

**December 31, 2019**

**Pennsylvania SERS 457(b)**



**Investment Measurement Service  
Quarterly Review**

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**U.S. EQUITY**

The fourth quarter closed out a near-historic year for equity markets, in particular the S&P 500, which ended 2019 up 31.5%—enough to claim second place behind 2013 for the strongest year of the decade (during which large cap equities only saw one down year). Both Apple (+85%) and Microsoft (+54%) reached over \$1 trillion in market cap and accounted for 15% of the S&P 500's advance for the year. For the recent quarter, investors globally were spurred by three interest rate cuts by the Fed, a potential U.S.-China trade armistice, continued low inflation, and some clarity around Brexit.

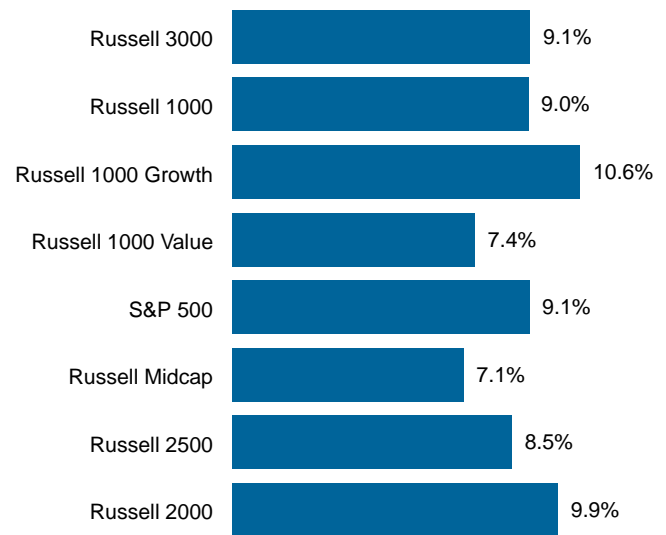
**Large cap vs. small cap** (Russell 2000: +9.9%; Russell 1000: +9.0%)

- Small cap trailed for most of 2019 but eclipsed large cap stocks in the fourth quarter due to notable contributions from the Health Care sector, where the biotech and pharmaceutical industries saw heightened new drug approvals and M&A activity during the quarter.
- Small growth outpaced small value for the quarter, the year, and the decade; the Russell 2000 Growth Index outpaced the Russell 2000 Value Index by 3% annualized over the past 10 years as the low interest rate environment favored growth stocks and challenged the Russell 2000 Value's heavy exposure to Financials.
- While small cap outpaced large cap in the fourth quarter, large cap stocks led for the third straight year, owing much to Tech (+50.3%) and Communication Services (+32.7%).

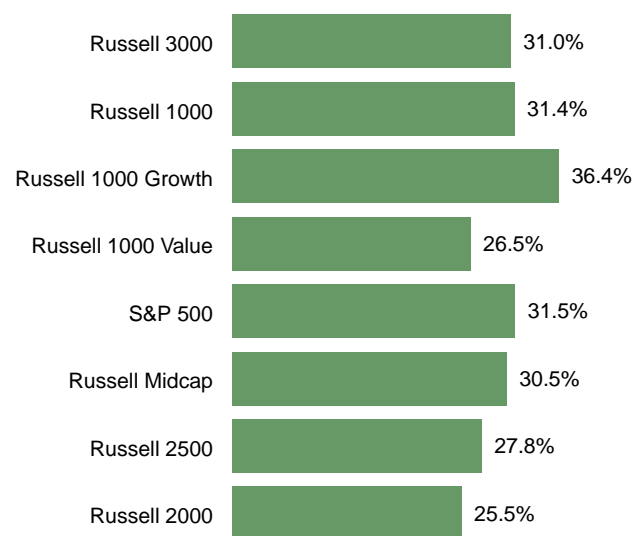
**Growth vs. Value** (Russell 1000 Growth: +10.6%; Russell 1000 Value: +7.4%)

- Growth continued its dominance over value during the quarter, closing out a decade-long trend.
- Tech giants Facebook, Apple, Microsoft, and Alphabet/Google remained meaningful contributors for the quarter although Health Care (+14.4%) was also among the top sector performers.
- The fourth quarter saw a rotation away from the more defensive sectors (e.g., Consumer Staples (+3.5%), Utilities (+0.8%), and Real Estate (-0.5%)) and into Cyclical, further supporting growth stocks.

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

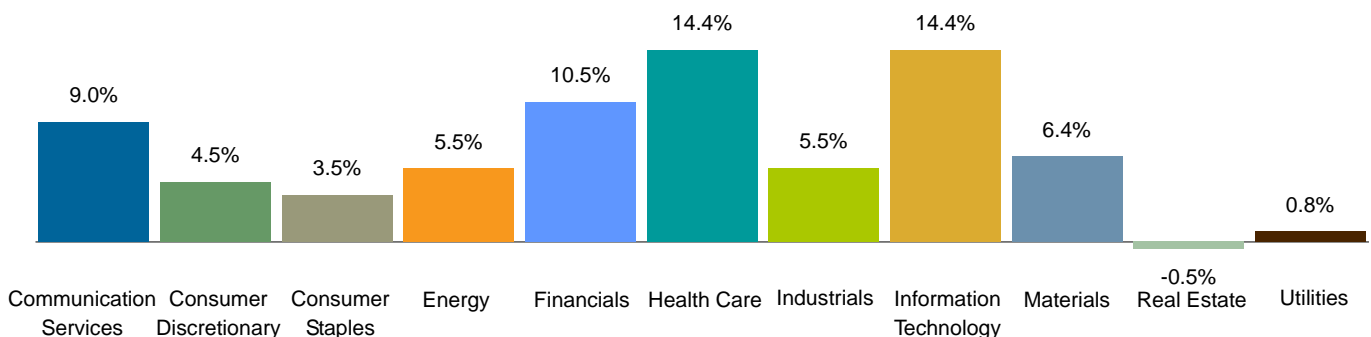


**U.S. Equity: One-Year Returns**



Sources: FTSE Russell, Standard & Poor's

**S&P Sector Returns, Quarter Ended December 31, 2019**



Source: Standard & Poor's

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

Global equity markets bounced back in the fourth quarter as uncertainties abated. De-escalation of the U.S.-China trade war coupled with some Brexit clarity boosted markets. With this backdrop, trade-related areas of the market led the rally.

**Global/Developed ex-U.S.** (MSCI EAFE: +8.2%; MSCI World ex USA: +7.9%; MSCI ACWI ex USA: +8.9%; MSCI Japan: +7.6%; MSCI Pacific ex Japan: +5.8%)

- Optimism catalyzed by easing tension between the U.S. and China and nearing conclusion of Brexit boosted the markets, and the U.S. dollar fell against most currencies within developed and emerging markets.
- British Prime Minister Boris Johnson gained command of the Parliament as a result of the Dec. 12 election, adding further clarity to Brexit and sparking the pound to its best quarterly results in a decade by rising 7.5% relative to the dollar.
- Accommodative policies such as a fiscal stimulus program and dovish monetary rhetoric continued to support the Japanese economy and its market.
- Despite GDP contraction of 3.2% and its first recession in a decade due to political protests, Hong Kong rose 7.3% as U.S.-China trade tensions improved.
- Every sector generated positive returns, led by Technology.

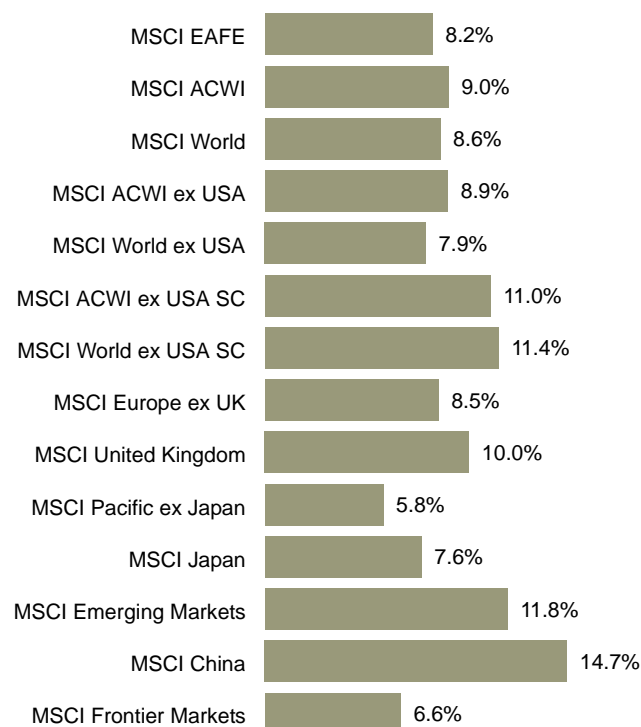
**Emerging Markets** (MSCI Emerging Markets Index: +11.8%)

- Emerging markets were the best-performing among the global ex-U.S. markets as trade war uncertainty receded.
- China soared 14.7% with easing trade tensions and expected fiscal and monetary stimulus packages in 2020.
- Brazil posted a 14.2% gain, its best quarter since late 2017, emboldened by President Jair Bolsonaro’s deregulation policies, the country’s 1.2% GDP growth, and pending pension reform.
- Russia was the best-performing country in 2019 (+50.9%) and a top five performer in the quarter (+16.8%) as rising oil prices over the past year helped fuel sentiment.
- Every sector generated positive returns, led by Asian technology companies, given the “phase one” trade deal, chip demands for 5G, and growth in China.

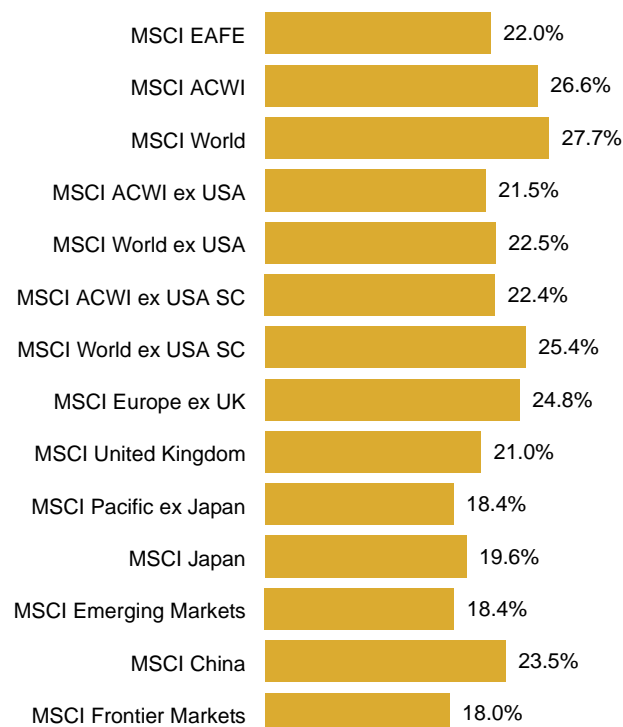
**Global ex-U.S. Small Cap** (MSCI World ex USA Small Cap: +11.4%; MSCI EM Small Cap: +9.5%; MSCI ACWI ex USA Small Cap: +11.0%)

- The “risk-on” market environment triggered by the U.S.-China trade war de-escalation enabled small caps to outperform large caps.
- Additional Brexit clarity drove the U.K. as the top country performer (+19.4%) within developed ex-U.S.
- Argentina (+33.5%) and Brazil (+24.8%) were two of the top EM country performers as key appointments in the Argentinian government, and deregulation and pension reform in Brazil, boosted market sentiment.

**Global Equity: Quarterly Returns**



**Global Equity: One-Year Returns**



Source: MSCI

**FIXED INCOME**

The Federal Open Market Committee (FOMC) cut short-term interest rates by 25 basis points once in the fourth quarter to 1.50%-1.75%, citing weak business investment and export data, along with muted inflation. The overall economic backdrop remained strong supported by a solid labor market, which led to a pause in rate cuts at the most recent FOMC meeting. The FOMC indicated its current monetary policy stance is appropriate to sustain the economic expansion. The European Central Bank kept rates steady while continuing to purchase assets in the open market. Yield movement was mixed in the U.S. as short-term rates fell and long-term rates rose amid ongoing trade negotiations.

**U.S. Fixed Income** (Bloomberg Barclays US Aggregate Bond Index: +0.2%)

- Treasuries fell 0.8% as the Treasury yield curve steepened, with yields falling on the short end and rising modestly in the intermediate and long end of the curve on expectations of stronger economic growth.
- The spread between the 2-year and 10-year Treasury remained positive, ending the year at 34 bps.
- Long Treasuries fell 4.1% as the 30-year yield rose 27 bps to end the year at 2.39% as investors favored risk assets.
- TIPS outperformed nominal Treasuries as inflation expectations rose; the 10-year breakeven spread was 1.77% at quarter end, up from 1.53% as of Sept. 30.

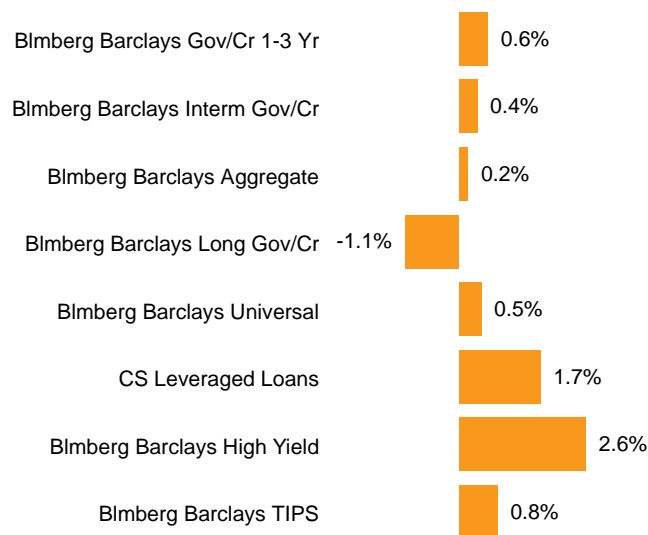
**Investment Grade Corporates** (Bloomberg Barclays Corporate: +1.2%)

- Investment grade corporate credit spreads narrowed in the fourth quarter and posted the best results within the Bloomberg Barclays US Aggregate Bond Index amid a risk-on market environment; BBB-rated corporates (+1.7%) outperformed single A-rated or higher corporates (+0.7%), indicating investors' willingness to extend risk down the credit spectrum.
- Issuance in the corporate bond market was \$200 billion in the fourth quarter, which was \$8 billion lower than that from a year ago. Issuance was \$140 billion lower compared to the third quarter, as is typical toward year-end; demand remained strong amid the risk-on market tone as global investors continued their hunt for positive-yielding assets.

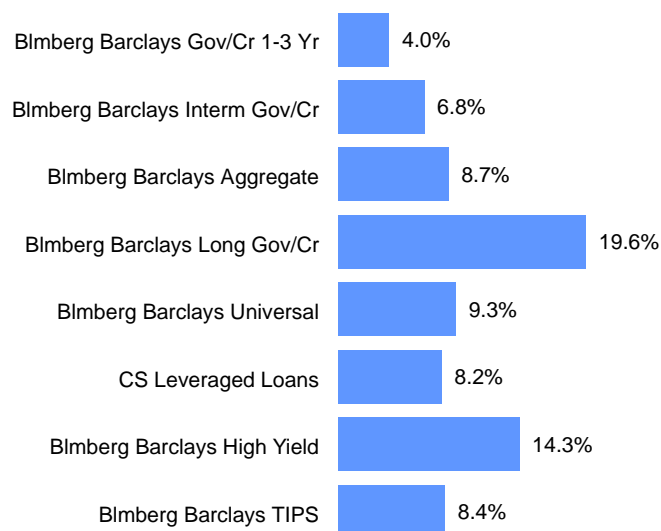
**High Yield** (Bloomberg Barclays Corporate High Yield: +2.6%)

- CCC-rated corporates (+3.7%) outperformed BB-rated corporates (+2.5%), as the risk-on market sentiment spurred demand for lower-rated securities.
- Spreads across credit quality buckets tightened in the fourth quarter, as the market anticipated improvements in credit fundamentals.

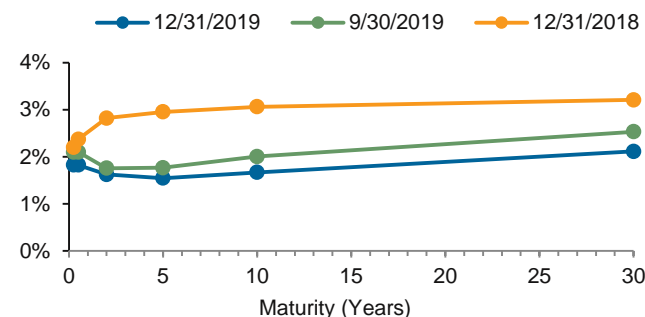
**U.S. Fixed Income: Quarterly Returns**



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



**U.S. Treasury Yield Curves**



Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

**Leveraged Loans** (CS Leveraged Loans: +1.7%)

- Bank loans, which have floating-rate coupons, underperformed high yield as investors shunned loans in favor of high yield bonds.
- CLO issuance remained consistent, providing technical support for the leveraged loan market.

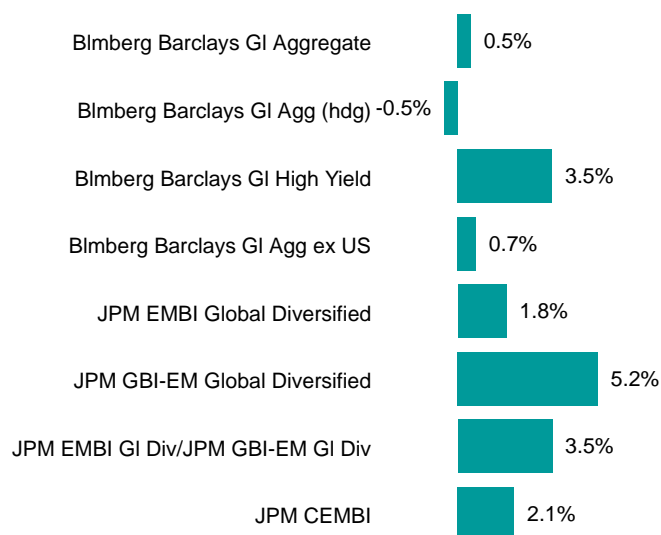
**Global Fixed Income** (Bloomberg Barclays Global Aggregate (unhedged): +0.5%; (hedged): -0.5%)

- Developed market sovereign bond yields rose modestly in the fourth quarter as global financial conditions improved, but ended lower on the year. The ECB kept the deposit rate steady at its December meeting; negative-yielding debt totaled less than \$12 trillion, down from \$17 trillion in the third quarter.
- The U.S. dollar declined in the fourth quarter versus the euro, Australian dollar, and British pound; however, it had a modest gain versus the Japanese yen.

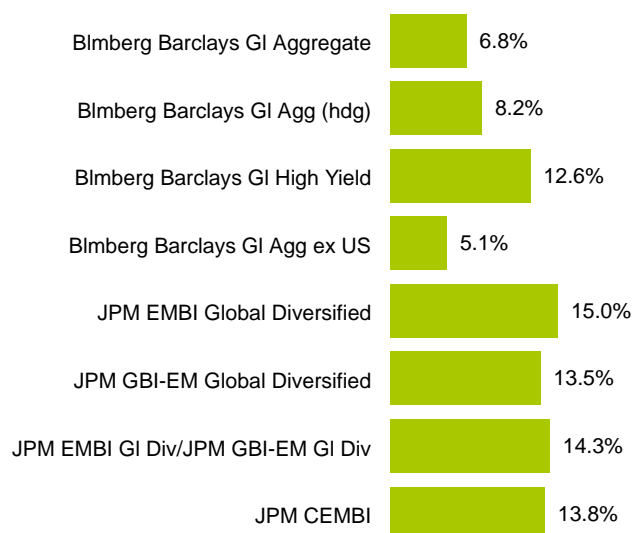
**US\$ EMD** (JPM EMBI Global Diversified: +1.8%), **Local Currency EMD** (JPM GBI-EM Global Diversified: +5.2%)

- Broadly, emerging market debt benefited from dovish global central banks and a risk-on environment.
- Within the dollar-denominated benchmark, which posted mixed results, Lebanon (-29.4%) was an outlier as the debt-to-GDP ratio continued to swell and anti-government protests persisted; Argentina rallied (+20.8%) to end the year down 23.6% as a new president was inaugurated. Returns in the local debt benchmark were largely positive, with only Chile (-6.2%) and the Dominican Republic (-0.7%) declining. South Africa (+10.2%) and Russia (+10.0%) were top performers.

**Global Fixed Income: Quarterly Returns**

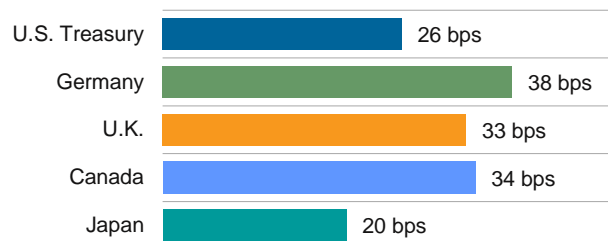


**Global Fixed Income: One-Year Returns**



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

**3Q19 to 4Q19**



Sources: Bloomberg, Bloomberg Barclays, JP Morgan





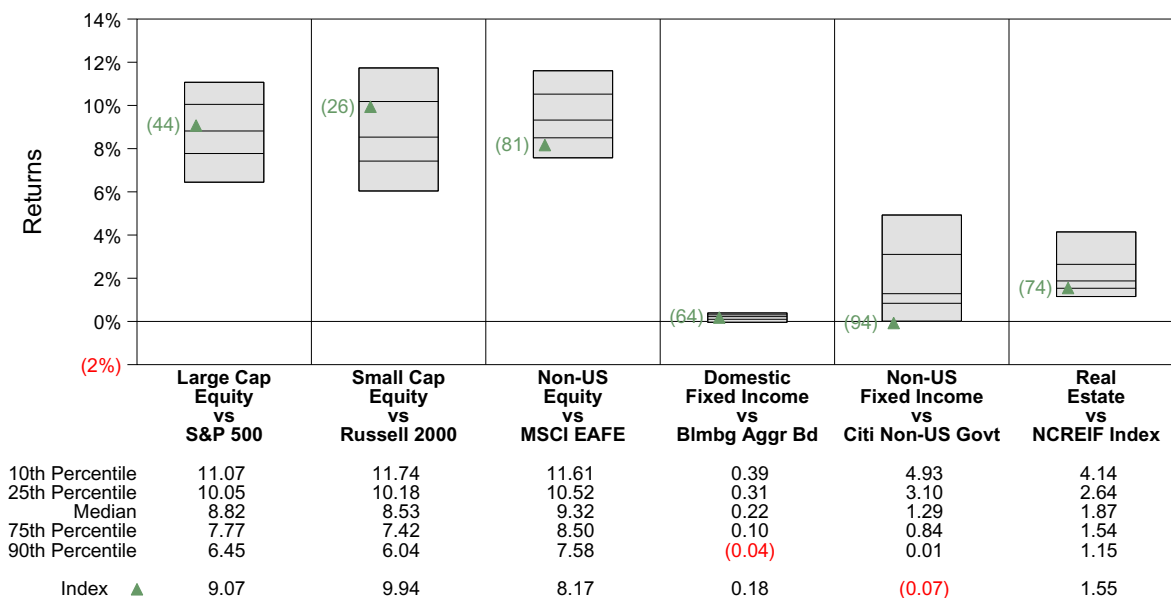
## Market Overview

### Active Management vs Index Returns

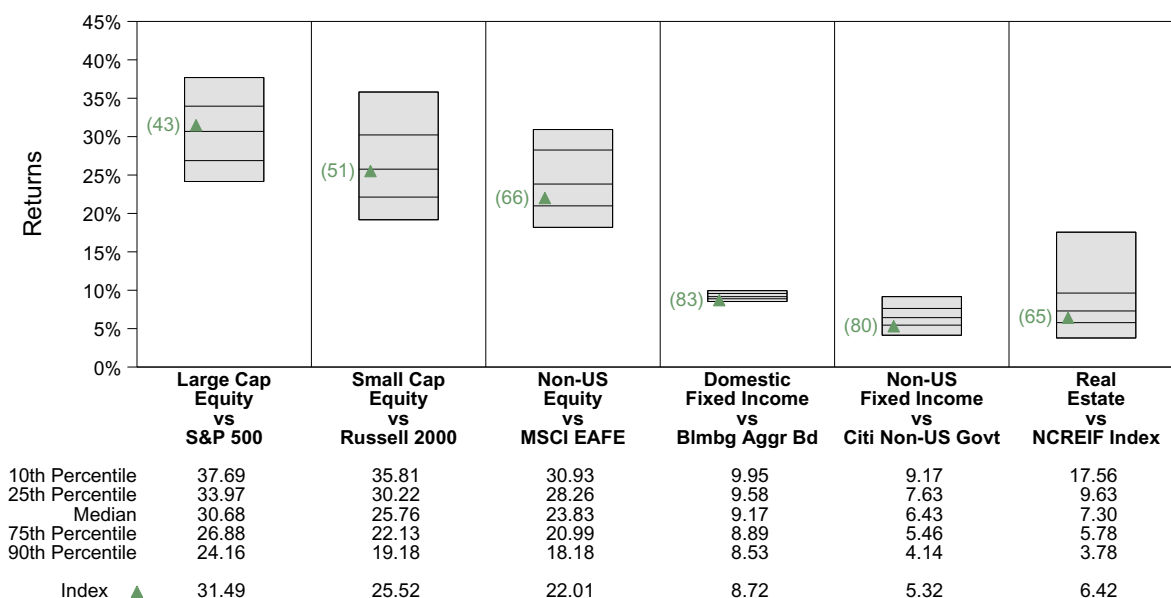
#### Market Overview

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 December 31, 2019



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

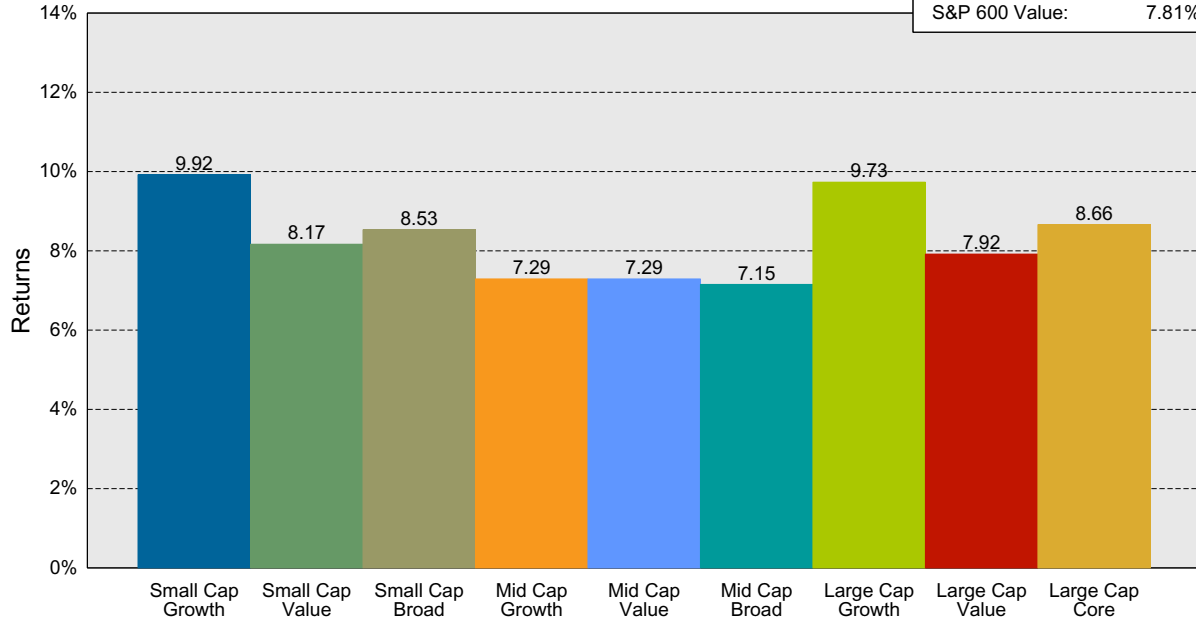


## Domestic Equity Active Management Overview

The S&P 500 Index rose 9.1% in the fourth quarter, bringing its year-to-date result to a whopping 31.5%, the best calendar year return since 2013 and capping a decade of strong performance. Small cap stocks outperformed in the fourth quarter, but trailed for the year (Russell 2000: +9.9%; +25.5% vs. Russell 1000: 9.0%; +31.4%). Growth stocks outperformed for both periods (Russell 1000 Growth: +10.6%; +36.3%; Russell 1000 Value: +7.4%; +26.5). From a sector perspective, Real Estate (-0.5%) was the only sector to post a negative return in the fourth quarter, though Utilities (+0.8%) was only modestly positive. Technology and Health Care (both +14.4%) were the twin "winners." For the year, all sectors posted double-digit returns; Energy (+11.8%) and Technology (+50.3%) were the bookends.

