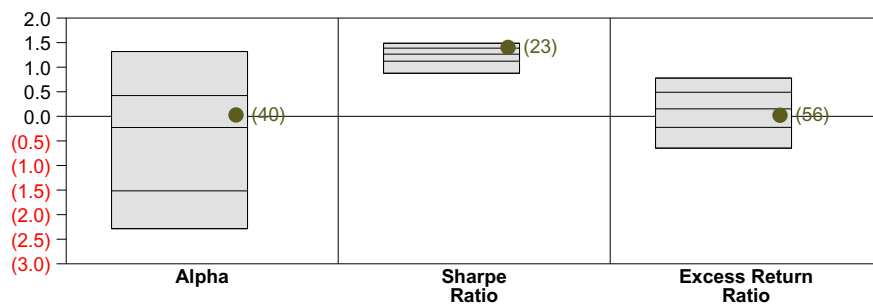
### Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)



### 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 June 30, 2019



# SERS Conservative Portfolio Fund

## Period Ended June 30, 2019

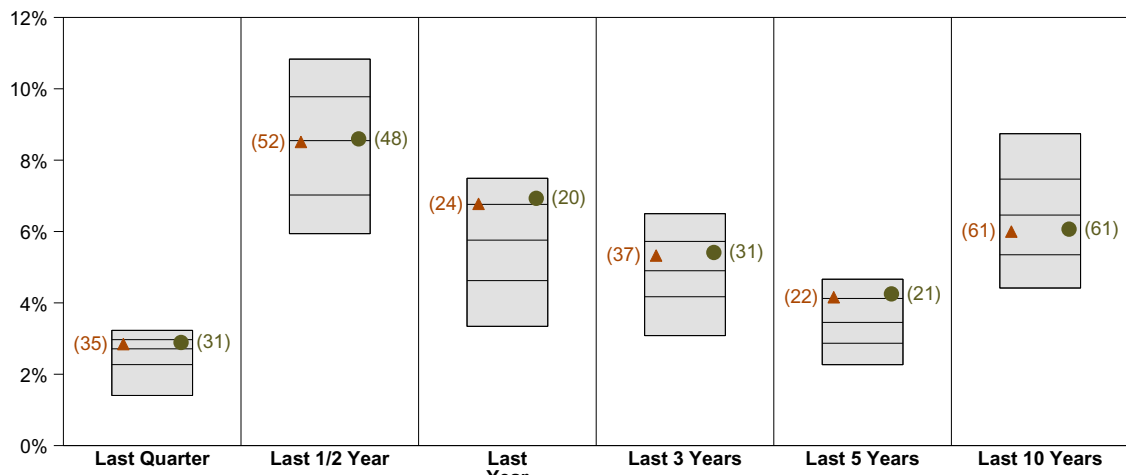
### Investment Philosophy

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

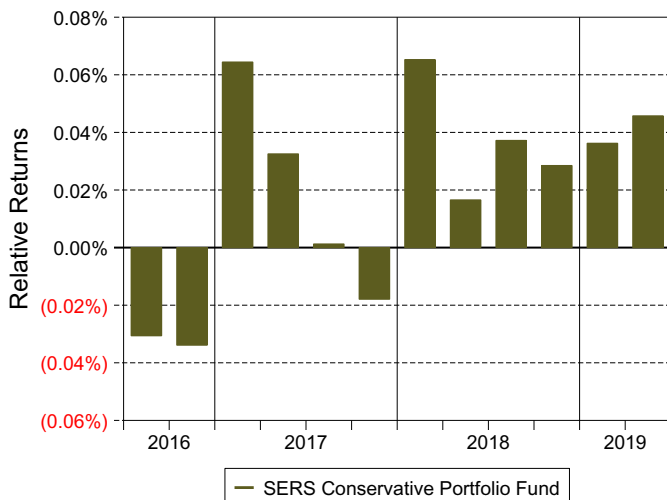
- SERS Conservative Portfolio Fund's portfolio posted a 2.89% return for the quarter placing it in the 31 percentile of the Callan Mixed-Asset Target Alloc Cons MFs group for the quarter and in the 20 percentile for the last year.
- SERS Conservative Portfolio Fund's portfolio outperformed the Conservative Portfolio Custom Index by 0.05% for the quarter and outperformed the Conservative Portfolio Custom Index for the year by 0.15%.

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

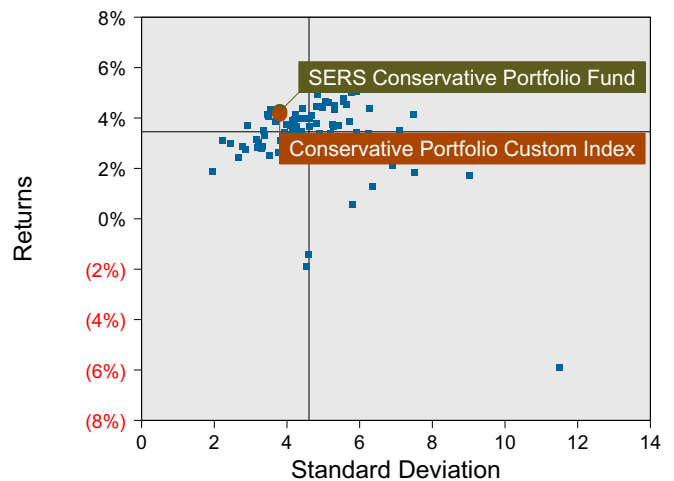


10th Percentile	3.23	10.83	7.49	6.50	4.66	8.74
25th Percentile	2.97	9.78	6.76	5.72	4.12	7.47
Median	2.71	8.55	5.76	4.90	3.45	6.46
75th Percentile	2.27	7.02	4.62	4.17	2.87	5.35
90th Percentile	1.41	5.94	3.34	3.08	2.27	4.42
<b>SERS Conservative Portfolio Fund</b>	<b>2.89</b>	<b>8.60</b>	<b>6.93</b>	<b>5.41</b>	<b>4.25</b>	<b>6.07</b>
Conservative Portfolio Custom Index	2.84	8.51	6.78	5.33	4.16	6.00

### Relative Returns vs Conservative Portfolio Custom Index



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

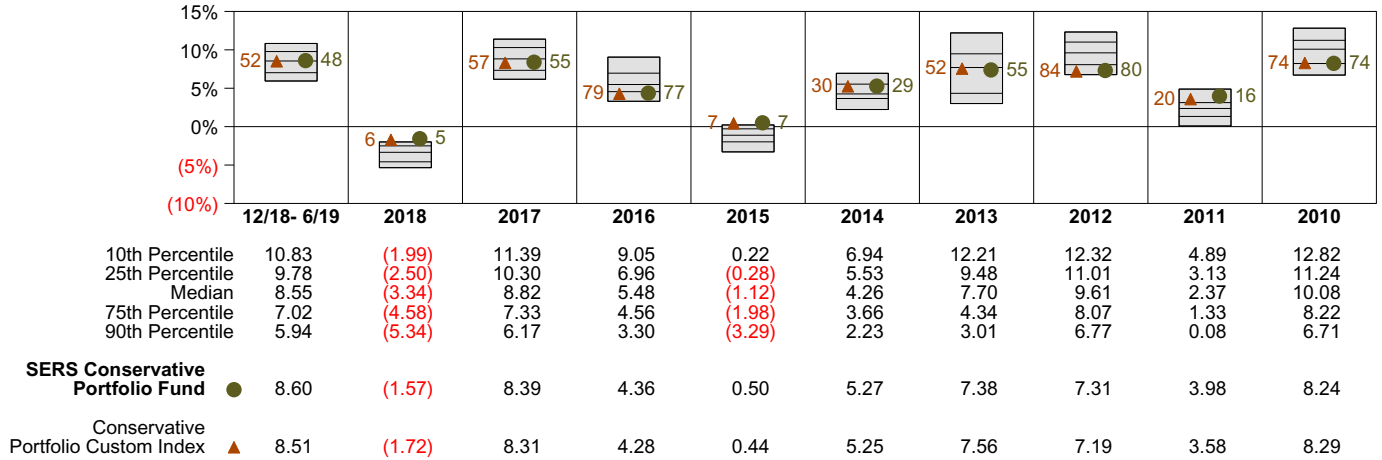


# SERS Conservative Portfolio Fund Return Analysis Summary

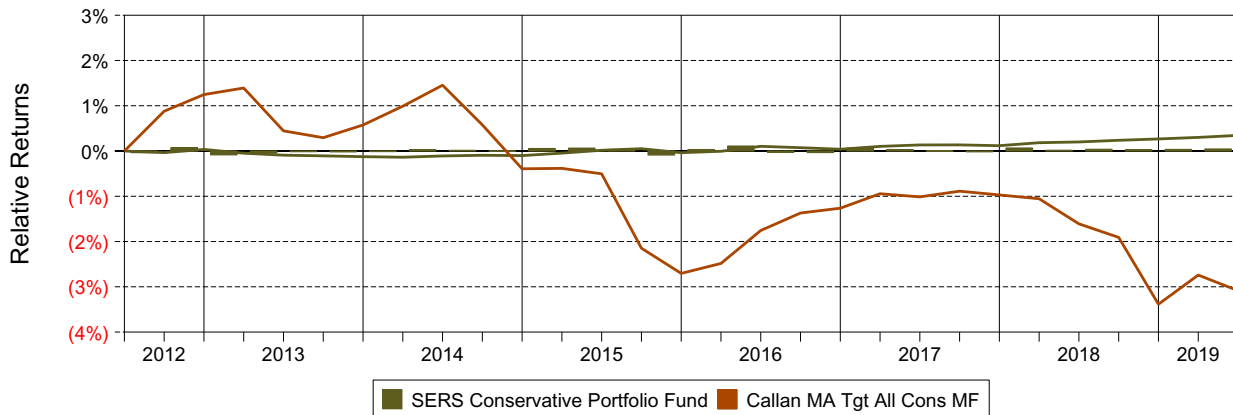
## Return Analysis

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.

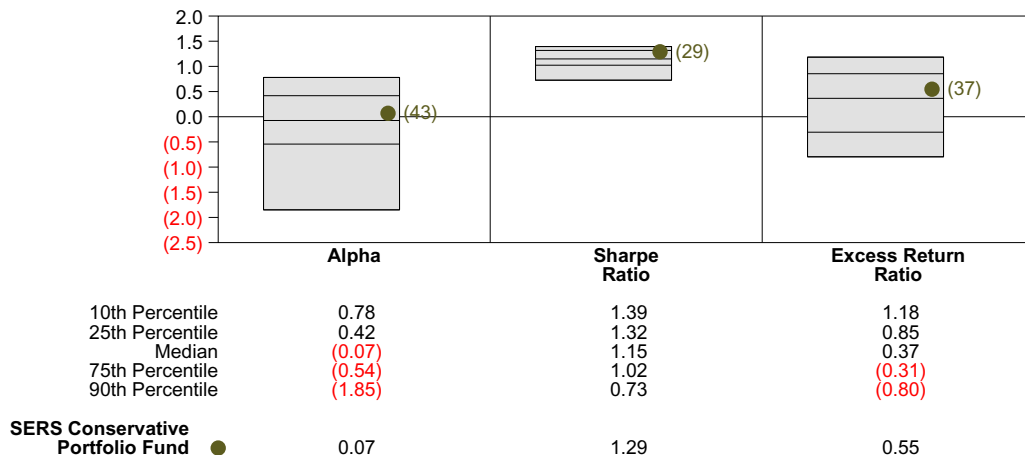
### Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)



### 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 June 30, 2019



# SERS Moderate Portfolio Fund

## Period Ended June 30, 2019

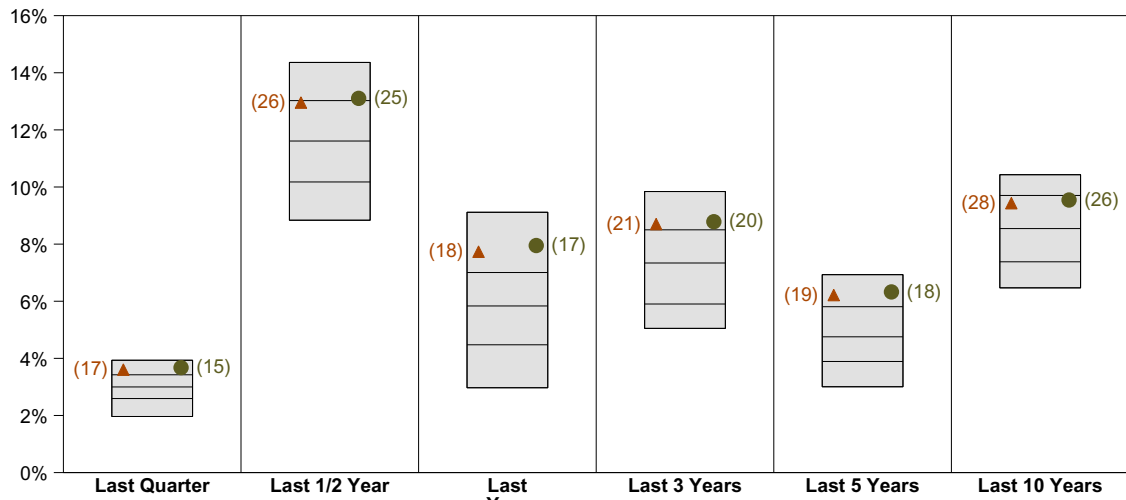
### Investment Philosophy

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

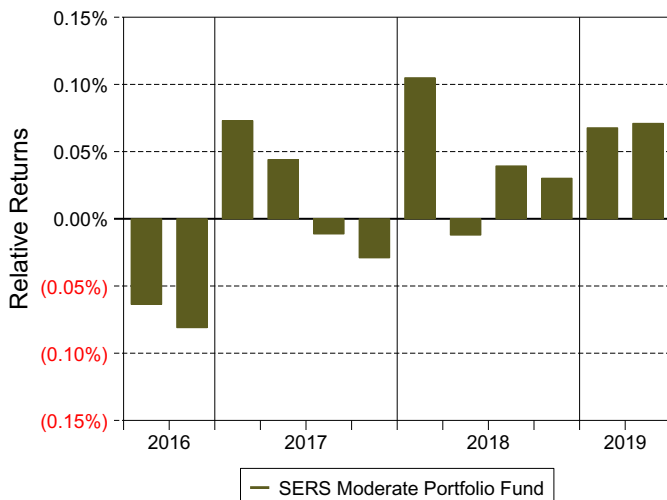
- SERS Moderate Portfolio Fund's portfolio posted a 3.68% return for the quarter placing it in the 15 percentile of the Callan Mixed-Asset Target Alloc Mod MF group for the quarter and in the 17 percentile for the last year.
- SERS Moderate Portfolio Fund's portfolio outperformed the Moderate Portfolio Custom Index by 0.07% for the quarter and outperformed the Moderate Portfolio Custom Index for the year by 0.22%.

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

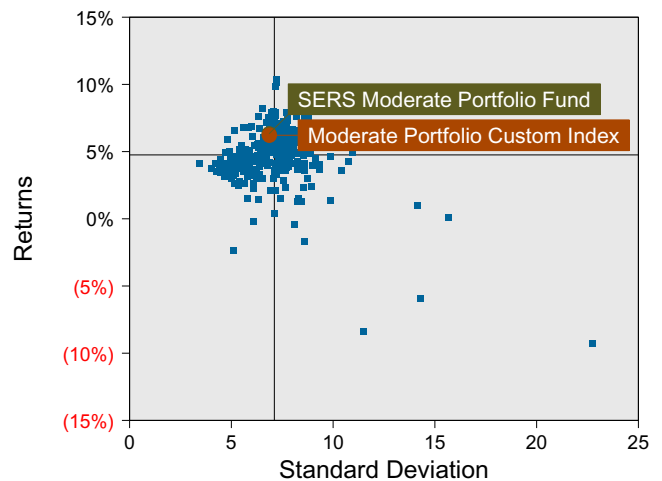


10th Percentile	3.93	14.36	9.12	9.84	6.93	10.43
25th Percentile	3.42	13.02	7.01	8.50	5.81	9.70
Median	3.00	11.61	5.83	7.34	4.75	8.54
75th Percentile	2.59	10.18	4.48	5.90	3.89	7.38
90th Percentile	1.96	8.84	2.97	5.05	3.01	6.47
<b>SERS Moderate Portfolio Fund</b>	● 3.68	13.10	7.95	8.78	6.33	9.54
Moderate Portfolio Custom Index	▲ 3.61	12.96	7.73	8.70	6.22	9.43

### Relative Returns vs Moderate Portfolio Custom Index



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

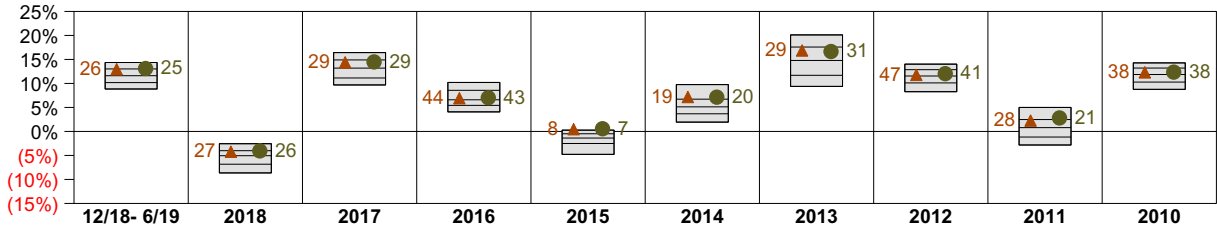


# SERS Moderate Portfolio Fund Return Analysis Summary

## Return Analysis

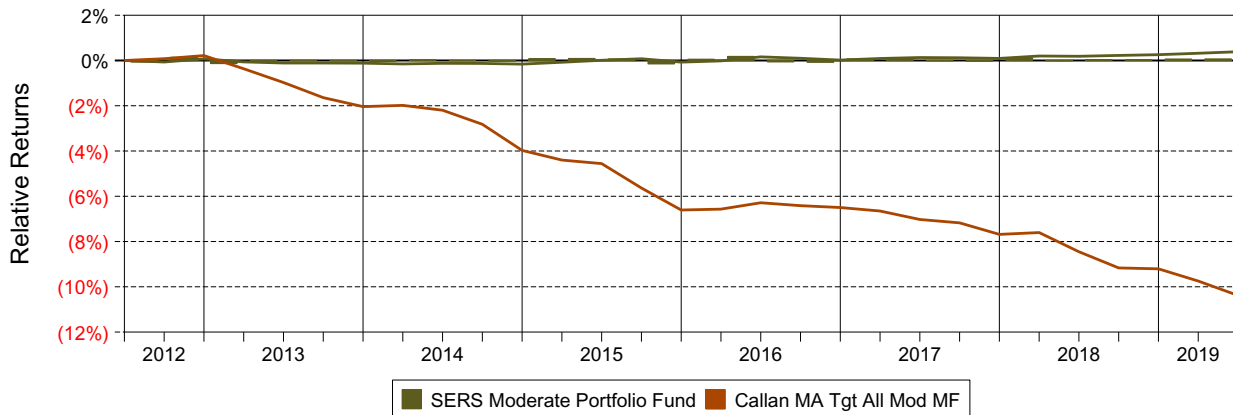
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

