

September 30, 2020

**Pennsylvania SERS 457(b)**



**Investment Measurement Service  
Quarterly Review**

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**U.S. EQUITY**

**Gains YTD**

- S&P +8.9% for the quarter, bringing YTD to +5.6%
- Consumer Discretionary (+15%) and Industrials (+13%) dominated, with Tech (+12%) a close third in risk-on market.
- S&P 500 YTD would be negative if not for Facebook, Microsoft, Amazon, Alphabet, and Apple, representing 33% of the return.
- YTD, pandemic punished some sectors, rewarded others
- Tech +29% YTD; Cons. Disc. +23% (online retailers +60%)
- Energy -48% amid declining crude and natural gas prices
- Demand from hotels/cruise lines/airlines down as those industries have dropped 40%+

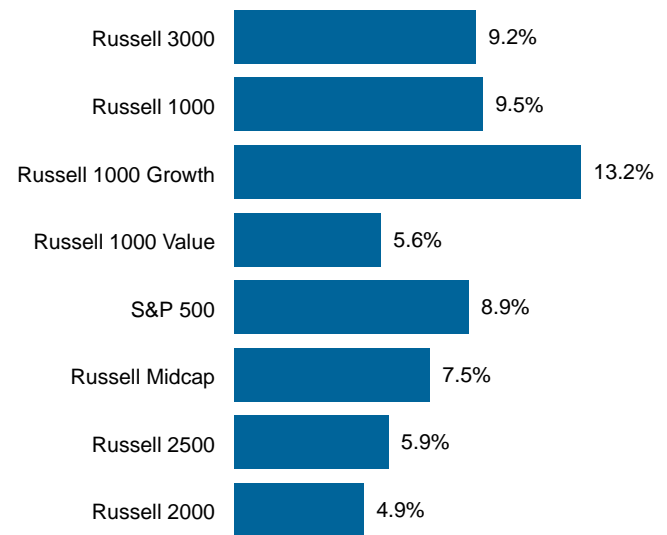
**Small cap reverses to trail large cap**

- Following a stellar 2Q20 recovery, small cap trailed large.
- Behind large cap by a wide margin over last 12 months

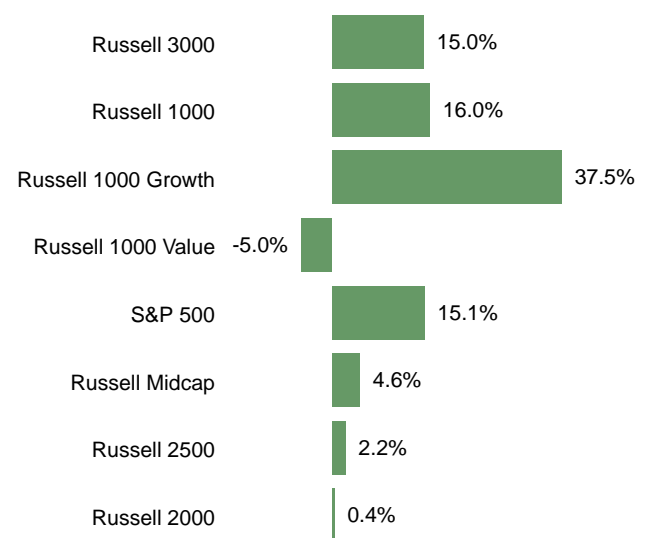
**Growth continues to outpace value across market caps**

- Growth, value dispersion near all-time high driven by Tech
- YTD RUS1G +25% vs. RUS1V -12%
- Growth stock P/E near 2x historical average across market caps
- Today's index concentration surpasses levels seen in the late 90's Dot-Com boom.
- Index concentration of the top five names is at 5 standard deviations above the 30-year average of approximately 13%.
- Large and small value indices continue to underperform large and small growth in 3Q20 and YTD.
- Higher interest rates, a steeper yield curve, economic growth, and improving consumer confidence are among the catalysts that could result in value outperforming.
- S&P 500 Index currently delivers a dividend yield well above the 10-year Treasury, which can help support current valuation levels.