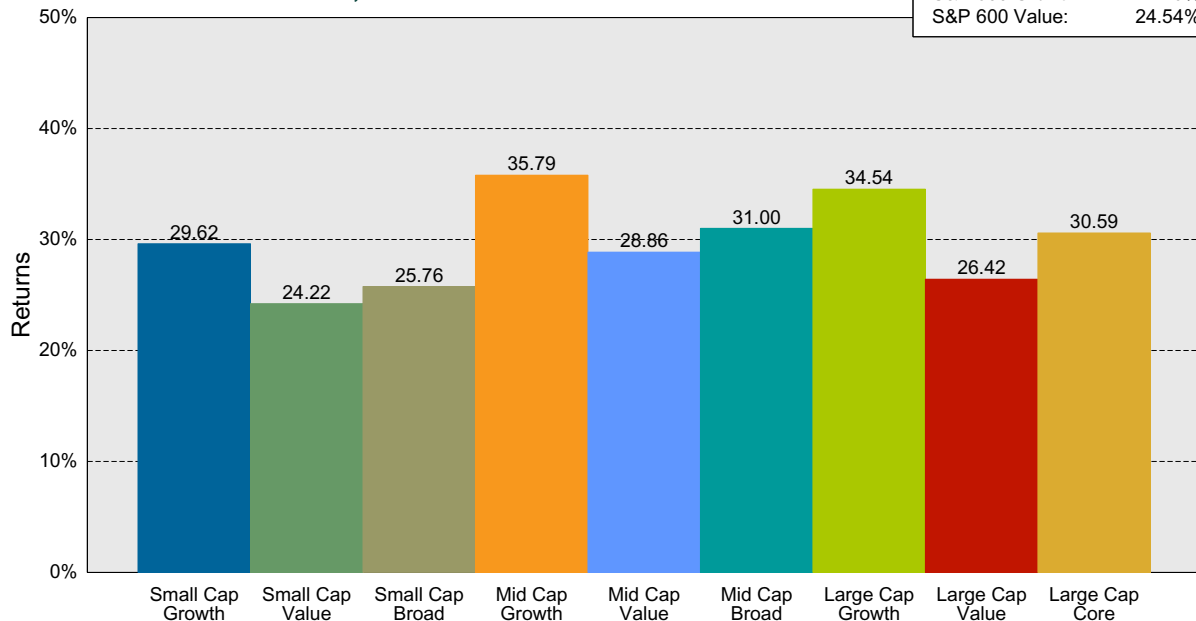
S&P 500:	9.07%
S&P 500 Growth:	8.32%
S&P 500 Value:	9.93%
S&P Mid Cap:	7.06%
S&P 600:	8.21%
S&P 600 Growth:	8.64%
S&P 600 Value:	7.81%

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



S&P 500:	31.49%
S&P 500 Growth:	31.13%
S&P 500 Value:	31.93%
S&P Mid Cap:	26.20%
S&P 600:	22.78%
S&P 600 Growth:	21.13%
S&P 600 Value:	24.54%

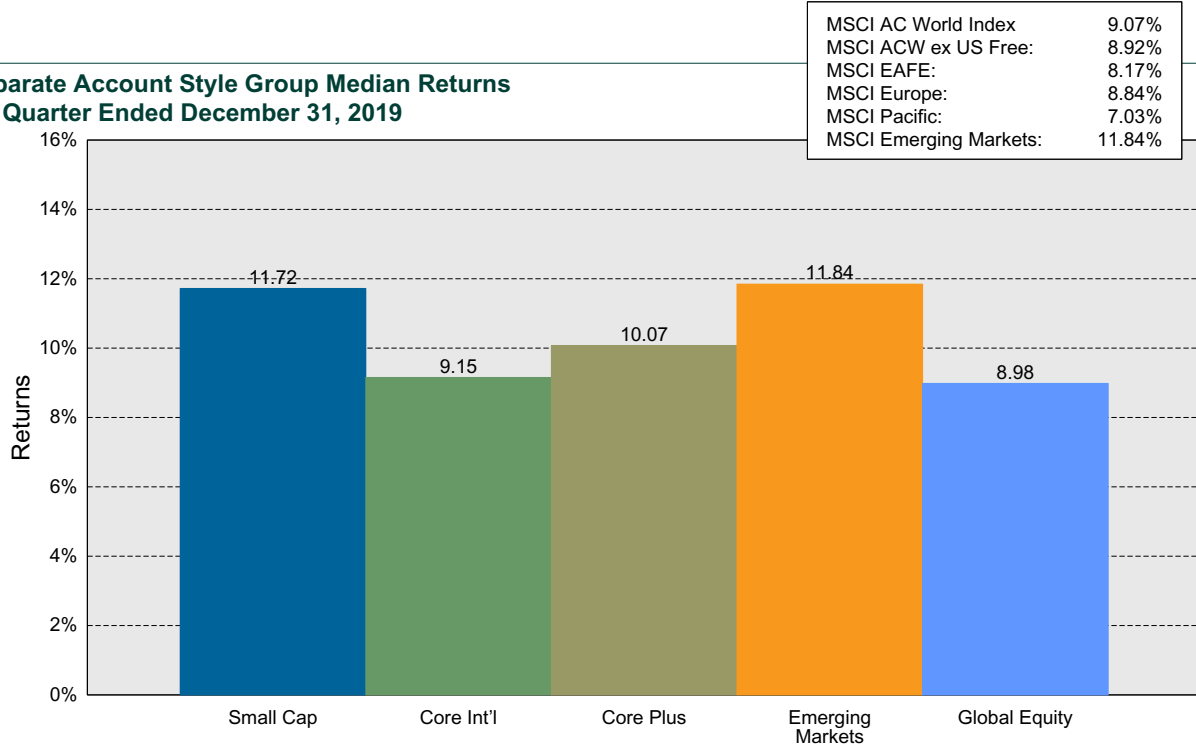
### Separate Account Style Group Median Returns for One Year Ended December 31, 2019



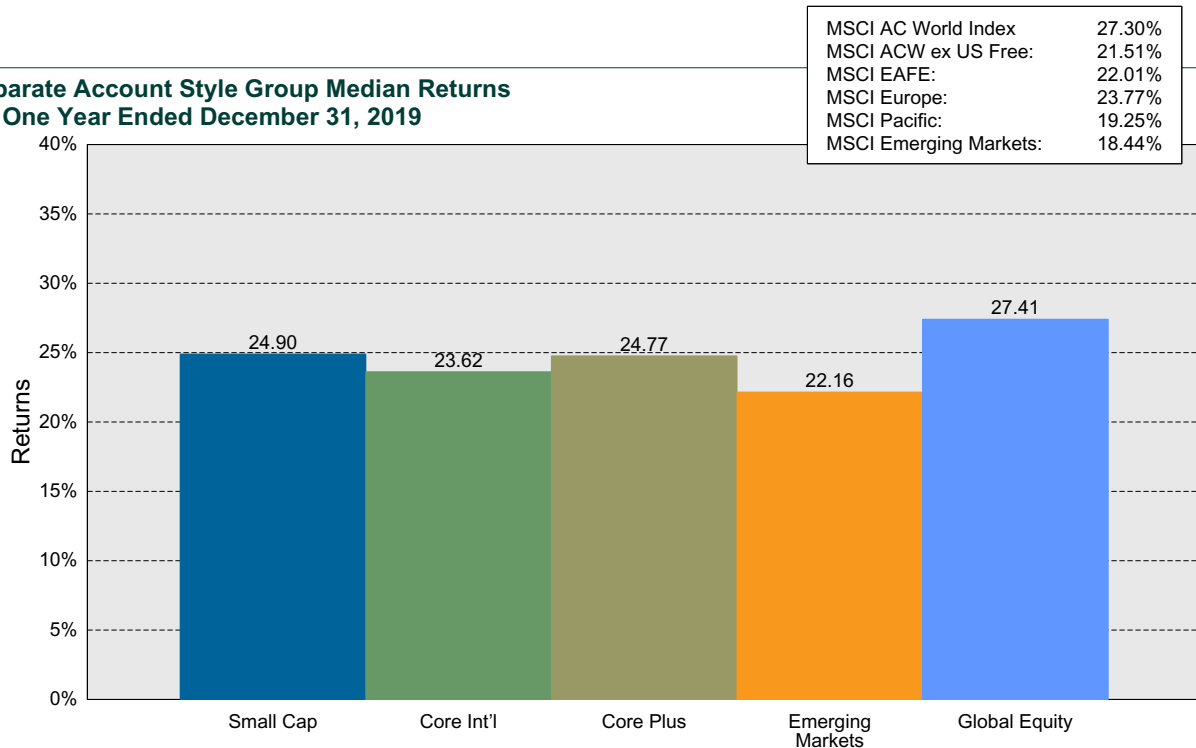
## International Equity Active Management Overview

Non-U.S. developed markets trailed the U.S. but were still up sharply in the fourth quarter and 2019 (MSCI ACWI ex-USA: +8.9%; +21.5%). Virtually all countries posted positive returns for both periods, though results were varied. Emerging markets outperformed developed markets in the fourth quarter but trailed for the full year (MSCI EM Index: +11.8% +18.4%). Chile (-8.8%; -16.9%) was the only country to deliver a negative return for both periods due to a sharp decline in the Chilean peso amid civil unrest. Russia (+16.8%; +50.9%) was the top performer for the year as its central bank aggressively cut rates. Returns for the BRIC countries were mixed. Brazil (+14.2%; +26.3%) and China (+14.7%; +23.5%) also posted strong results while returns from India (+5.3%; +7.6%) were more modest.

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



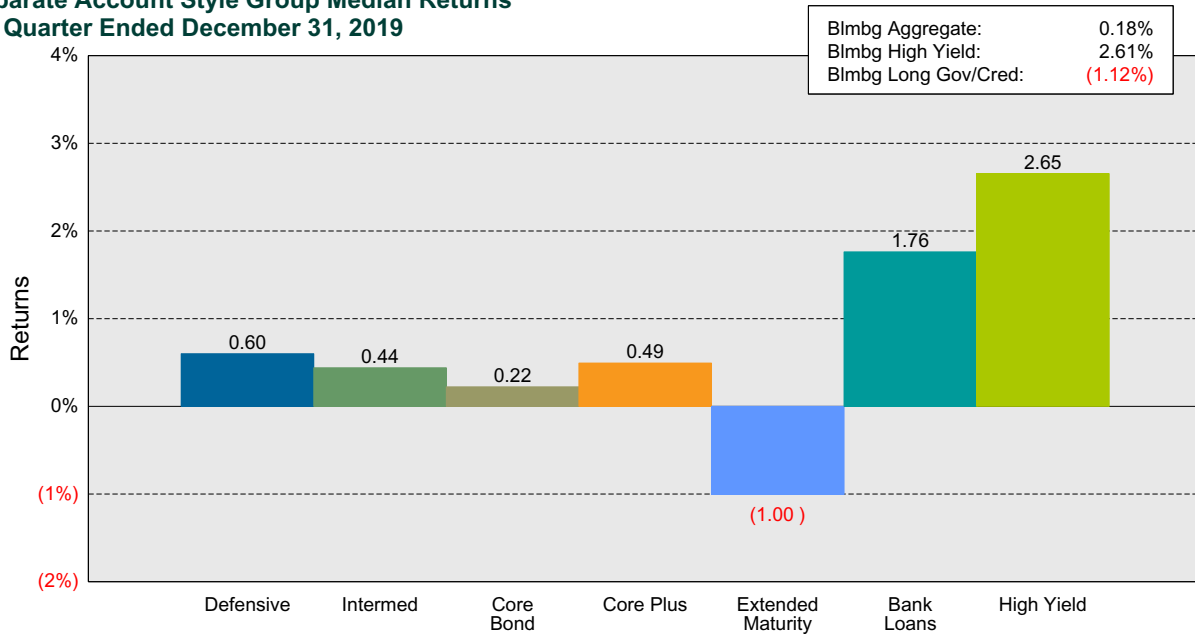
**Separate Account Style Group Median Returns  
for One Year Ended December 31, 2019**



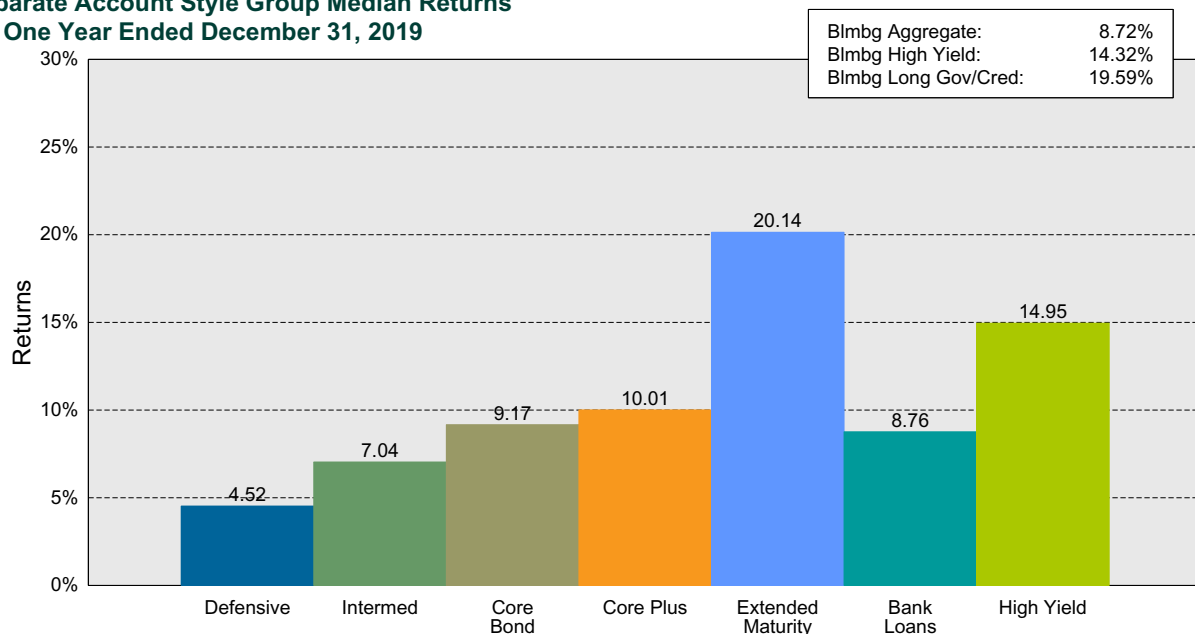
## Domestic Fixed Income Active Management Overview

Fixed income markets posted strong returns in 2019 fueled both by falling interest rates and strong investor demand, especially for higher-yielding sectors. The 10-year U.S. Treasury closed the year at 1.92%, up from 1.68% at the end of the third quarter and down sharply from 2.69% at the close of 2018. The Bloomberg Barclays US Aggregate Bond Index rose 8.7%, the best calendar year return since 2002, with the lowest-quality tier of the Index up 16.4%. Fourth quarter gains were more muted at 0.2% as Treasury yields rose modestly. Corporate bonds were the best-performing sector in the fourth quarter and 2019 (Bloomberg Barclays Corporate Index: +1.2%; +14.5%). High yield corporates also posted sharp gains; the Bloomberg Barclays Corporate High Yield Index rose 2.6% in the fourth quarter and 14.3% in 2019. Leveraged loans suffered outflows throughout the year, but still posted a solid return (CS Leveraged Loan: +1.7%; +9.0%). The Bloomberg Barclays US TIPS Index sharply outperformed the Treasury Index in the fourth quarter as inflation expectations rose.

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



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

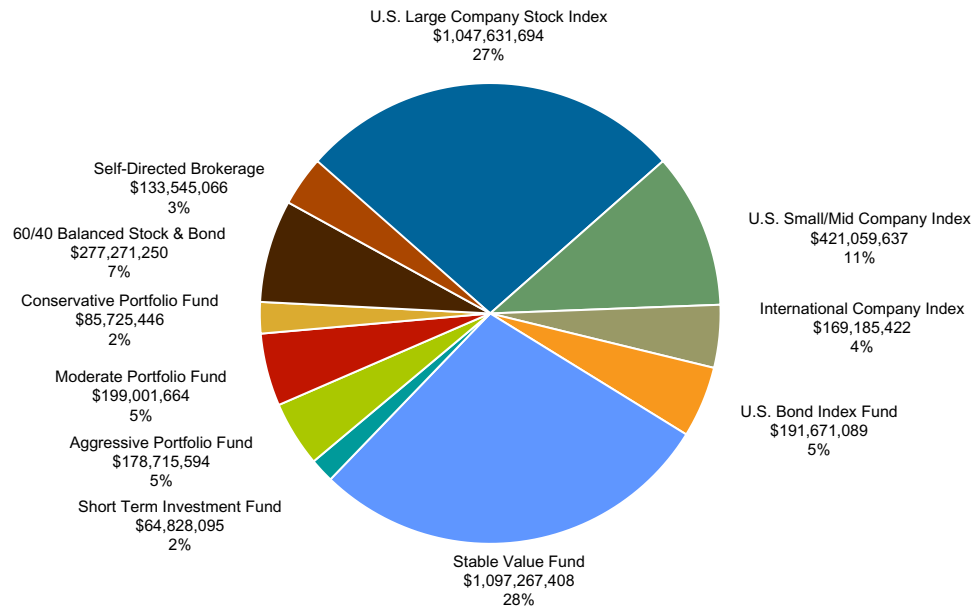




## Changes in Investment Fund Balances Period Ended December 31, 2019

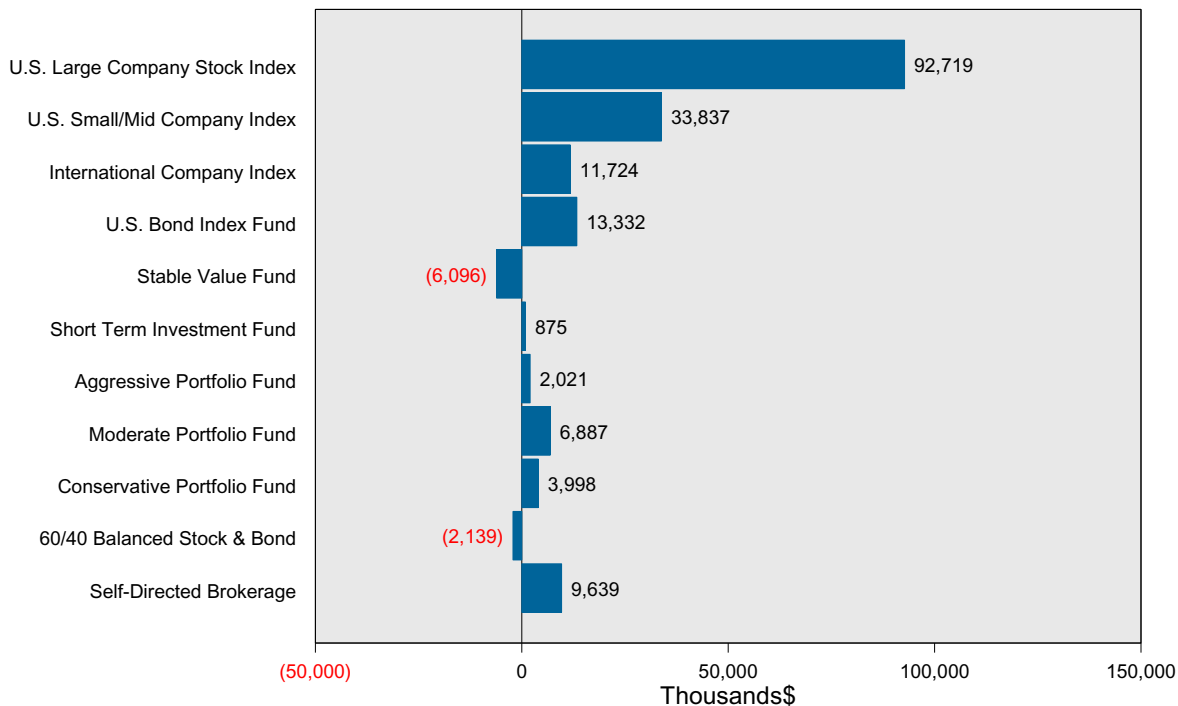
### Allocation Across Investment Options

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



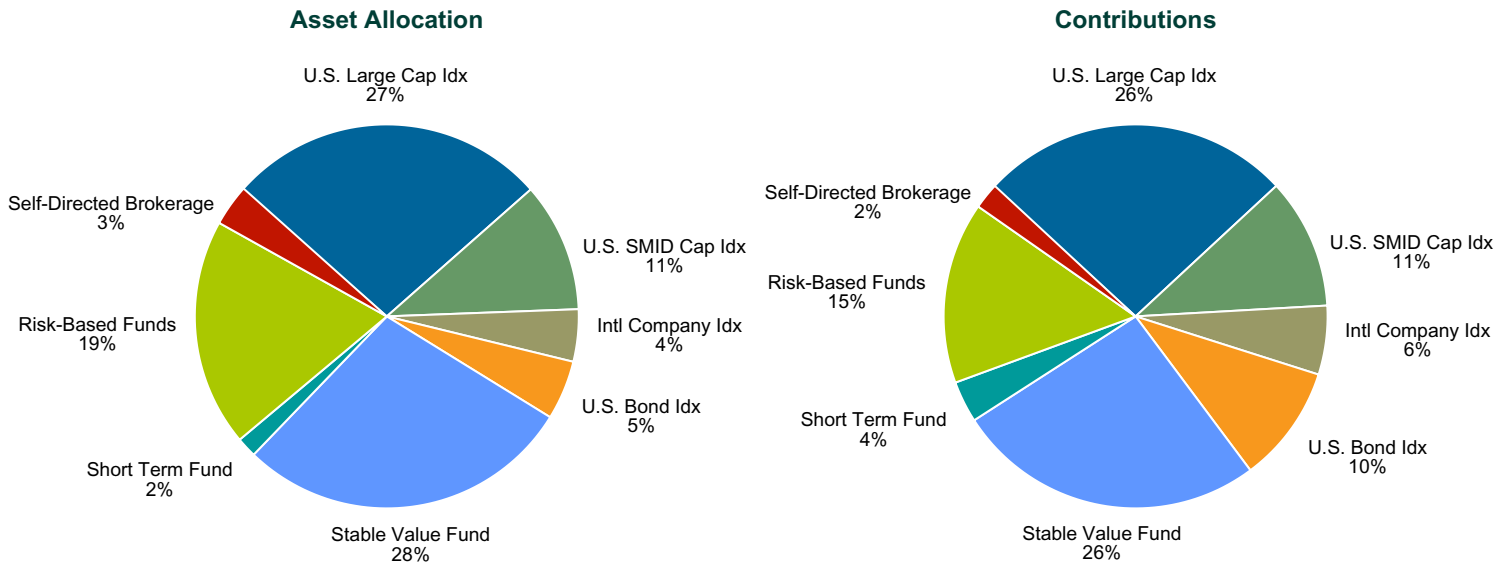
### Changes in Fund Values

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

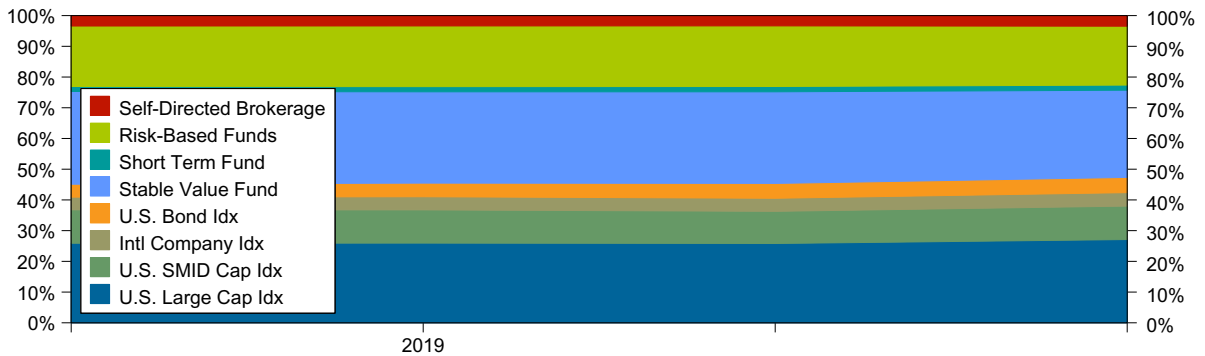


## Asset Allocation

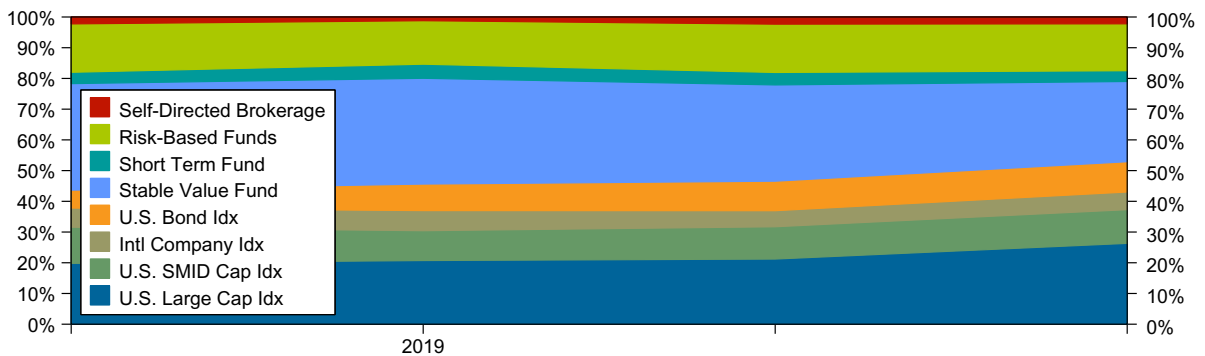
The charts below illustrate the historical asset allocation of the fund as well as the historical allocations of contributions to the fund. The pie charts on the top show the most recent allocations of both assets and contributions which include exchanges and transfers within the plan. The middle chart displays the historical allocation of fund assets. The bottom chart illustrates the historical allocation of contributions.



## Historical Asset Allocation



## Historical Allocation of Contributions



## Investment Fund Balances

The table below compares the fund's investment fund balances as of December 31, 2019 with that of September 30, 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

	December 31, 2019		Net New Inv.	Inv. Return	September 30, 2019	
	Market Value \$(000)	% of Total Weight			Market Value \$(000)	% of Total Weight
<b>SERS Risk-Based Funds</b>	<b>\$740,714</b>	<b>19.16%</b>	<b>\$(28,856)</b>	<b>\$39,623</b>	<b>\$729,947</b>	<b>19.73%</b>
SERS 60/40 Stock & Bond Fund	277,271	7.17%	(17,190)	15,052	279,410	7.55%
SERS Conservative Portfolio Fund	85,725	2.22%	1,697	2,301	81,728	2.21%
SERS Moderate Portfolio Fund	199,002	5.15%	(3,269)	10,156	192,115	5.19%
SERS Aggressive Portfolio Fund	178,716	4.62%	(10,094)	12,115	176,695	4.78%
<b>SERS U.S. Equity</b>	<b>\$1,468,691</b>	<b>37.99%</b>	<b>\$6,466</b>	<b>\$120,090</b>	<b>\$1,342,135</b>	<b>36.28%</b>
SERS U.S. Large Company Index	1,047,632	27.10%	6,584	86,135	954,913	25.81%
SERS U.S. SMID Company Index	421,060	10.89%	(118)	33,955	387,222	10.47%
<b>SERS International Equity</b>						
SERS Intl Company Idx Fund	169,185	4.38%	(629)	12,353	157,461	4.26%
<b>SERS Fixed Income</b>	<b>\$1,353,767</b>	<b>35.02%</b>	<b>\$790</b>	<b>\$7,322</b>	<b>\$1,345,655</b>	<b>36.38%</b>
SERS Short Term Investment Fund	64,828	1.68%	604	271	63,953	1.73%
SERS Stable Value Fund	1,097,267	28.38%	(12,937)	6,841	1,103,363	29.83%
SERS U.S. Bond Index Fund	191,671	4.96%	13,123	210	178,339	4.82%
<b>Self-Directed Brokerage</b>						
Self-Directed Brokerage Account	133,545	3.45%	921	8,718	123,906	3.35%
<b>SERS 457(b) Total Fund</b>	<b>\$3,865,902</b>	<b>100.0%</b>	<b>\$(21,308)</b>	<b>\$188,106</b>	<b>\$3,699,104</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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	5.56%	22.19%	10.94%	8.37%	9.95%
60% S&P 500/ 40% Aggregate Bond	5.51%	22.11%	10.89%	8.35%	9.96%
Callan Dom Balanced MFs	5.58%	20.74%	9.73%	7.10%	9.21%
SERS Conservative Portfolio Fund	2.83%	13.19%	6.48%	4.83%	5.25%
Conservative Portfolio Custom Index(3)	2.82%	13.10%	6.38%	4.75%	5.21%
Callan MA Tgt All Cons MF	2.46%	12.63%	5.78%	4.30%	4.89%
SERS Moderate Portfolio Fund	5.36%	20.60%	9.81%	7.34%	8.59%
Moderate Portfolio Custom Index(2)	5.36%	20.45%	9.69%	7.23%	8.55%
Callan MA Tgt All Mod MF	4.54%	18.06%	7.92%	5.83%	7.21%
SERS Aggressive Portfolio Fund	7.06%	24.63%	11.62%	8.67%	10.50%
Aggressive Portfolio Custom Index(1)	7.08%	24.47%	11.48%	8.54%	10.45%
Callan MA Tgt All AgGr MF	7.89%	25.19%	11.09%	7.75%	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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	9.84%	-	-
60% S&P 500/ 40% Aggregate Bond	9.81%	7.36%	6.04%
Callan Dom Balanced MFs	8.98%	6.56%	5.55%
SERS Conservative Portfolio Fund	5.62%	5.09%	-
Conservative Portfolio Custom Index(3)	5.55%	5.03%	4.90%
Callan MA Tgt All Cons MF	5.70%	4.66%	4.92%
SERS Moderate Portfolio Fund	8.70%	6.90%	-
Moderate Portfolio Custom Index(2)	8.59%	6.83%	5.81%
Callan MA Tgt All Mod MF	7.41%	6.05%	5.41%
SERS Aggressive Portfolio Fund	10.20%	7.61%	-
Aggressive Portfolio Custom Index(1)	10.06%	7.50%	5.79%
Callan MA Tgt All AgGr MF	9.51%	6.75%	5.29%

(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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	9.07%	31.50%	15.27%	11.70%	14.74%
S&P 500 Index	9.07%	31.49%	15.27%	11.70%	14.73%
Callan Lg Cap Broad MF	8.76%	30.14%	14.69%	10.58%	13.86%
SERS U.S. SMID Company Idx Fund	8.84%	28.18%	11.16%	9.04%	12.63%
Dow Jones US Completion	8.82%	27.91%	10.96%	8.84%	12.42%
Callan SMID Broad MFs	7.68%	29.40%	12.48%	9.18%	12.02%
<b>International Equity</b>					
SERS International Company Idx Fund	7.89%	22.33%	9.97%	6.13%	6.49%
MSCI EAFE	8.17%	22.01%	9.56%	5.67%	6.35%
Callan Intl Eq Dev Mkt MF	9.07%	22.87%	9.49%	5.65%	6.31%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.48%	2.31%	1.82%	1.25%	0.94%
3-month Treasury Bill	0.46%	2.28%	1.67%	1.07%	0.78%
Callan Cash Database(1)	0.53%	2.62%	1.99%	1.41%	1.09%
SERS Stable Value Fund	0.66%	2.59%	2.26%	2.19%	2.25%
3-month Treasury Bill	0.46%	2.28%	1.67%	1.07%	0.78%
Callan Stable Value	0.64%	2.51%	2.26%	2.14%	2.02%
SERS U.S. Bond Index Fund	0.17%	8.67%	4.00%	3.00%	2.65%
Blmbg Aggregate	0.18%	8.72%	4.03%	3.05%	2.72%
Callan Core Bond MFs	0.15%	9.17%	4.17%	3.12%	2.71%

(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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	13.58%	9.04%	6.10%
S&P 500 Index	13.56%	9.00%	6.06%
Callan Lg Cap Broad MF	12.67%	8.85%	5.96%
SERS U.S. SMID Company Idx Fund	12.92%	9.34%	7.49%
Dow Jones US Completion	12.72%	9.13%	7.12%
Callan SMID Broad MFs	12.28%	8.91%	8.28%
<b>International Equity</b>			
SERS International Company Idx Fund	5.81%	5.12%	3.23%
MSCI EAFE	5.50%	4.84%	3.32%
Callan Intl Eq Dev Mkt MF	5.78%	5.04%	3.94%
<b>Domestic Fixed Income</b>			
SERS Short Term Investment Fund	0.73%	1.56%	-
3-month Treasury Bill	0.58%	1.39%	1.78%
Callan Cash Database(1)	0.91%	1.81%	2.14%
SERS Stable Value Fund	2.61%	3.30%	-
3-month Treasury Bill	0.58%	1.39%	1.78%
Callan Stable Value	2.23%	2.93%	3.68%
SERS U.S. Bond Index Fund	3.68%	4.09%	4.98%
Blmbg Aggregate	3.75%	4.15%	5.03%
Callan Core Bond MFs	4.04%	4.38%	5.08%

(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.