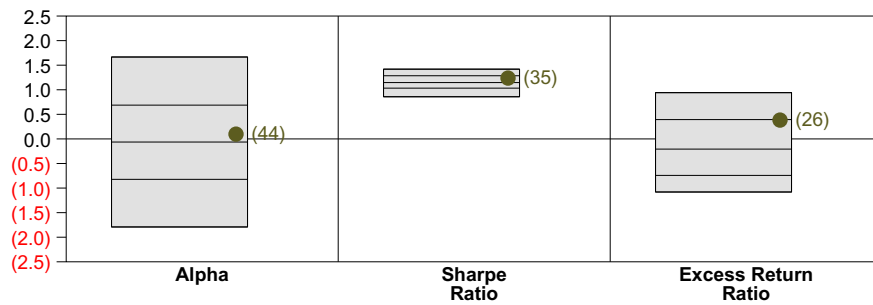


	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	14.36	(2.56)	16.43	10.21	0.27	9.76	20.11	14.02	5.00	14.28
25th Percentile	13.02	(4.01)	14.90	8.57	(0.49)	6.72	17.59	12.87	2.48	13.20
Median	11.61	(5.06)	13.20	6.59	(1.38)	5.12	14.79	11.55	0.79	11.86
75th Percentile	10.18	(6.83)	11.14	5.43	(2.51)	3.68	11.69	10.11	(1.16)	10.28
90th Percentile	8.84	(8.64)	9.68	4.07	(4.78)	1.94	9.39	8.28	(2.83)	8.77
<b>SERS Moderate Portfolio Fund</b>	● 13.10	(4.06)	14.48	7.02	0.56	7.14	16.65	12.03	2.81	12.35
Moderate Portfolio Custom Index	▲ 12.96	(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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.67	1.42	0.94
25th Percentile	0.69	1.29	0.39
Median	(0.06)	1.15	(0.21)
75th Percentile	(0.82)	1.03	(0.74)
90th Percentile	(1.79)	0.86	(1.08)
<b>SERS Moderate Portfolio Fund</b>	● 0.10	1.24	0.38

# SERS Aggressive Portfolio Fund

## Period Ended June 30, 2019

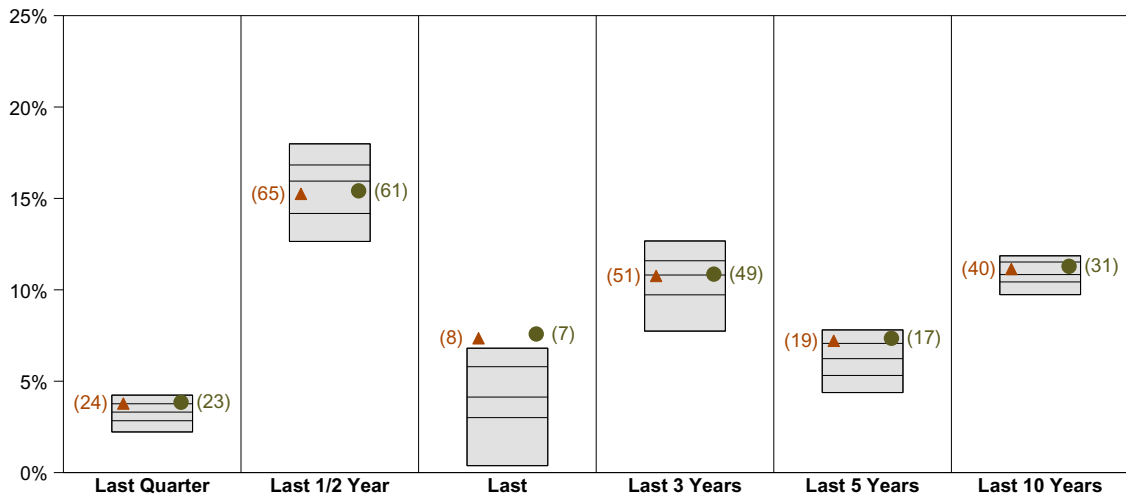
### Investment Philosophy

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

- SERS Aggressive Portfolio Fund's portfolio posted a 3.85% return for the quarter placing it in the 23 percentile of the Callan Mix-Asst Tgt Alloc Aggr Grwth MF group for the quarter and in the 7 percentile for the last year.
- SERS Aggressive Portfolio Fund's portfolio outperformed the Aggressive Portfolio Custom Index by 0.07% for the quarter and outperformed the Aggressive Portfolio Custom Index for the year by 0.23%.

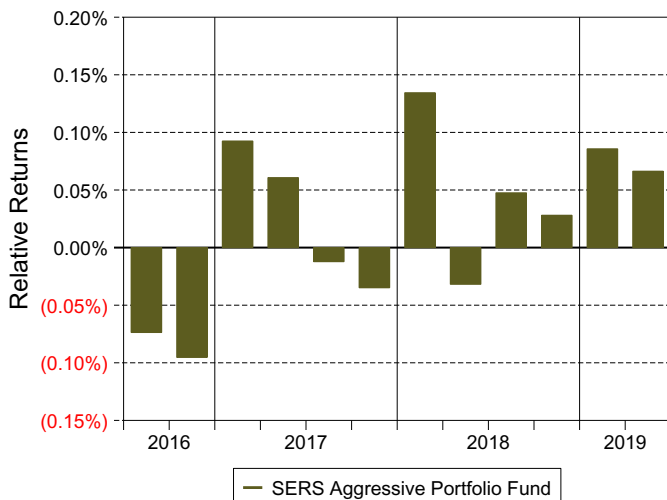
### Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



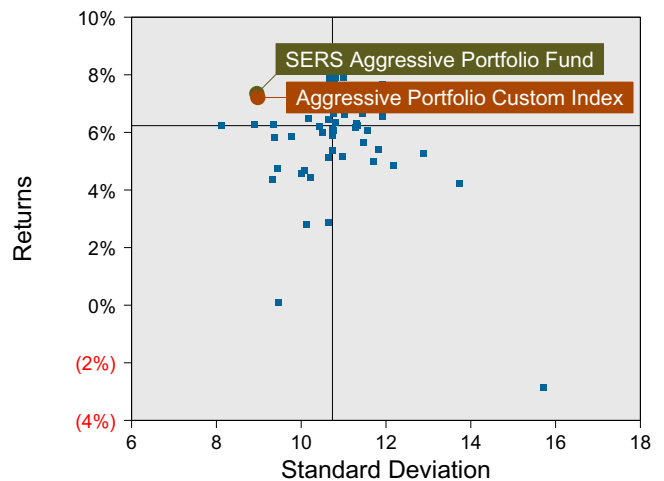
10th Percentile	4.24	17.99	6.81	12.67	7.81	11.86
25th Percentile	3.77	16.83	5.79	11.59	7.07	11.52
Median	3.31	15.95	4.13	10.81	6.23	10.83
75th Percentile	2.84	14.18	3.01	9.73	5.31	10.43
90th Percentile	2.22	12.65	0.38	7.74	4.38	9.74

<b>SERS Aggressive Portfolio Fund</b> ●	3.85	15.41	7.58	10.86	7.35	11.29
Aggressive Portfolio Custom Index ▲	3.78	15.25	7.35	10.76	7.21	11.14

### Relative Returns vs Aggressive Portfolio Custom Index



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

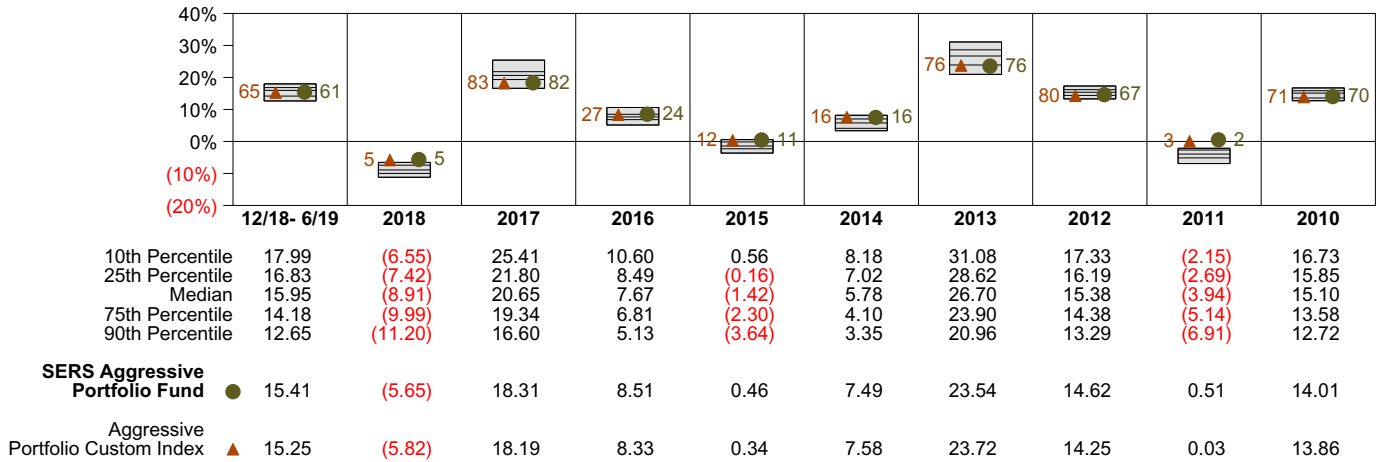


# SERS Aggressive Portfolio Fund Return Analysis Summary

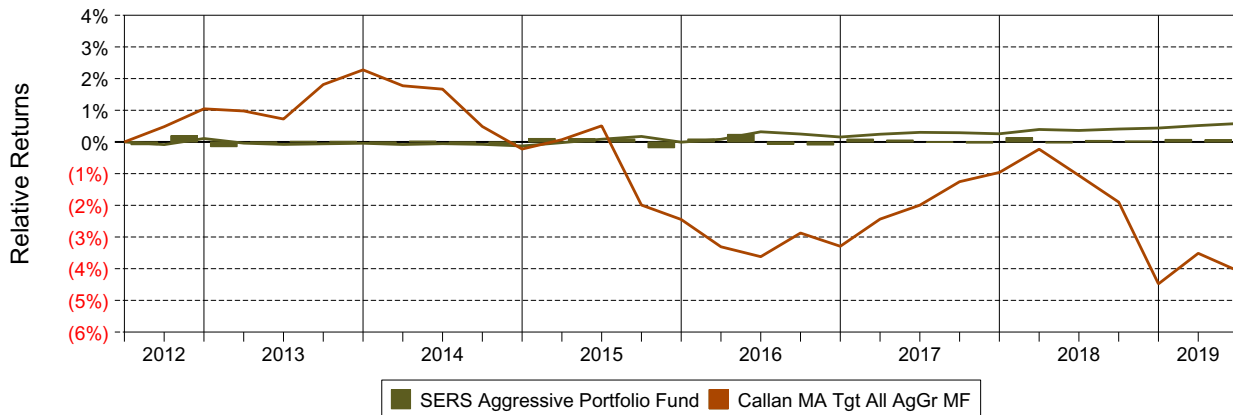
## Return Analysis

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.

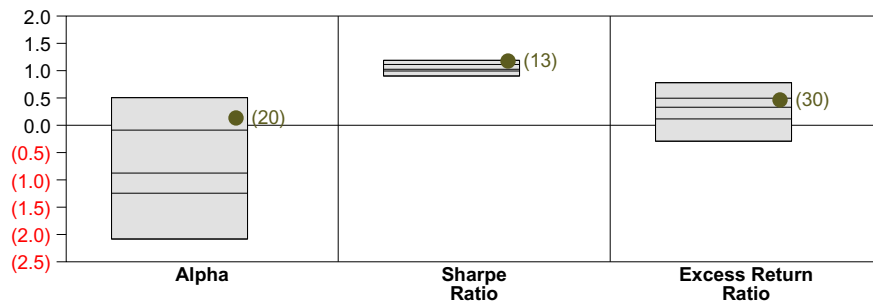
### Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



### 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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.51	1.19	0.78
25th Percentile	(0.09)	1.11	0.50
Median	(0.88)	1.03	0.33
75th Percentile	(1.24)	0.99	0.12
90th Percentile	(2.08)	0.90	(0.29)
<b>SERS Aggressive Portfolio Fund</b>	● 0.13	1.18	0.46





# SERS U.S. Large Company Index Fund

## Period Ended June 30, 2019

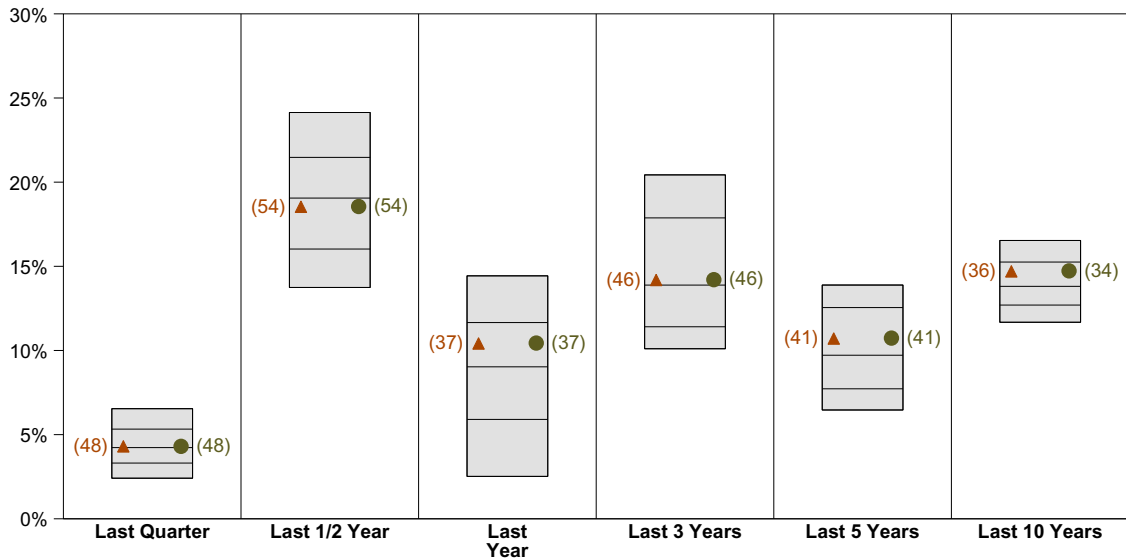
### Investment Philosophy

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

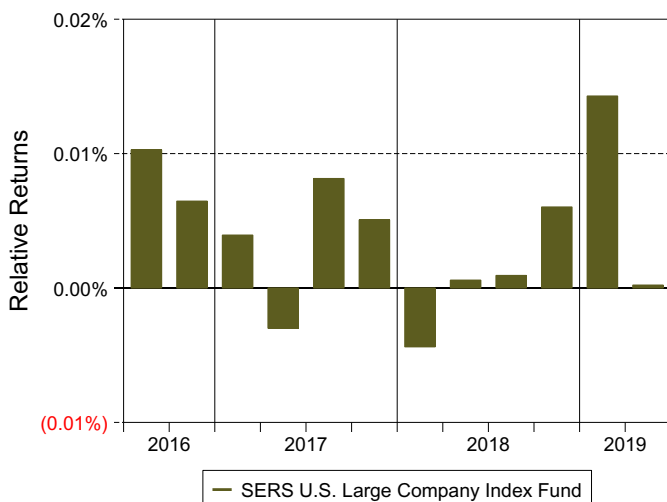
- SERS U.S. Large Company Index Fund's portfolio posted a 4.30% return for the quarter placing it in the 48 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 37 percentile for the last year.
- SERS U.S. Large Company Index Fund's portfolio outperformed the S&P 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)

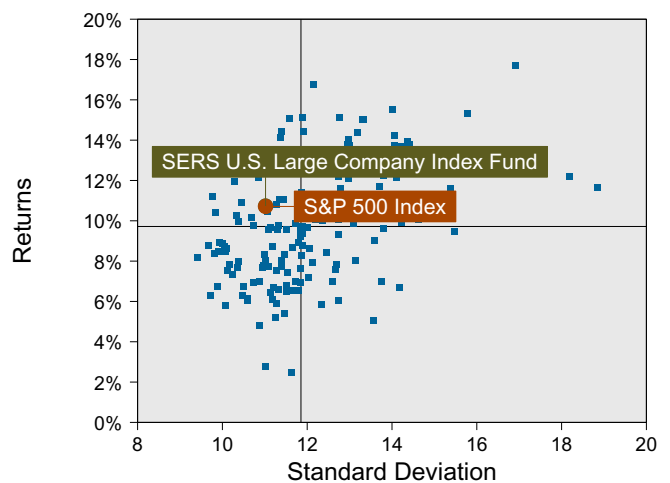


10th Percentile	6.54	24.14	14.43	20.43	13.89	16.53
25th Percentile	5.33	21.47	11.66	17.88	12.55	15.25
Median	4.23	19.05	9.03	13.88	9.72	13.81
75th Percentile	3.31	16.03	5.91	11.41	7.72	12.70
90th Percentile	2.41	13.74	2.52	10.10	6.46	11.68
<b>SERS U.S. Large Company Index Fund</b> ●	4.30	18.55	10.44	14.21	10.74	14.73
S&P 500 Index ▲	4.30	18.54	10.42	14.19	10.71	14.70

### Relative Return vs S&P 500 Index



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

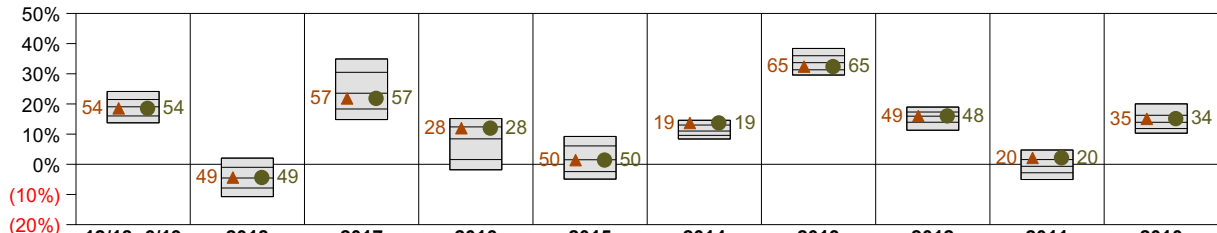


# SERS U.S. Large Company Index Fund Return Analysis Summary

## 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.

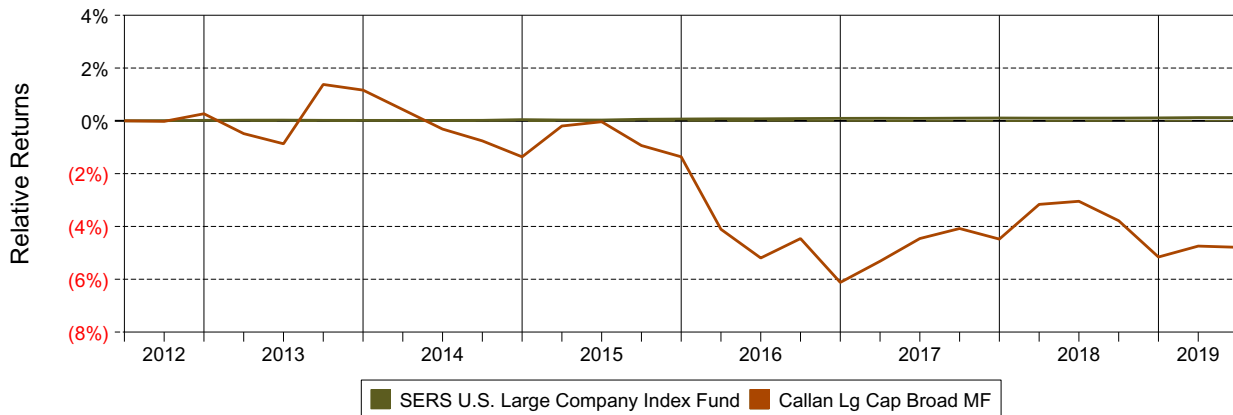
### Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