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

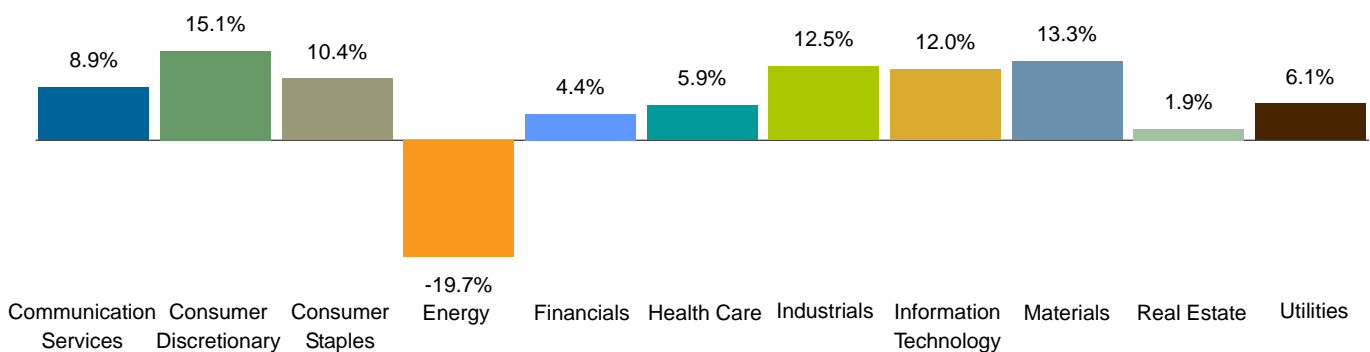


**U.S. Equity: One-Year Returns**



Sources: FTSE Russell, S&P Dow Jones Indices

**S&P Sector Returns, Quarter Ended September 30, 2020**



Source: S&P Dow Jones Indices

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

**Continued recovery into 3Q20**

- Returns broadly positive across developed and emerging markets but muted YTD
- Recent support from ultra-low interest rates and upward earnings revisions
- EM recovery driven by global risk-on environment; key countries within EM (China and South Korea) have better managed the pandemic
- Small cap continued to outperform large as lockdowns eased and business confidence improved.

**Rebound for cyclicals**

- Materials, Industrials, and Consumer Discretionary outperformed as consumption and production resumed.
- Factor performance led by momentum (rebound) and volatility (risk-on market mentality)

**U.S. dollar vs. other currencies**

- U.S. dollar lost ground versus every developed market currency on expectation of lower-for-longer U.S. rates due to Fed’s shift in approach toward inflation and employment.

**COVID-19 exacerbated outperformance of growth vs. value**

- Growth outpaced value by 34% year-to-date as of Sept. 30.
- Extremely narrow market with performance dominated by Tech
- Growth benefited from strong performance by Information Technology (27%), while Financials (-22%) and Energy (-46%) weighed on value.
- YTD performance gap between growth and value has not been seen over the past 45 years.

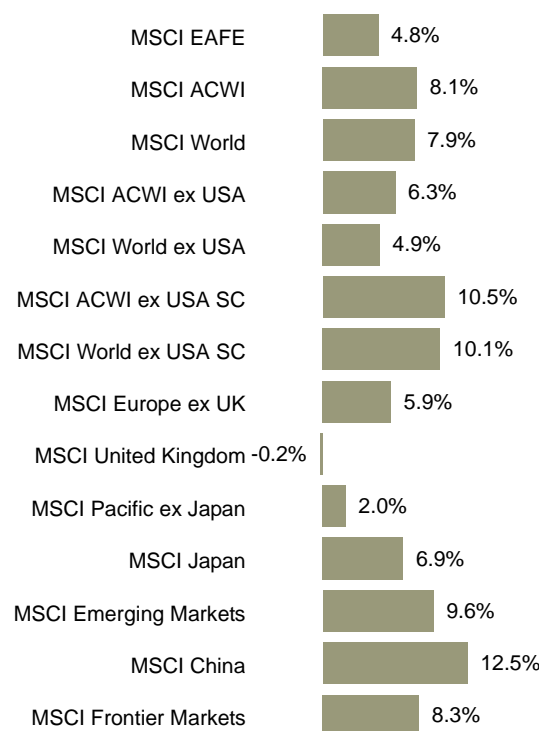
**What may stoke value rotation?**

- Higher bond yields may be needed to drive value rebound.
- Bond yields correlated to value/growth since the GFC