	2019	2018	2017	2016	2015
<b>Net Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	22.19%	(2.19%)	14.25%	8.16%	1.20%
60% S&P 500/ 40% Aggregate Bond	22.11%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	20.74%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	13.19%	(1.58%)	8.37%	4.35%	0.48%
Conservative Portfolio Custom Index(3)	13.10%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	12.63%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	20.60%	(4.07%)	14.46%	7.00%	0.55%
Moderate Portfolio Custom Index(2)	20.45%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	18.06%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	24.63%	(5.66%)	18.29%	8.49%	0.45%
Aggressive Portfolio Custom Index(1)	24.47%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	25.19%	(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.

	2019	2018	2017	2016	2015
<b>Net Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	31.50%	(4.39%)	21.84%	11.98%	1.40%
S&P 500 Index	31.49%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	30.14%	(4.54%)	23.56%	8.43%	1.50%
SERSU.S. SMID Company Idx Fund	28.18%	(9.34%)	18.19%	16.05%	(3.32%)
Dow Jones US Completion	27.91%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	29.40%	(8.69%)	17.14%	13.80%	(2.80%)
<b>International Equity</b>					
SERS International Company Idx Fund	22.33%	(13.39%)	25.51%	1.71%	(0.43%)
MSCI EAFE	22.01%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	22.87%	(15.06%)	26.64%	0.39%	(0.73%)
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	2.31%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	2.28%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.62%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	2.35%	2.34%	1.85%	1.99%	2.18%
3-month Treasury Bill	2.28%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	2.51%	2.24%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	8.67%	0.01%	3.51%	2.57%	0.47%
Blmbg Aggregate	8.72%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	9.17%	(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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	5.56%	22.21%	10.96%	8.38%	9.97%
60% S&P 500/ 40% Aggregate Bond	5.51%	22.11%	10.89%	8.35%	9.96%
Callan Dom Balanced MFs	5.58%	20.74%	9.73%	7.10%	9.21%
SERS Conservative Portfolio Fund	2.83%	13.21%	6.50%	4.84%	5.26%
Conservative Portfolio Custom Index(3)	2.82%	13.10%	6.38%	4.75%	5.21%
Callan MA Tgt All Cons MF	2.46%	12.63%	5.78%	4.30%	4.89%
SERS Moderate Portfolio Fund	5.36%	20.62%	9.83%	7.35%	8.60%
Moderate Portfolio Custom Index(2)	5.36%	20.45%	9.69%	7.23%	8.55%
Callan MA Tgt All Mod MF	4.54%	18.06%	7.92%	5.83%	7.21%
SERS Aggressive Portfolio Fund	7.06%	24.65%	11.64%	8.69%	10.52%
Aggressive Portfolio Custom Index(1)	7.08%	24.47%	11.48%	8.54%	10.45%
Callan MA Tgt All AgGr MF	7.89%	25.19%	11.09%	7.75%	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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	9.86%	-	-
60% S&P 500/ 40% Aggregate Bond	9.81%	7.36%	6.04%
Callan Dom Balanced MFs	8.98%	6.56%	5.55%
SERS Conservative Portfolio Fund	5.63%	5.10%	-
Conservative Portfolio Custom Index(3)	5.55%	5.03%	4.90%
Callan MA Tgt All Cons MF	5.70%	4.66%	4.92%
SERS Moderate Portfolio Fund	8.71%	6.92%	-
Moderate Portfolio Custom Index(2)	8.59%	6.83%	5.81%
Callan MA Tgt All Mod MF	7.41%	6.05%	5.41%
SERS Aggressive Portfolio Fund	10.22%	7.63%	-
Aggressive Portfolio Custom Index(1)	10.06%	7.50%	5.79%
Callan MA Tgt All AgGr MF	9.51%	6.75%	5.29%

(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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	9.07%	31.51%	15.29%	11.72%	14.75%
S&P 500 Index	9.07%	31.49%	15.27%	11.70%	14.73%
Callan Lg Cap Broad MF	8.76%	30.14%	14.69%	10.58%	13.86%
SERS U.S. SMID Company Idx Fund	8.85%	28.21%	11.18%	9.06%	12.65%
Dow Jones US Completion	8.82%	27.91%	10.96%	8.84%	12.42%
Callan SMID Broad MFs	7.68%	29.40%	12.48%	9.18%	12.02%
<b>International Equity</b>					
International Company Stock Idx Fund	7.90%	22.36%	9.99%	6.15%	6.51%
MSCI EAFE	8.17%	22.01%	9.56%	5.67%	6.35%
Callan Intl Eq Dev Mkt MF	9.07%	22.87%	9.49%	5.65%	6.31%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.48%	2.31%	1.82%	1.25%	0.94%
3-month Treasury Bill	0.46%	2.28%	1.67%	1.07%	0.78%
Callan Cash Database(1)	0.53%	2.62%	1.99%	1.41%	1.09%
SERS Stable Value Fund	0.68%	2.66%	2.41%	2.41%	2.50%
3-month Treasury Bill	0.46%	2.28%	1.67%	1.07%	0.78%
Callan Stable Value	0.64%	2.51%	2.26%	2.14%	2.02%
SERS U.S. Bond Index Fund	0.17%	8.69%	4.02%	3.02%	2.67%
Blmbg Aggregate	0.18%	8.72%	4.03%	3.05%	2.72%
Callan Core Bond MFs	0.15%	9.17%	4.17%	3.12%	2.71%

(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 December 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended December 31, 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	13.59%	9.05%	6.11%
S&P 500 Index	13.56%	9.00%	6.06%
Callan Lg Cap Broad MF	12.67%	8.85%	5.96%
SERS U.S. SMID Company Idx Fund	12.94%	9.36%	7.51%
Dow Jones US Completion	12.72%	9.13%	7.12%
Callan SMID Broad MFs	12.28%	8.91%	8.28%
<b>International Equity</b>			
International Company Stock Idx Fund	5.83%	5.14%	3.26%
MSCI EAFE	5.50%	4.84%	3.32%
Callan Intl Eq Dev Mkt MF	5.78%	5.04%	3.94%
<b>Domestic Fixed Income</b>			
SERS Short Term Investment Fund	0.73%	1.56%	-
3-month Treasury Bill	0.58%	1.39%	1.78%
Callan Cash Database(1)	0.91%	1.81%	2.14%
SERS Stable Value Fund	2.88%	3.57%	-
3-month Treasury Bill	0.58%	1.39%	1.78%
Callan Stable Value	2.23%	2.93%	3.68%
SERS U.S. Bond Index Fund	3.70%	4.12%	5.00%
Blmbg Aggregate	3.75%	4.15%	5.03%
Callan Core Bond MFs	4.04%	4.38%	5.08%

(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.

	2019	2018	2017	2016	2015
<b>Gross Performance</b>					
<b>Risk-Based Funds</b>					
SERS 60/40 Stock & Bond Fund	22.21%	(2.18%)	14.27%	8.18%	1.21%
60% S&P 500/ 40% Aggregate Bond	22.11%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	20.74%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	13.21%	(1.57%)	8.39%	4.36%	0.50%
Conservative Portfolio Custom Index(3)	13.10%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	12.63%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	20.62%	(4.06%)	14.48%	7.02%	0.56%
Moderate Portfolio Custom Index(2)	20.45%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	18.06%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	24.65%	(5.65%)	18.31%	8.51%	0.46%
Aggressive Portfolio Custom Index(1)	24.47%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	25.19%	(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.

	2019	2018	2017	2016	2015
<b>Gross Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Idx Fund	31.51%	(4.38%)	21.85%	11.99%	1.41%
S&P 500 Index	31.49%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	30.14%	(4.54%)	23.56%	8.43%	1.50%
SERS U.S. SMID Company Idx Fund	28.21%	(9.32%)	18.21%	16.08%	(3.30%)
Dow Jones US Completion	27.91%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	29.40%	(8.69%)	17.14%	13.80%	(2.80%)
<b>International Equity</b>					
International Company Stock Idx Fund	22.36%	(13.37%)	25.53%	1.73%	(0.41%)
MSCI EAFE	22.01%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	22.87%	(15.06%)	26.64%	0.39%	(0.73%)
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	2.31%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	2.28%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.62%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	2.66%	2.41%	2.16%	2.31%	2.51%
3-month Treasury Bill	2.28%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	2.51%	2.24%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	8.69%	0.03%	3.53%	2.59%	0.49%
Blmbg Aggregate	8.72%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	9.17%	(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  
December 31, 2019**

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
<b>Gross of Fee Performance</b>									
<b>Risk-Based Funds</b>									
<b>SERS 60/40 Stock &amp; Bond Fund</b> Callan Dom Balanced MFs	5.6 53	22.2 38	11.0 24	8.4 17	10.0 29	9.9 17			0.02 98
60% S&P 500/ 40% Aggregate Bond	5.5 57	22.1 38	10.9 25	8.4 18	10.0 29	9.8 17			
<b>SERS Conservative Portfolio Fund</b> Callan MA Tgt All Cons MF	2.8 37	13.2 42	6.5 28	4.8 26	5.3 38	5.6 52			0.02 100
Conservative Portfolio Custom Index	2.8 37	13.1 44	6.4 30	4.7 27	5.2 39	5.5 56			
<b>SERS Moderate Portfolio Fund</b> Callan MA Tgt All Mod MF	5.4 29	20.6 20	9.8 17	7.4 16	8.6 26	8.7 24			0.02 100
Moderate Portfolio Custom Index	5.4 29	20.4 21	9.7 21	7.2 19	8.6 26	8.6 26			
<b>SERS Aggressive Portfolio Fund</b> Callan MA Tgt All AgGr MF	7.1 75	24.7 63	11.6 34	8.7 19	10.5 36	10.2 22			0.02 100
Aggressive Portfolio Custom Index	7.1 75	24.5 66	11.5 43	8.5 23	10.4 37	10.1 31			
<b>Domestic Equity</b>									
<b>SERS U.S. Large Company Index</b> Callan Lg Cap Broad MF	9.1 42	31.5 40	15.3 45	11.7 39	14.7 37	13.6 34			0.01 99
S&P 500 Index	9.1 42	31.5 40	15.3 45	11.7 39	14.7 37	13.6 34			
<b>SERS U.S. Small/Mid Company Index</b> Callan SMID Broad MFs	8.8 29	28.2 58	11.2 52	9.1 51	12.7 38	12.9 40			0.03 100
Dow Jones US Completion	8.8 29	27.9 61	11.0 53	8.8 51	12.4 40	12.7 42			
<b>International Equity</b>									
<b>SERS International Company Idx Fund</b> Callan Intl Eq Dev Mkt MF	7.9 78	22.4 58	10.0 45	6.2 36	6.5 37	5.8 49			0.04 99
MSCI EAFE	8.2 70	22.0 60	9.6 48	5.7 49	6.3 49	5.5 57			
<b>Domestic Fixed Income</b>									
<b>SERS Short Term Investment Fund</b> Callan Cash Database	0.5 79	2.3 83	1.8 76	1.2 78	0.9 79	0.7 79			0.00 100
3-month Treasury Bill	0.5 85	2.3 84	1.7 90	1.1 94	0.8 94	0.6 96			
<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  
December 31, 2019**

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
<b>SERS Stable Value Fund</b> Callan Stable Value	0.7 13	2.7 27	2.4 18	2.4 2	2.5 1	2.9 1			
3-month Treasury Bill	0.5 100	2.3 89	1.7 97	1.1 98	0.8 99	0.6 100			
<b>SERS U.S. Bond Index Fund</b> Callan Core Bond MFs	0.2 43	8.7 61	4.0 64	3.0 64	2.7 56	3.7 82			0.03 98
Blmbg Aggregate	0.2 43	8.7 60	4.0 64	3.0 56	2.7 50	3.7 79			

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 December 31, 2019

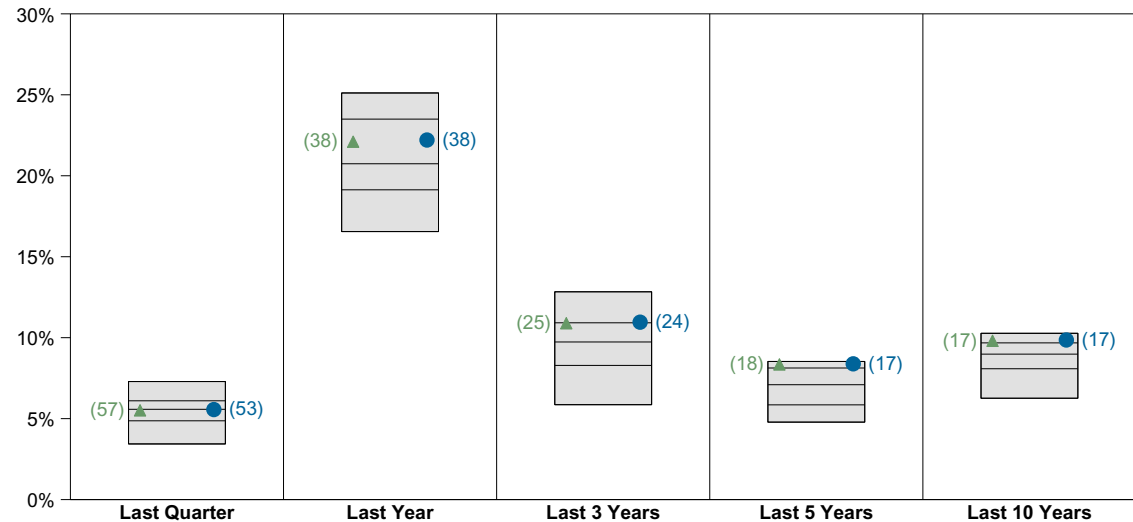
### Investment Philosophy

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

### Quarterly Summary and Highlights

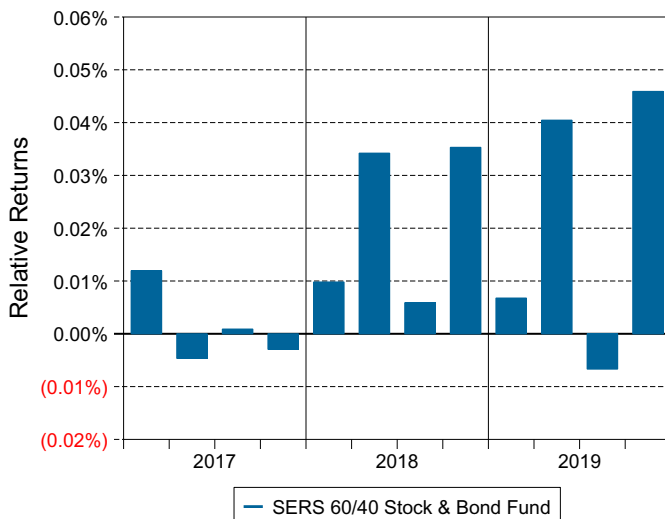
- SERS 60/40 Stock & Bond Fund's portfolio posted a 5.56% return for the quarter placing it in the 53 percentile of the Callan Domestic Balanced Mutual Funds group for the quarter and in the 38 percentile for the last year.
- SERS 60/40 Stock & Bond Fund's portfolio outperformed the 60% S&P 500/ 40% Aggregate Bond by 0.05% 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)

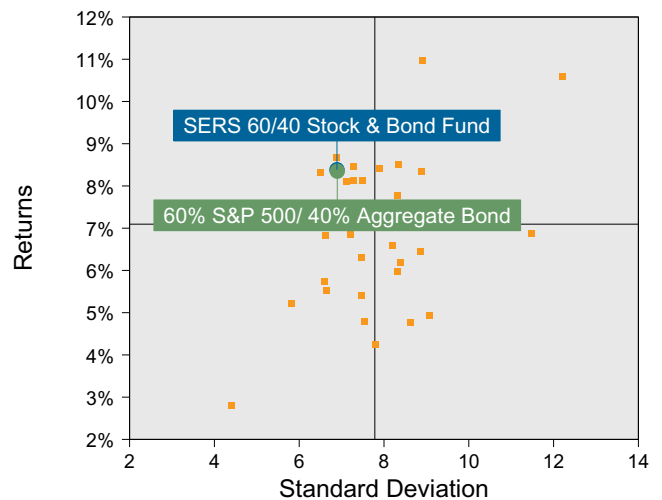


10th Percentile	7.29	25.11	12.83	8.53	10.27
25th Percentile	6.10	23.50	10.92	8.13	9.68
Median	5.58	20.74	9.73	7.10	8.98
75th Percentile	4.87	19.13	8.29	5.85	8.08
90th Percentile	3.44	16.55	5.86	4.78	6.26
<b>SERS 60/40 Stock &amp; Bond Fund</b>	<b>5.56</b>	<b>22.21</b>	<b>10.96</b>	<b>8.38</b>	<b>9.86</b>
60% S&P 500/ 40% Aggregate Bond	5.51	22.11	10.89	8.35	9.81

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



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



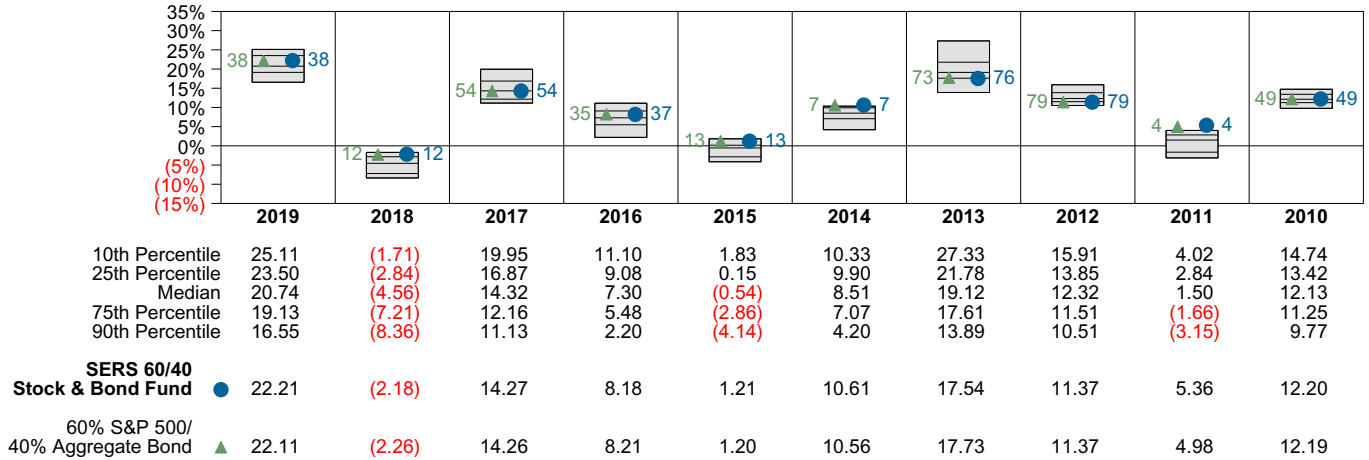


# SERS 60/40 Stock & Bond Fund Return Analysis Summary

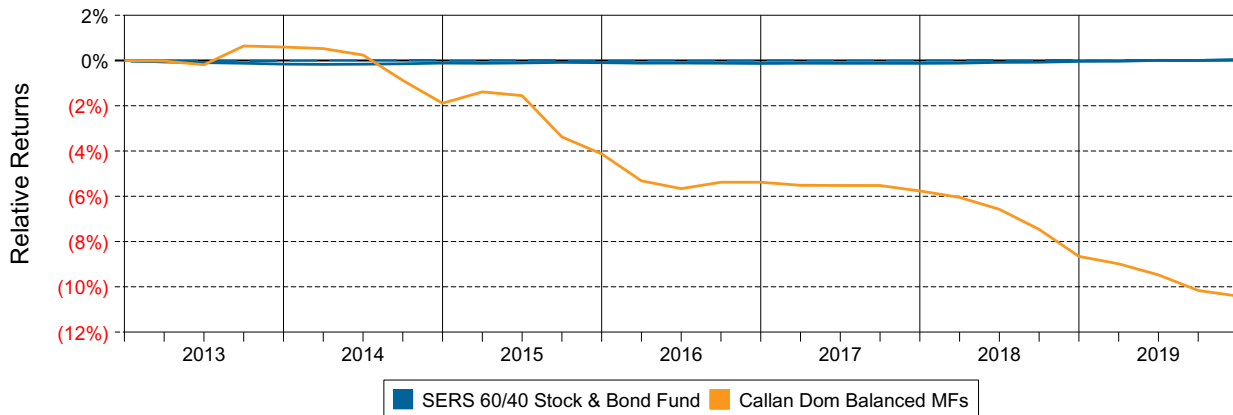
## Return Analysis

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.

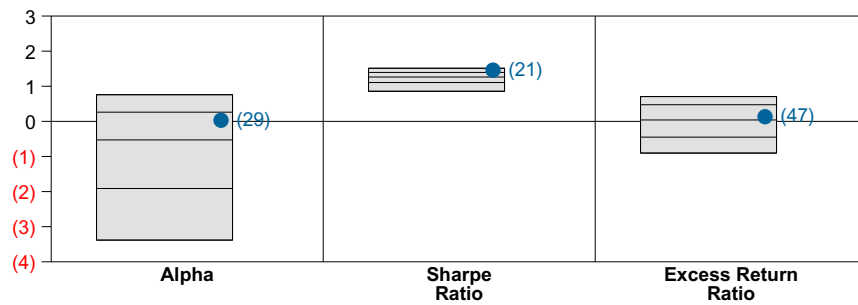
### Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)



### 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 December 31, 2019



# SERS Conservative Portfolio Fund

## Period Ended December 31, 2019

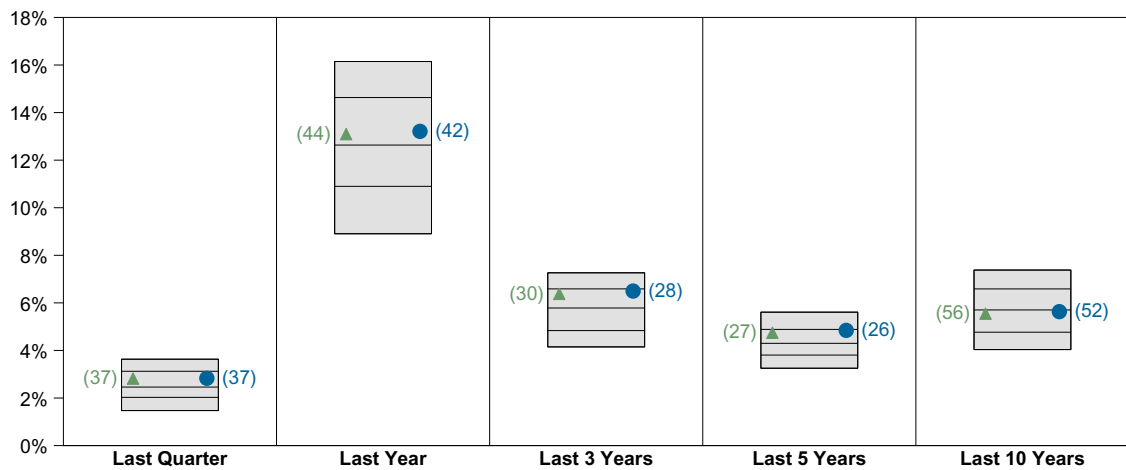
### Investment Philosophy

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

### Quarterly Summary and Highlights

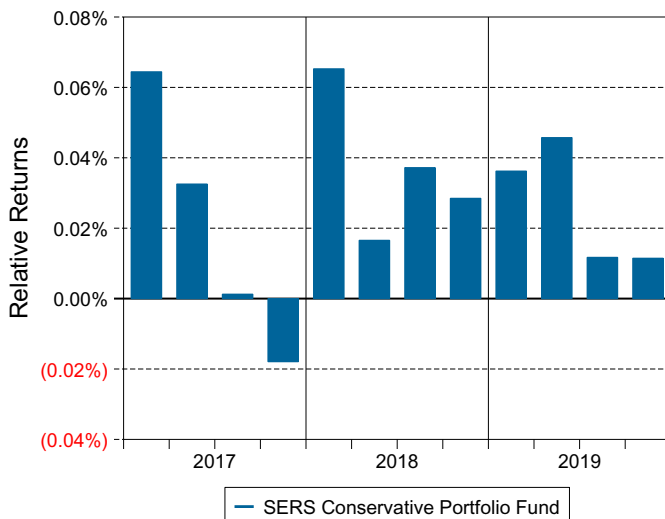
- SERS Conservative Portfolio Fund's portfolio posted a 2.83% return for the quarter placing it in the 37 percentile of the Callan Mixed-Asset Target Alloc Cons MFs group for the quarter and in the 42 percentile for the last year.
- SERS Conservative Portfolio Fund's portfolio outperformed the Conservative Portfolio Custom Index by 0.01% for the quarter and outperformed the Conservative Portfolio Custom Index for the year by 0.11%.