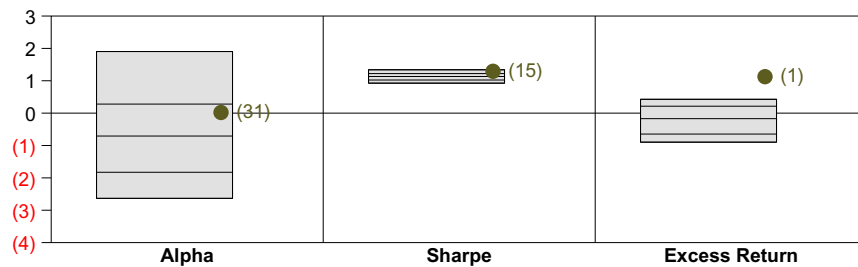
	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	24.14	2.05	34.91	15.17	9.23	14.58	38.40	18.96	4.74	20.03
25th Percentile	21.47	(1.00)	30.48	12.39	6.09	13.01	35.98	17.33	1.57	16.25
Median	19.05	(4.54)	23.56	8.43	1.50	11.02	33.69	15.94	(0.67)	13.92
75th Percentile	16.03	(7.86)	18.33	1.56	(2.42)	9.59	31.31	13.94	(2.81)	11.84
90th Percentile	13.74	(10.72)	14.82	(1.82)	(4.91)	8.38	29.58	11.29	(5.04)	10.31

	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS U.S. Large Company Index Fund</b>	● 18.55	(4.38)	21.85	11.99	1.41	13.72	32.39	16.04	2.15	15.14
S&P 500 Index	▲ 18.54	(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 June 30, 2019



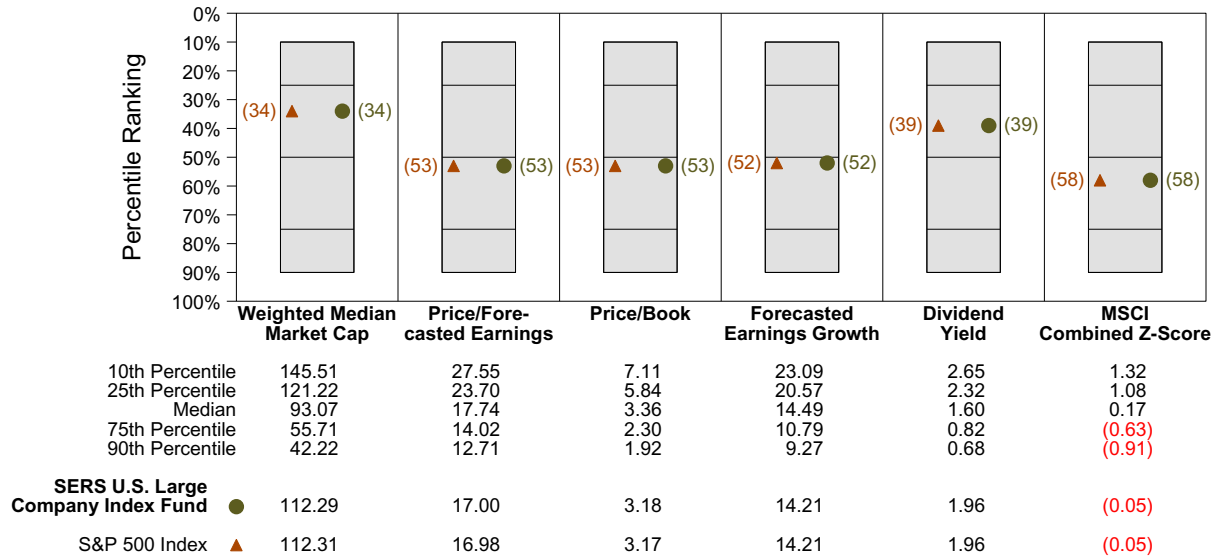
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.90	1.34	0.43
25th Percentile	0.28	1.22	0.21
Median	(0.71)	1.13	(0.17)
75th Percentile	(1.83)	1.02	(0.65)
90th Percentile	(2.63)	0.93	(0.90)
<b>SERS U.S. Large Company Index Fund</b>	● 0.02	1.29	1.13

# SERS U.S. Large Company Index Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

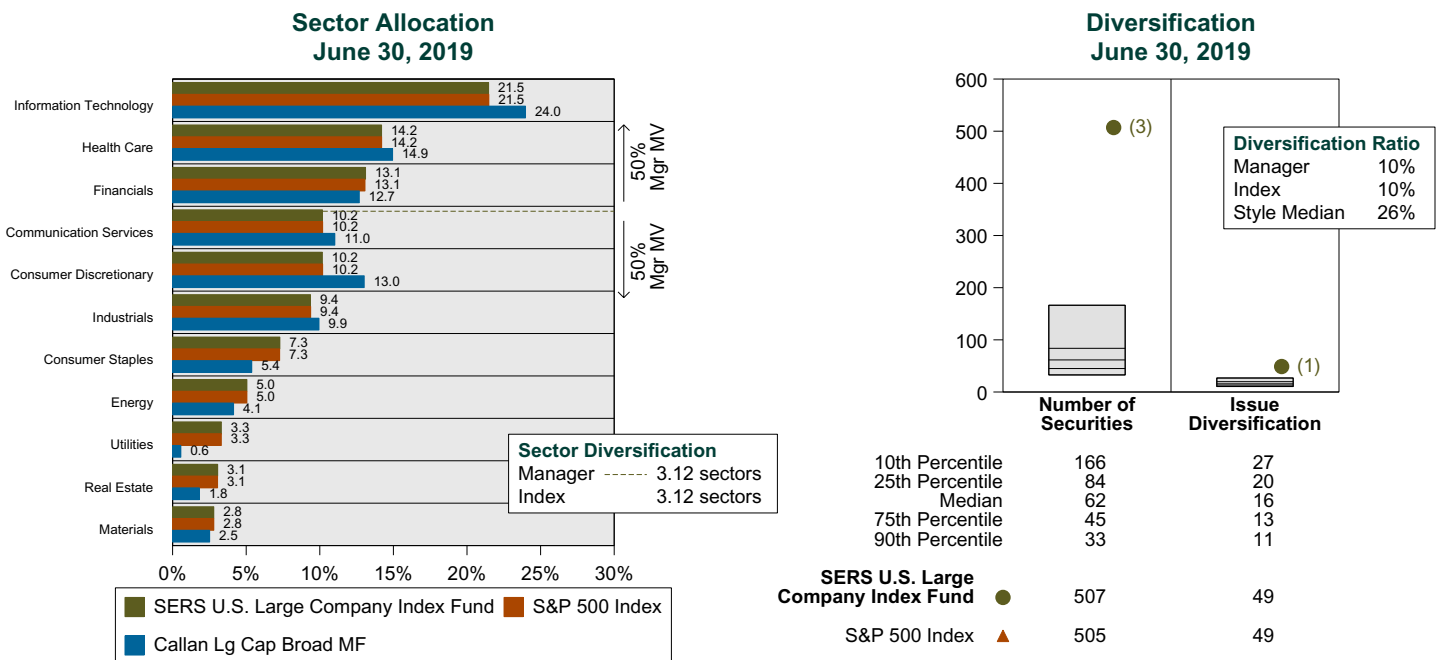
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Large Cap Broad Equity Mut Funds as of June 30, 2019



## 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.



## SERS U.S. Large Company Index Fund Top 10 Portfolio Holdings Characteristics as of June 30, 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	\$39,982,168	4.2%	14.00%	1026.51	26.21	1.37%	14.90%
Apple Inc	Information Technology	\$33,695,463	3.5%	4.60%	910.64	16.07	1.56%	12.00%
Amazon.Com	Consumer Discretionary	\$30,502,057	3.2%	6.34%	932.29	57.77	0.00%	94.00%
Facebook Inc Cl A	Communication Services	\$18,059,417	1.9%	15.78%	463.69	23.45	0.00%	14.30%
Berkshire Hathaway Inc Del Cl B New	Financials	\$16,087,883	1.7%	6.11%	291.67	19.99	0.00%	23.30%
Johnson & Johnson	Health Care	\$14,402,171	1.5%	0.32%	369.80	15.69	2.73%	6.30%
JPMorgan Chase & Co	Financials	\$14,124,743	1.5%	11.28%	362.68	10.83	2.86%	5.76%
Alphabet Inc Cl C	Communication Services	\$12,901,427	1.4%	(7.88)%	376.44	21.78	0.00%	15.76%
Exxon Mobil Corp	Energy	\$12,631,458	1.3%	(4.08)%	324.38	16.46	4.54%	10.00%
Alphabet Inc Cl A	Communication Services	\$12,630,970	1.3%	(7.99)%	324.23	21.87	0.00%	15.76%

### 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
Anadarko Petroleum Corp	Energy	\$1,381,953	0.1%	55.81%	35.43	28.30	1.70%	31.60%
Arconic Inc	Industrials	\$397,051	0.0%	35.24%	11.58	13.24	0.31%	11.20%
Total Sys Svcs Inc	Information Technology	\$815,675	0.1%	35.14%	22.70	24.60	0.41%	11.35%
Qualcomm Inc	Information Technology	\$3,603,306	0.4%	34.62%	92.48	15.91	3.26%	27.05%
Marketaxess Hldgs Inc	Financials	\$423,295	0.0%	30.85%	12.12	58.34	0.63%	13.27%
Cerner Corp	Health Care	\$930,223	0.1%	28.45%	23.85	25.14	0.98%	13.10%
Disney Walt Co Com Disney	Communication Services	\$9,493,260	1.0%	25.77%	251.31	21.48	1.26%	2.80%
Hasbro Inc	Consumer Discretionary	\$475,580	0.0%	25.13%	13.30	22.06	2.57%	11.20%
American Intl Group Inc	Financials	\$1,808,000	0.2%	24.48%	46.34	10.62	2.40%	49.51%
Carmax	Consumer Discretionary	\$562,569	0.1%	24.40%	14.36	16.15	0.00%	12.19%

### 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
Mylan N V Shs Euro	Health Care	\$377,561	0.0%	(32.82)%	9.81	4.31	0.00%	5.10%
Gap	Consumer Discretionary	\$146,532	0.0%	(30.71)%	6.79	8.49	5.40%	3.92%
Foot Locker Inc	Consumer Discretionary	\$180,037	0.0%	(30.41)%	4.60	8.06	3.63%	11.04%
Kohls Corp	Consumer Discretionary	\$301,265	0.0%	(29.89)%	7.70	8.82	5.64%	10.21%
Nordstrom	Consumer Discretionary	\$131,506	0.0%	(27.36)%	4.93	9.31	4.65%	8.87%
Capri Holdings Limited Shs	Consumer Discretionary	\$203,593	0.0%	(24.20)%	5.23	6.88	0.00%	6.62%
Regeneron Pharmaceutical	Health Care	\$960,081	0.1%	(23.77)%	33.72	13.67	0.00%	5.00%
Occidental Petroleum	Energy	\$1,490,205	0.2%	(22.81)%	37.60	13.82	6.21%	3.64%
Pvh Corp	Consumer Discretionary	\$275,651	0.0%	(22.37)%	7.09	8.90	0.16%	11.45%
Halliburton Co	Energy	\$775,491	0.1%	(21.75)%	19.87	13.44	3.17%	18.70%

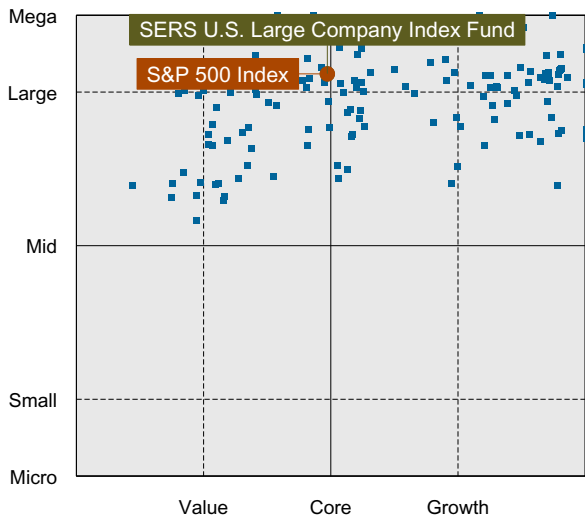
# Historical Holdings Based Style Analysis

## SERS U.S. Large Company Index Fund

### For Three Years Ended June 30, 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.

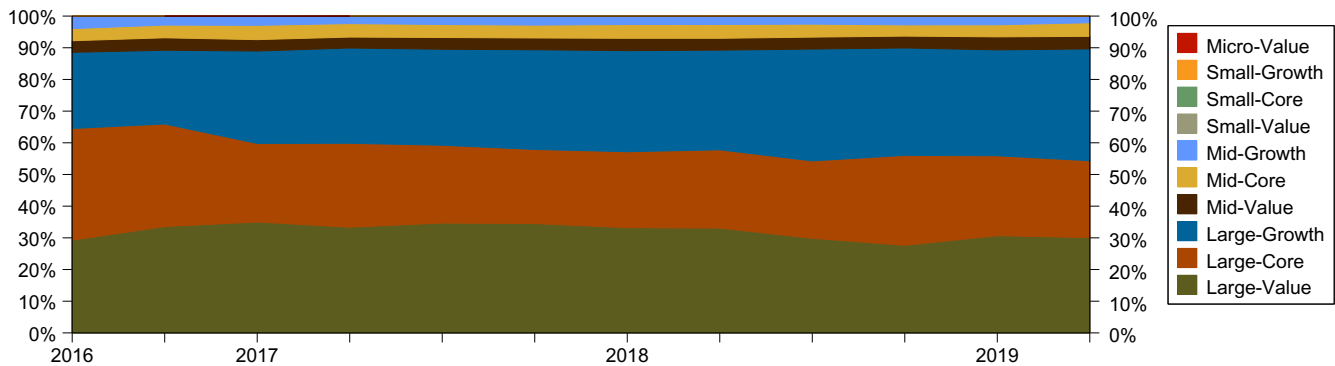
**Average Style Map vs Callan Lg Cap Broad MF Holdings for Three Years Ended June 30, 2019**



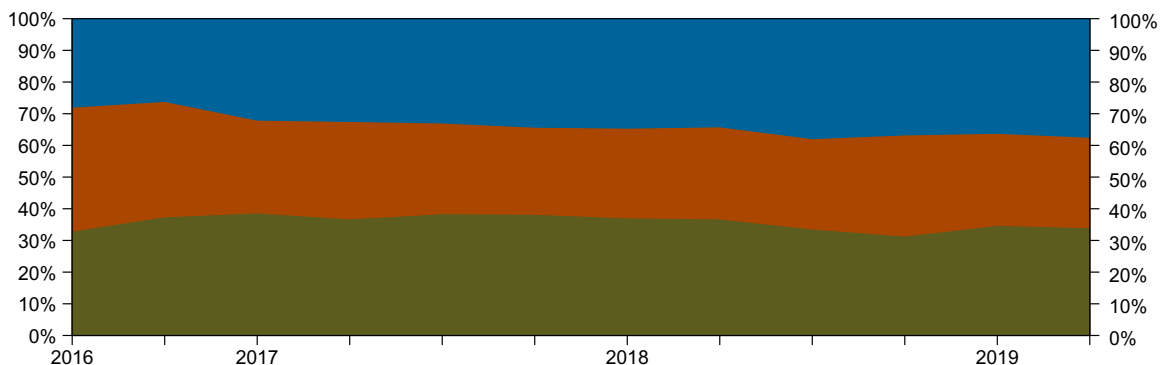
**Average Style Exposure Matrix Holdings for Three Years Ended June 30, 2019**

	32.1% (104)	26.5% (93)	30.8% (87)	<b>89.4% (284)</b>
Large	<b>32.0% (104)</b>	<b>26.5% (93)</b>	<b>30.8% (87)</b>	<b>89.4% (284)</b>
Mid	3.8% (82)	4.1% (82)	2.7% (52)	<b>10.6% (216)</b>
	<b>3.8% (82)</b>	<b>4.1% (82)</b>	<b>2.7% (52)</b>	<b>10.6% (216)</b>
Small	0.0% (2)	0.0% (0)	0.0% (1)	<b>0.0% (3)</b>
	<b>0.0% (3)</b>	<b>0.0% (1)</b>	<b>0.0% (1)</b>	<b>0.1% (5)</b>
Micro	0.0% (0)	0.0% (0)	0.0% (0)	<b>0.0% (0)</b>
	<b>0.0% (0)</b>	<b>0.0% (0)</b>	<b>0.0% (0)</b>	<b>0.0% (0)</b>
<b>Total</b>	<b>35.9% (188)</b>	<b>30.6% (175)</b>	<b>33.5% (140)</b>	<b>100.0% (503)</b>
	<b>35.8% (189)</b>	<b>30.6% (176)</b>	<b>33.6% (140)</b>	<b>100.0% (505)</b>
	Value	Core	Growth	<b>Total</b>

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



### SERS U.S. Large Company Index Fund Historical Style Only Exposures



# SERS U.S. SMID Company Idx Fund

## Period Ended June 30, 2019

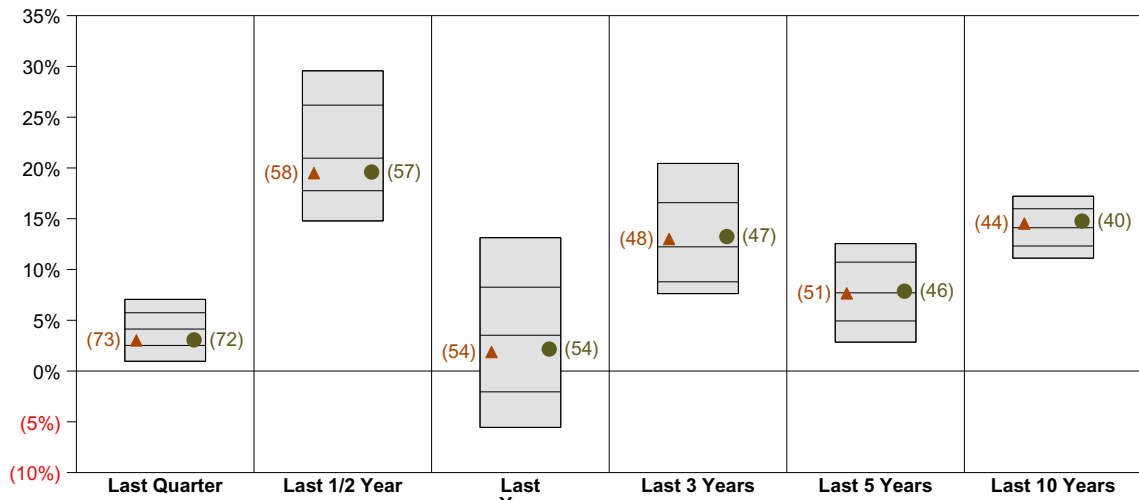
### Investment Philosophy

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

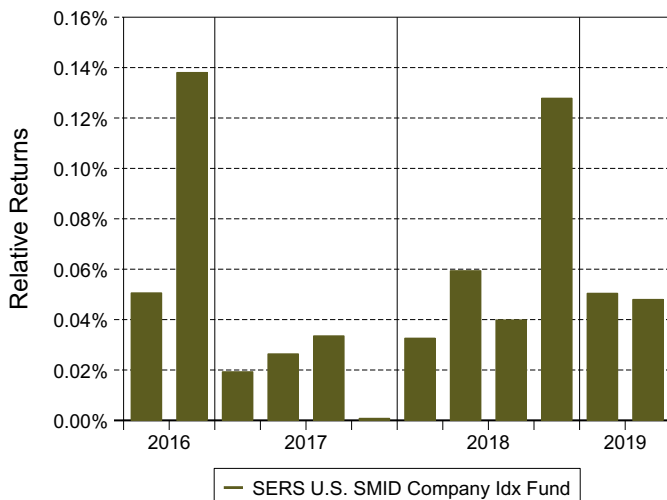
- SERS U.S. SMID Company Idx Fund's portfolio posted a 3.07% return for the quarter placing it in the 72 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 54 percentile for the last year.
- SERS U.S. SMID Company Idx Fund's portfolio outperformed the Dow Jones US Completion by 0.05% for the quarter and outperformed the Dow Jones US Completion for the year by 0.29%.