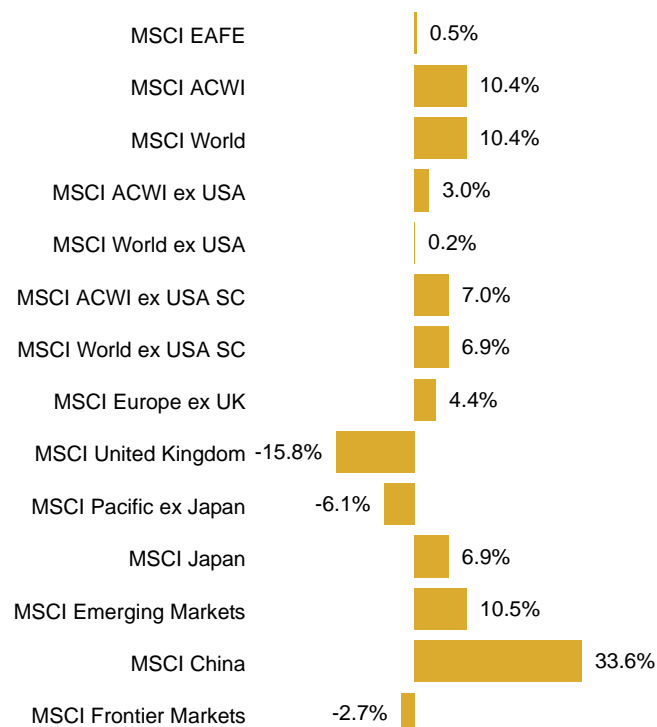
**Key drivers: global recovery, U.S. elections**

- Management of COVID-19 a key variable to recovery
- Advanced economies have struggled to contain the pandemic relative to emerging markets.
- Asian currencies have maintained resiliency relative to the U.S. dollar due to better COVID-19 management and economic outlook.
- Greater probability of Democratic sweep is expected to pressure USD to the downside on a medium-term basis.
- Potentially easier fiscal policy and a larger budget deficit in the aftermath of a “Blue Wave” may yield lower dollar.

**Global Equity: Quarterly Returns**



**Global Equity: One-Year Returns**



Source: MSCI

**U.S. FIXED INCOME**

**Treasury yields largely unchanged**

- 10-year UST yield at 0.69% in 3Q20, up 3 bps from 2Q20 but off sharply from year-end level of 1.92%
- TIPS did well as inflation expectations rose from 1.34% to 1.63%.
- No rate hikes expected until at least 2023

**Bloomberg Barclays Aggregate roughly flat**

- Corporate and CMBS the strongest investment grade sectors as investors hunted for yield
- Corporate supply (\$1 trillion YTD) at a record as companies rushed to take advantage of ultra-low interest rates

**Risk-on sentiment helped high yield and loans**

- Non-investment grade sectors rallied, but remain roughly flat YTD.
- The high yield bond market also experienced high levels of net new issuance (over \$120 billion YTD).

**Munis boosted by favorable supply/demand dynamics**

- Robust demand and muted supply of tax-exempt municipals
- Issuance in taxable municipals sharply higher
- Tax revenues better than expected, but challenges remain and stimulus uncertain (but needed)

**High yield trended higher in quality**

- BB/Ba-rated debt, the highest-quality category within high yield, experienced a surge of new issuance as 2020 remains a year of record new issuance across corporate debt.
- Reconstitution of downgraded investment grade debt into high yield has also added to the category.
- BBs now represents over half of the Bloomberg Barclays US High Yield Index.
- Historically, composition changes have generated market inefficiencies that managers can seek to exploit.

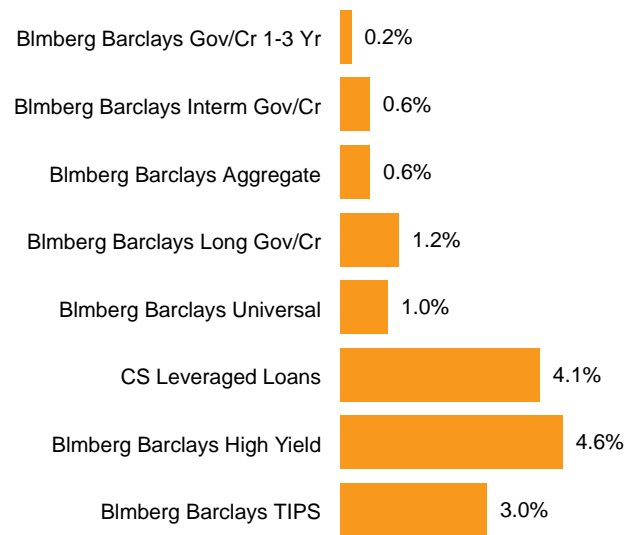
**Default rate has trended higher, but below GFC levels**

- Additionally, spreads at the height of COVID-19 implied a 16.8% default rate, but thus far defaults have been well below market expectations at 5.77%.