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

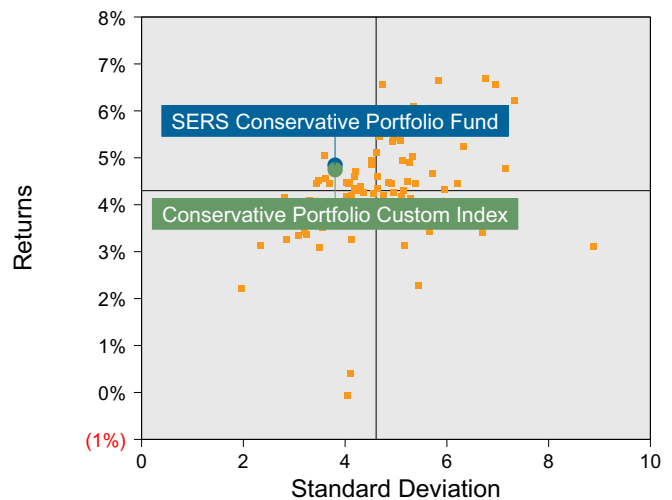


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	3.63	16.15	7.26	5.61	7.38
25th Percentile	3.12	14.63	6.59	4.88	6.59
Median	2.46	12.63	5.78	4.30	5.70
75th Percentile	2.03	10.90	4.83	3.81	4.77
90th Percentile	1.47	8.91	4.15	3.25	4.04
<b>SERS Conservative Portfolio Fund</b>	<b>2.83</b>	<b>13.21</b>	<b>6.50</b>	<b>4.84</b>	<b>5.63</b>
Conservative Portfolio Custom Index	2.82	13.10	6.38	4.75	5.55

### Relative Returns vs Conservative Portfolio Custom Index



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

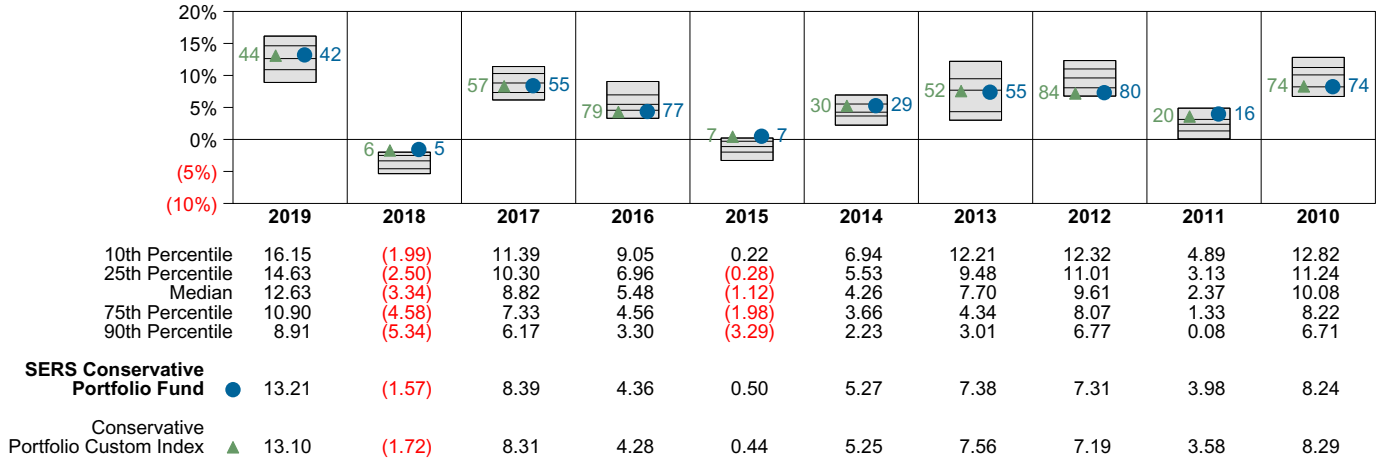


# SERS Conservative Portfolio Fund Return Analysis Summary

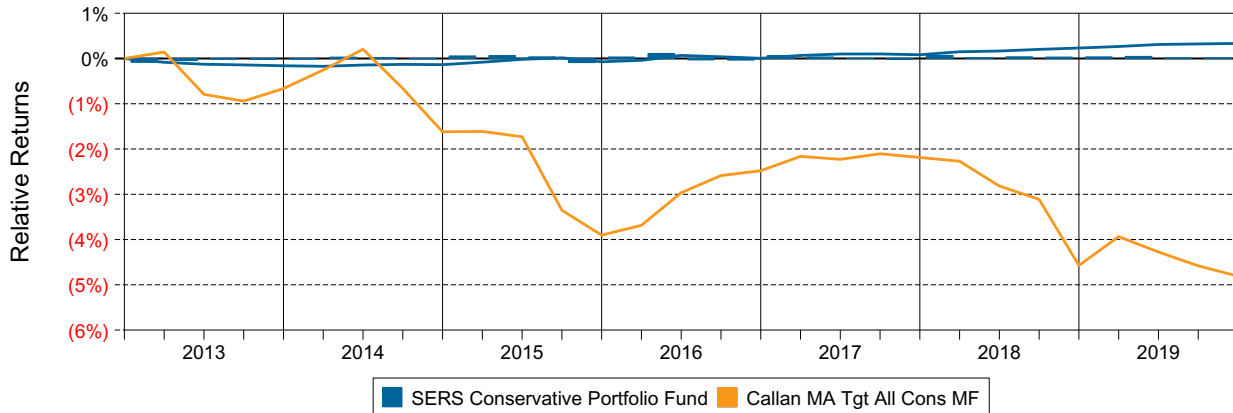
## Return Analysis

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.

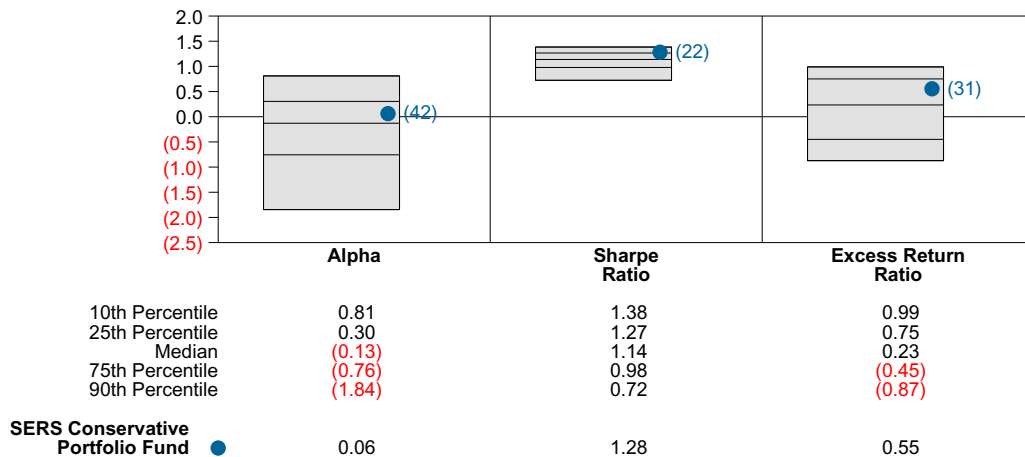
### Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)



### 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 December 31, 2019



# SERS Moderate Portfolio Fund

## Period Ended December 31, 2019

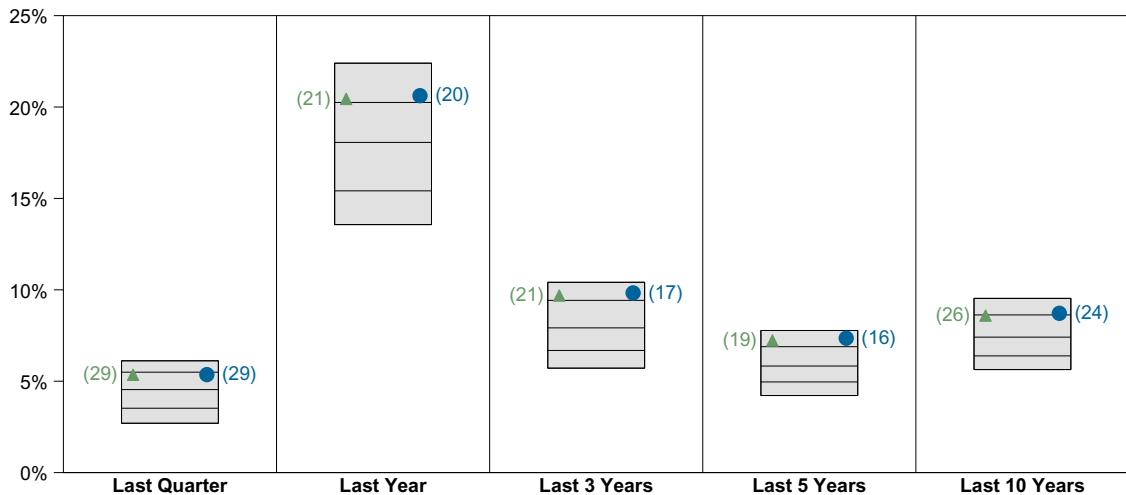
### Investment Philosophy

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

### Quarterly Summary and Highlights

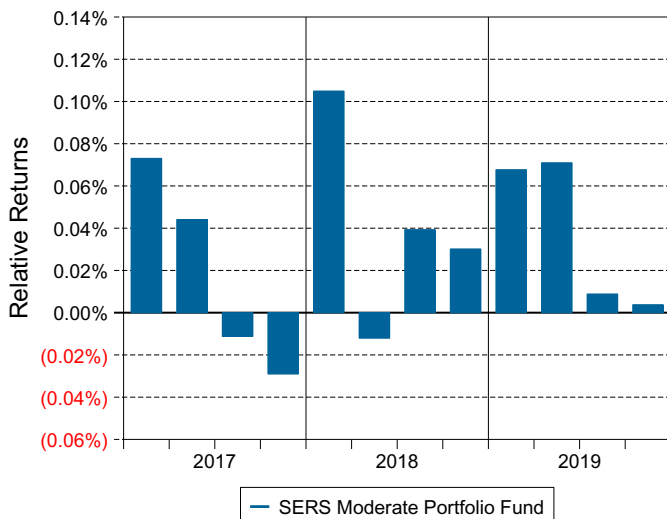
- SERS Moderate Portfolio Fund's portfolio posted a 5.36% return for the quarter placing it in the 29 percentile of the Callan Mixed-Asset Target Alloc Mod MF group for the quarter and in the 20 percentile for the last year.
- SERS Moderate Portfolio Fund's portfolio outperformed the Moderate Portfolio Custom Index by 0.00% for the quarter and outperformed the Moderate Portfolio Custom Index for the year by 0.17%.

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

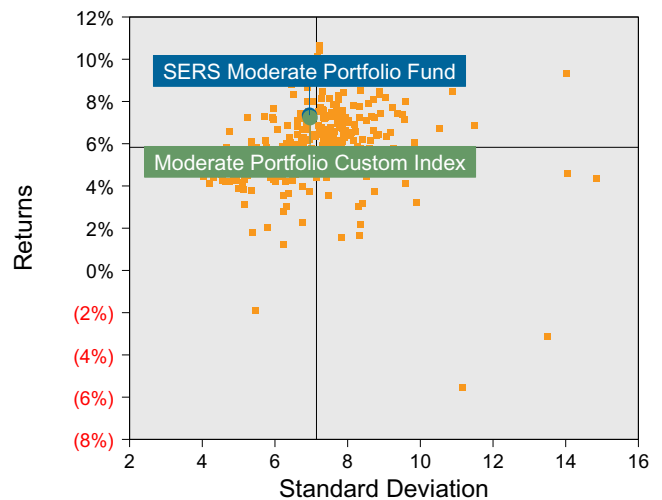


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	6.12	22.40	10.41	7.77	9.53
25th Percentile	5.49	20.25	9.42	6.89	8.63
Median	4.54	18.06	7.92	5.83	7.41
75th Percentile	3.52	15.41	6.68	4.96	6.39
90th Percentile	2.70	13.57	5.71	4.22	5.64
<b>SERS Moderate Portfolio Fund</b>	<b>5.36</b>	<b>20.62</b>	<b>9.83</b>	<b>7.35</b>	<b>8.71</b>
Moderate Portfolio Custom Index	5.36	20.45	9.69	7.23	8.59

### Relative Returns vs Moderate Portfolio Custom Index



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

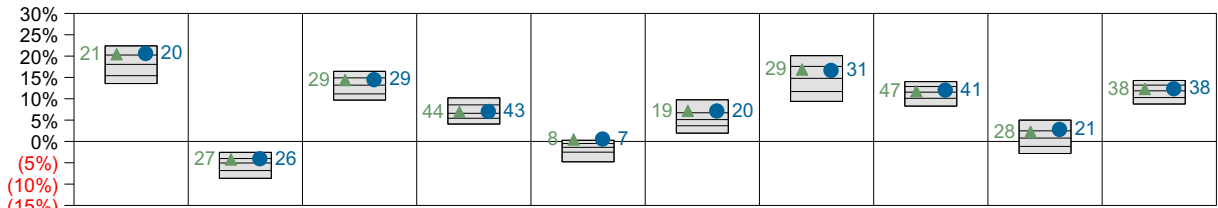


# SERS Moderate Portfolio Fund Return Analysis Summary

## 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.

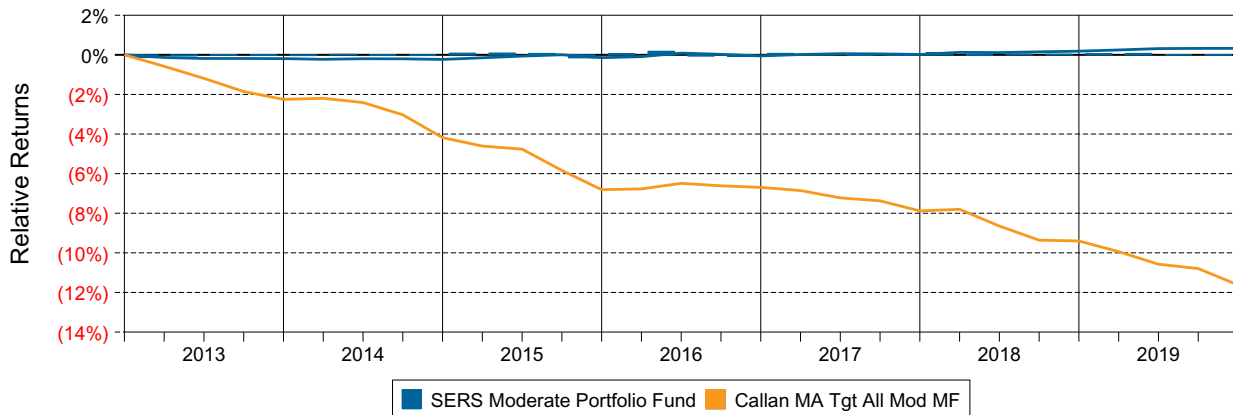
### Performance vs Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)



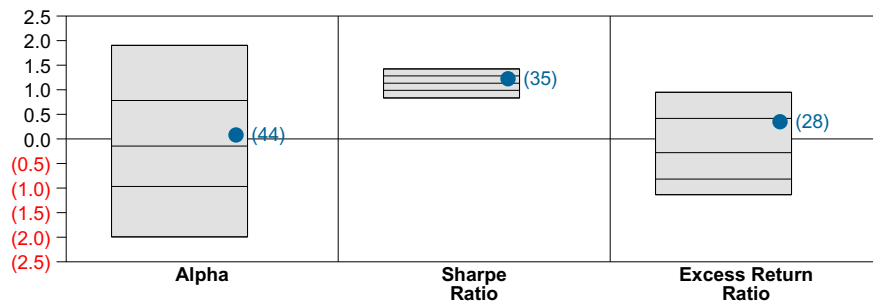
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	22.40	(2.56)	16.43	10.21	0.27	9.76	20.11	14.02	5.00	14.28
25th Percentile	20.25	(4.01)	14.90	8.57	(0.49)	6.72	17.59	12.87	2.48	13.20
Median	18.06	(5.06)	13.20	6.59	(1.38)	5.12	14.79	11.55	0.79	11.86
75th Percentile	15.41	(6.83)	11.14	5.43	(2.51)	3.68	11.69	10.11	(1.16)	10.28
90th Percentile	13.57	(8.64)	9.68	4.07	(4.78)	1.94	9.39	8.28	(2.83)	8.77

<b>SERS Moderate Portfolio Fund</b>	●	20.62	(4.06)	14.48	7.02	0.56	7.14	16.65	12.03	2.81	12.35
Moderate Portfolio Custom Index	▲	20.45	(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 December 31, 2019



10th Percentile	1.90	1.42	0.95
25th Percentile	0.78	1.28	0.42
Median	(0.15)	1.13	(0.28)
75th Percentile	(0.97)	0.99	(0.82)
90th Percentile	(1.99)	0.83	(1.13)

<b>SERS Moderate Portfolio Fund</b>	●	0.08	1.22	0.35
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# SERS Aggressive Portfolio Fund Period Ended December 31, 2019

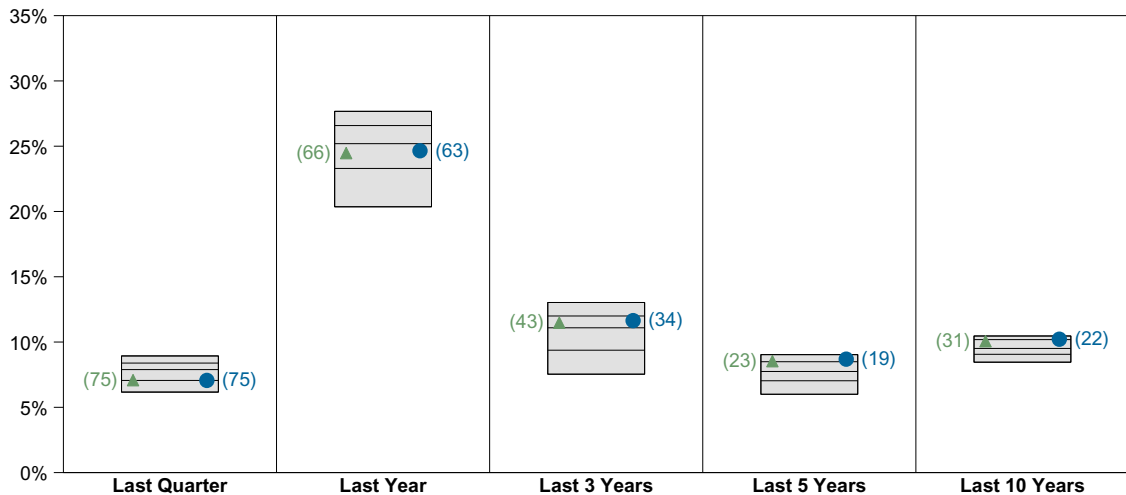
## Investment Philosophy

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

## Quarterly Summary and Highlights

- SERS Aggressive Portfolio Fund's portfolio posted a 7.06% return for the quarter placing it in the 75 percentile of the Callan Mix-Asst Tgt Alloc Aggr Grwth MF group for the quarter and in the 63 percentile for the last year.
- SERS Aggressive Portfolio Fund's portfolio underperformed the Aggressive Portfolio Custom Index by 0.02% for the quarter and outperformed the Aggressive Portfolio Custom Index for the year by 0.18%.

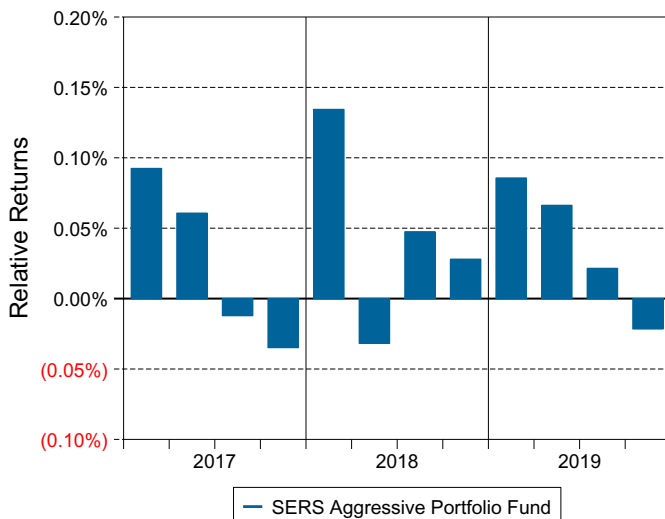
## Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



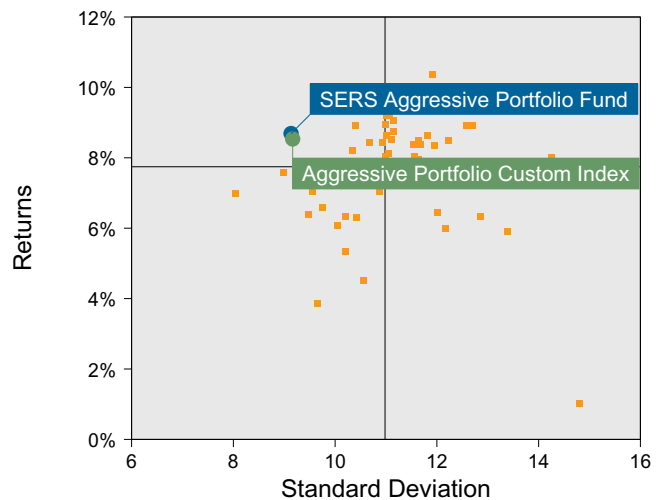
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	8.94	27.67	13.03	9.04	10.46
25th Percentile	8.39	26.58	12.00	8.49	10.18
Median	7.89	25.19	11.09	7.75	9.51
75th Percentile	7.06	23.30	9.37	7.03	9.06
90th Percentile	6.17	20.36	7.54	6.00	8.46

<b>SERS Aggressive Portfolio Fund</b>	<b>7.06</b>	<b>24.65</b>	<b>11.64</b>	<b>8.69</b>	<b>10.22</b>
Aggressive Portfolio Custom Index	7.08	24.47	11.48	8.54	10.06

## Relative Returns vs Aggressive Portfolio Custom Index



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

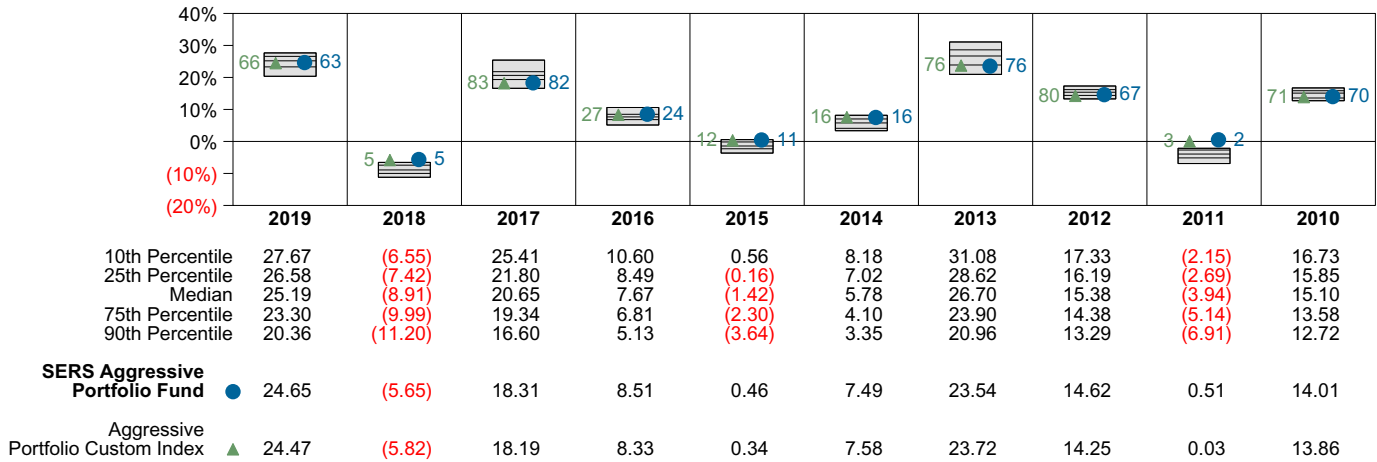


# SERS Aggressive Portfolio Fund Return Analysis Summary

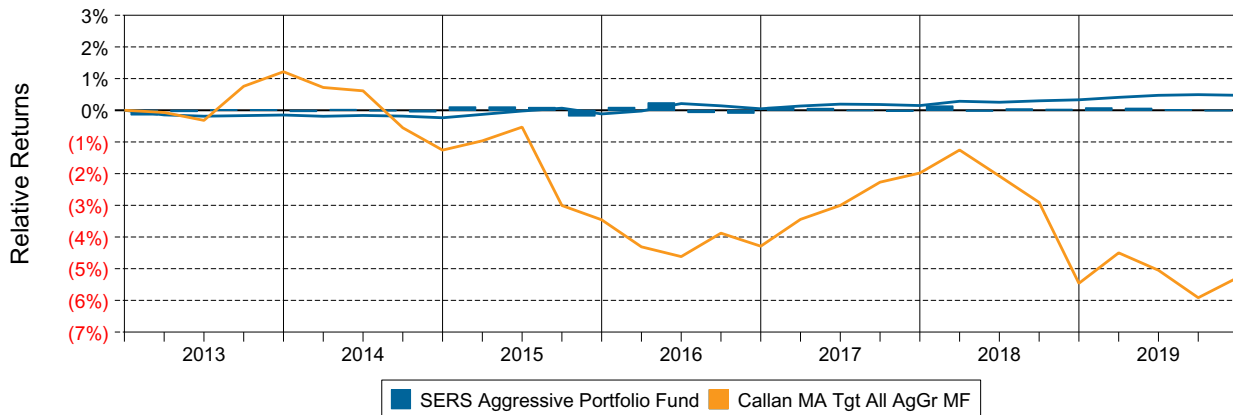
## Return Analysis

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.

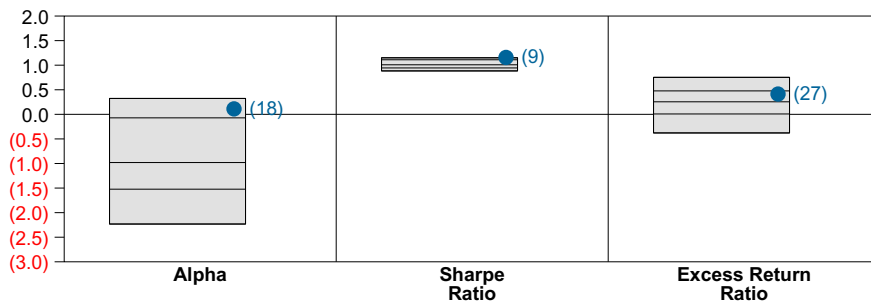
### Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



### 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 December 31, 2019







# SERS U.S. Large Company Index Fund

## Period Ended December 31, 2019

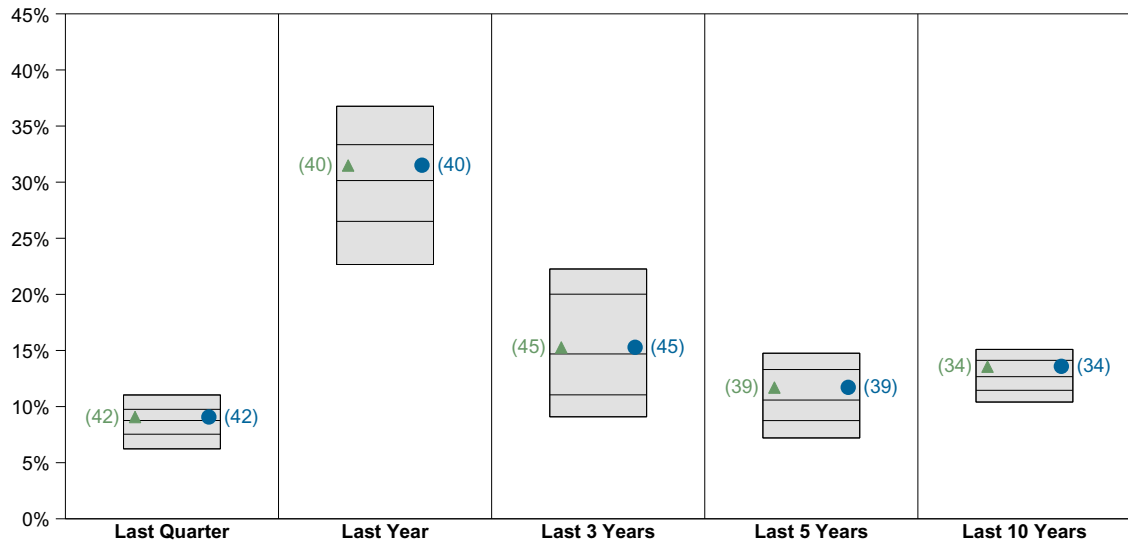
### Investment Philosophy

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

### Quarterly Summary and Highlights

- SERS U.S. Large Company Index Fund's portfolio posted a 9.07% return for the quarter placing it in the 42 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 40 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 0.03%.