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

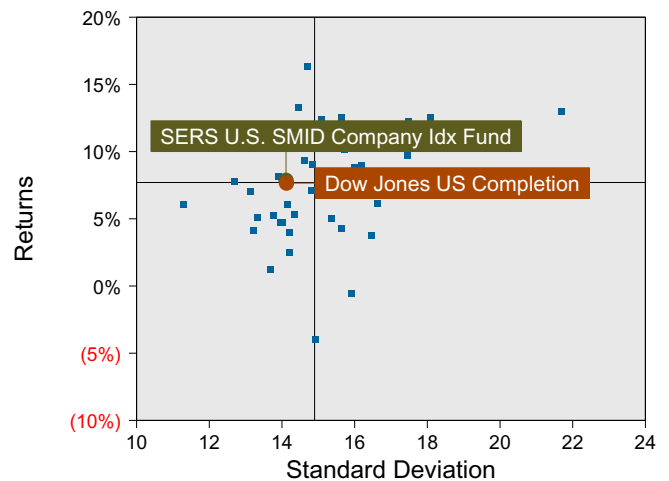


10th Percentile	7.06	29.57	13.13	20.44	12.55	17.22
25th Percentile	5.74	26.19	8.26	16.58	10.72	15.98
Median	4.14	20.96	3.52	12.23	7.70	14.11
75th Percentile	2.52	17.76	(2.05)	8.79	4.94	12.31
90th Percentile	0.96	14.78	(5.55)	7.63	2.84	11.11
<b>SERS U.S. SMID Company Idx Fund</b>	● 3.07	19.60	2.16	13.24	7.86	14.77
Dow Jones US Completion	▲ 3.02	19.49	1.87	13.01	7.65	14.53

### Relative Return vs Dow Jones US Completion



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

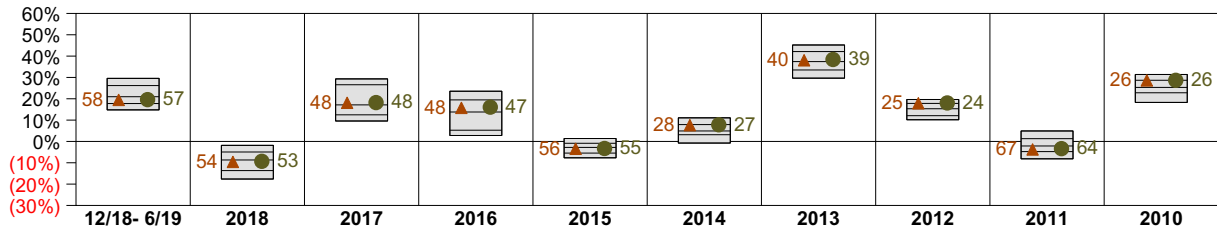


# SERS U.S. SMID Company Idx Fund Return Analysis Summary

## 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.

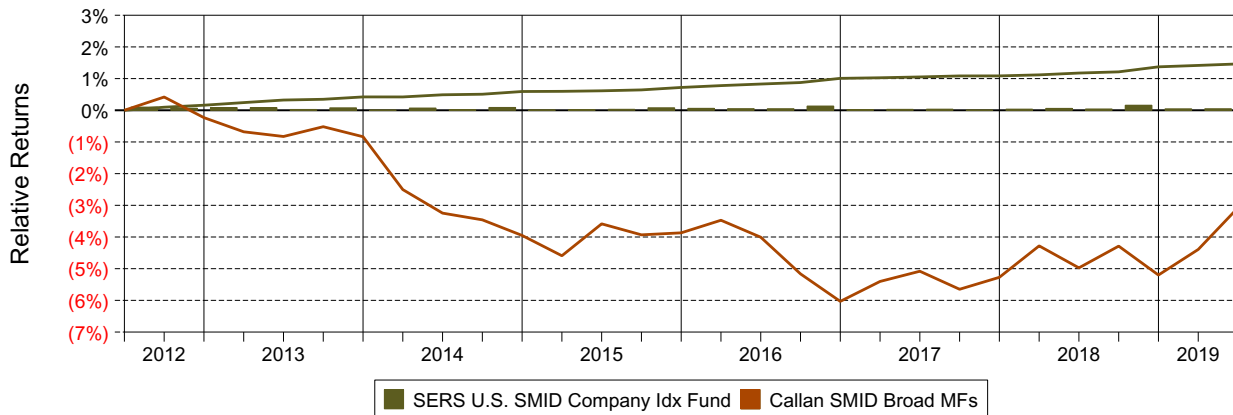
### Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



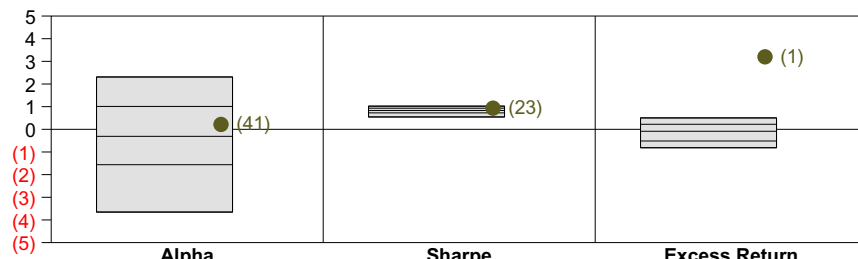
	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	29.57	(1.83)	29.31	23.54	1.38	11.06	45.21	19.66	4.92	31.38
25th Percentile	26.19	(4.95)	26.58	19.48	(0.87)	7.90	42.13	17.83	1.30	28.67
Median	20.96	(8.69)	17.14	13.80	(2.80)	4.92	37.43	15.32	(2.13)	25.33
75th Percentile	17.76	(13.66)	12.47	5.26	(5.46)	3.15	33.50	12.08	(4.76)	22.82
90th Percentile	14.78	(17.62)	9.57	2.79	(7.67)	(0.76)	29.67	10.16	(8.15)	18.29

	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS U.S. SMID Company Idx Fund</b>	19.60	(9.32)	18.21	16.08	(3.30)	7.81	38.41	18.04	(3.37)	28.65
Dow Jones US Completion	19.49	(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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.31	1.02	0.50
25th Percentile	1.01	0.93	0.22
Median	(0.31)	0.83	(0.09)
75th Percentile	(1.56)	0.73	(0.52)
90th Percentile	(3.65)	0.54	(0.81)

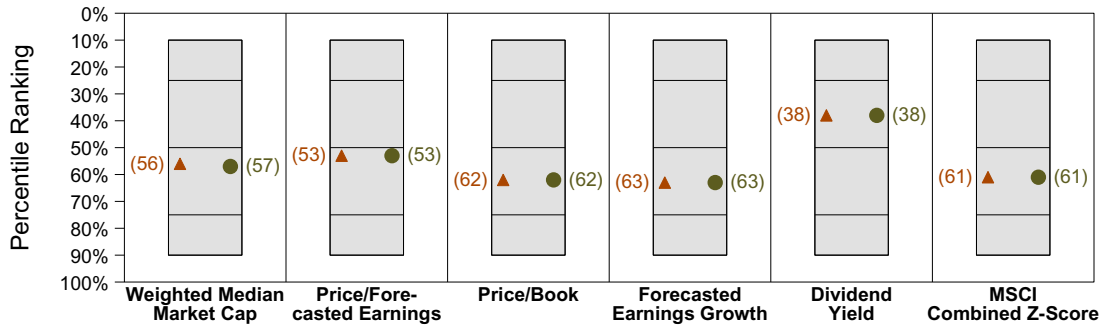
<b>SERS U.S. SMID Company Idx Fund</b>	0.22	0.93	3.20
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# SERS U.S. SMID Company Idx Fund Equity Characteristics Analysis Summary

## 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 June 30, 2019

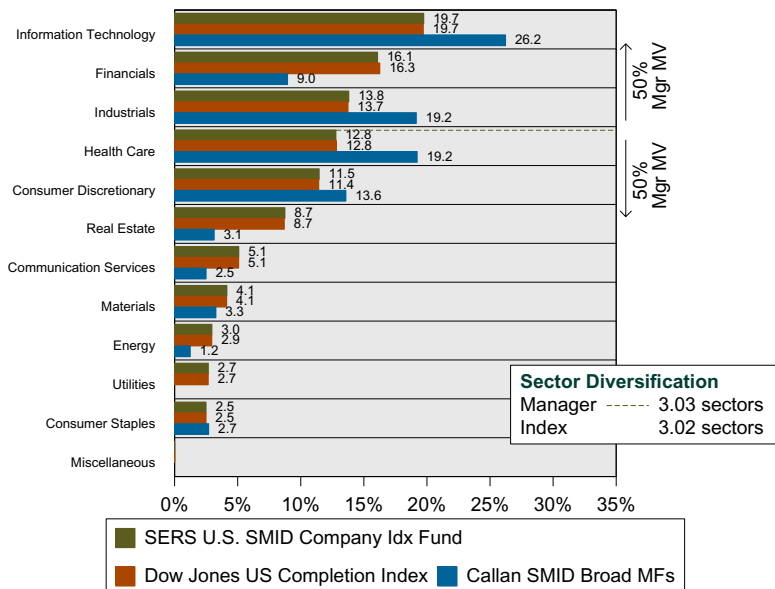


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	8.97	39.30	6.01	23.59	2.15	1.02
25th Percentile	8.11	32.67	5.03	19.25	1.76	0.89
Median	5.12	23.24	3.71	16.08	0.76	0.46
75th Percentile	3.65	13.98	1.79	11.27	0.48	(0.49)
90th Percentile	2.70	13.26	1.50	8.07	0.26	(0.65)
<b>SERS U.S. SMID Company Idx Fund</b>	4.76	21.75	2.28	14.74	1.43	0.14
Dow Jones US Completion Index	4.77	21.85	2.27	14.75	1.42	0.15

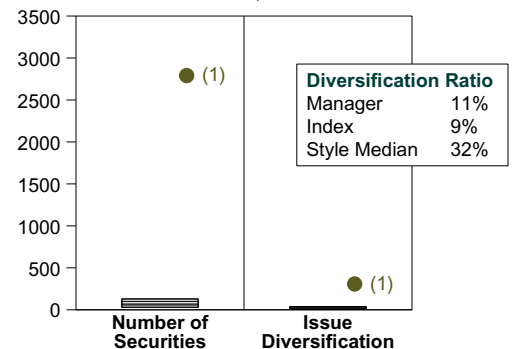
## Sector Weights

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 June 30, 2019



### Diversification June 30, 2019



	Number of Securities	Issue Diversification
10th Percentile	129	39
25th Percentile	100	33
Median	69	23
75th Percentile	57	19
90th Percentile	30	9
<b>SERS U.S. SMID Company Idx Fund</b>	2791	308
Dow Jones US Completion Index	3276	306



## SERS U.S. SMID Company Idx Fund Top 10 Portfolio Holdings Characteristics as of June 30, 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	\$4,003,887	1.0%	11.39%	50.94	73.53	0.00%	30.50%
Worldpay Inc Cl A	Information Technology	\$3,010,721	0.8%	7.97%	38.14	24.13	0.00%	15.40%
Workday Inc Cl A	Information Technology	\$2,636,420	0.7%	6.60%	33.30	107.24	0.00%	28.30%
Tesla Mtrs Inc	Consumer Discretionary	\$2,447,823	0.6%	(20.15)%	39.50	134.94	0.00%	-
T Mobile Us Inc	Communication Services	\$1,855,232	0.5%	7.29%	63.34	17.23	0.00%	16.60%
Square Inc Cl A	Information Technology	\$1,804,494	0.5%	(3.19)%	24.39	76.91	0.00%	49.85%
Las Vegas Sands Corp	Consumer Discretionary	\$1,700,021	0.4%	(1.81)%	45.66	17.33	5.21%	3.48%
Veeva Sys Inc Cl A Com	Health Care	\$1,634,270	0.4%	27.79%	21.09	74.98	0.00%	18.96%
Costar Group Inc	Industrials	\$1,602,838	0.4%	18.79%	20.25	50.45	0.00%	18.50%
Palo Alto Networks Inc	Information Technology	\$1,543,932	0.4%	(16.11)%	19.56	33.08	0.00%	24.67%

### 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
Genoclea Biosciences Inc	Health Care	\$1,345	0.0%	564.41%	0.10	(1.30)	0.00%	-
Workhorse Group Inc	Consumer Discretionary	\$9,981	0.0%	378.05%	0.19	(18.38)	0.00%	-
Orion Energy Systems Inc	Industrials	\$7,125	0.0%	235.21%	0.09	9.64	0.00%	0.00%
Aspen Aerogels Inc	Energy	\$13,646	0.0%	179.61%	0.17	(17.14)	0.00%	-
Iovance Biotherapeutics Inc	Health Care	\$247,937	0.1%	157.83%	3.03	(19.20)	0.00%	-
Zynerba Pharmaceuticals Inc	Health Care	\$17,657	0.0%	150.00%	0.29	(7.38)	0.00%	-
Cel Sci Corp Com Par New	Health Care	\$12,548	0.0%	136.72%	0.28	39.90	0.00%	-
Arqule Inc	Health Care	\$90,377	0.0%	129.85%	1.32	(30.58)	0.00%	8.00%
Rafael Hldgs Inc Cl B	Real Estate	\$29,284	0.0%	127.27%	0.38	(463.71)	0.00%	-
Adverum Biotechnologies Inc	Health Care	\$57,649	0.0%	126.91%	0.76	(10.62)	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
Fuelcell Energy Inc	Industrials	\$99	0.0%	(94.04)%	0.00	(0.04)	0.00%	44.34%
Acer Therapeutics Inc	Health Care	\$1,497	0.0%	(83.95)%	0.04	(1.60)	0.00%	-
Navidea Biopharmaceuticals I	Health Care	\$580	0.0%	(77.14)%	0.01	(0.59)	0.00%	-
Comscore Inc	Communication Services	\$21,141	0.0%	(74.52)%	0.31	(3.89)	0.00%	(57.21)%
Superior Energy Svcs Inc	Energy	\$17,264	0.0%	(72.16)%	0.20	(2.09)	0.00%	(17.04)%
Roan Res Inc Cl A Com	Energy	\$5,080	0.0%	(71.52)%	0.27	2.74	0.00%	-
Ultra Petroleum	Energy	\$3,229	0.0%	(70.38)%	0.04	0.76	0.00%	(17.07)%
Nuvecra Corp Com	Health Care	\$6,166	0.0%	(69.57)%	0.06	(1.30)	0.00%	-
Dean Foods Co New	Consumer Staples	\$7,227	0.0%	(69.50)%	0.08	(2.72)	12.99%	(6.28)%
Kirklands Inc	Consumer Discretionary	\$3,456	0.0%	(67.85)%	0.03	(10.92)	0.00%	(24.64)%

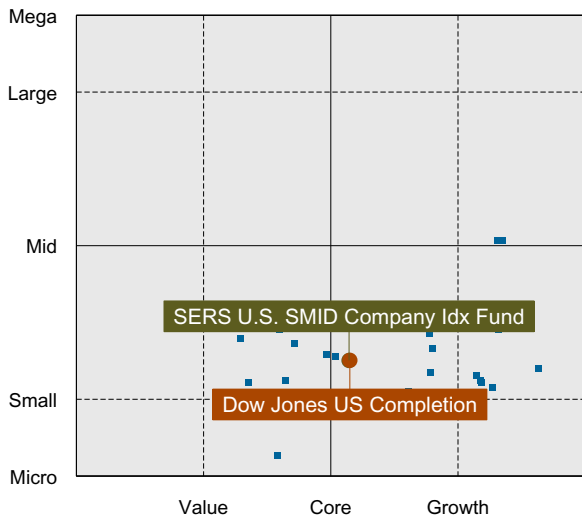
# Historical Holdings Based Style Analysis

## SERS U.S. SMID Company Idx Fund

### For Three Years Ended June 30, 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.

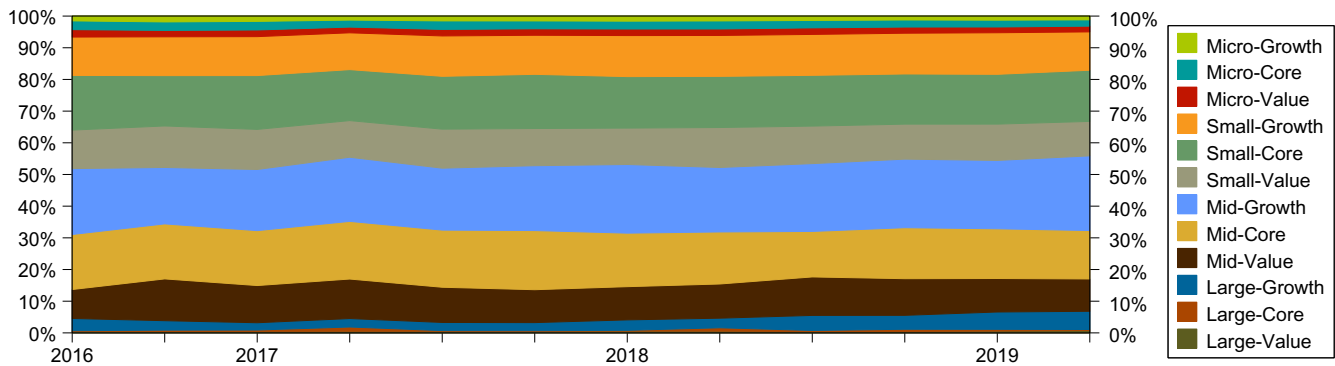
**Average Style Map vs Callan SMID Broad MFs Holdings for Three Years Ended June 30, 2019**