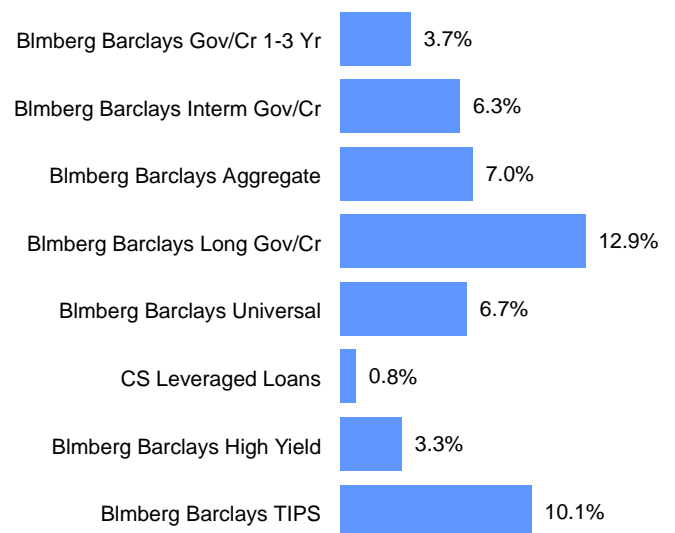
**High yield spreads have rallied; managers are putting a greater focus on security selection**

- Recovery rates remain low relative to the 30-year average, concentrated within pandemic-sensitive sectors (particularly retail and energy) and subordinated debt.
- The ratio of downgrades to upgrades is higher than in 2008.

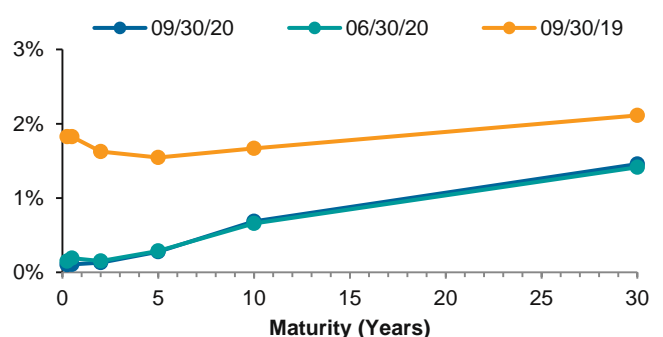
**U.S. Fixed Income: Quarterly Returns**



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



**U.S. Treasury Yield Curves**



Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

**GLOBAL FIXED INCOME**

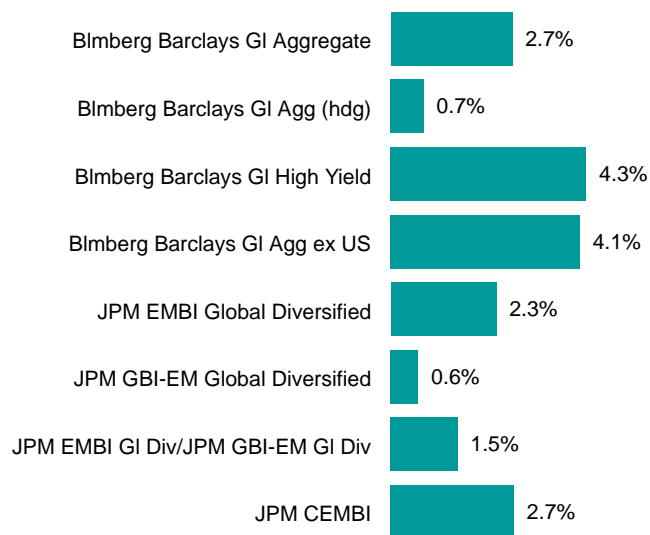
**Global fixed income rose amid rate cuts**

- Central banks continued to act aggressively to provide support via rate cuts, asset purchase programs, and other forms of stimulus.
- Broad-based U.S. dollar weakness dampened hedged returns as the USD lost 4% versus the euro and the British pound, and 2% versus the yen.
- Over 70% of global sovereign debt has *negative* real yields, a record high, according to JP Morgan.