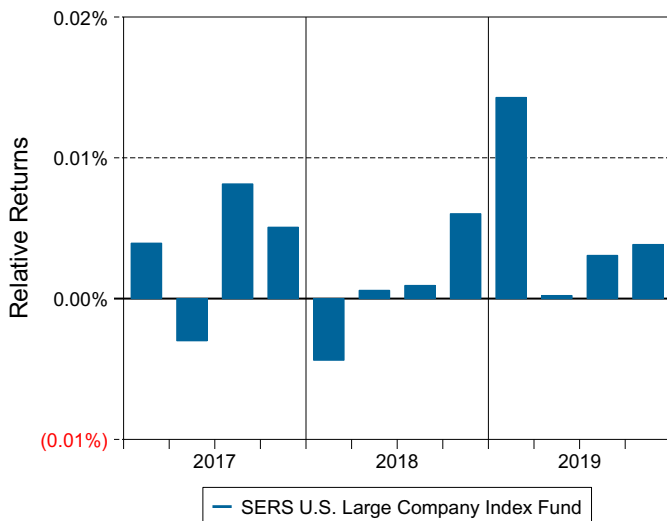
### Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



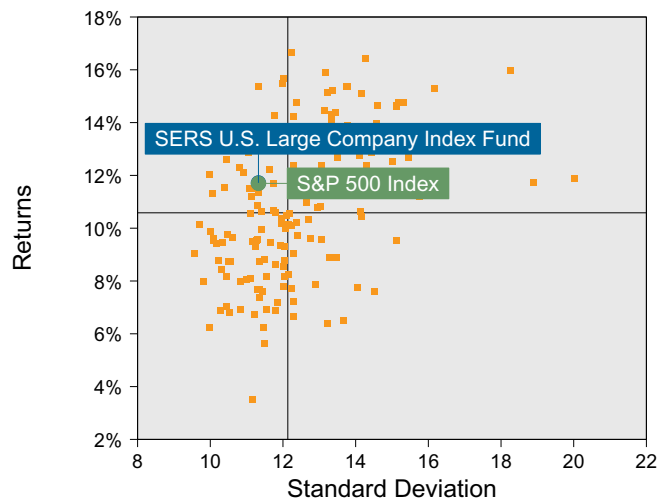
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	11.04	36.76	22.26	14.75	15.10
25th Percentile	9.76	33.34	20.02	13.30	14.12
Median	8.76	30.14	14.69	10.58	12.67
75th Percentile	7.54	26.51	11.05	8.75	11.45
90th Percentile	6.23	22.66	9.09	7.21	10.40

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
<b>SERS U.S. Large Company Index Fund</b> ●	9.07	31.51	15.29	11.72	13.59
S&P 500 Index ▲	9.07	31.49	15.27	11.70	13.56

### Relative Return vs S&P 500 Index



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

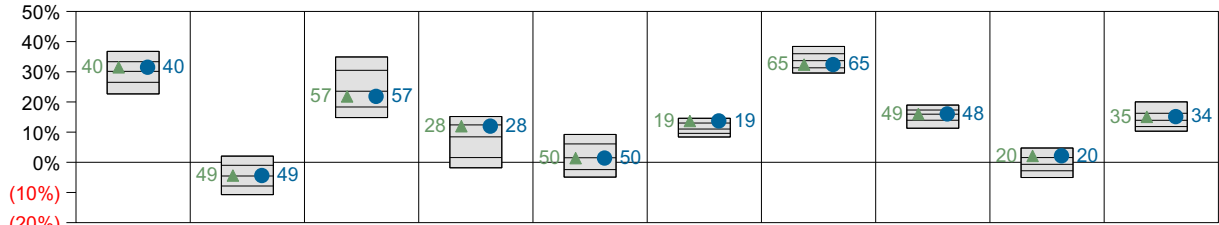


# SERS U.S. Large Company Index Fund Return Analysis Summary

## 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.

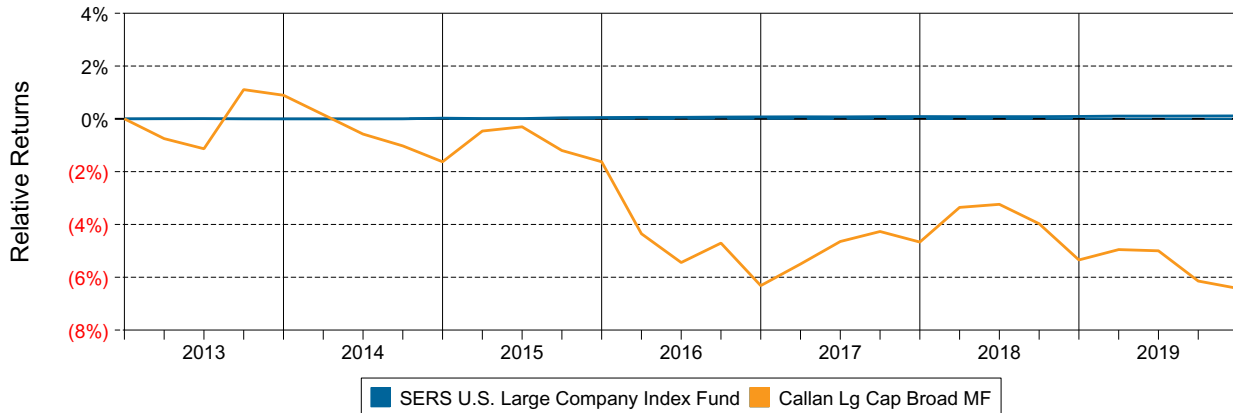
### Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



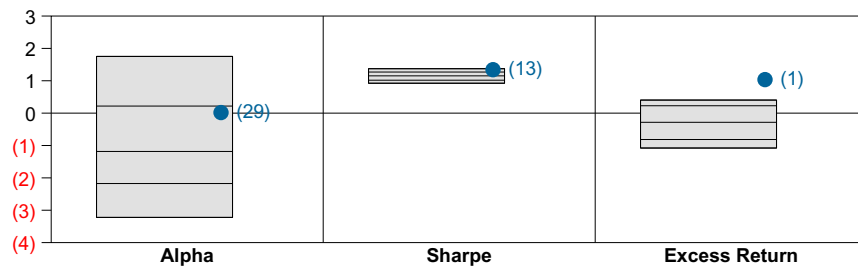
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	36.76	2.05	34.91	15.17	9.23	14.58	38.40	18.96	4.74	20.03
25th Percentile	33.34	(1.00)	30.48	12.39	6.09	13.01	35.98	17.33	1.57	16.25
Median	30.14	(4.54)	23.56	8.43	1.50	11.02	33.69	15.94	(0.67)	13.92
75th Percentile	26.51	(7.86)	18.33	1.56	(2.42)	9.59	31.31	13.94	(2.81)	11.84
90th Percentile	22.66	(10.72)	14.82	(1.82)	(4.91)	8.38	29.58	11.29	(5.04)	10.31

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS U.S. Large Company Index Fund</b>	● 31.51	(4.38)	21.85	11.99	1.41	13.72	32.39	16.04	2.15	15.14
S&P 500 Index	▲ 31.49	(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 December 31, 2019



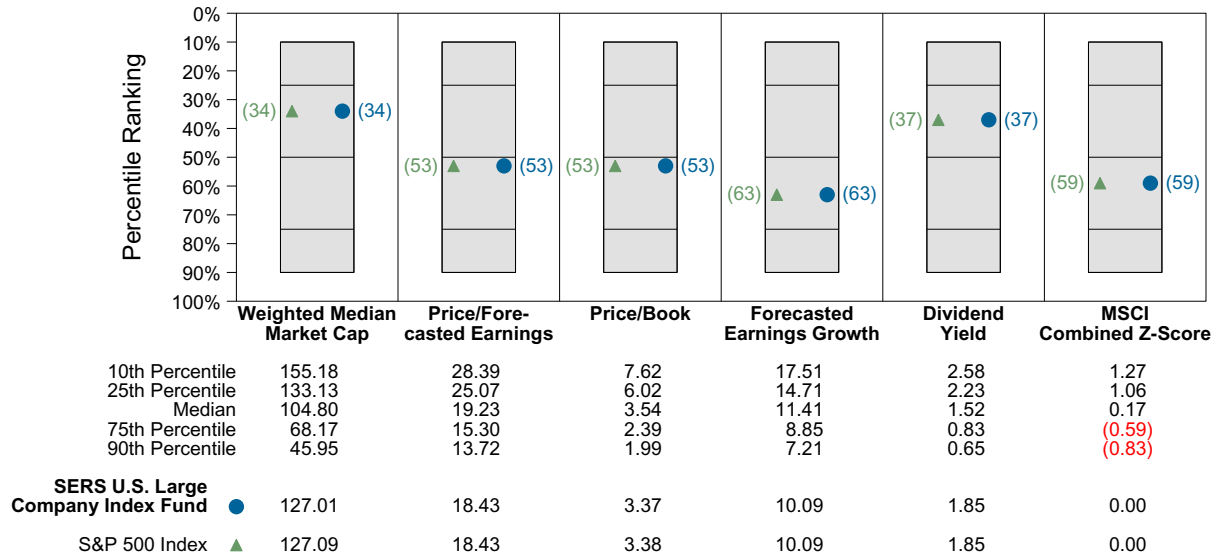
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.75	1.37	0.40
25th Percentile	0.22	1.27	0.23
Median	(1.18)	1.15	(0.28)
75th Percentile	(2.18)	1.02	(0.82)
90th Percentile	(3.22)	0.92	(1.08)
<b>SERS U.S. Large Company Index Fund</b>	● 0.02	1.34	1.04

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

## Portfolio Characteristics

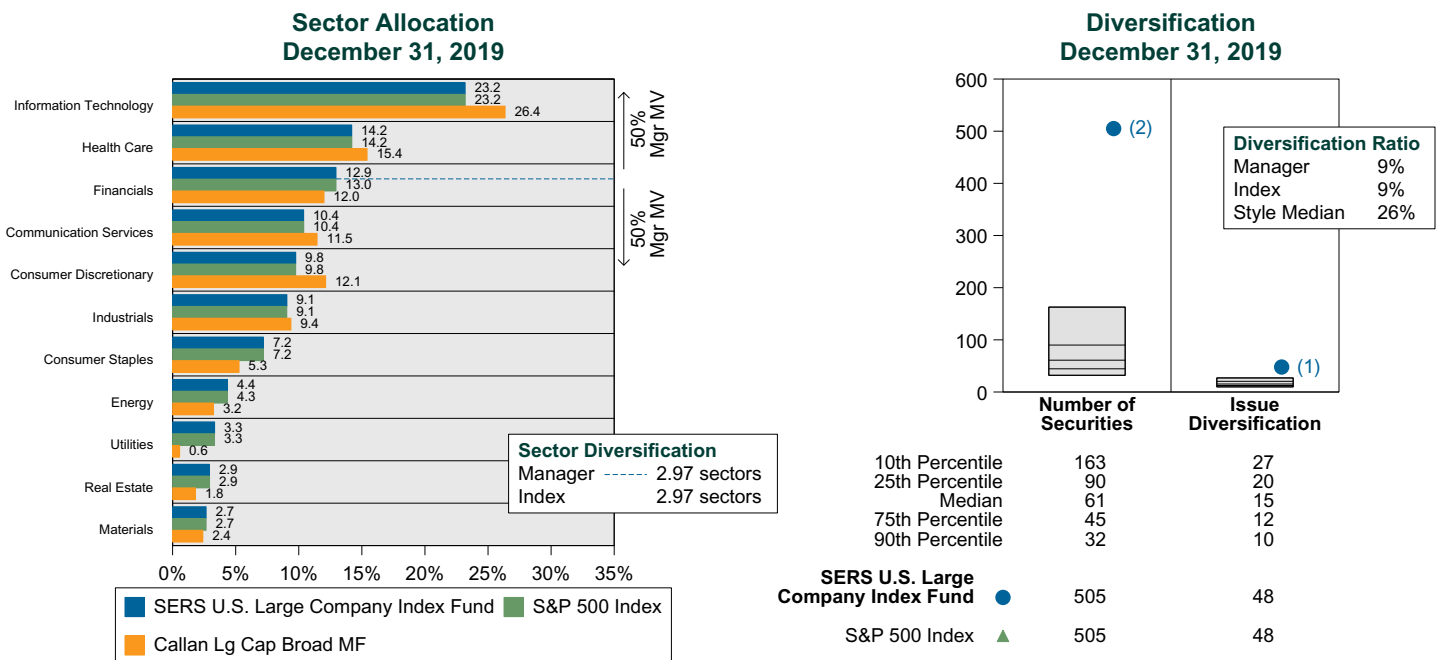
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

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

### 10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Apple Inc	Information Technology	\$48,011,884	4.6%	31.50%	1304.76	21.70	1.05%	8.97%
Microsoft Corp	Information Technology	\$47,095,237	4.5%	13.82%	1203.06	27.55	1.29%	14.05%
Amazon.Com	Consumer Discretionary	\$30,124,112	2.9%	6.45%	916.15	68.21	0.00%	28.00%
Facebook Inc Cl A	Communication Services	\$19,332,906	1.8%	15.26%	493.93	22.43	0.00%	11.53%
Berkshire Hathaway Inc Del Cl B New	Financials	\$17,340,721	1.7%	8.88%	313.34	21.19	0.00%	6.72%
JPMorgan Chase & Co	Financials	\$17,113,000	1.6%	19.40%	437.23	13.15	2.58%	7.71%
Alphabet Inc Cl A	Communication Services	\$15,707,317	1.5%	9.68%	401.32	24.75	0.00%	10.00%
Alphabet Inc Cl C	Communication Services	\$15,640,818	1.5%	9.68%	459.33	24.65	0.00%	12.91%
Johnson & Johnson	Health Care	\$15,025,758	1.4%	13.53%	383.91	16.03	2.61%	5.30%
Visa Inc Com Cl A	Information Technology	\$12,588,467	1.2%	9.42%	321.81	29.06	0.64%	15.20%

### 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
Advanced Micro Devices Inc	Information Technology	\$1,995,232	0.2%	58.19%	51.07	41.69	0.00%	36.49%
Qorvo Inc	Information Technology	\$524,451	0.1%	56.77%	13.50	18.19	0.00%	11.90%
Align Technology Inc	Health Care	\$779,260	0.1%	54.23%	21.99	43.20	0.00%	19.30%
Skyworks Solutions	Information Technology	\$802,126	0.1%	53.21%	20.59	18.04	1.46%	14.05%
Centene Corp Del	Health Care	\$1,026,560	0.1%	45.33%	26.02	13.10	0.00%	14.95%
Tiffany & Co	Consumer Discretionary	\$573,190	0.1%	44.91%	16.03	27.03	1.74%	8.12%
Humana	Health Care	\$1,896,033	0.2%	43.57%	48.54	19.64	0.60%	13.15%
Fortinet Inc	Information Technology	\$600,355	0.1%	39.08%	18.26	39.39	0.00%	19.00%
Freeport-Mcmoran Inc Cl B	Materials	\$751,180	0.1%	37.81%	19.04	24.75	1.52%	(2.88)%
Unitedhealth Group	Health Care	\$10,899,807	1.0%	35.80%	278.52	17.86	1.47%	13.25%

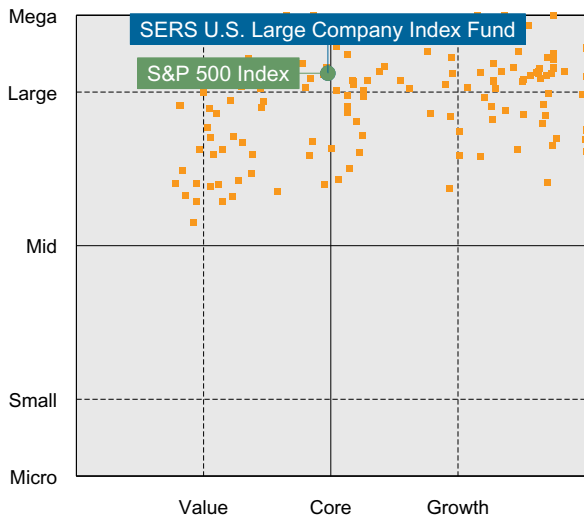
### 10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Twitter Inc	Communication Services	\$977,186	0.1%	(22.21)%	24.88	35.61	0.00%	13.90%
Ventas	Real Estate	\$846,226	0.1%	(19.85)%	21.52	49.35	5.49%	(0.50)%
Expedia Group Inc	Consumer Discretionary	\$596,663	0.1%	(19.26)%	15.07	15.49	1.26%	7.60%
Dollar Tree Inc	Consumer Discretionary	\$877,625	0.1%	(17.62)%	22.26	17.65	0.00%	3.70%
Arista Networks Inc	Information Technology	\$439,961	0.0%	(14.87)%	15.54	22.50	0.00%	9.12%
Boeing Co	Industrials	\$6,814,450	0.7%	(13.89)%	183.33	17.22	2.52%	7.20%
Public Storage	Real Estate	\$1,248,236	0.1%	(12.32)%	37.20	27.69	3.76%	6.41%
Alliance Data Systems Corp	Information Technology	\$179,490	0.0%	(11.92)%	5.17	5.41	2.25%	4.96%
Ball Corp	Materials	\$830,816	0.1%	(10.98)%	21.16	21.70	0.93%	15.92%
Yum Brands	Consumer Discretionary	\$1,188,615	0.1%	(10.82)%	30.47	24.27	1.67%	14.63%

# Historical Holdings Based Style Analysis SERS U.S. Large Company Index Fund For Three Years Ended December 31, 2019

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

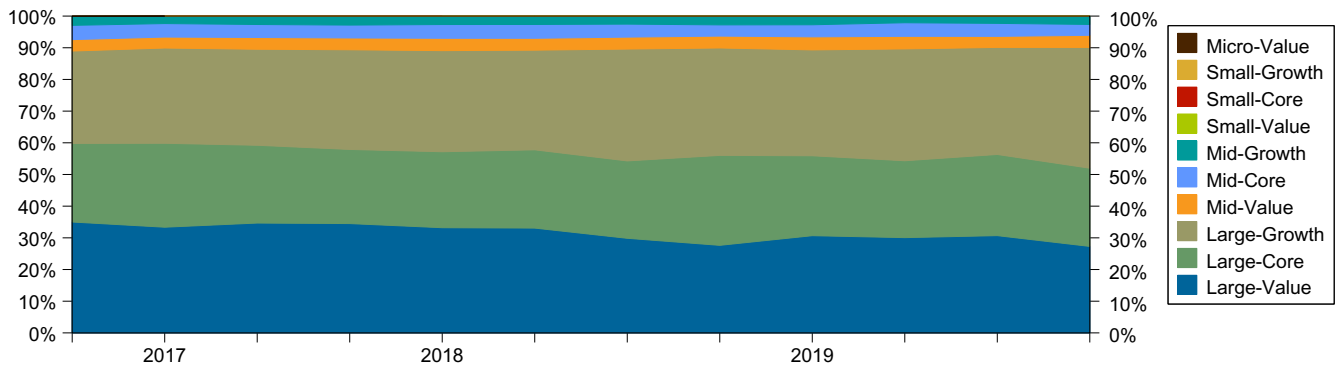
**Average Style Map vs Callan Lg Cap Broad MF Holdings for Three Years Ended December 31, 2019**



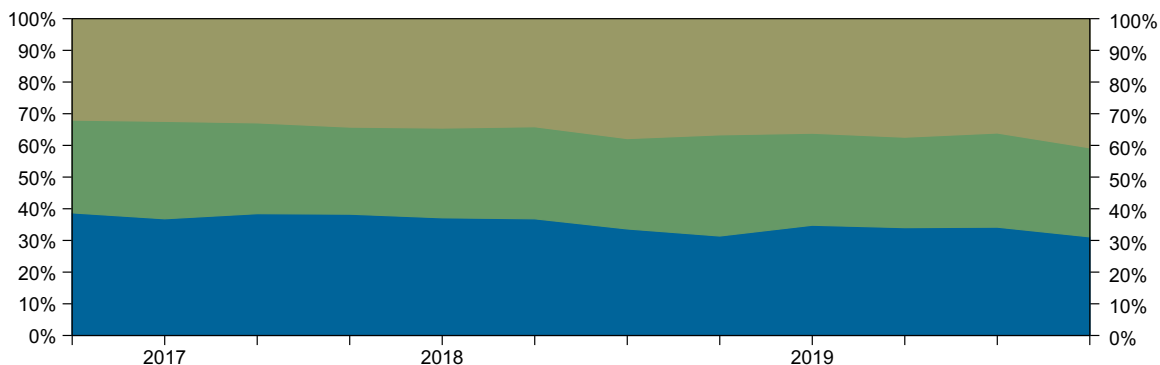
**Average Style Exposure Matrix Holdings for Three Years Ended December 31, 2019**

	31.7% (105)	25.0% (92)	32.9% (87)	<b>89.6% (284)</b>
Large	31.6% (105)	25.1% (92)	32.9% (88)	<b>89.6% (285)</b>
Mid	3.8% (84)	4.1% (83)	2.6% (49)	<b>10.4% (216)</b>
	3.7% (84)	4.1% (83)	2.5% (49)	<b>10.4% (216)</b>
Small	0.0% (2)	0.0% (0)	0.0% (1)	<b>0.0% (3)</b>
	0.0% (2)	0.0% (0)	0.0% (1)	<b>0.0% (3)</b>
Micro	0.0% (0)	0.0% (0)	0.0% (0)	<b>0.0% (0)</b>
	0.0% (0)	0.0% (0)	0.0% (0)	<b>0.0% (0)</b>
<b>Total</b>	<b>35.5% (191)</b>	<b>29.1% (175)</b>	<b>35.4% (137)</b>	<b>100.0% (503)</b>
	<b>35.4% (191)</b>	<b>29.1% (175)</b>	<b>35.4% (138)</b>	<b>100.0% (504)</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 December 31, 2019

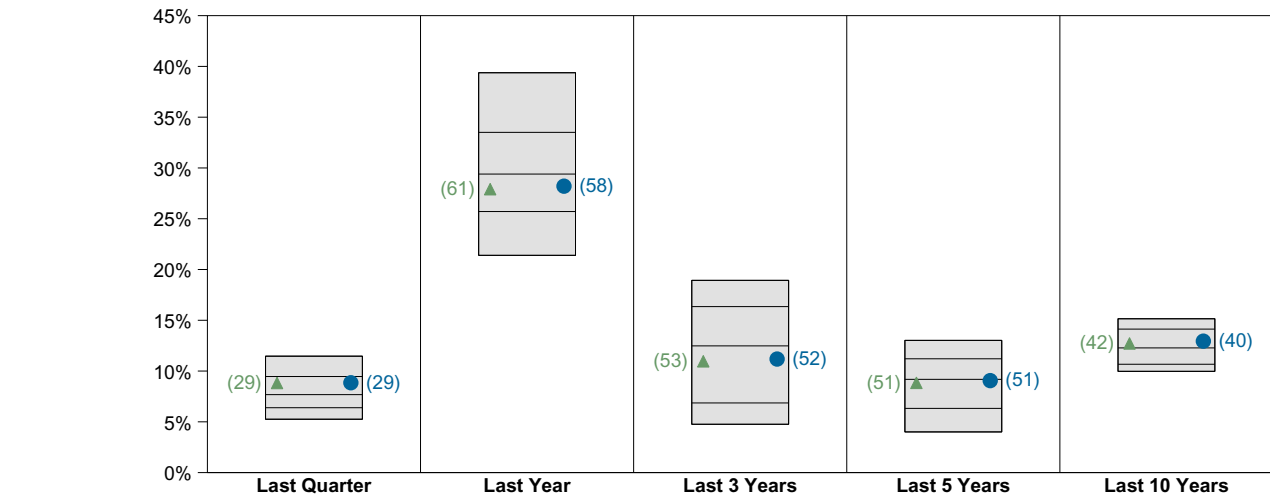
### Investment Philosophy

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

### Quarterly Summary and Highlights

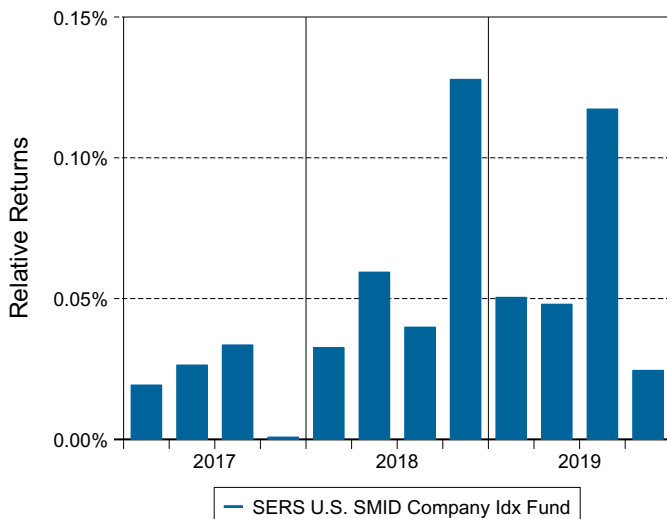
- SERS U.S. SMID Company Idx Fund's portfolio posted a 8.85% return for the quarter placing it in the 29 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 58 percentile for the last year.
- SERS U.S. SMID Company Idx Fund's portfolio outperformed the Dow Jones US Completion by 0.02% for the quarter and outperformed the Dow Jones US Completion for the year by 0.30%.

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

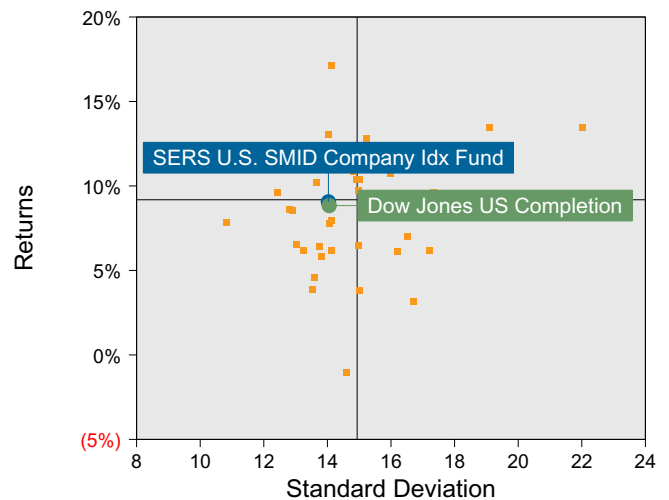


10th Percentile	11.47	39.38	18.93	13.02	15.15
25th Percentile	9.46	33.51	16.35	11.21	14.13
Median	7.68	29.40	12.48	9.18	12.28
75th Percentile	6.39	25.71	6.86	6.32	10.67
90th Percentile	5.26	21.40	4.76	4.00	9.97
<b>SERS U.S. SMID Company Idx Fund</b>	<b>8.85</b>	<b>28.21</b>	<b>11.18</b>	<b>9.06</b>	<b>12.94</b>
Dow Jones US Completion	8.82	27.91	10.96	8.84	12.72

### Relative Return vs Dow Jones US Completion



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

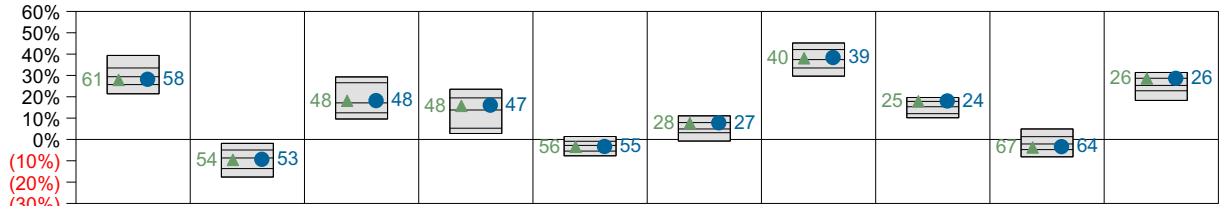


# SERS U.S. SMID Company Idx Fund Return Analysis Summary

## 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.

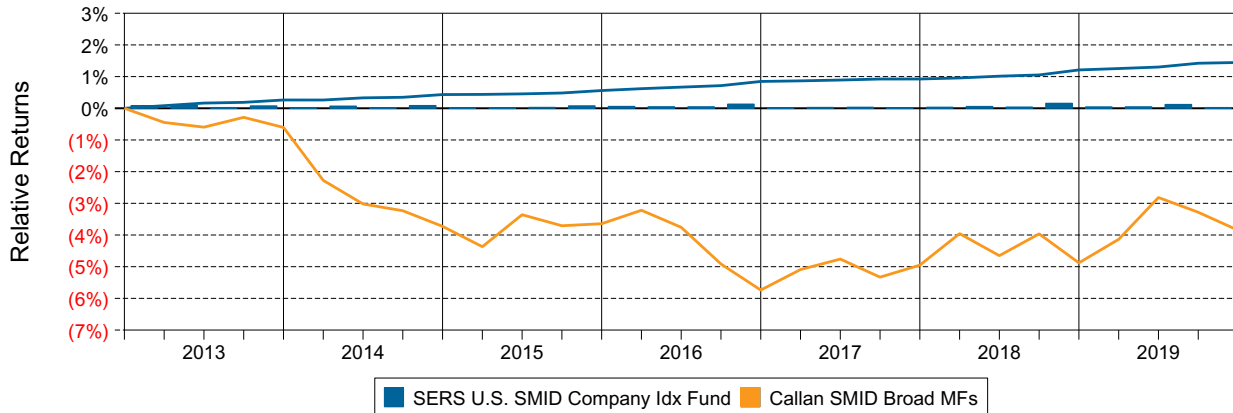
### Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



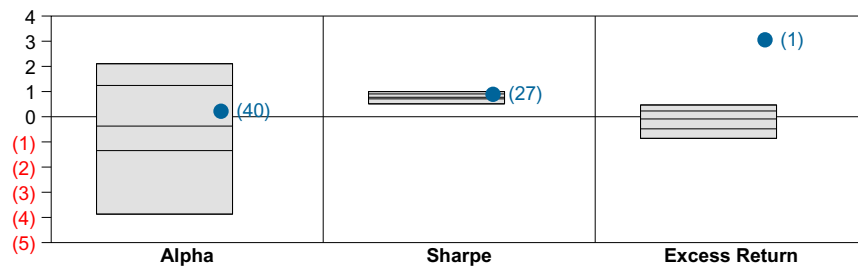
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	39.38	(1.83)	29.31	23.54	1.38	11.06	45.21	19.66	4.92	31.38
25th Percentile	33.51	(4.95)	26.58	19.48	(0.87)	7.90	42.13	17.83	1.30	28.67
Median	29.40	(8.69)	17.14	13.80	(2.80)	4.92	37.43	15.32	(2.13)	25.33
75th Percentile	25.71	(13.66)	12.47	5.26	(5.46)	3.15	33.50	12.08	(4.76)	22.82
90th Percentile	21.40	(17.62)	9.57	2.79	(7.67)	(0.76)	29.67	10.16	(8.15)	18.29

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS U.S. SMID Company Idx Fund</b>	28.21	(9.32)	18.21	16.08	(3.30)	7.81	38.41	18.04	(3.37)	28.65
Dow Jones US Completion	27.91	(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 December 31, 2019