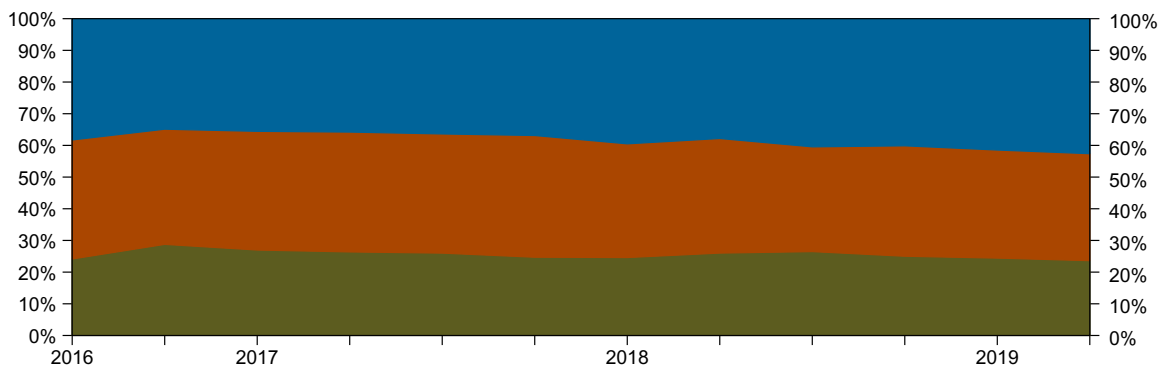
**Average Style Exposure Matrix Holdings for Three Years Ended June 30, 2019**

	0.5% (1)	0.5% (3)	3.6% (8)	4.7% (12)
Large	0.5% (1)	0.4% (2)	3.6% (8)	4.5% (11)
Mid	11.1% (93)	16.8% (136)	20.7% (152)	48.7% (381)
Small	11.9% (328)	16.3% (479)	12.5% (374)	40.8% (1181)
Micro	2.0% (438)	2.4% (670)	1.5% (269)	5.9% (1377)
<b>Total</b>	<b>25.6% (860)</b>	<b>36.1% (1288)</b>	<b>38.3% (803)</b>	<b>100.0% (2951)</b>
	Value	Core	Growth	Total

**SERS U.S. SMID Company Idx Fund Historical Cap/Style Exposures**



**SERS U.S. SMID Company Idx Fund Historical Style Only Exposures**





# SERS International Company Index Fund

## Period Ended June 30, 2019

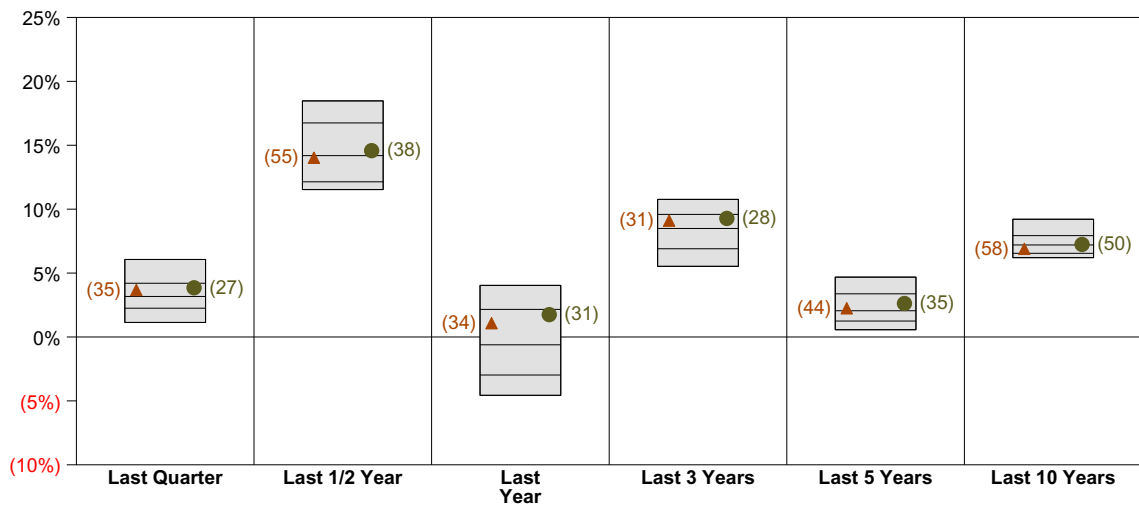
### Investment Philosophy

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

- SERS International Company Index Fund's portfolio posted a 3.85% return for the quarter placing it in the 27 percentile of the Callan Intl Eq Developed Mkts MFs group for the quarter and in the 31 percentile for the last year.
- SERS International Company Index Fund's portfolio outperformed the MSCI EAFE by 0.17% for the quarter and outperformed the MSCI EAFE for the year by 0.67%.

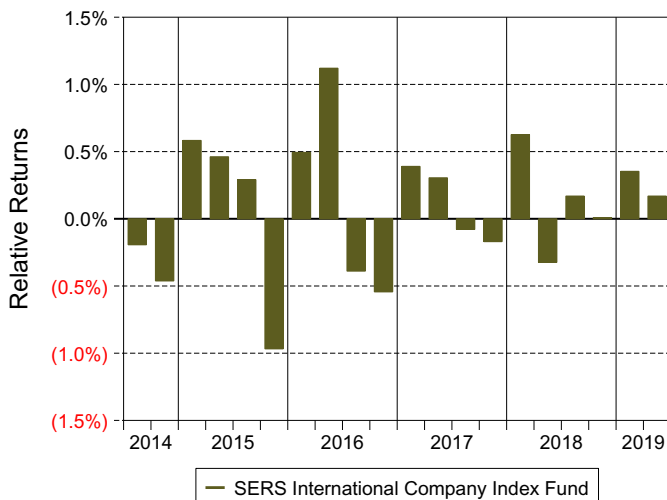
### Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)



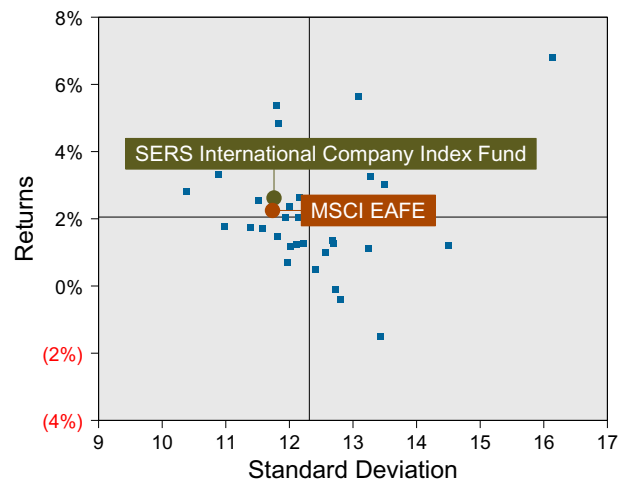
	Last Quarter	Last 1/2 Year	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	6.06	18.47	4.04	10.77	4.68	9.21
25th Percentile	4.20	16.75	2.16	9.59	3.38	7.93
Median	3.17	14.19	(0.61)	8.49	2.05	7.20
75th Percentile	2.25	12.14	(2.98)	6.90	1.25	6.55
90th Percentile	1.14	11.53	(4.57)	5.53	0.57	6.21

	Last Quarter	Last 1/2 Year	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
<b>SERS International Company Index Fund</b>	● 3.85	14.58	1.75	9.27	2.62	7.24
<b>MSCI EAFE</b>	▲ 3.68	14.03	1.08	9.11	2.25	6.90

### Relative Return vs MSCI EAFE



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

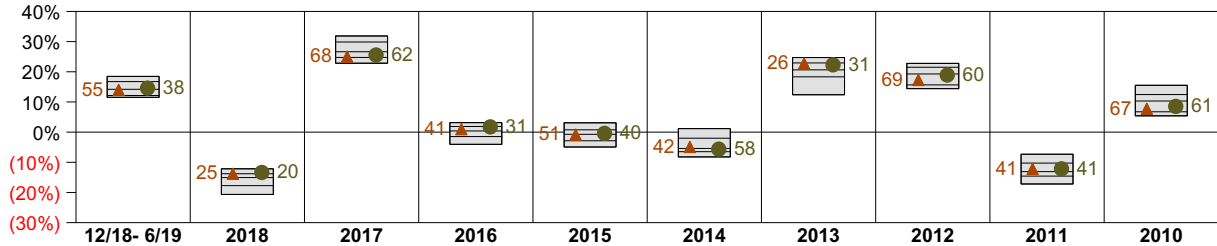


# SERS International Company Index Fund Return Analysis Summary

## 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.

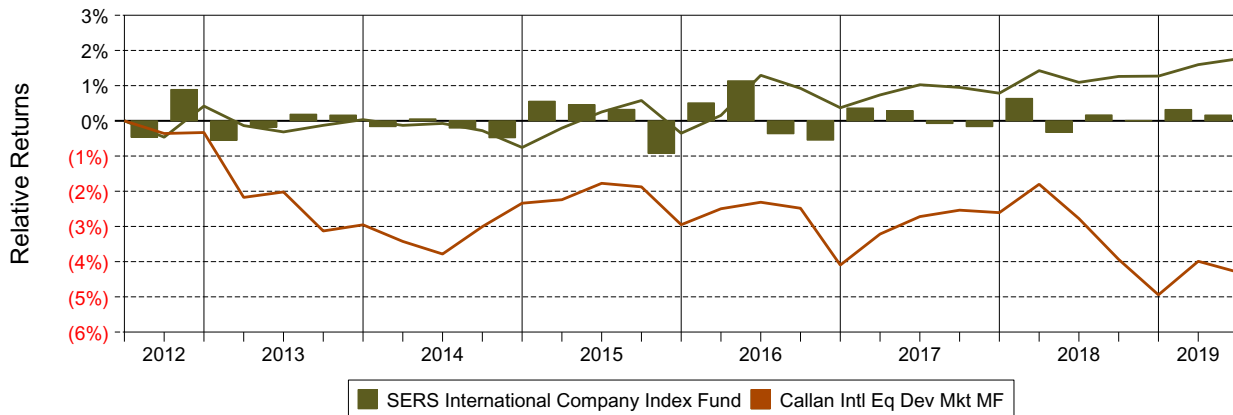
### Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)



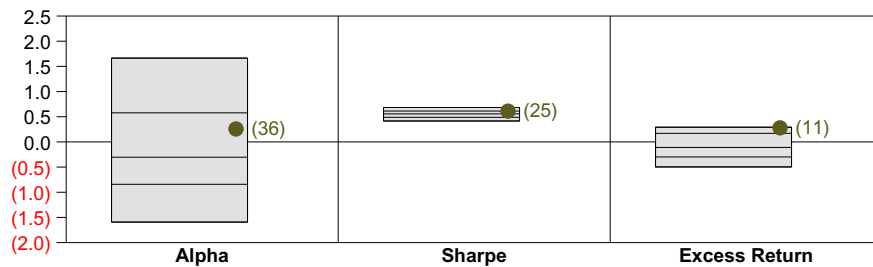
	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	18.47	(12.16)	31.87	3.15	3.09	1.17	24.72	22.78	(7.33)	15.51
25th Percentile	16.75	(13.79)	29.87	1.87	0.76	(2.02)	22.94	21.50	(10.27)	12.45
Median	14.19	(15.06)	26.64	0.39	(0.73)	(5.41)	20.64	19.28	(13.09)	10.31
75th Percentile	12.14	(17.73)	24.76	(1.47)	(2.86)	(6.48)	18.33	15.66	(14.58)	6.74
90th Percentile	11.53	(20.66)	22.83	(4.05)	(4.93)	(8.23)	12.38	14.42	(17.19)	5.40

	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS International Company Index Fund</b>	● 14.58	(13.37)	25.55	1.73	(0.41)	(5.65)	22.31	18.92	(12.17)	8.52
MSCI EAFE	▲ 14.03	(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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.66	0.68	0.29
25th Percentile	0.58	0.61	0.17
Median	(0.30)	0.56	(0.11)
75th Percentile	(0.84)	0.49	(0.30)
90th Percentile	(1.59)	0.42	(0.50)

<b>SERS International Company Index Fund</b>	● 0.26	0.61	0.28
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# SERS International Company Index Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

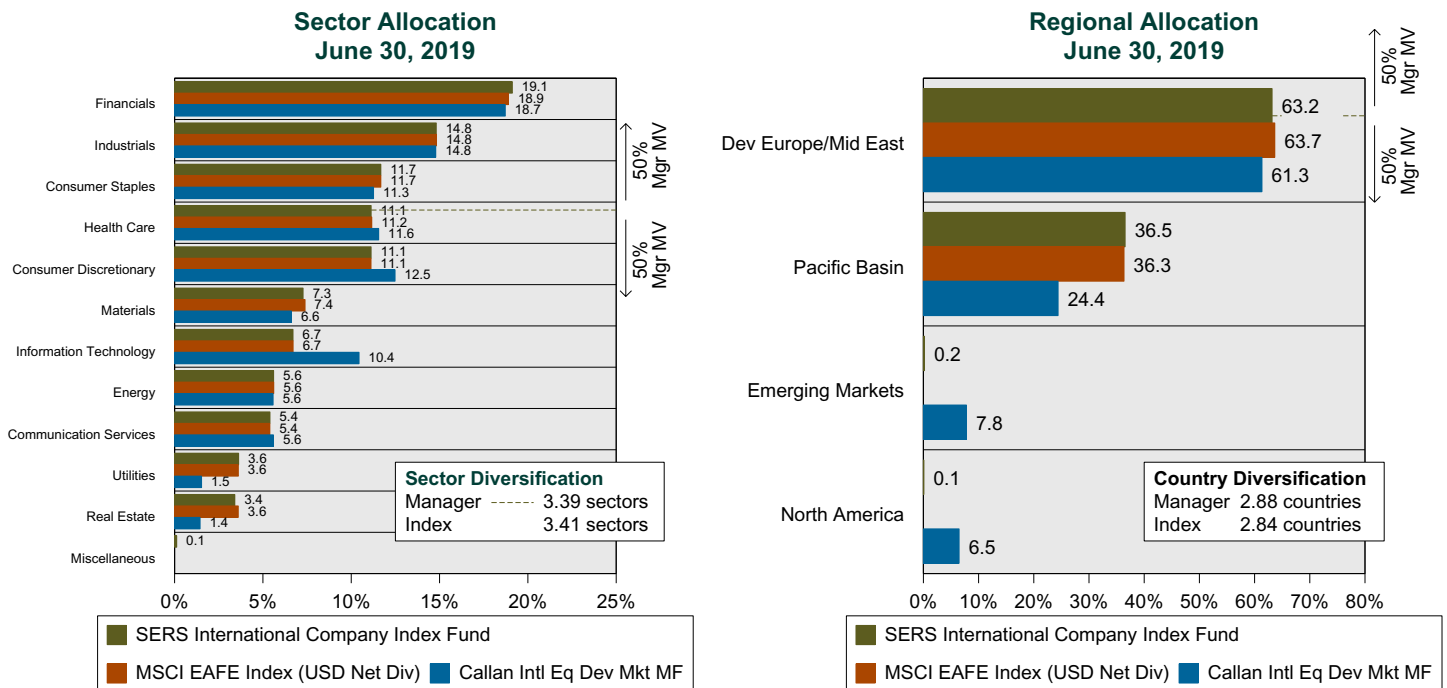
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Intl Eq Developed Mkts MFs as of June 30, 2019



## 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.

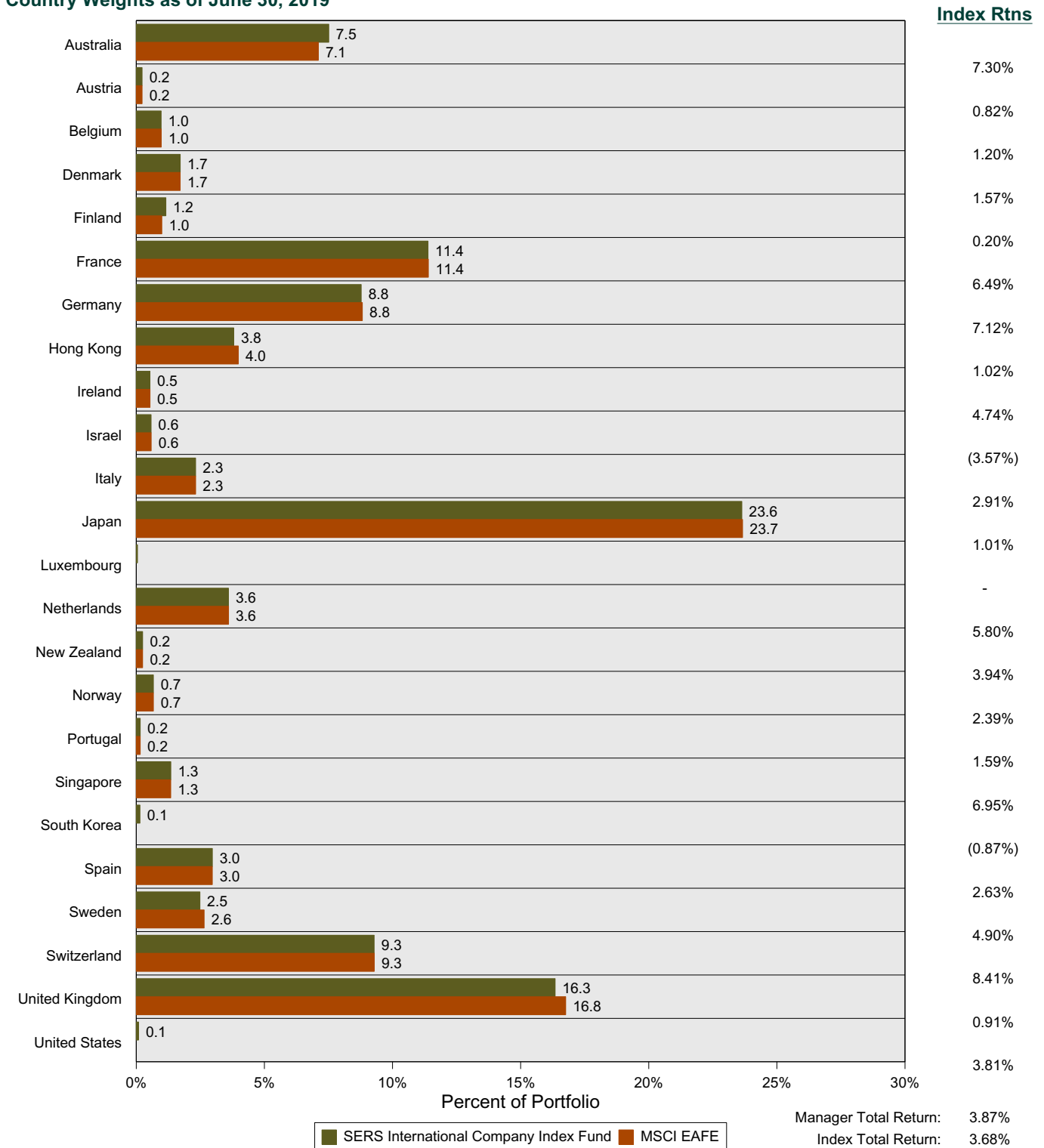


## Country Allocation SERS International Company Index Fund VS MSCI EAFE Index (USD Net Div)

### Country Allocation

The chart below contrasts the portfolio's country allocation with that of the index as of June 30, 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 June 30, 2019



## SERS International Company Index Fund Top 10 Portfolio Holdings Characteristics as of June 30, 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	\$3,563,233	2.3%	11.60%	308.46	22.25	2.42%	8.63%
Novartis	Health Care	\$2,226,582	1.4%	7.61%	231.22	17.32	3.20%	6.44%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	\$2,221,636	1.4%	2.25%	197.90	14.36	3.02%	4.15%
Hsbc Holdings (Gb)	Financials	\$1,904,489	1.2%	4.15%	169.19	11.45	5.96%	2.82%
Royal Dutch Shell A Shs	Energy	\$1,627,435	1.0%	5.57%	141.60	11.16	5.75%	11.04%
Toyota Motor Corp	Consumer Discretionary	\$1,592,026	1.0%	7.82%	202.55	8.16	3.29%	12.95%
Bp Plc Shs	Energy	\$1,588,245	1.0%	(2.59)%	142.34	11.81	5.79%	27.22%
Sap Se Shs	Information Technology	\$1,517,642	1.0%	20.27%	168.53	23.77	1.25%	12.71%
Total Sa Act	Energy	\$1,498,123	1.0%	2.26%	149.64	9.76	5.15%	14.02%
Aia Group Ltd Com Par Usd 1	Financials	\$1,462,494	0.9%	9.69%	130.36	19.09	1.30%	24.74%

### 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
Persol Hldgs Co Ltd Shs	Industrials	\$45,136	0.0%	45.48%	5.56	20.08	0.99%	7.74%
Springer (Axel)	Communication Services	\$37,919	0.0%	43.30%	7.62	23.64	3.39%	6.45%
Taiyo Nippon Sanso Corp	Materials	\$30,613	0.0%	39.49%	9.20	16.99	1.09%	12.66%
Infogenie Europe Nm	Information Technology	\$223,307	0.1%	34.44%	20.74	29.62	0.14%	35.40%
Merlin Entertainments Plc 144a	Consumer Discretionary	\$44,356	0.0%	29.83%	5.85	21.26	1.78%	5.50%
Fast Retailing Co Ltd Ord	Consumer Discretionary	\$397,517	0.3%	28.58%	64.12	35.22	0.74%	15.65%
Adidas Ag Namen -Akt	Consumer Discretionary	\$625,573	0.4%	28.14%	61.78	26.00	1.24%	15.59%
Sony Financial Holdings Inc Shs	Financials	\$41,110	0.0%	27.83%	10.45	18.31	2.41%	6.60%
Nintendo Ltd Ord	Communication Services	\$466,347	0.3%	27.11%	48.26	19.26	2.05%	39.67%
Rea Group Ltd Shs	Communication Services	\$40,649	0.0%	27.01%	8.88	34.92	1.22%	13.90%

### 10 Worst Performers

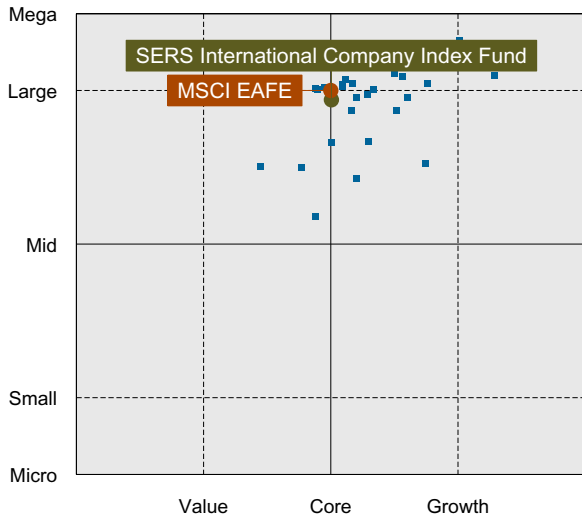
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Teva Pharmaceutical Inds Ltd Adr	Health Care	\$111,379	0.1%	(41.14)%	10.40	(3.07)	0.00%	(7.60)%
Imperial Brands Plc Shs	Consumer Staples	\$253,521	0.2%	(30.23)%	22.49	6.56	10.32%	3.69%
Ryohin Keikaku Co Ltd Shs	Consumer Discretionary	\$47,973	0.0%	(28.69)%	5.07	15.87	1.99%	6.43%
Umicore Group Shs	Materials	\$70,888	0.0%	(27.16)%	7.91	19.17	1.86%	11.27%
Pandora A/S	Consumer Discretionary	\$41,708	0.0%	(24.01)%	3.56	5.88	7.71%	18.39%
Dainippon Sumitomo Pharma Co Ord	Health Care	\$33,712	0.0%	(23.08)%	7.55	16.14	1.37%	3.56%
Deutsche Wohnen	Real Estate	\$148,665	0.1%	(22.41)%	13.19	21.93	2.68%	9.30%
Kansai Electric Power Co Inc Shs	Utilities	\$90,489	0.1%	(22.33)%	10.76	7.75	4.05%	(15.52)%
Taisei Corp Shs	Industrials	\$82,192	0.1%	(21.68)%	8.16	7.44	3.32%	46.91%
Colruyt Sa Halle Strip Vvpr	Consumer Staples	\$37,323	0.0%	(21.51)%	8.02	18.74	1.67%	2.92%



# Historical Holdings Based Style Analysis SERS International Company Index Fund For Three Years Ended June 30, 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.

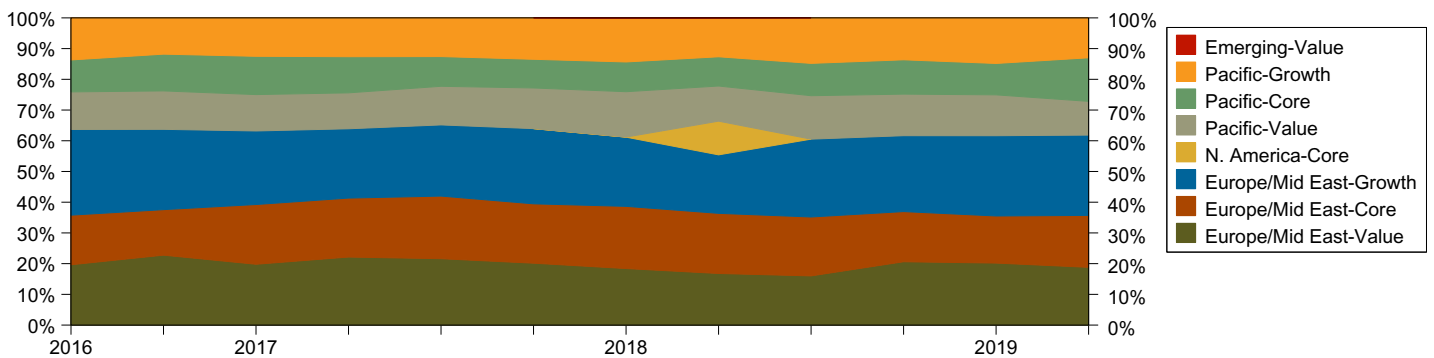
**Average Style Map vs Callan Intl Eq Dev Mkt Holdings for Three Years Ended June 30, 2019**



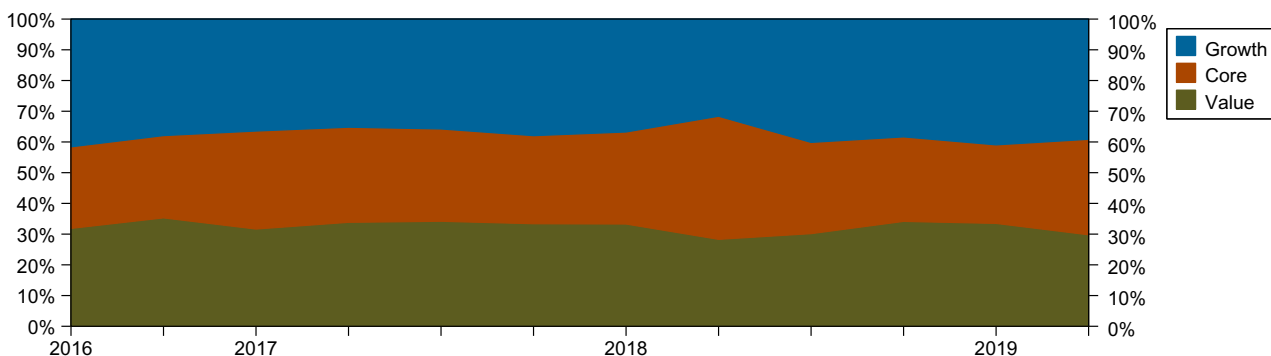
**Average Style Exposure Matrix Holdings for Three Years Ended June 30, 2019**

	19.7% (128)	18.1% (130)	24.3% (180)	62.2% (438)
Europe/ Mid East	20.0% (133)	18.3% (132)	24.8% (189)	63.1% (454)
N. America	0.0% (0)	0.9% (0)	0.0% (0)	0.9% (0)
	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Pacific	12.7% (143)	10.9% (151)	13.3% (175)	36.9% (469)
	13.0% (144)	10.8% (150)	13.1% (176)	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)
<b>Total</b>	<b>32.4% (271)</b>	<b>29.9% (281)</b>	<b>37.7% (355)</b>	<b>100.0% (907)</b>
	<b>33.0% (277)</b>	<b>29.1% (282)</b>	<b>37.9% (365)</b>	<b>100.0% (924)</b>
	Value	Core	Growth	Total

**SERS International Company Index Fund Historical Region/Style Exposures**



**SERS International Company Index Fund Historical Style Only Exposures**





# SERS Short Term Investment Fund

## Period Ended June 30, 2019

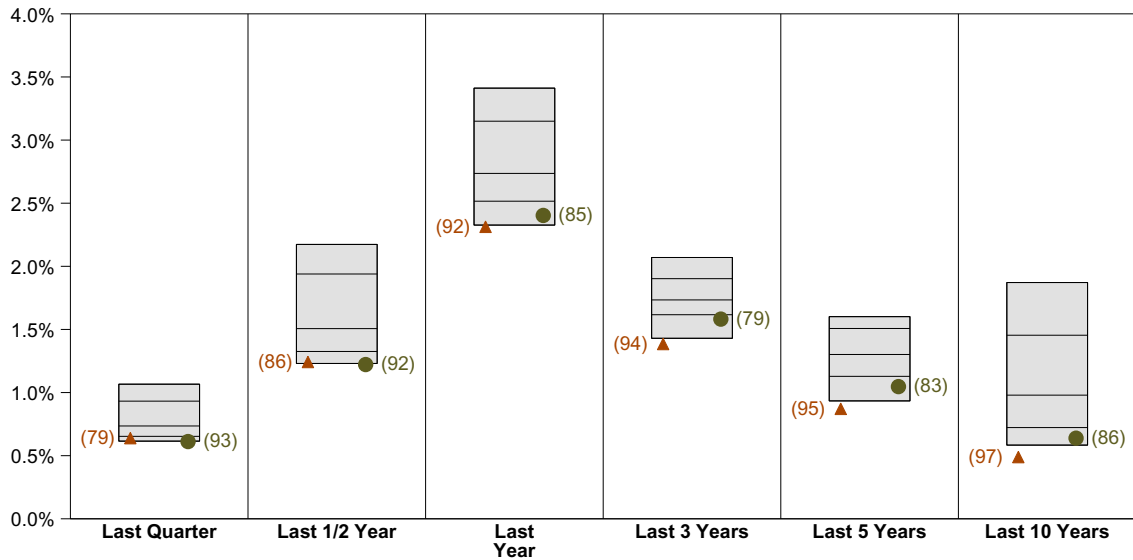
### Investment Philosophy

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. It is compared against the Callan Cash database: a group that contains STIF, enhanced cash, and money market funds.

### Quarterly Summary and Highlights

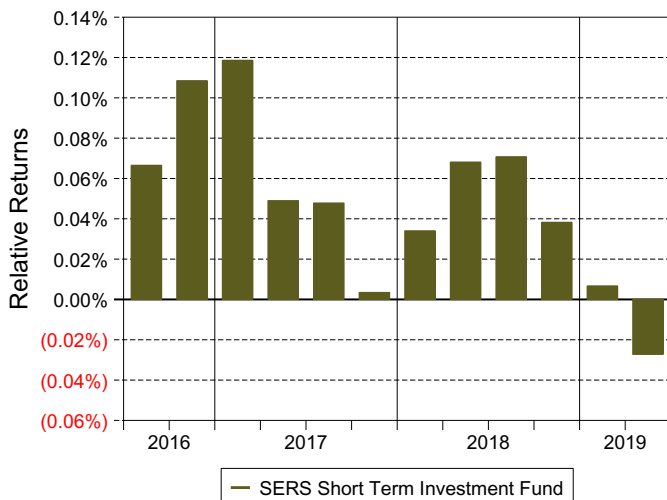
- SERS Short Term Investment Fund's portfolio posted a 0.61% return for the quarter placing it in the 93 percentile of the Callan Cash Database group for the quarter and in the 85 percentile for the last year.
- SERS Short Term Investment Fund's portfolio underperformed the 3-month Treasury Bill by 0.03% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.09%.

### Performance vs Callan Cash Database (Gross)

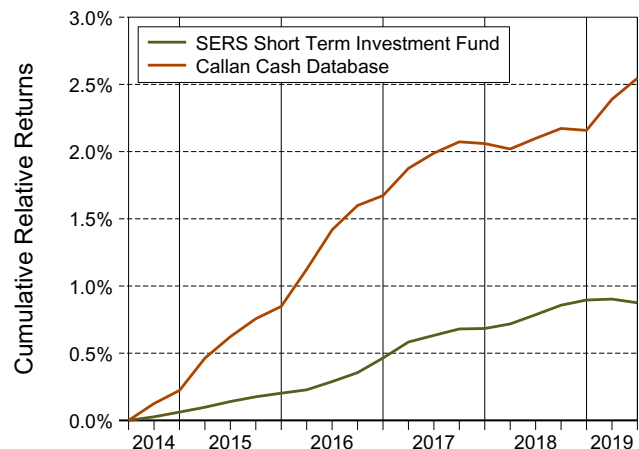


10th Percentile	1.07	2.17	3.41	2.07	1.60	1.87
25th Percentile	0.93	1.94	3.15	1.90	1.51	1.45
Median	0.74	1.51	2.74	1.73	1.30	0.98
75th Percentile	0.65	1.33	2.52	1.62	1.13	0.72
90th Percentile	0.62	1.23	2.33	1.43	0.93	0.58
<b>SERS Short Term Investment Fund</b>	● 0.61	1.22	2.40	1.58	1.05	0.64
3-month Treasury Bill	▲ 0.64	1.24	2.31	1.38	0.87	0.49

### Relative Return vs 3-month Treasury Bill



### Cumulative Returns vs 3-month Treasury Bill

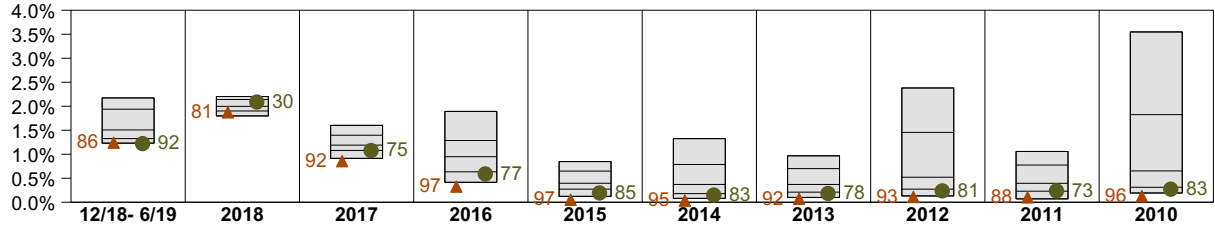


# SERS Short Term Investment Fund Return Analysis Summary

## 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. The Callan Cash Database includes STIF, enhanced cash, and money market funds.

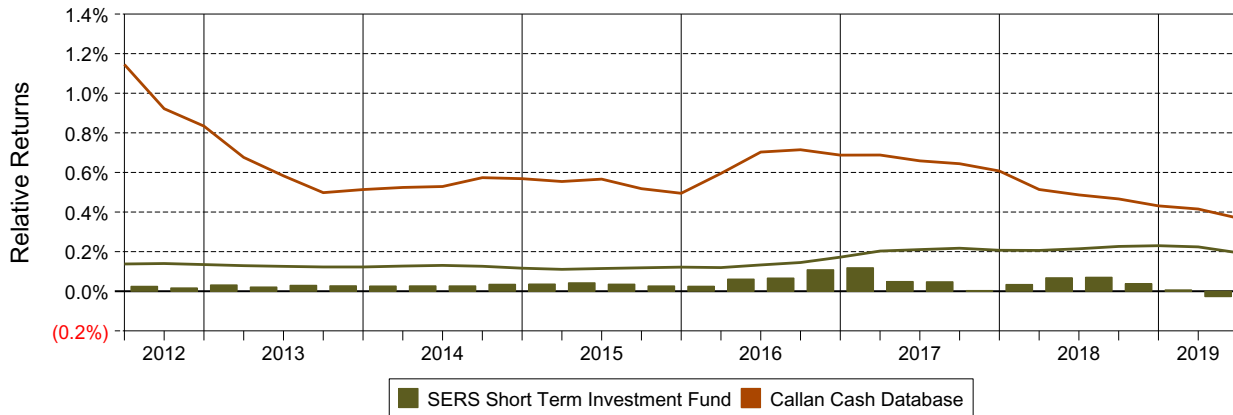
### Performance vs Callan Cash Database (Gross)



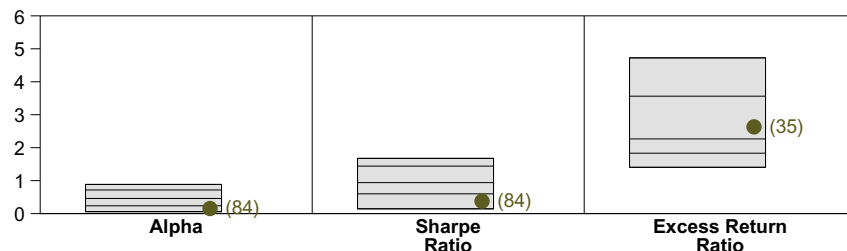
	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	2.17	2.20	1.60	1.89	0.85	1.33	0.97	2.38	1.06	3.55
25th Percentile	1.94	2.14	1.40	1.29	0.65	0.79	0.70	1.45	0.78	1.83
Median	1.51	2.00	1.19	0.95	0.40	0.37	0.37	0.52	0.39	0.65
75th Percentile	1.33	1.90	1.08	0.63	0.27	0.18	0.21	0.27	0.23	0.31
90th Percentile	1.23	1.80	0.91	0.41	0.12	0.08	0.10	0.13	0.07	0.19

	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS Short Term Investment Fund</b>	1.22	2.09	1.08	0.59	0.19	0.15	0.18	0.24	0.24	0.27
3-month Treasury Bill	1.24	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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.88	1.68	4.73
25th Percentile	0.72	1.44	3.56
Median	0.46	0.94	2.27
75th Percentile	0.24	0.60	1.83
90th Percentile	0.06	0.15	1.40
<b>SERS Short Term Investment Fund</b>	0.15	0.38	2.63

# SERS Stable Value Fund

## Period Ended June 30, 2019

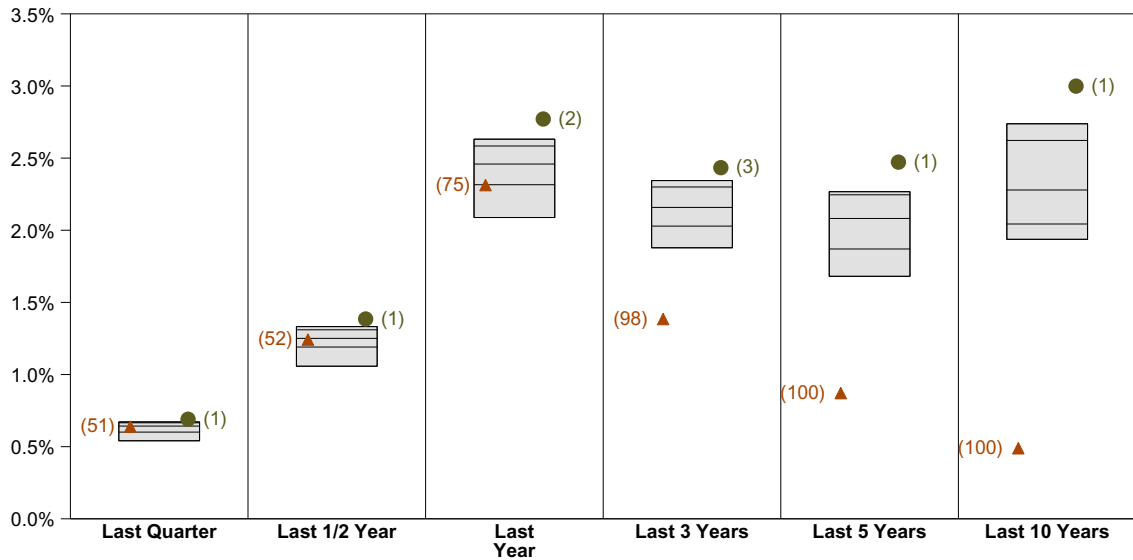
### Investment Philosophy

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

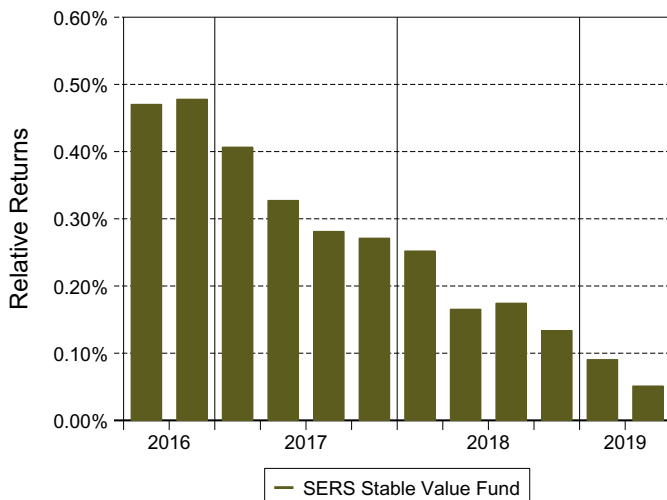
- SERS Stable Value Fund's portfolio posted a 0.69% return for the quarter placing it in the 1 percentile of the Callan Stable Value group for the quarter and in the 2 percentile for the last year.
- SERS Stable Value Fund's portfolio outperformed the 3-month Treasury Bill by 0.05% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.46%.