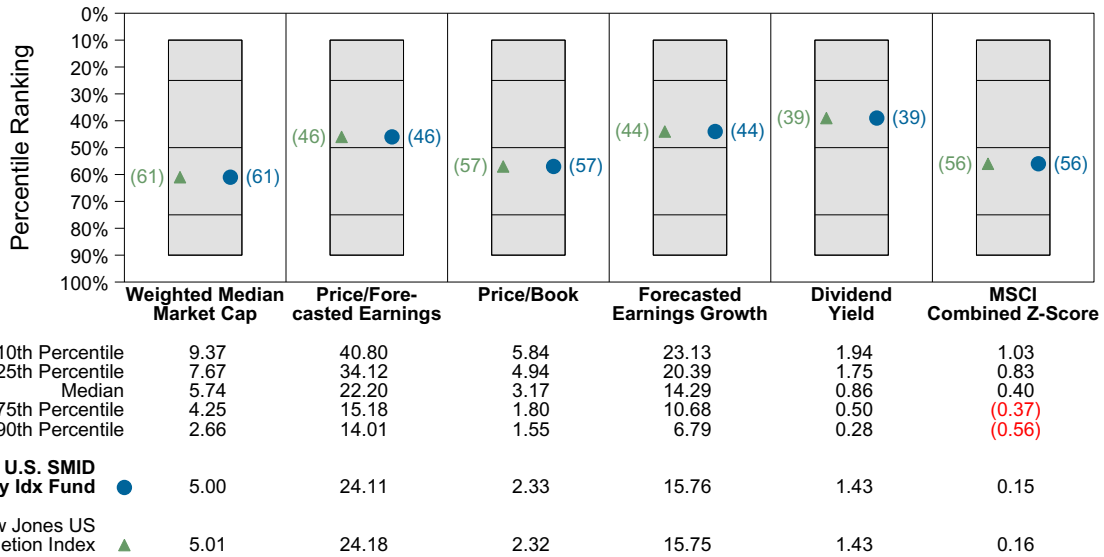
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.11	1.00	0.47
25th Percentile	1.24	0.91	0.23
Median	(0.37)	0.77	(0.09)
75th Percentile	(1.35)	0.71	(0.48)
90th Percentile	(3.87)	0.51	(0.86)
<b>SERS U.S. SMID Company Idx Fund</b>	0.22	0.89	3.06

# SERS U.S. SMID Company Idx Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

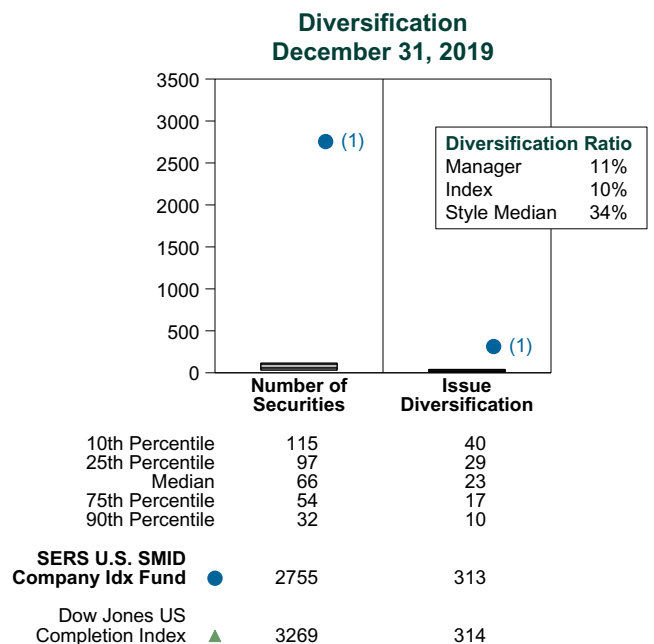
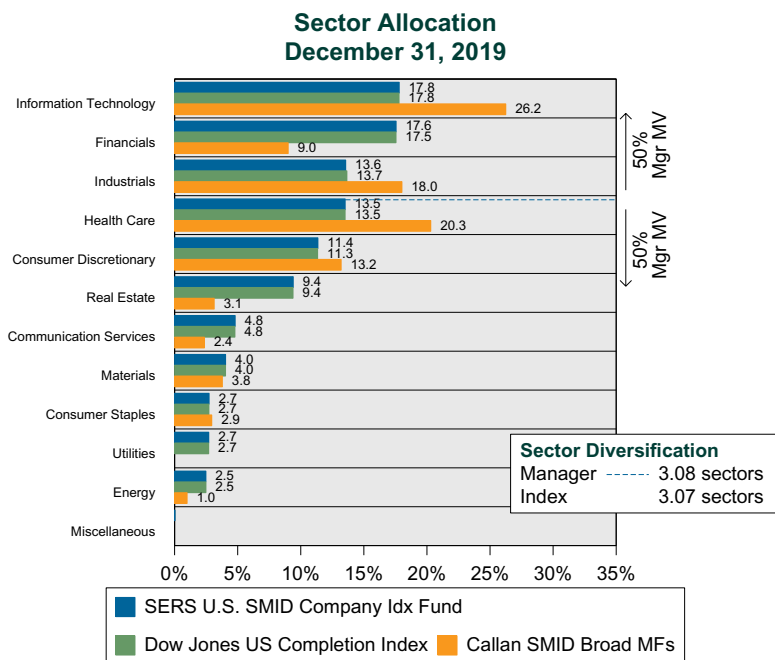
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Small/MidCap Broad Mutual Funds as of December 31, 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. SMID Company Idx Fund Top 10 Portfolio Holdings Characteristics as of December 31, 2019

### 10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Tesla Mtrs Inc	Consumer Discretionary	\$4,818,304	1.1%	73.67%	75.40	77.47	0.00%	-
Blackstone Group Inc Com Cl A	Financials	\$2,982,773	0.7%	15.58%	36.88	18.28	3.43%	16.70%
Lululemon Athletica Inc	Consumer Discretionary	\$2,249,677	0.5%	20.33%	28.57	41.25	0.00%	20.70%
Workday Inc Cl A	Information Technology	\$2,179,659	0.5%	(3.24)%	27.46	76.24	0.00%	25.90%
Splunk Inc	Information Technology	\$1,867,700	0.4%	27.07%	23.36	64.81	0.00%	37.20%
Palo Alto Networks Inc	Information Technology	\$1,830,217	0.4%	13.45%	22.65	42.00	0.00%	13.62%
Costar Group Inc	Industrials	\$1,770,648	0.4%	0.86%	21.92	57.58	0.00%	46.53%
Square Inc Cl A	Information Technology	\$1,731,712	0.4%	0.98%	21.72	65.17	0.00%	40.66%
Dexcom Inc	Health Care	\$1,628,442	0.4%	46.57%	20.02	120.19	0.00%	78.00%
Liberty Broadband Corp Com Ser C	Communication Services	\$1,550,622	0.4%	20.14%	19.20	40.96	0.00%	-

### 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
Iveric Bio Inc	Health Care	\$25,557	0.0%	666.07%	0.41	(8.61)	0.00%	-
Constellation Pharmcetics I	Health Care	\$41,352	0.0%	629.26%	1.89	(14.59)	0.00%	-
Forty Seven Inc	Health Care	\$98,206	0.0%	513.24%	1.86	(14.47)	0.00%	-
Chemocentryx Inc	Health Care	\$123,422	0.0%	483.33%	2.30	(27.66)	0.00%	-
Axsome Therapeutics Inc.	Health Care	\$200,973	0.0%	410.67%	3.80	(61.16)	0.00%	-
Kodiak Sciences Inc	Health Care	\$138,274	0.0%	400.35%	3.16	(36.34)	0.00%	-
Karuna Therapeutics	Health Care	\$55,417	0.0%	361.64%	1.96	(26.25)	0.00%	-
Clearside Biomedical Inc	Health Care	\$8,188	0.0%	360.32%	0.12	(6.04)	0.00%	-
Intra Cellular Therapies Inc	Health Care	\$115,278	0.0%	359.30%	1.90	(9.32)	0.00%	-
Cassava Sciences Inc	Health Care	\$3,951	0.0%	333.33%	0.09	37.14	0.00%	58.11%

### 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
Lipocine Inc New	Health Care	\$717	0.0%	(86.30)%	0.01	(1.28)	0.00%	-
Lsc Communications Inc	Industrials	\$603	0.0%	(85.07)%	0.01	(0.12)	0.00%	(42.26)%
Restorbio Inc	Health Care	\$2,439	0.0%	(83.14)%	0.05	(1.15)	0.00%	-
Mcclatchy Co Cl A New	Communication Services	\$212	0.0%	(83.04)%	0.00	(0.20)	0.00%	(41.69)%
Transenterix Inc	Health Care	\$2,115	0.0%	(81.76)%	0.03	(0.53)	0.00%	(1.34)%
Unit Corp	Energy	\$3,381	0.0%	(79.41)%	0.04	(2.17)	0.00%	(18.78)%
Cyclerion Therapeutics	Health Care	\$3,502	0.0%	(77.56)%	0.07	(1.16)	0.00%	-
Contura Energy Inc	Energy	\$15,116	0.0%	(67.63)%	0.16	(4.69)	0.00%	(26.41)%
Mcdermott Intl Inc	Energy	\$10,331	0.0%	(66.50)%	0.12	0.88	0.00%	(5.26)%
Cpi Card Group Inc	Information Technology	\$281	0.0%	(65.12)%	0.01	(4.09)	100.00%	-

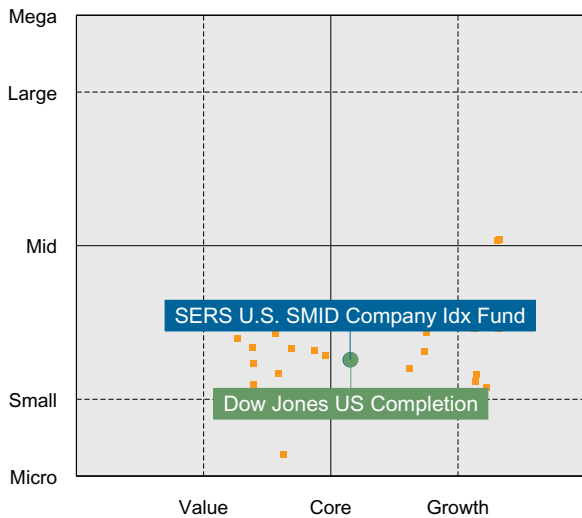
# Historical Holdings Based Style Analysis

## SERS U.S. SMID Company Idx Fund

### For Three Years Ended December 31, 2019

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

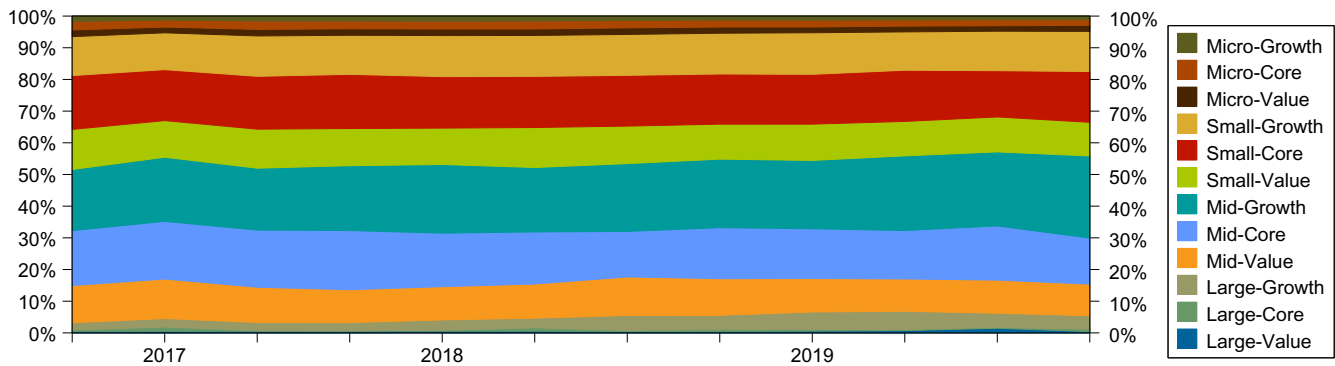
**Average Style Map vs Callan SMID Broad MFs Holdings for Three Years Ended December 31, 2019**



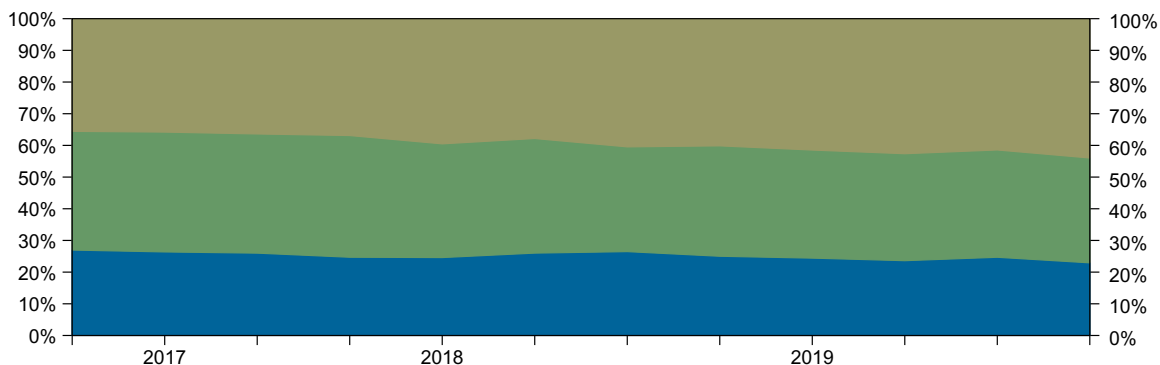
**Average Style Exposure Matrix Holdings for Three Years Ended December 31, 2019**

	Value	Core	Growth	Total
Large	0.6% (2)	0.5% (3)	3.8% (8)	4.9% (13)
	0.6% (2)	0.5% (2)	3.8% (8)	4.8% (12)
Mid	11.0% (91)	16.6% (134)	21.6% (157)	49.1% (382)
	11.0% (92)	16.6% (135)	21.6% (158)	49.2% (385)
Small	11.6% (325)	16.1% (484)	12.6% (377)	40.3% (1186)
	11.5% (325)	16.1% (488)	12.6% (380)	40.3% (1193)
Micro	2.0% (441)	2.3% (631)	1.4% (260)	5.6% (1332)
	1.9% (534)	2.4% (854)	1.4% (300)	5.7% (1688)
<b>Total</b>	<b>25.1% (859)</b>	<b>35.5% (1252)</b>	<b>39.3% (802)</b>	<b>100.0% (2913)</b>
	<b>25.0% (953)</b>	<b>35.6% (1479)</b>	<b>39.4% (846)</b>	<b>100.0% (3278)</b>

### 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 December 31, 2019

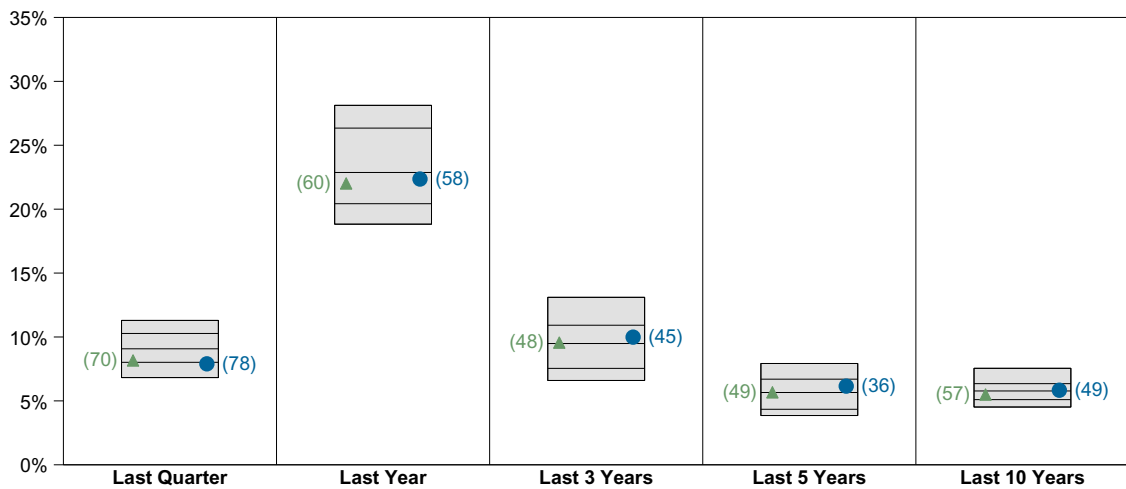
### Investment Philosophy

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

### Quarterly Summary and Highlights

- SERS International Company Index Fund's portfolio posted a 7.90% return for the quarter placing it in the 78 percentile of the Callan Intl Eq Developed Mkts MFs group for the quarter and in the 58 percentile for the last year.
- SERS International Company Index Fund's portfolio underperformed the MSCI EAFE by 0.27% for the quarter and outperformed the MSCI EAFE for the year by 0.34%.

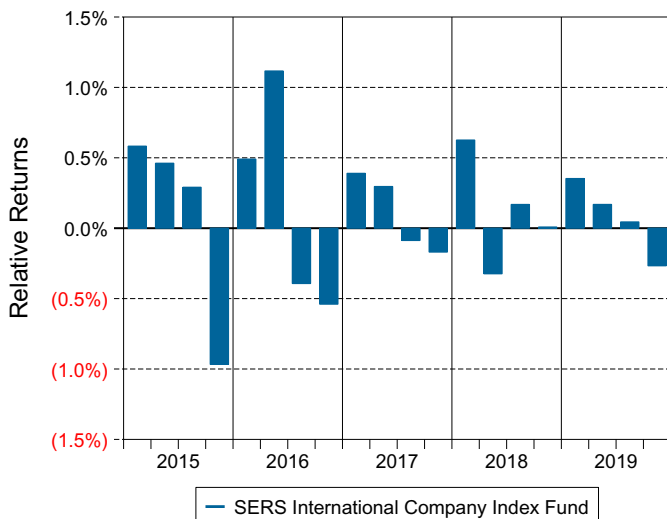
### Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)



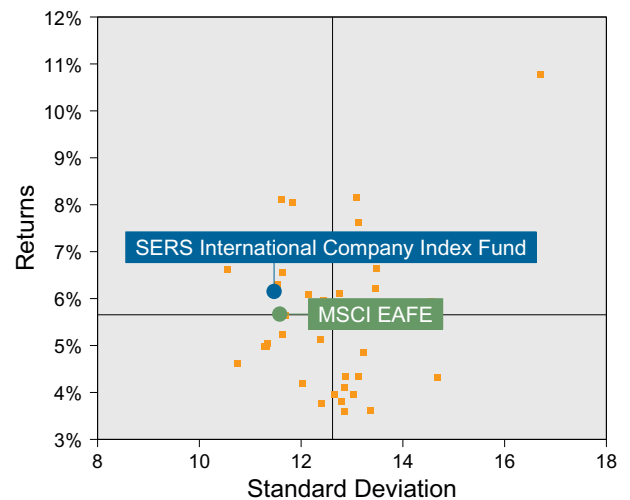
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	11.30	28.12	13.10	7.92	7.55
25th Percentile	10.28	26.34	10.92	6.70	6.35
Median	9.07	22.87	9.49	5.65	5.78
75th Percentile	8.02	20.43	7.54	4.34	5.10
90th Percentile	6.82	18.82	6.60	3.86	4.52

<b>SERS International Company Index Fund</b>	<b>7.90</b>	<b>22.36</b>	<b>9.99</b>	<b>6.15</b>	<b>5.83</b>
<b>MSCI EAFE</b>	<b>8.17</b>	<b>22.01</b>	<b>9.56</b>	<b>5.67</b>	<b>5.50</b>

### Relative Return vs MSCI EAFE



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

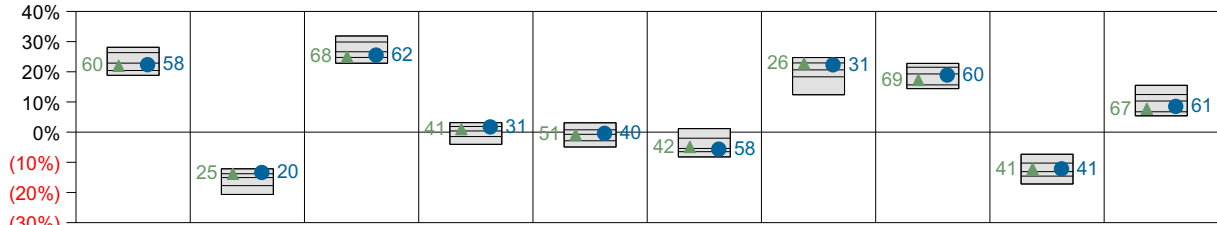


# SERS International Company Index Fund Return Analysis Summary

## 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.

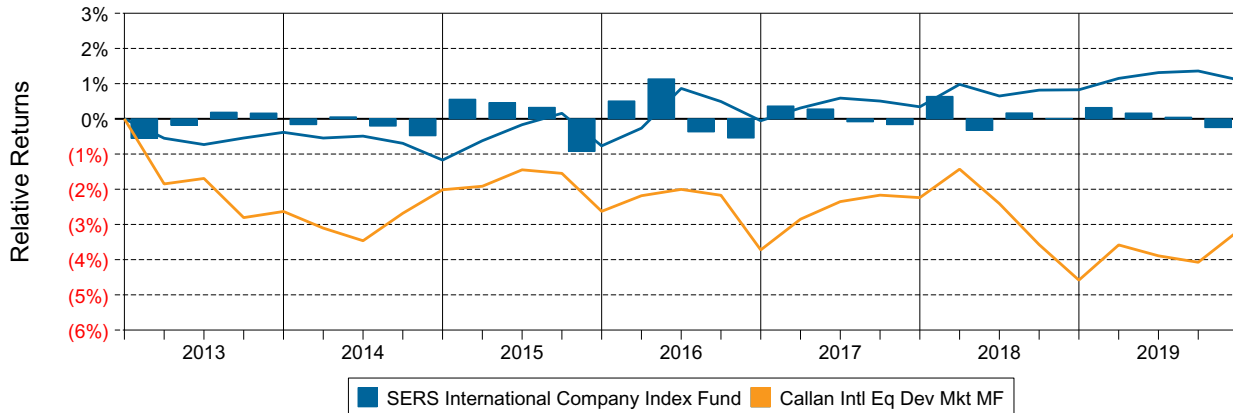
### Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)



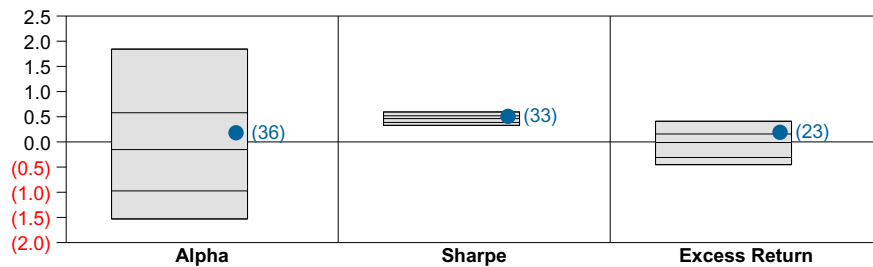
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	28.12	(12.16)	31.87	3.15	3.09	1.17	24.72	22.78	(7.33)	15.51
25th Percentile	26.34	(13.79)	29.87	1.87	0.76	(2.02)	22.94	21.50	(10.27)	12.45
Median	22.87	(15.06)	26.64	0.39	(0.73)	(5.41)	20.64	19.28	(13.09)	10.31
75th Percentile	20.43	(17.73)	24.76	(1.47)	(2.86)	(6.48)	18.33	15.66	(14.58)	6.74
90th Percentile	18.82	(20.66)	22.83	(4.05)	(4.93)	(8.23)	12.38	14.42	(17.19)	5.40

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS International Company Index Fund</b>	● 22.36	(13.37)	25.53	1.73	(0.41)	(5.65)	22.31	18.92	(12.17)	8.52
MSCI EAFE	▲ 22.01	(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 December 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.84	0.59	0.41
25th Percentile	0.58	0.52	0.16
Median	(0.15)	0.46	(0.01)
75th Percentile	(0.97)	0.39	(0.31)
90th Percentile	(1.53)	0.33	(0.45)

<b>SERS International Company Index Fund</b>	● 0.18	0.51	0.19
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# SERS International Company Index Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

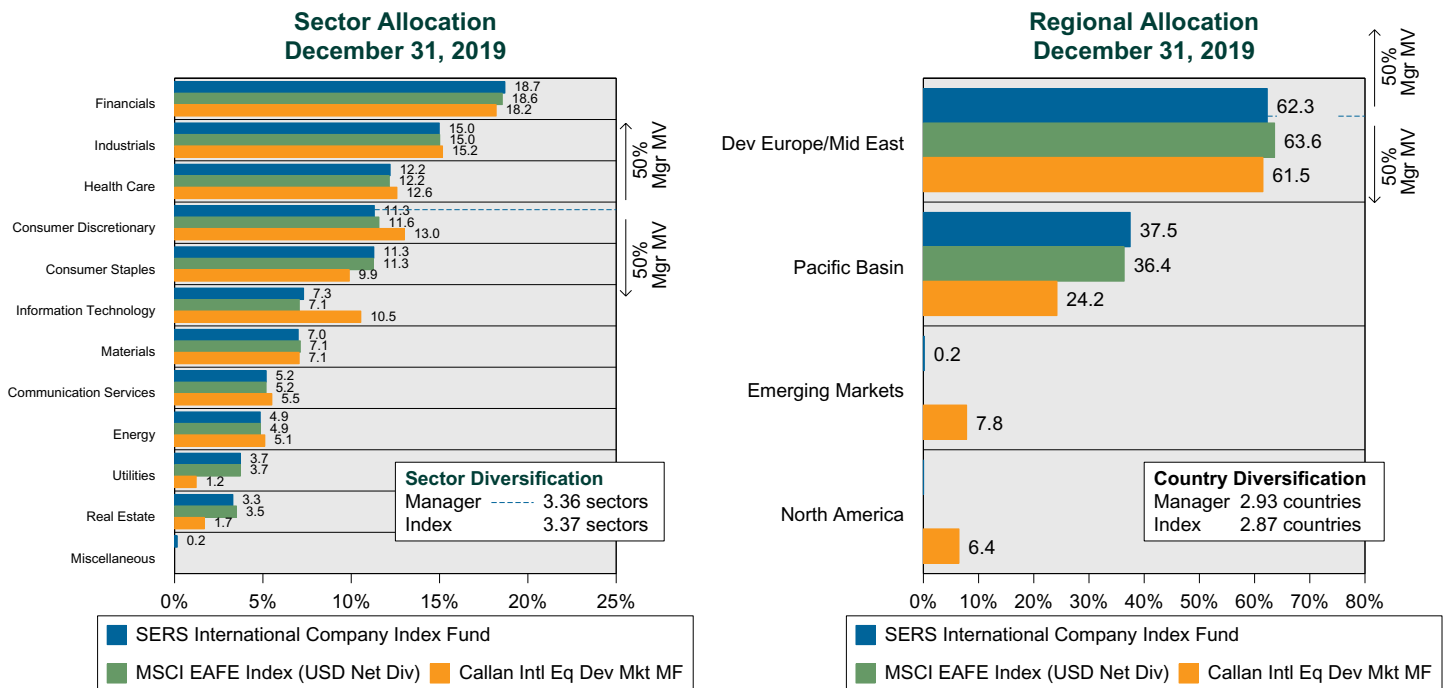
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Intl Eq Developed Mkts MFs as of December 31, 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.