### Performance vs Callan Stable Value (Gross)

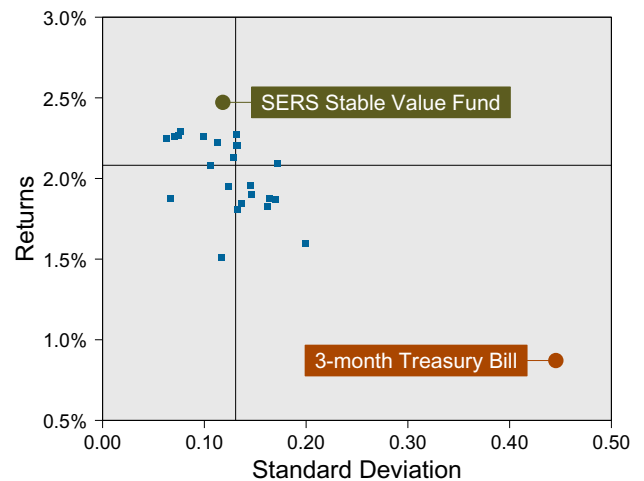


10th Percentile	0.67	1.33	2.63	2.34	2.27	2.74
25th Percentile	0.67	1.31	2.58	2.30	2.25	2.62
Median	0.64	1.25	2.46	2.16	2.08	2.28
75th Percentile	0.60	1.19	2.32	2.03	1.87	2.04
90th Percentile	0.54	1.06	2.09	1.88	1.68	1.94
<b>SERS Stable Value Fund</b>	● 0.69	1.38	2.77	2.43	2.47	3.00
3-month Treasury Bill	▲ 0.64	1.24	2.31	1.38	0.87	0.49

### Relative Return vs 3-month Treasury Bill



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

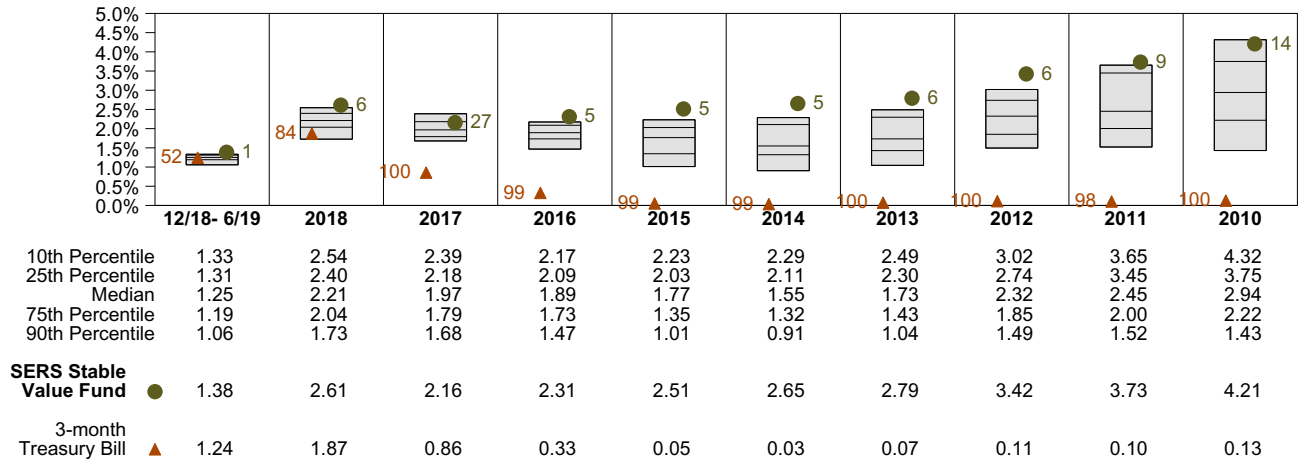


# SERS Stable Value Fund Return Analysis Summary

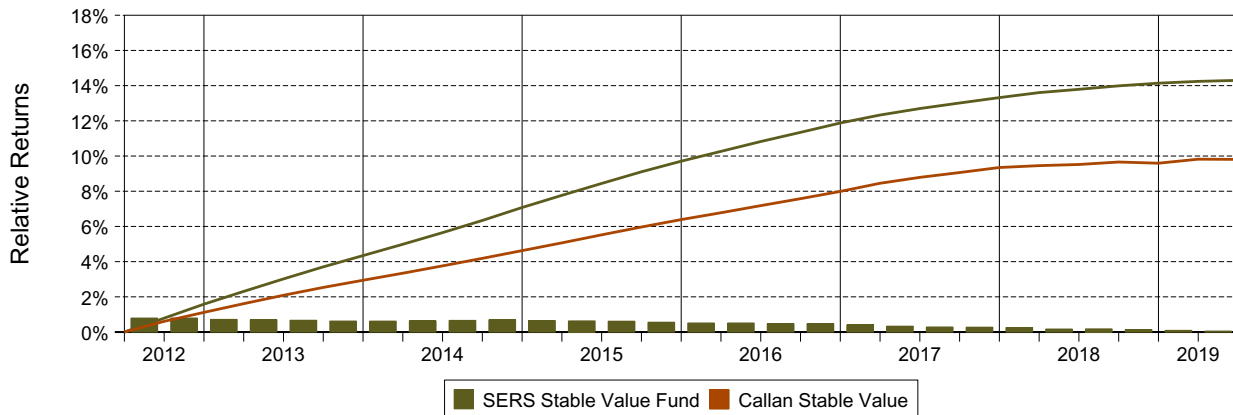
## Return Analysis

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.

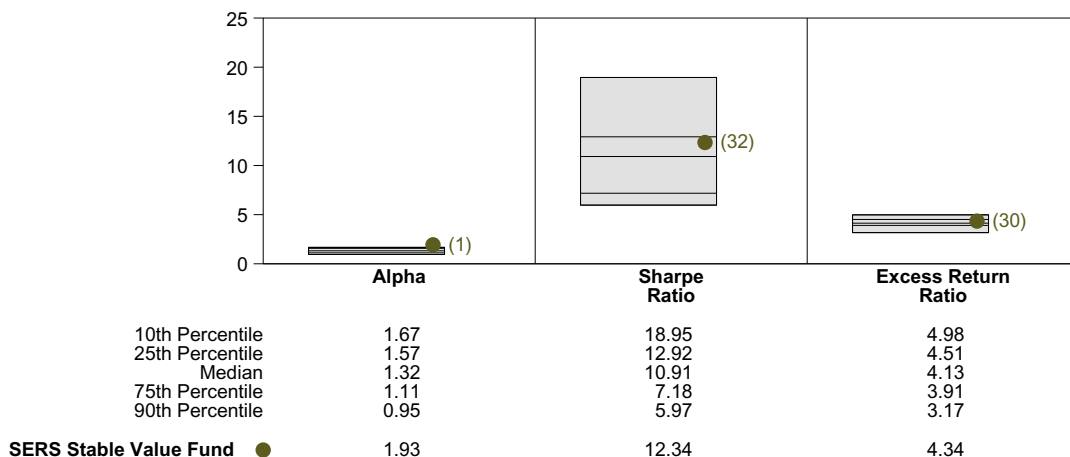
### Performance vs Callan Stable Value (Gross)



### 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 June 30, 2019



# SERS U.S. Bond Index Fund

## Period Ended June 30, 2019

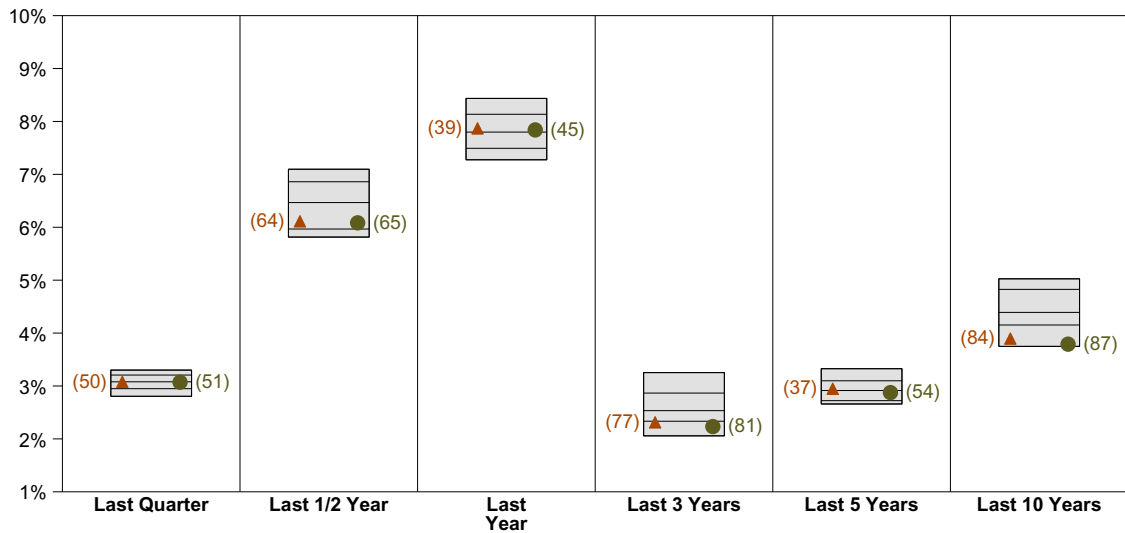
### Investment Philosophy

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

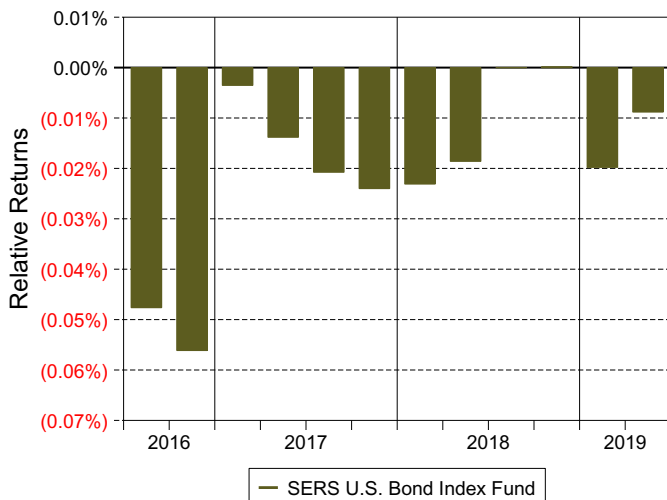
- SERS U.S. Bond Index Fund's portfolio posted a 3.07% return for the quarter placing it in the 51 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 45 percentile for the last year.
- SERS U.S. Bond Index Fund's portfolio underperformed the Blmbg Aggregate by 0.01% for the quarter and underperformed the Blmbg Aggregate for the year by 0.03%.

### Performance vs Callan Core Bond Mutual Funds (Institutional Net)

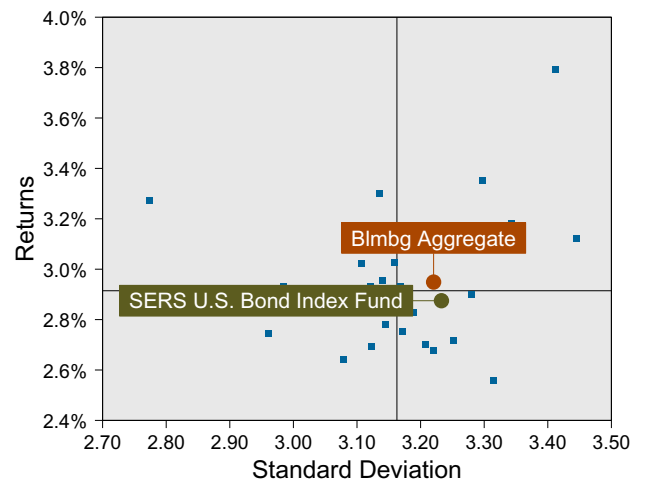


10th Percentile	3.30	7.10	8.44	3.25	3.33	5.03
25th Percentile	3.21	6.86	8.14	2.87	3.10	4.83
Median	3.08	6.47	7.80	2.53	2.91	4.39
75th Percentile	2.95	5.97	7.49	2.33	2.72	4.15
90th Percentile	2.80	5.81	7.28	2.06	2.66	3.75
<b>SERS U.S. Bond Index Fund</b>	<b>3.07</b>	<b>6.08</b>	<b>7.84</b>	<b>2.23</b>	<b>2.87</b>	<b>3.79</b>
<b>Blmbg Aggregate</b>	<b>3.08</b>	<b>6.11</b>	<b>7.87</b>	<b>2.31</b>	<b>2.95</b>	<b>3.90</b>

### Relative Return vs Blmbg Aggregate



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

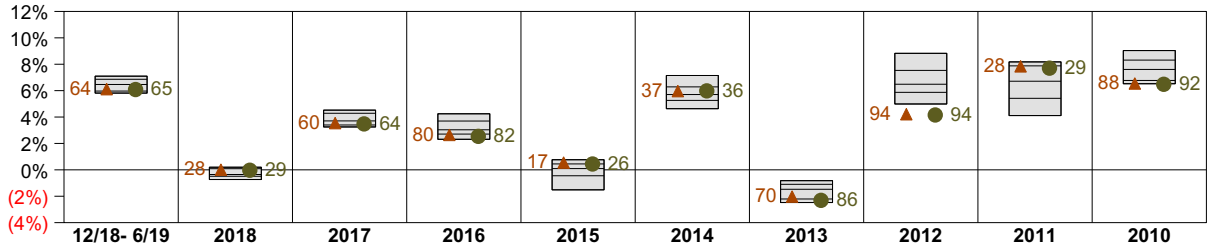


# SERS U.S. Bond Index Fund Return Analysis Summary

## 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.

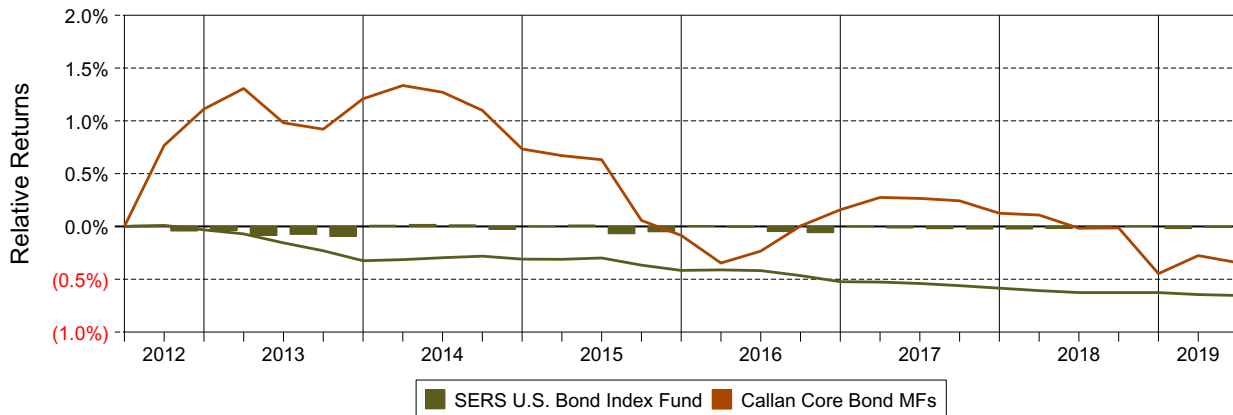
### Performance vs Callan Core Bond Mutual Funds (Institutional Net)



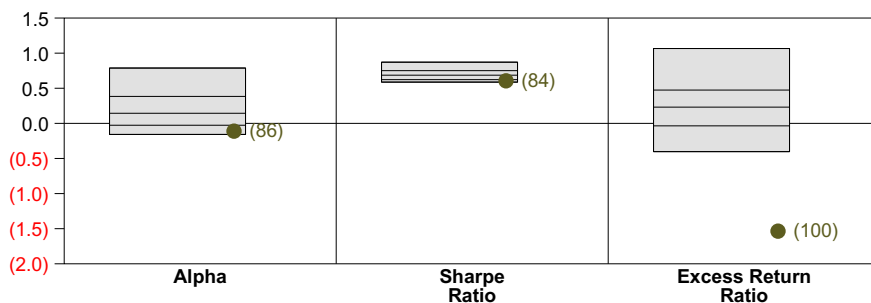
	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	7.10	0.20	4.52	4.25	0.77	7.15	(0.82)	8.83	8.18	9.04
25th Percentile	6.86	0.09	4.28	3.70	0.45	6.29	(1.10)	7.53	7.88	8.31
Median	6.47	(0.35)	3.71	3.03	0.10	5.71	(1.47)	6.49	6.71	7.61
75th Percentile	5.97	(0.49)	3.40	2.71	(0.45)	5.26	(2.21)	5.87	5.42	6.77
90th Percentile	5.81	(0.73)	3.25	2.31	(1.52)	4.63	(2.48)	4.99	4.11	6.52