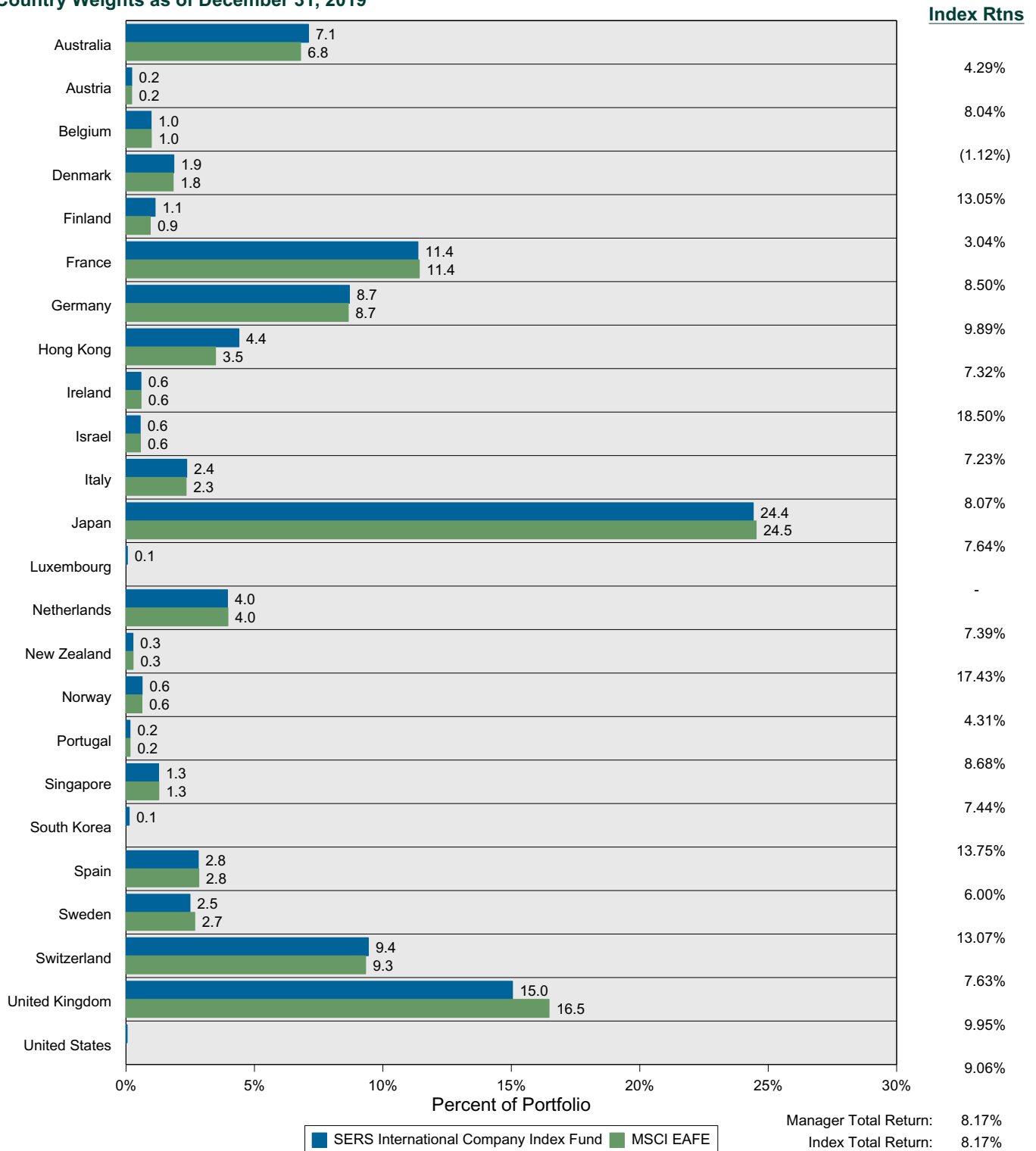
## Country Allocation

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

#### Country Weights as of December 31, 2019



## SERS International Company Index Fund Top 10 Portfolio Holdings Characteristics as of December 31, 2019

### 10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nestle S A Shs Nom New	Consumer Staples	\$3,706,199	2.2%	(0.36)%	322.01	22.10	2.34%	8.81%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	\$2,621,824	1.5%	11.32%	227.81	15.36	2.64%	7.10%
Novartis	Health Care	\$2,346,301	1.4%	9.35%	239.85	16.56	3.10%	8.18%
Toyota Motor Corp	Consumer Discretionary	\$1,842,033	1.1%	7.74%	231.61	9.35	2.85%	12.54%
Hsbc Holdings (Gb)	Financials	\$1,798,466	1.1%	3.26%	159.28	11.20	6.73%	1.52%
Sap Se Shs	Information Technology	\$1,527,385	0.9%	14.60%	165.92	22.20	1.25%	13.20%
Total Sa Act	Energy	\$1,505,608	0.9%	5.79%	143.70	10.54	5.24%	5.20%
Astrazeneca Plc Ord	Health Care	\$1,501,720	0.9%	12.62%	132.23	23.54	2.83%	17.10%
Lvmh Moet Hennessy Lou Vuitt Ord	Consumer Discretionary	\$1,468,082	0.9%	17.60%	235.00	25.36	1.50%	11.32%
Bp Plc Shs	Energy	\$1,445,667	0.9%	(0.21)%	127.28	11.16	6.78%	6.05%

### 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
Delivery Hero	Consumer Discretionary	\$102,683	0.1%	80.05%	15.01	(35.24)	0.00%	-
Mitsubishi Tanabe Pharma Cor Shs	Health Care	\$47,192	0.0%	68.48%	10.37	118.46	2.79%	(44.19)%
Z Hldgs Corp Shs	Communication Services	\$126,964	0.1%	50.81%	20.46	23.82	1.92%	9.62%
Eisai Co	Health Care	\$215,525	0.1%	48.58%	22.39	31.71	1.95%	11.54%
Teva Pharmaceutical Inds Ltd Adr	Health Care	\$120,801	0.1%	42.44%	10.71	4.00	0.00%	(4.05)%
Sharp Corp Osaka Shs	Consumer Discretionary	\$36,715	0.0%	40.27%	8.26	15.35	1.19%	(10.08)%
Stmicroelectronics N V Shs	Information Technology	\$207,867	0.1%	39.46%	24.52	20.08	0.89%	7.03%
Fisher & Paykel Healthcare C Ord	Health Care	\$96,697	0.1%	38.98%	8.60	43.67	1.15%	19.39%
Iliad Act	Communication Services	\$40,909	0.0%	37.99%	7.67	21.80	0.78%	2.90%
Line Corp	Communication Services	\$32,904	0.0%	37.80%	11.87	(101.30)	0.00%	-

### 10 Worst Performers

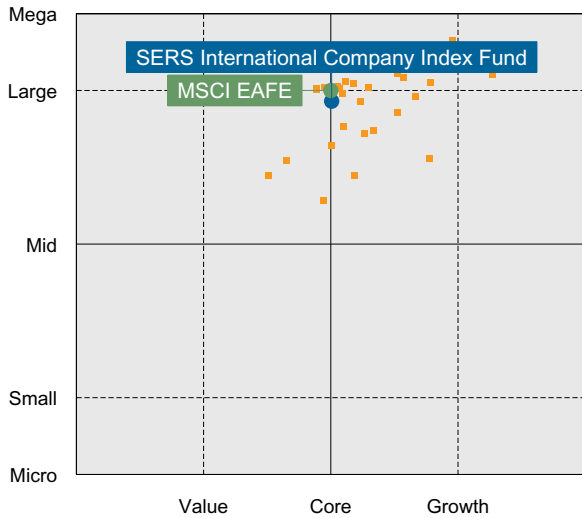
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Banco Espirito Santo E Comer Ord	Financials	\$3	0.0%	(50.00)%	0.00	-	0.00%	-
Nmc Health	Health Care	\$24,090	0.0%	(29.90)%	4.89	12.07	1.02%	28.55%
Wisetech Global	Information Technology	\$26,108	0.0%	(29.87)%	5.23	74.00	0.19%	39.20%
Nokia Ord A Eur 0.24	Information Technology	\$239,472	0.1%	(27.02)%	20.87	13.17	4.48%	15.71%
Infogenie Europe Nm	Information Technology	\$163,777	0.1%	(24.70)%	14.93	18.63	0.19%	36.45%
Suzuken Co	Health Care	\$33,336	0.0%	(23.68)%	4.25	16.67	1.43%	15.79%
Ses Global Sa Cert Global	Communication Services	\$58,294	0.0%	(22.11)%	5.38	18.93	5.44%	8.53%
Air Water Inc Osaka Shs	Materials	\$26,478	0.0%	(17.61)%	3.32	10.17	2.56%	19.68%
Renault Sa Shs Sicovam	Consumer Discretionary	\$102,481	0.1%	(17.53)%	14.00	4.74	8.42%	(1.91)%
Cid Created On Bank Faith For Id Bg0	Consumer Discretionary	\$18,139	0.0%	(17.02)%	3.16	(26.41)	0.00%	-



# Historical Holdings Based Style Analysis SERS International Company Index Fund For Three Years Ended December 31, 2019

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

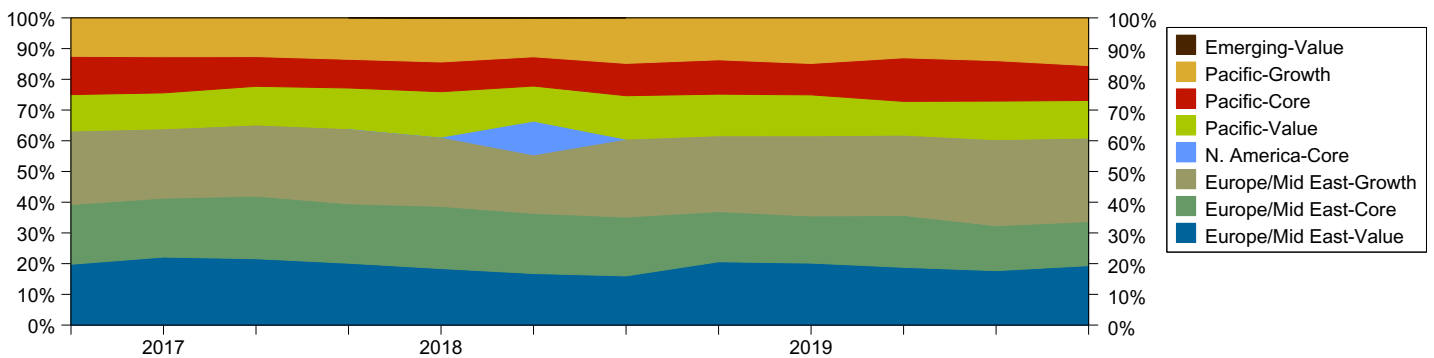
**Average Style Map vs Callan Intl Eq Dev Mkt MF Holdings for Three Years Ended December 31, 2019**



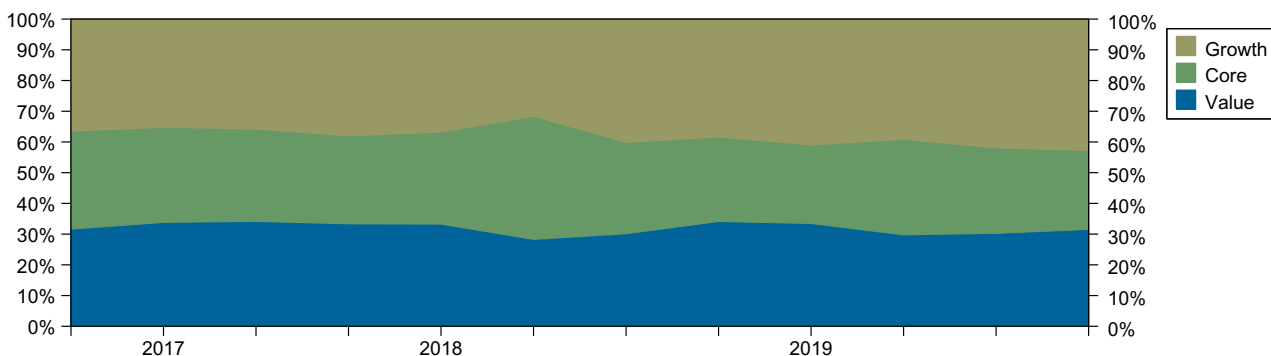
**Average Style Exposure Matrix Holdings for Three Years Ended December 31, 2019**

	19.3% (127)	17.9% (125)	24.4% (177)	61.6% (429)
Europe/ Mid East	19.8% (135)	18.1% (128)	25.0% (189)	62.8% (452)
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% (146)	11.1% (148)	13.6% (174)	37.4% (468)
	13.0% (147)	10.9% (148)	13.4% (175)	37.2% (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>32.0% (273)</b>	<b>29.9% (273)</b>	<b>38.1% (351)</b>	<b>100.0% (897)</b>
	32.7% (282)	29.0% (276)	38.3% (364)	100.0% (922)
	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 December 31, 2019

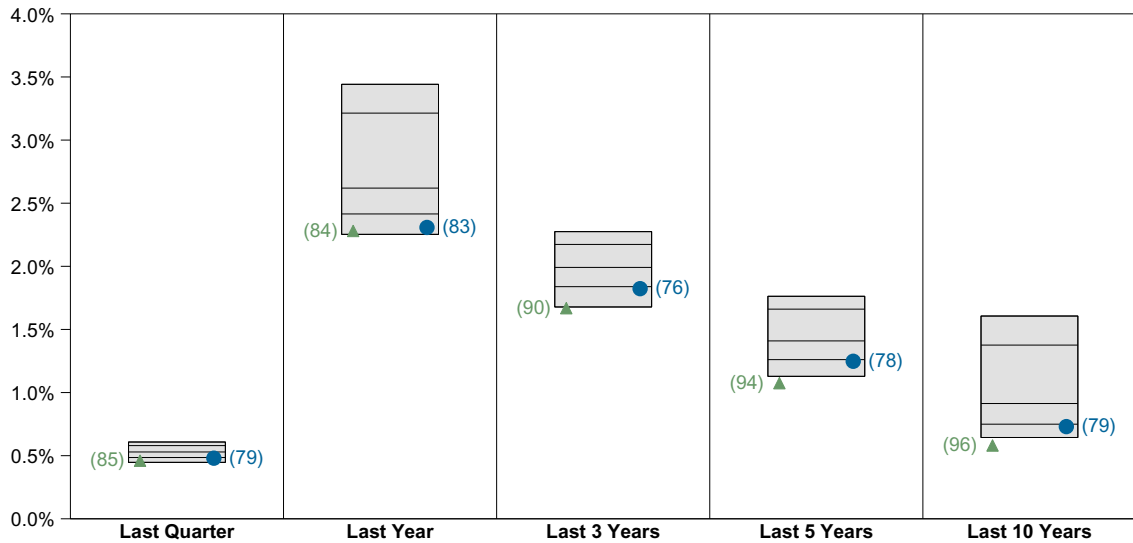
## Investment Philosophy

The Short Term Investment Fund seeks to achieve the highest current income consistent with maintaining liquidity and safety of principal. This fund is managed by the Pennsylvania State Treasurer. 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 0.48% return for the quarter placing it in the 79 percentile of the Callan Cash Database group for the quarter and in the 83 percentile for the last year.
- SERS Short Term Investment Fund's portfolio outperformed the 3-month Treasury Bill by 0.02% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.03%.

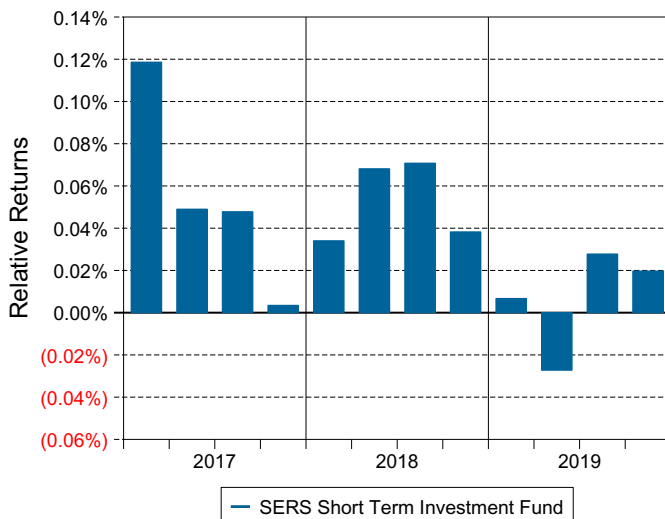
## Performance vs Callan Cash Database (Gross)



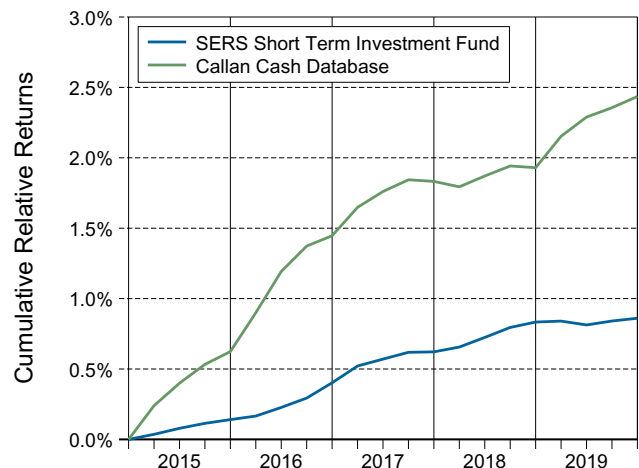
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.61	3.44	2.27	1.76	1.61
25th Percentile	0.58	3.21	2.17	1.66	1.38
Median	0.53	2.62	1.99	1.41	0.91
75th Percentile	0.49	2.41	1.84	1.26	0.75
90th Percentile	0.45	2.25	1.68	1.13	0.64

<b>SERS Short Term Investment Fund</b>	<b>0.48</b>	<b>2.31</b>	<b>1.82</b>	<b>1.25</b>	<b>0.73</b>
3-month Treasury Bill	0.46	2.28	1.67	1.07	0.58

## Relative Return vs 3-month Treasury Bill



## Cumulative Returns vs 3-month Treasury Bill

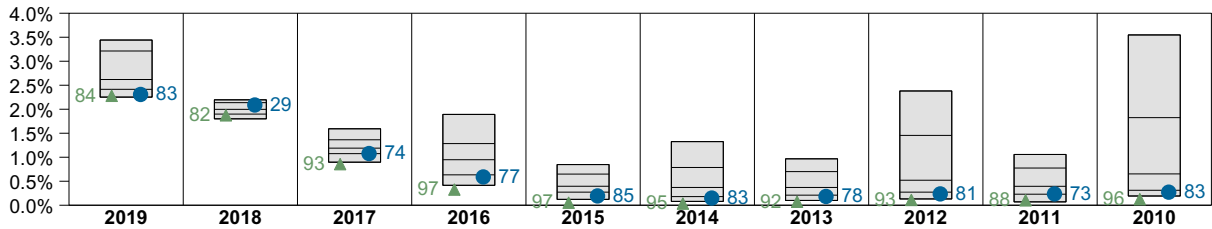


# SERS Short Term Investment Fund Return Analysis Summary

## 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.

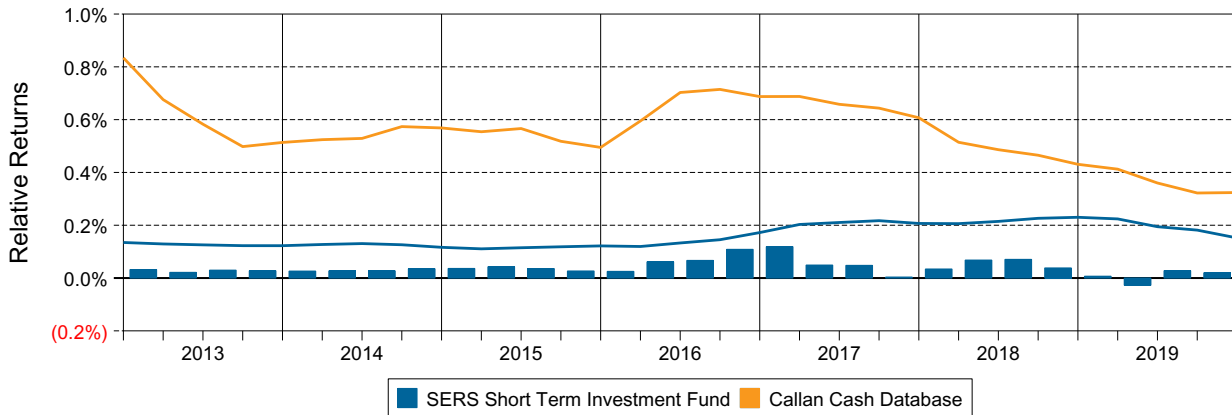
### Performance vs Callan Cash Database (Gross)



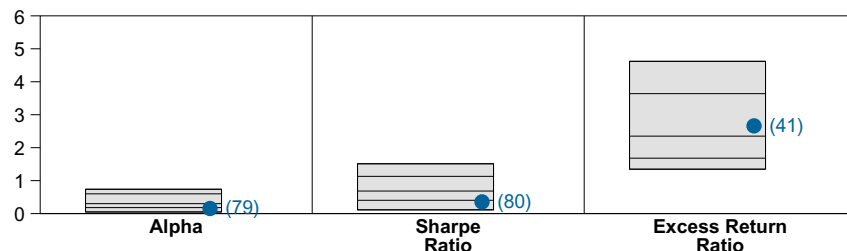
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	3.44	2.20	1.59	1.89	0.85	1.33	0.97	2.38	1.06	3.55
25th Percentile	3.21	2.14	1.36	1.28	0.65	0.79	0.70	1.45	0.78	1.83
Median	2.62	2.00	1.19	0.95	0.40	0.37	0.37	0.52	0.39	0.65
75th Percentile	2.41	1.90	1.08	0.63	0.27	0.18	0.21	0.27	0.23	0.31
90th Percentile	2.25	1.80	0.90	0.41	0.12	0.08	0.10	0.13	0.07	0.19

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>SERS Short Term Investment Fund</b>	2.31	2.09	1.08	0.59	0.19	0.15	0.18	0.24	0.24	0.27
3-month Treasury Bill	2.28	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 December 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.74	1.51	4.62
25th Percentile	0.60	1.13	3.64
Median	0.30	0.68	2.35
75th Percentile	0.18	0.40	1.68
90th Percentile	0.05	0.11	1.35
<b>SERS Short Term Investment Fund</b>	0.15	0.36	2.66

# SERS Stable Value Fund

## Period Ended December 31, 2019

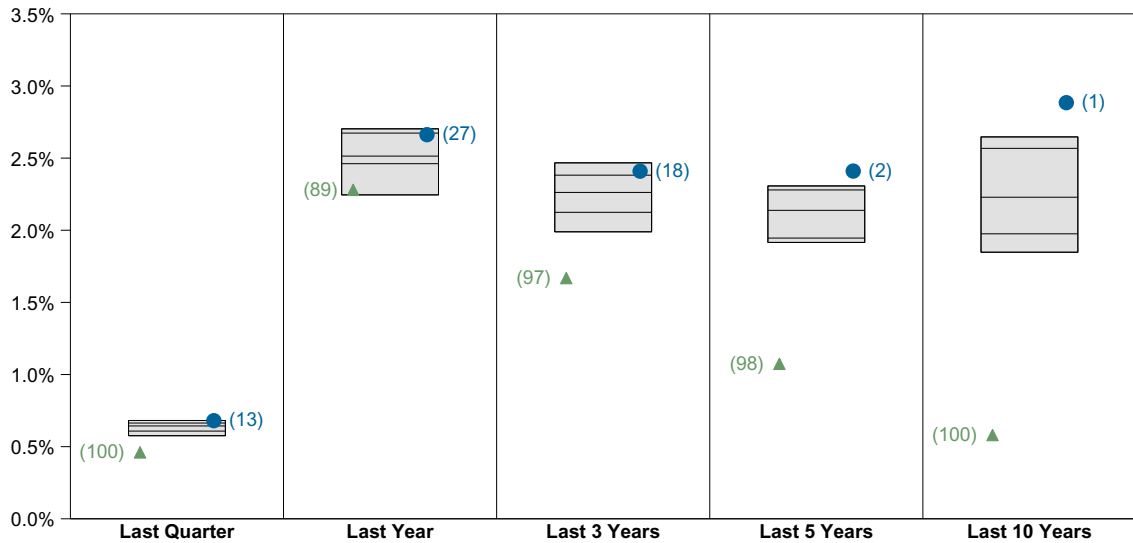
### Investment Philosophy

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

### Quarterly Summary and Highlights

- SERS Stable Value Fund's portfolio posted a 0.68% return for the quarter placing it in the 13 percentile of the Callan Stable Value group for the quarter and in the 27 percentile for the last year.
- SERS Stable Value Fund's portfolio outperformed the 3-month Treasury Bill by 0.22% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.38%.

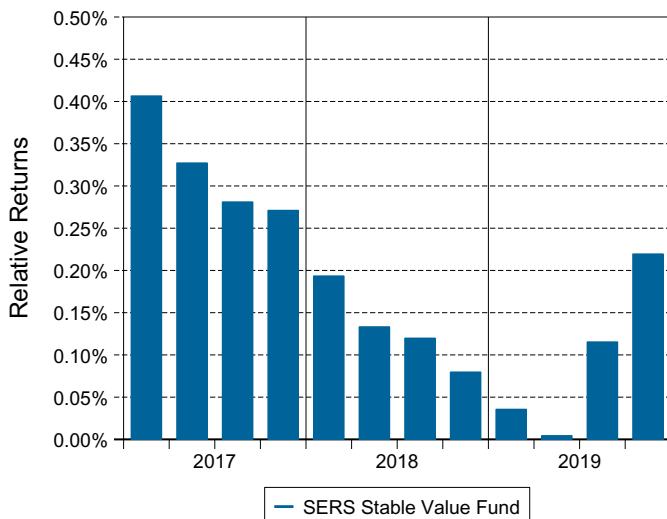
### Performance vs Callan Stable Value (Gross)



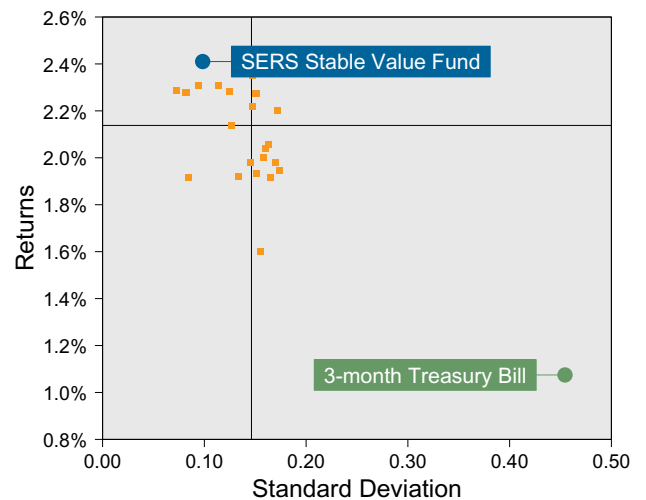
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.68	2.70	2.47	2.31	2.65
25th Percentile	0.66	2.67	2.38	2.28	2.57
Median	0.64	2.51	2.26	2.14	2.23
75th Percentile	0.61	2.46	2.12	1.95	1.98
90th Percentile	0.58	2.25	1.99	1.92	1.85

<b>SERS Stable Value Fund</b>	● 0.68	● 2.66	● 2.41	● 2.41	● 2.88
3-month Treasury Bill	▲ 0.46	▲ 2.28	▲ 1.67	▲ 1.07	▲ 0.58

### Relative Return vs 3-month Treasury Bill



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

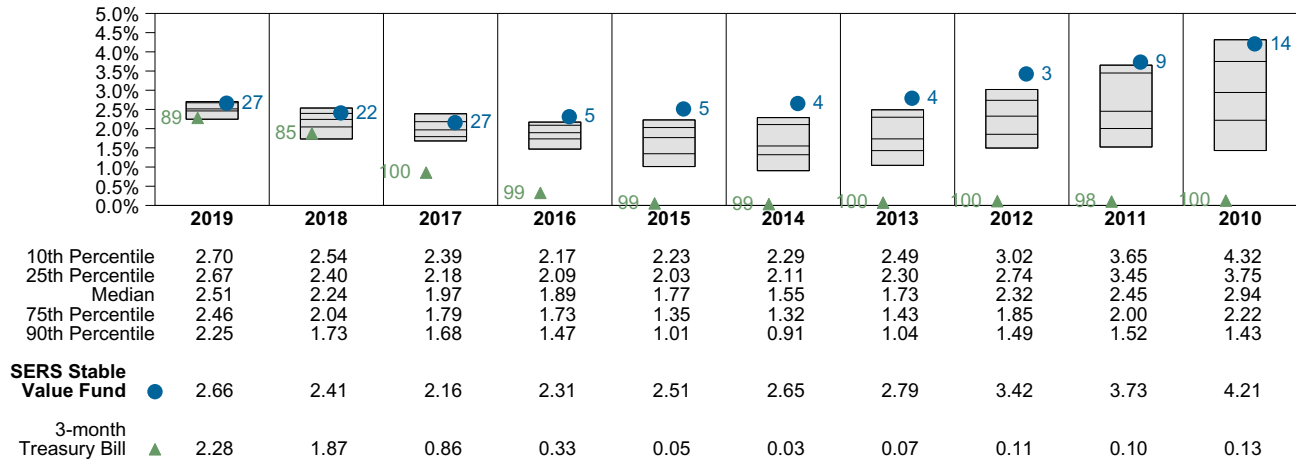


# SERS Stable Value Fund Return Analysis Summary

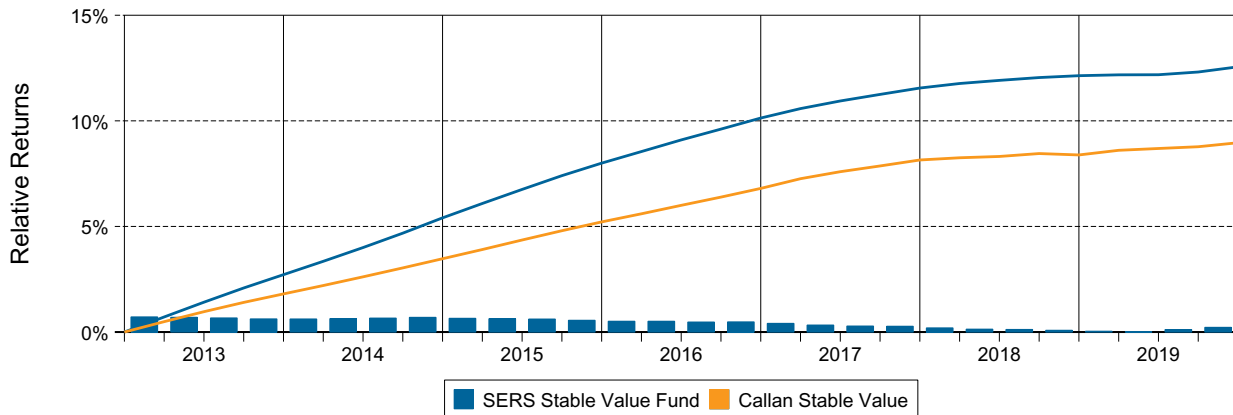
## Return Analysis

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.

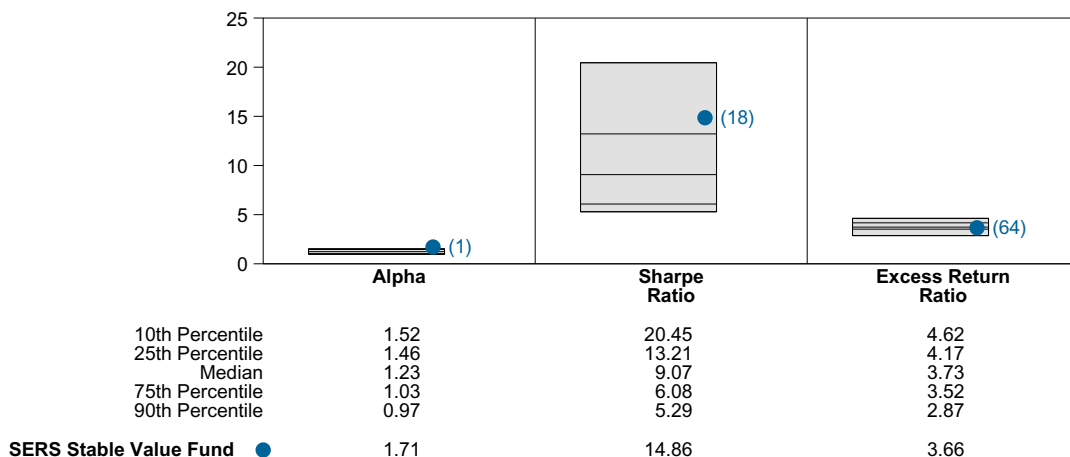
### Performance vs Callan Stable Value (Gross)



### 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 December 31, 2019



# SERS U.S. Bond Index Fund

## Period Ended December 31, 2019

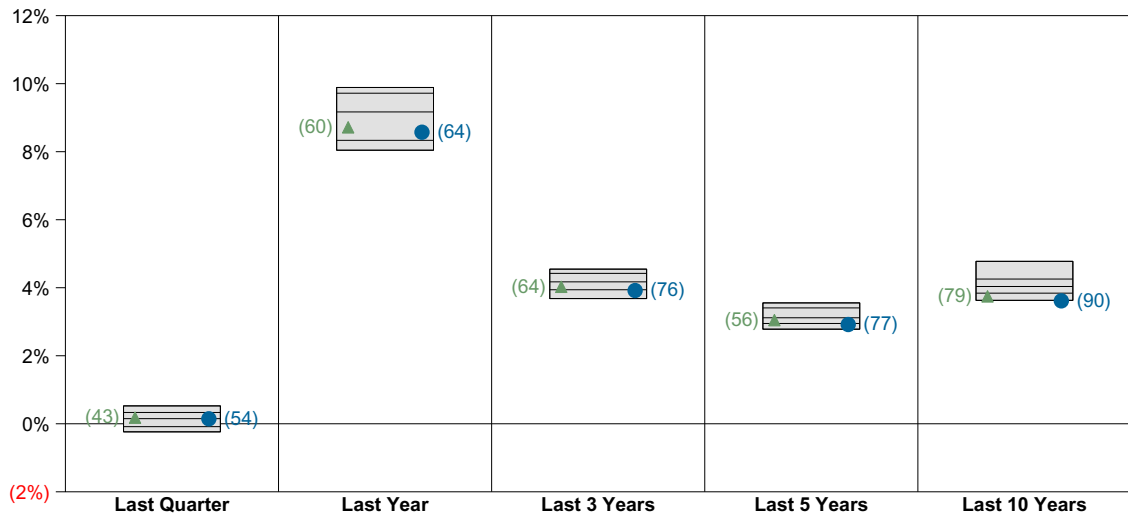
### Investment Philosophy

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

### Quarterly Summary and Highlights

- SERS U.S. Bond Index Fund's portfolio posted a 0.15% return for the quarter placing it in the 54 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 64 percentile for the last year.
- SERS U.S. Bond Index Fund's portfolio underperformed the Blmbg Aggregate by 0.03% for the quarter and underperformed the Blmbg Aggregate for the year by 0.14%.

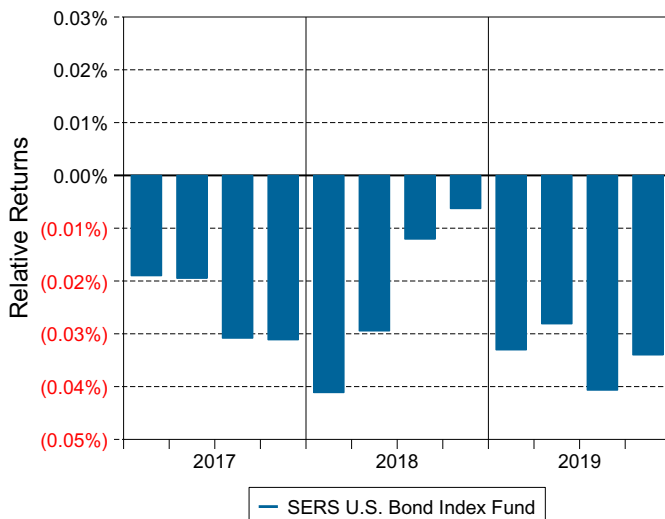
### Performance vs Callan Core Bond Mutual Funds (Institutional Net)



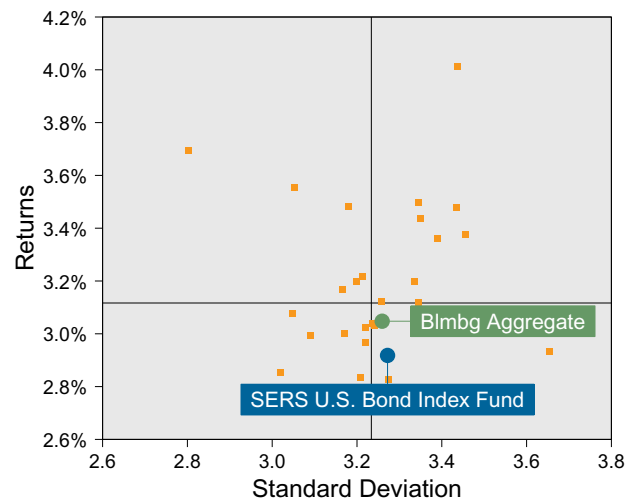
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.53	9.89	4.55	3.55	4.78
25th Percentile	0.33	9.72	4.42	3.41	4.26
Median	0.15	9.17	4.17	3.12	4.04
75th Percentile	(0.08)	8.33	3.94	2.95	3.84
90th Percentile	(0.24)	8.04	3.68	2.78	3.63

<b>SERS U.S. Bond Index Fund</b>	●	0.15	8.57	3.92	2.92	3.61
Blmbg Aggregate	▲	0.18	8.72	4.03	3.05	3.75

### Relative Return vs Blmbg Aggregate



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

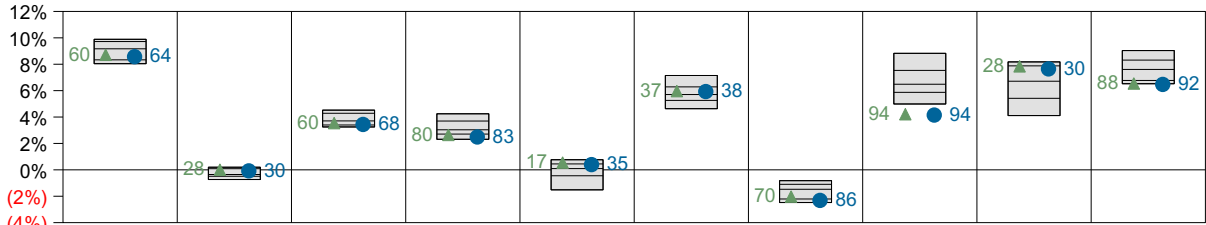


# SERS U.S. Bond Index Fund Return Analysis Summary

## 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.

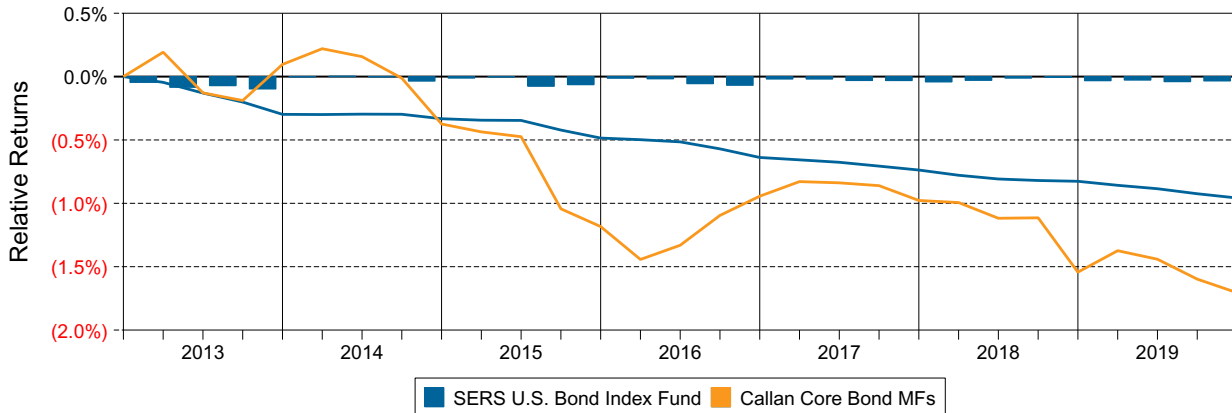
### Performance vs Callan Core Bond Mutual Funds (Institutional Net)



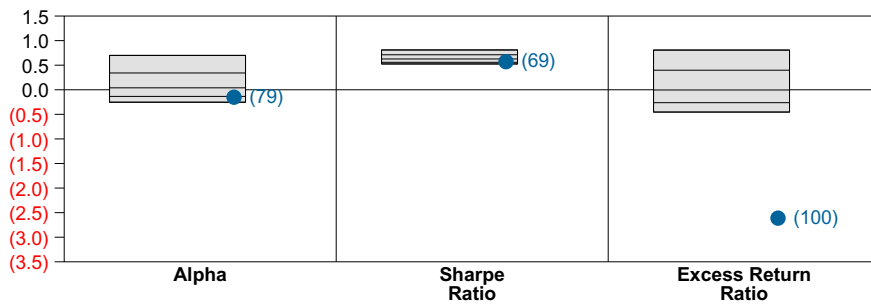
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	9.89	0.20	4.52	4.25	0.77	7.15	(0.82)	8.83	8.18	9.04
25th Percentile	9.72	0.09	4.28	3.70	0.45	6.29	(1.10)	7.53	7.88	8.31
Median	9.17	(0.35)	3.71	3.03	0.10	5.71	(1.47)	6.49	6.71	7.61
75th Percentile	8.33	(0.49)	3.40	2.71	(0.45)	5.26	(2.21)	5.87	5.42	6.77
90th Percentile	8.04	(0.73)	3.25	2.31	(1.52)	4.63	(2.48)	4.99	4.11	6.52

SERS U.S. Bond Index Fund		2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
SERS U.S. Bond Index Fund	●	8.57	(0.08)	3.44	2.49	0.40	5.93	(2.32)	4.15	7.65	6.47
Blmbg Aggregate	▲	8.72	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 December 31, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.70	0.81	0.81
25th Percentile	0.34	0.71	0.40
Median	0.04	0.63	(0.00)
75th Percentile	(0.14)	0.56	(0.26)
90th Percentile	(0.25)	0.53	(0.45)
SERS U.S. Bond Index Fund	●	0.57	(2.61)

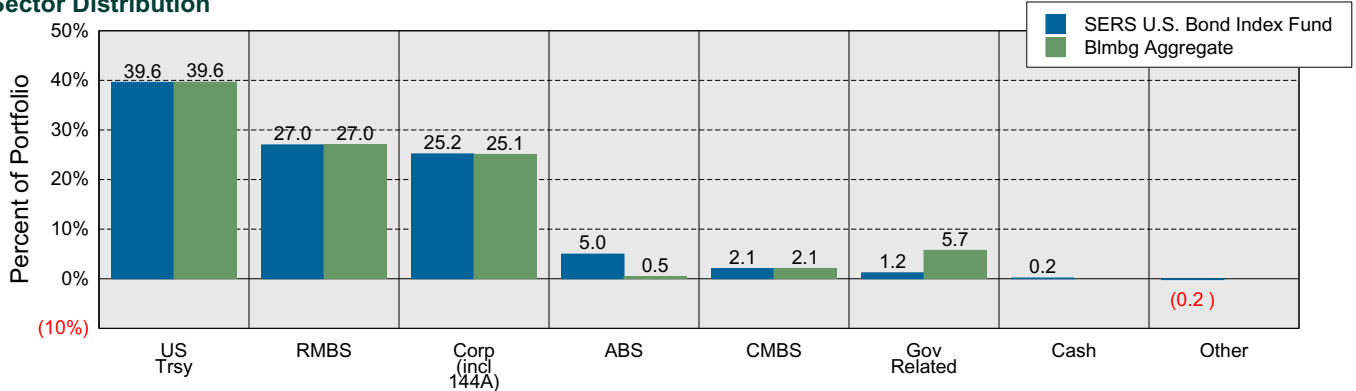


# SERS U.S. Bond Index Fund Portfolio Characteristics Summary As of December 31, 2019

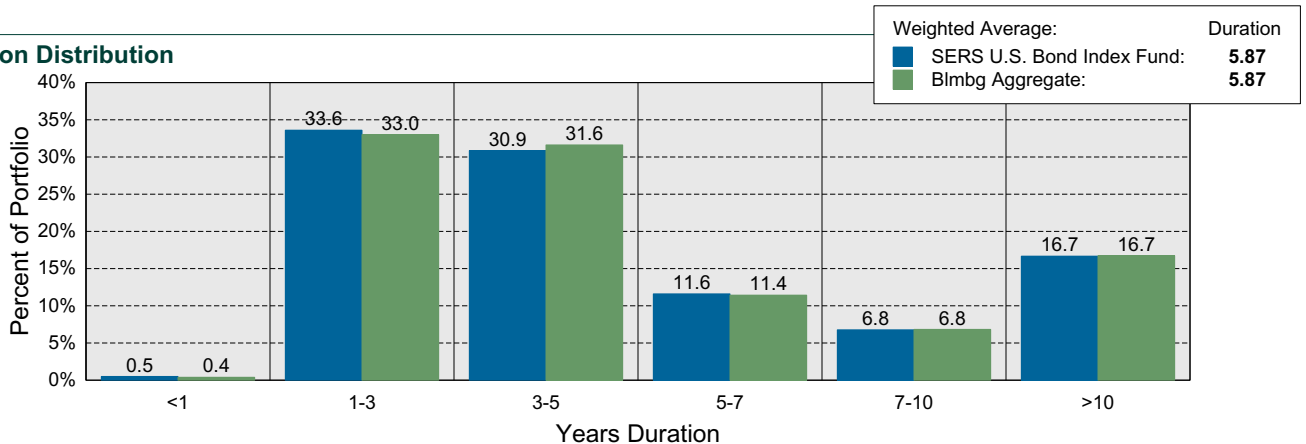
## Portfolio Structure Comparison

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

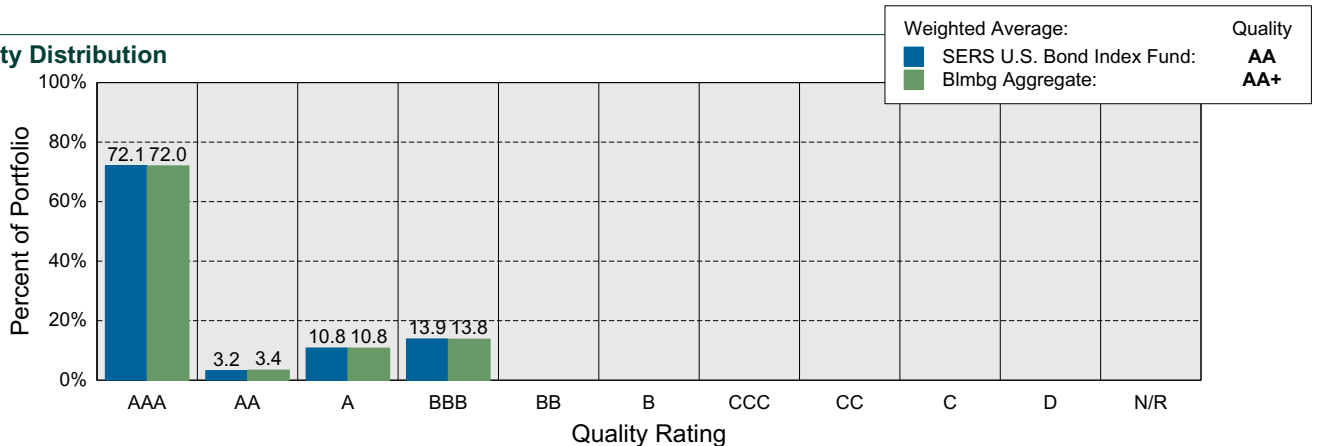
### Sector Distribution



### Duration Distribution



### Quality Distribution



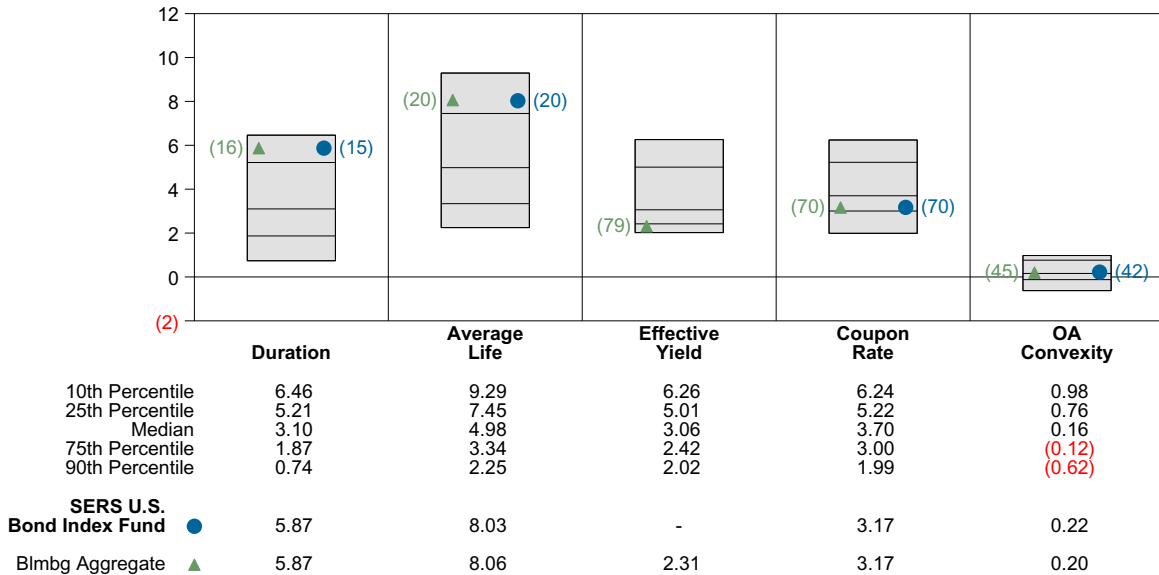
# SERS U.S. Bond Index Fund

## Bond Characteristics Analysis Summary

### Portfolio Characteristics

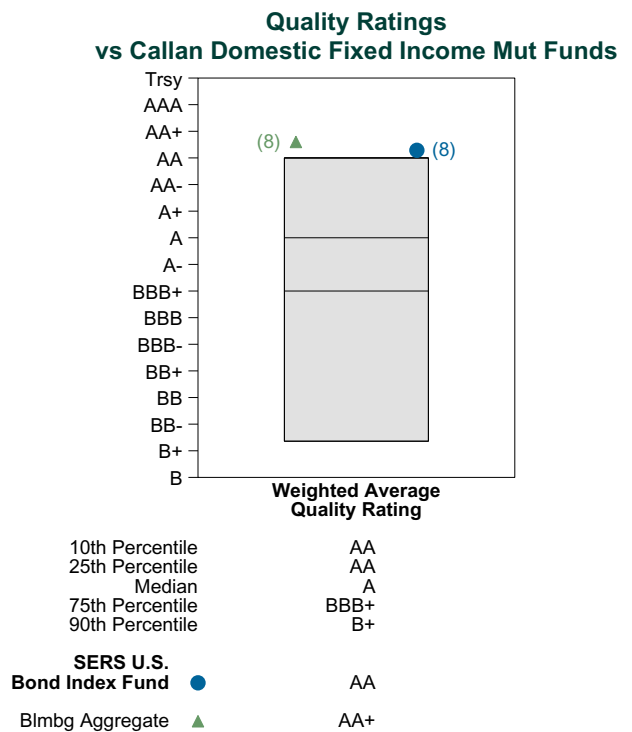
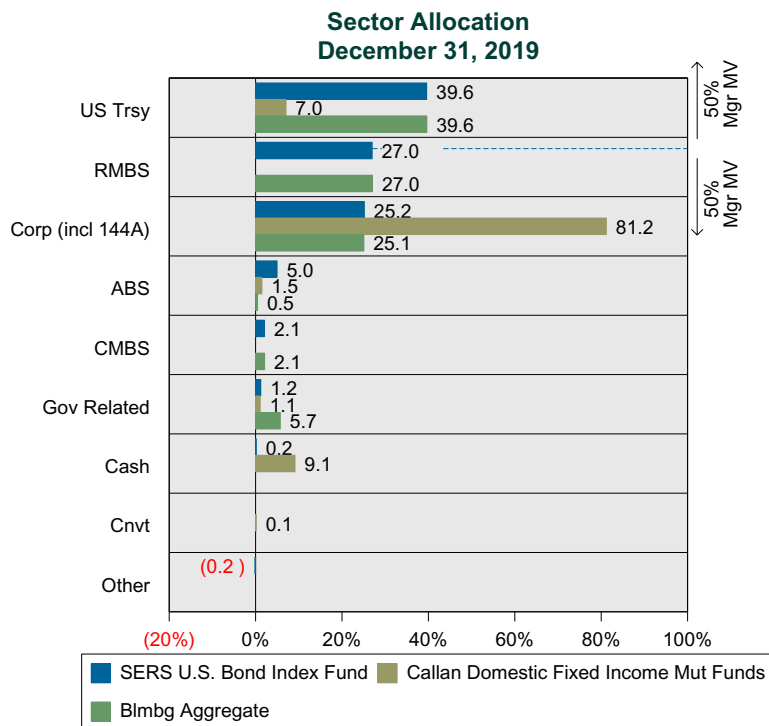
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Fixed Income Portfolio Characteristics Rankings Against Callan Domestic Fixed Income Mut Funds as of December 31, 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

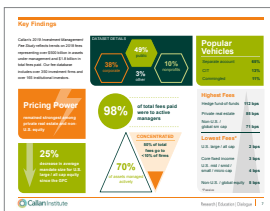
The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit [www.callan.com/library](http://www.callan.com/library) to see all of our publications, and [www.callan.com/blog](http://www.callan.com/blog) 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

### Long-Dated Private Equity Funds: More Illiquidity Please? |

In this paper, Ashley DeLuce of Callan's Private Equity Consulting Group analyzes long-dated private equity funds, which have terms of 15 years or more (some even have no fixed term), and tend to focus on stable, mature businesses that may not fit a traditional private equity investment profile. Although these companies may not generate the outsized internal rates of return associated with traditional private equity investments, they tend to have stronger downside protection. In evaluating a potential long-dated fund investment, investors need to be wary of the strategy's increased illiquidity and how it can impact annual commitment pacing.

Callan 2019 Investment Management Fee Study | This study using Callan's proprietary database is our eighth examination of



institutional investment management fee trends. The purpose of the study is to provide a detailed analysis on fee levels and trends across multiple asset classes and mandate sizes, for both active and passive management.

Gold: Real Asset, Risk Mitigator, or Pet Rock? | In this *Hedge Fund Monitor*, Jim McKee reviews the history of gold as a form of money, the reasons behind the recent renaissance in gold, the potential roles of gold for institutional investors, and the alternative approaches to invest in gold-related themes.



For some institutional investors, gold can play a useful role in diversifying risk or enhancing returns. For others, particularly those with higher risk tolerances and longer time horizons, a strategic gold allocation has about as much purpose as a Pet Rock.

## Quarterly Periodicals

Private Equity Trends, 3Q19 | This newsletter from Callan's Private Equity Consulting Group provides a high-level summary of private equity activity in the quarter through all the investment stages, from fundraising to exits, as well as long-term performance data.

### Monthly Periodic Table of Investment Returns, November 2019 |

A regular update to Callan's Periodic Table covering the major public equity and fixed income asset classes.

Active vs. Passive Report, 3Q19 | This series of charts compares active managers alongside relevant benchmarks over the long term.

Market Pulse Flipbook, 3Q19 | A quarterly market reference guide covering trends in the U.S. economy, developments for institutional investors, and the latest data for U.S. and global ex-U.S. equities and fixed income, alternatives, and defined contribution plans.

Capital Market Review, 3Q19 | This newsletter provides analysis and a broad overview of the economy and public and private market activity each quarter across a wide range of asset classes.

Hedge Fund Quarterly, 3Q19 | Callan's Jim McKee of our Hedge Fund Research Group provides commentary on developments for hedge funds and multi-asset class (MAC) strategies.

Real Estate Indicators: Too Hot to Touch or Cool Enough to Handle? | Callan's Real Assets Consulting Group identifies seven indicators that, combined with an understanding of prevailing market dynamics, have helped signal when the institutional real estate market is overheated or cooled.

Real Assets Reporter, 3Q19 | This newsletter from our experts offers Callan's data and insights on real estate and other real asset investment topics.

## 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:

### 2020 June Regional Workshops

June 23 – San Francisco

June 25 – Chicago

### 2020 October Regional Workshops

October 27 – Atlanta

October 29 – Portland

Please also keep your eye out for upcoming Webinars in 2020! We will be sending invitations to register for these events and will also have registration links on our website at [www.callan.com/webinarsupcoming](http://www.callan.com/webinarsupcoming).

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

## Education: By the Numbers

50+

Unique pieces of research the Institute generates each year

525

Attendees (on average) of the Institute's annual National Conference

3,700

Total attendees of the "Callan College" since 1994



**"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

## Education

Through the "Callan College," the Callan Institute offers educational sessions for industry professionals involved in the investment decision-making process. It was founded in 1994 to provide both clients and non-clients with basic- to intermediate-level instruction.

### Introduction to Investments for Institutional Investors

April 21-22, 2020 – San Francisco

July 21-22, 2020 – Chicago

October 13-14, 2020 – Chicago

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

Learn more at [www.callan.com/callan-college-intro-2/](http://www.callan.com/callan-college-intro-2/)

### Alternative Investments for Institutional Investors

June 16, 2020 – San Francisco

November 3, 2020 – Chicago

Alternative investments like private equity, hedge funds, and real estate can play a key role in any portfolio. In this one-day session, Callan experts will provide instruction about the importance of allocations to alternatives, and how to integrate, evaluate, and monitor them.

Learn from some of Callan's senior consultants and experts, including the head of Alternatives Consulting Pete Keliuotis. The session will cover private equity, private credit, hedge funds, real estate, and real assets; why invest in alternatives; risk/return characteristics and liquidity; designing and implementing an alternatives program; and trends and case studies.

Tuition is \$2,000 per person and includes instruction, all materials, and breakfast and lunch with the instructors.

Learn more at: <https://www.callan.com/callan-college-alternatives-2/>



## 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 an 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 Inc.
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
Cadence Capital Management
Cambiar Investors, LLC
Capital Group
Carillon Tower Advisers
CastleArk Management, LLC
Causeway Capital Management LLC
Ceredex Value Advisers

Manager Name
Camplain Investment Partners, LLC
Chartwell Investment Partners
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments
Columbus Circle Investors
Credit Suisse Asset Management
Davy Asset Management Limited
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
FIS Group, Inc.
Fisher Investments
Franklin Templeton
Fred Alger Management, Inc.
Fuller & Thaler Asset Management, Inc.
GAM (USA) Inc.
Glenmeade Investment Management, LP
GlobeFlex Capital, L.P.
GMO LLC
Goldman Sachs
Green Square Capital Advisors, LLC

Manager Name
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Hartford Investment Management Co.
Heitman LLC
Hotchkis & Wiley Capital Management, LLC
HSBC Global Asset Management
Impax Asset Management Limited
Income Research + Management, Inc.
Insight Investment Management Limited
Intech Investment Management, LLC
Intercontinental Real Estate Corporation
Invesco
Investec Asset Management North America, Inc.
Iridian Asset Management LLC
Ivy Investments
J.P. Morgan
Janus
Jennison Associates LLC
Jenson Investment Management
JO Hambro Capital Management Limited
Jobs Peak Advisors
John Hancock Investment Management Services, LLC
Kayne Anderson Rudnick Investment Management, LLC
KeyCorp
Lazard Asset Management
L & B Realty Advisors LLP
Legal & General Investment Management America
Lincoln Advisors
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
MacKenzie Investments
Macquarie Investment Management (MIM)
Manulife Investment Management
Marathon Asset Management, L.P.
McKinley Capital Management, LLC
Mellon
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

Manager Name
Nuveen
OFI Global Asset Management
Osterweis Capital Management, LLC
Owl Rock
P/E Investments
Pacific Investment Management Company
Parametric Portfolio Associates LLC
Pathway Capital Management
Peregrine Capital Management, LLC.
Perkins Investment Management
PFM Asset Management LLC
PGIM Fixed Income
PineBridge Investments
PNC Capital Advisors, LLC
Polen Capital Management
Principal Global Investors
Putnam Investments, LLC
QMA LLC
RBC Global Asset Management
Regions Financial Corporation
Riverbridge Partners LLC
Robeco Institutional Asset Management, US Inc.
Rockefeller Capital Management
Rothschild & Co. Asset Management US
Russell Investments
Schroder Investment Management North America Inc.
Segall Bryant & Hamill
Smith Graham & Co. Investment Advisors, L.P.
South Texas Money Management, Ltd.
Sprucegrove Investment Management Ltd.
State Street Global Advisors
Stone Harbor Investment Partners, L.P.
Strategic Global Advisors
Sun Life Investment Management
T. Rowe Price Associates, Inc.
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
Vulcan Value Partners, LLC
Wasatch Global Investors
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