	12/18- 6/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS U.S. Bond Index Fund</b> ●	6.08	(0.03)	3.48	2.54	0.44	5.98	(2.31)	4.16	7.70	6.48
Blmbg Aggregate ▲	6.11	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 June 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.79	0.87	1.07
25th Percentile	0.38	0.75	0.47
Median	0.14	0.69	0.23
75th Percentile	(0.03)	0.62	(0.04)
90th Percentile	(0.16)	0.59	(0.40)
<b>SERS U.S. Bond Index Fund</b> ●	(0.11)	0.61	(1.54)



# SERS U.S. Bond Index Fund

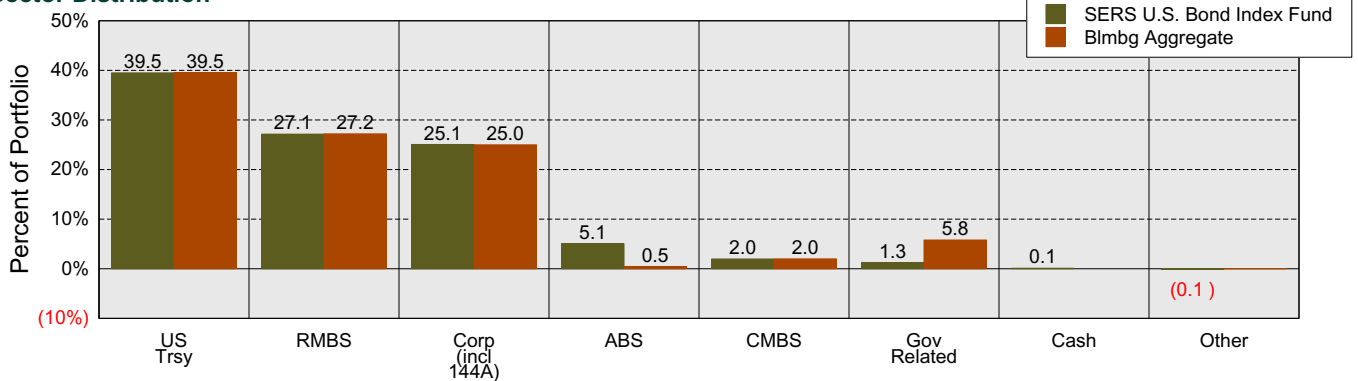
## Portfolio Characteristics Summary

### As of June 30, 2019

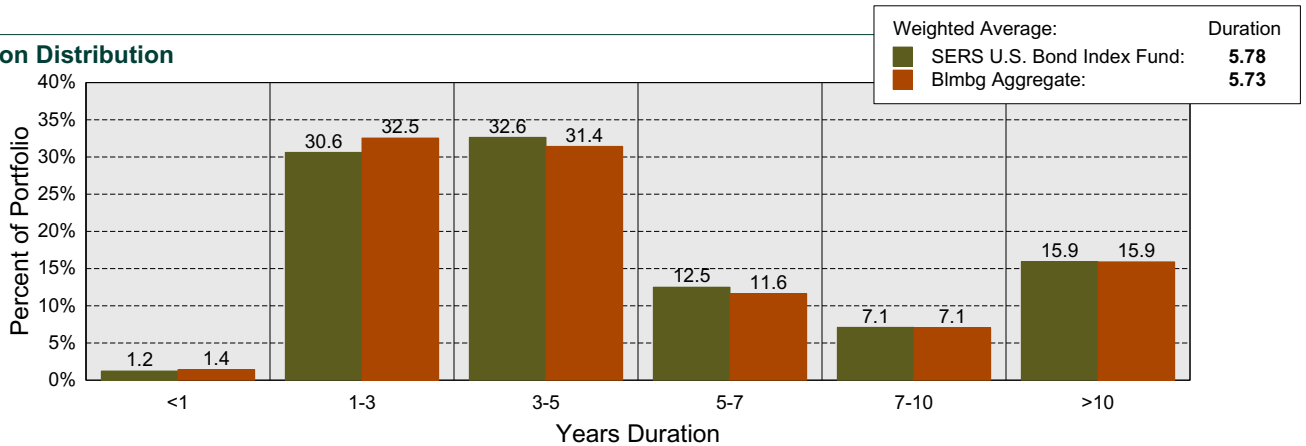
#### Portfolio Structure Comparison

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.

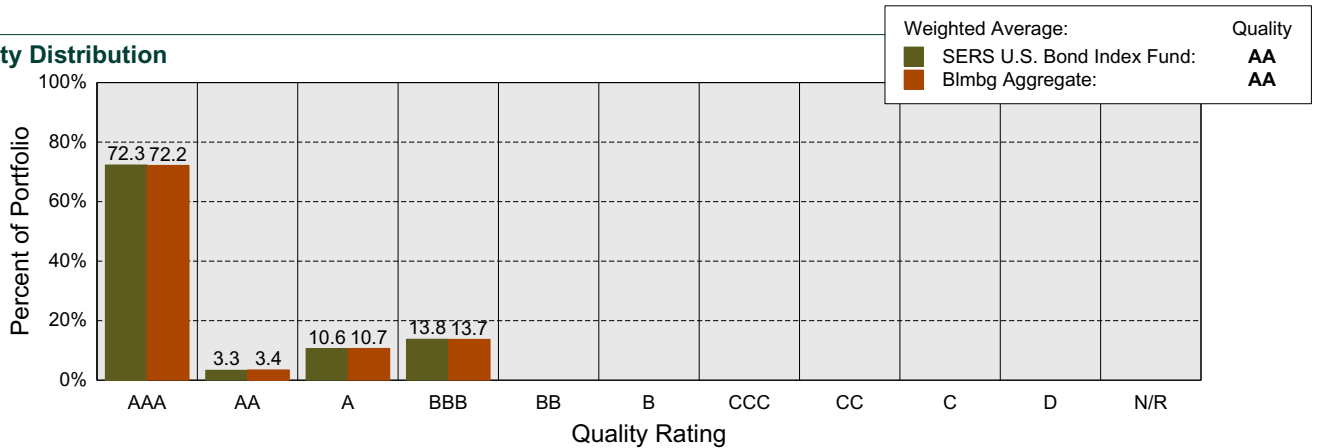
#### Sector Distribution



#### Duration Distribution



#### Quality Distribution



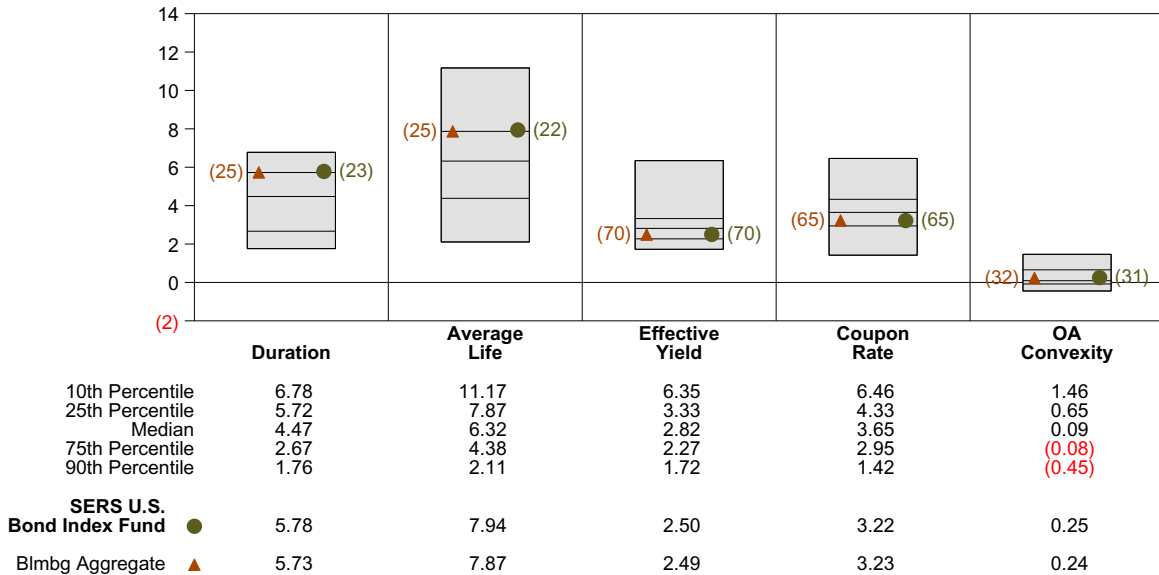
# SERS U.S. Bond Index Fund

## Bond Characteristics Analysis Summary

### Portfolio Characteristics

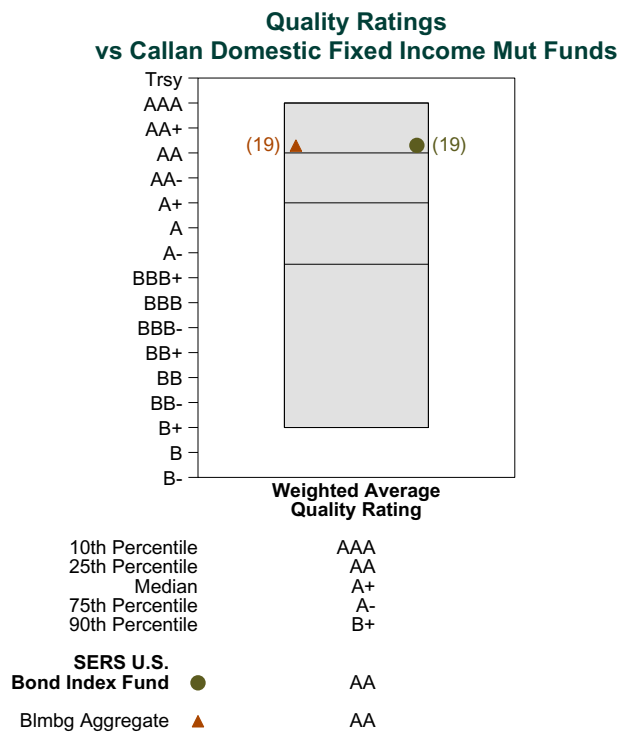
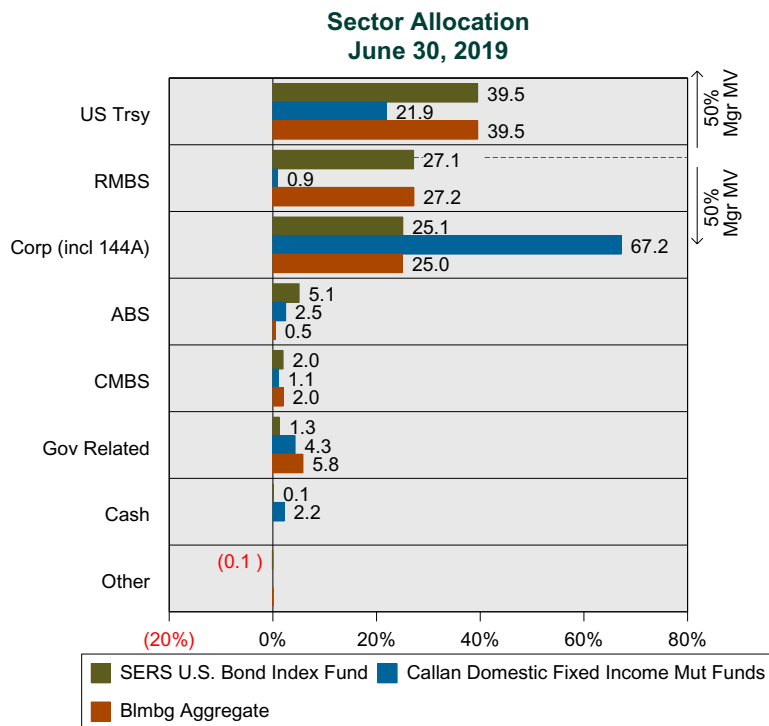
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Fixed Income Portfolio Characteristics Rankings Against Callan Domestic Fixed Income Mut Funds as of June 30, 2019



### 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.





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## 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.

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## 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.

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## 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.

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## 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.





## 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](http://www.callan.com/library) to see all of our publications, and [www.callan.com/blog](http://www.callan.com/blog) to view our blog "Perspectives." For more information contact Barb Gerraty at 415-274-3093 / [institute@callan.com](mailto:institute@callan.com).

### New Research from Callan's Experts

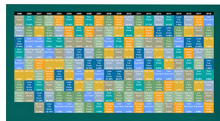
**The OCIO Model: How Do We Measure Success?** | This paper outlines the key issues for evaluating the success of outsourced chief investment officer (OCIO) services.

**Perspectives on Investing: The Evolution of Strategic Allocations** | In this video, Callan experts discuss the key challenges of evaluating non-U.S. equity investments.

**Opportunities & Challenges: Investing in Private Equity Partnerships** | In this video, Callan experts discuss investing directly in private equity partnerships.

**Building a Pool of Transition Managers: Both an Art and a Science** | Transition management is the restructuring of institutional portfolios from single or multiple investment managers/asset classes to a new allocation over a short-term horizon. This paper offers guidance on building a pool of transition managers.

**Callan's Periodic Table Explained** | The popular Callan Periodic Table of Investment Returns turned 20 this year. This animated feature discusses the benefits and some of the history of the table.



**The Cobbler's Shoes: How Asset Managers Run Their Own 401(k) Plans** | Can investment manager-sponsored DC plans provide insights on plan design and implementation? To help answer this question, Callan examined the 401(k) plans of investment



managers. The industry scored high on retirement savings metrics. But in contrast to the industry consensus, asset managers generally embraced complexity over simplicity in their investment designs.

### **How to Distinguish Between Growth Equity and Late-Stage VC**



Both growth equity and late-stage venture capital are growth-oriented but differ significantly in the types of companies they invest in, the structure of their investments, the way in which they create value, and the trade-offs between risk and return.

**Nurturing Strong Cultures at Professional Firms** | In this paper, Callan Executive Chairman Ron Peyton offers advice for building effective and transparent corporate cultures.

**Opening Doors of Opportunity** | This paper reviews the types of co-investment opportunities offered by hedge funds and funds-of-funds (FOFs).

### **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** | A newsletter providing 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/](http://www.callan.com/library/)

Please mark your calendar and look forward to upcoming invitations.

### October Regional Workshops

October 22, 2019 – Denver

October 24, 2019 – Chicago

### 2020 National Conference

January 27-29, 2020 – San Francisco

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](http://www.callan.com/events).

**For more information about events, please contact Barb Gerraty: 415-274-3093 / [gerraty@callan.com](mailto: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 23-24, 2019

Atlanta, October 8-9, 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 Investments

Chicago, October 29-30, 2019

The “Callan College” on Alternative Investments will cover: private equity, private credit, hedge funds, real estate, and real assets. Tuition for the “Callan College” on Alternative Investments session is \$2,500 per person. Tuition includes instruction, all materials, and breakfast and lunch on each day.

**Learn more at [www.callan.com/events/callan-college-intro](http://www.callan.com/events/callan-college-intro)**

## 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



## 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
Aberdeen Standard Investments
Acadian Asset Management LLC
AEGON USA Investment Management
Alcentra
AllianceBernstein
Allianz Global Investors
Allianz Life Insurance Company of North America
American Century Investments
Amundi Pioneer Asset Management
AQR Capital Management
Ares Management LLC
Ariel Investments, LLC
Atlanta Capital Management Co., LLC
Aviva Investors Americas
AXA Investment Managers
Baillie Gifford International, LLC
Baird Advisors
Baron Capital Management, Inc.
Barrow, Hanley, Mewhinney & Strauss, LLC
BlackRock
BMO Global Asset Management
BNP Paribas Asset Management
BNY Mellon Asset Management
Boston Partners
Brandes Investment Partners, L.P.
Brandywine Global Investment Management, LLC
BrightSphere Investment Group
Brown Brothers Harriman & Company
Cambiar Investors, LLC
Capital Group
Carillon Tower Advisers
CastleArk Management, LLC
Causeway Capital Management
Chartwell Investment Partners

Manager Name
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments
Columbus Circle Investors
Credit Suisse Asset Management
DePrince, Race & Zollo, Inc.
Diamond Hill Capital Management, Inc.
Dimensional Fund Advisors LP
Doubleline
Duff & Phelps Investment Management Co.
DWS
EARNEST Partners, LLC
Eaton Vance Management
Epoch Investment Partners, Inc.
Fayez Sarofim & Company
Federated Investors
Fidelity Institutional Asset Management
Fiera Capital Corporation
Financial Engines
First Hawaiian Bank Wealth Management Division
First State Investments
Fisher Investments
Franklin Templeton
Fred Alger Management, Inc.
GAM (USA) Inc.
Glenmeade Investment Management, LP
GlobeFlex Capital, L.P.
Goldman Sachs
Green Square Capital LLC
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Hartford Investment Management Co.
Heitman LLC

Manager Name
Hotchkis & Wiley Capital Management, LLC
HSBC Global Asset Management
Income Research + Management, Inc.
Insight Investment Management Limited
Intech Investment Management, LLC
Intercontinental Real Estate Corporation
Invesco
Investec Asset Management
Ivy Investments
J.P. Morgan
Janus
Jennison Associates LLC
Jobs Peak Advisors
KeyCorp
Lazard Asset Management
Legal & General Investment Management America
Lincoln National Corporation
Logan Circle Partners, L.P.
Longview Partners
Loomis, Sayles & Company, L.P.
Lord Abbett & Company
Los Angeles Capital Management
LSV Asset Management
MacKay Shields LLC
Macquarie Investment Management (MIM)
Manulife Asset Management
Marathon Asset Management, L.P.
McKinley Capital Management, LLC
MFS Investment Management
MidFirst Bank
Mondrian Investment Partners Limited
Montag & Caldwell, LLC
Morgan Stanley Investment Management
Mountain Lake Investment Management LLC
Mountain Pacific Advisors, LLC
MUFG Union Bank, N.A.
Natixis Investment Managers
Neuberger Berman
Newton Investment Management
Nikko Asset Management Co., Ltd.
Northern Trust Asset Management
Nuveen
OFI Global Asset Management
Osterweis Capital Management, LLC
P/E Investments

Manager Name
Pacific Investment Management Company
Pathway Capital Management
Peregrine Capital Management, Inc.
Perkins Investment Management
PGIM Fixed Income
PineBridge Investments
PNC Capital Advisors, LLC
Principal Global Investors
Putnam Investments, LLC
QMA LLC
RBC Global Asset Management
Regions Financial Corporation
Robeco Institutional Asset Management, US Inc.
Rockefeller Capital Management
Rothschild & Co. Asset Management US
Russell Investments
Schroder Investment Management North America Inc.
Smith Graham & Co. Investment Advisors, L.P.
Smith Group Asset Management
South Texas Money Management, Ltd.
State Street Global Advisors
Stone Harbor Investment Partners, L.P.
Sun Life Investment Management
T. Rowe Price Associates, Inc.
The Boston Company Asset Management
The TCW Group, Inc.
Thompson, Siegel & Walmsley LLC
Thornburg Investment Management, Inc.
Tri-Star Trust Bank
UBS Asset Management
VanEck
Versus Capital Group
Victory Capital Management Inc.
Virtus Investment Partners, Inc.
Vontobel Asset Management, Inc.
Voya
WCM Investment Management
WEDGE Capital Management
Wellington Management Company, LLP
Wells Fargo Asset Management
Western Asset Management Company LLC
Westfield Capital Management Company, LP
William Blair & Company LLC