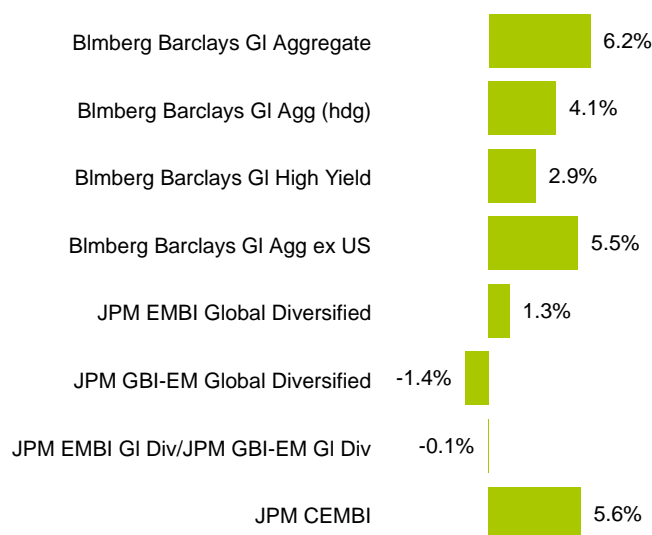
**Emerging market debt made up ground**

- Emerging market debt indices gained in 3Q20 but remain down from year-end.
- U.S. dollar-denominated index (EMBI Global Diversified) outperformed local currency as U.S. rates fell; returns were mixed across the 70+ constituents, but most were positive.
- Local currency index (GBI-EM Global Diversified) was up slightly but returns varied widely among constituents: Russia: -8%; Brazil: -3%; Mexico and S. Africa: +6%
- Staggered inclusion of China bonds continued with the weight rising to 7% in the JPM GBI-EM Global Diversified Index.

**Global Fixed Income: Quarterly Returns**

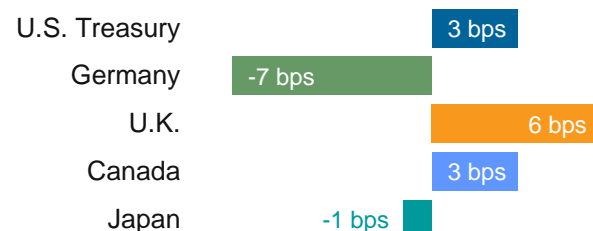


**Global Fixed Income: One-Year Returns**



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

**2Q20 to 3Q20**



Sources: Bloomberg, Bloomberg Barclays, JP Morgan





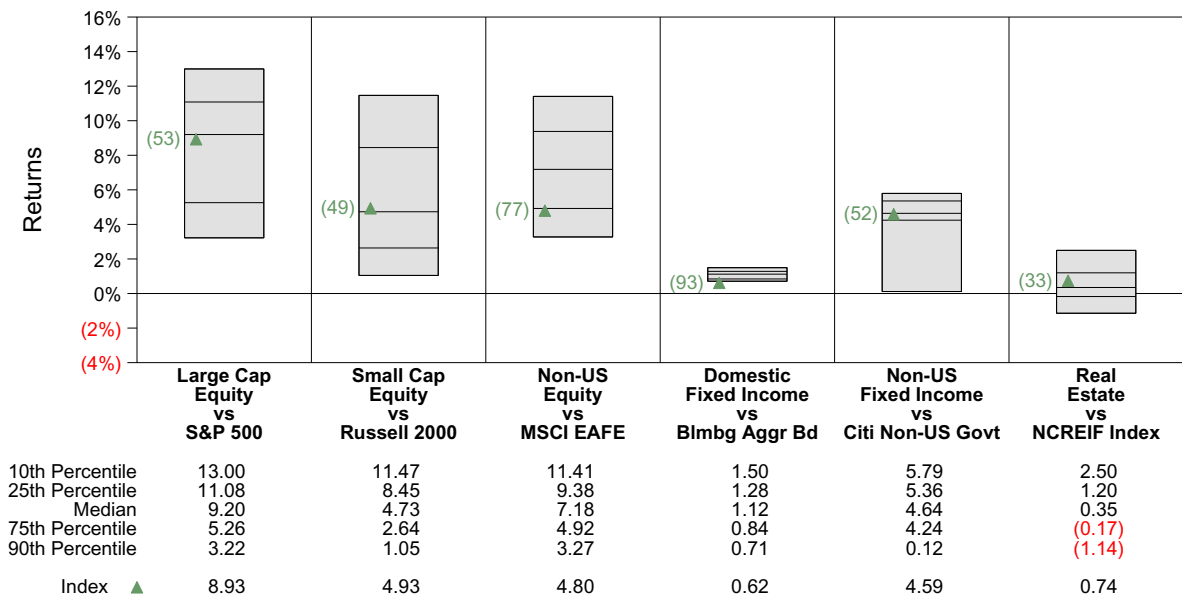
## Market Overview

### Active Management vs Index Returns

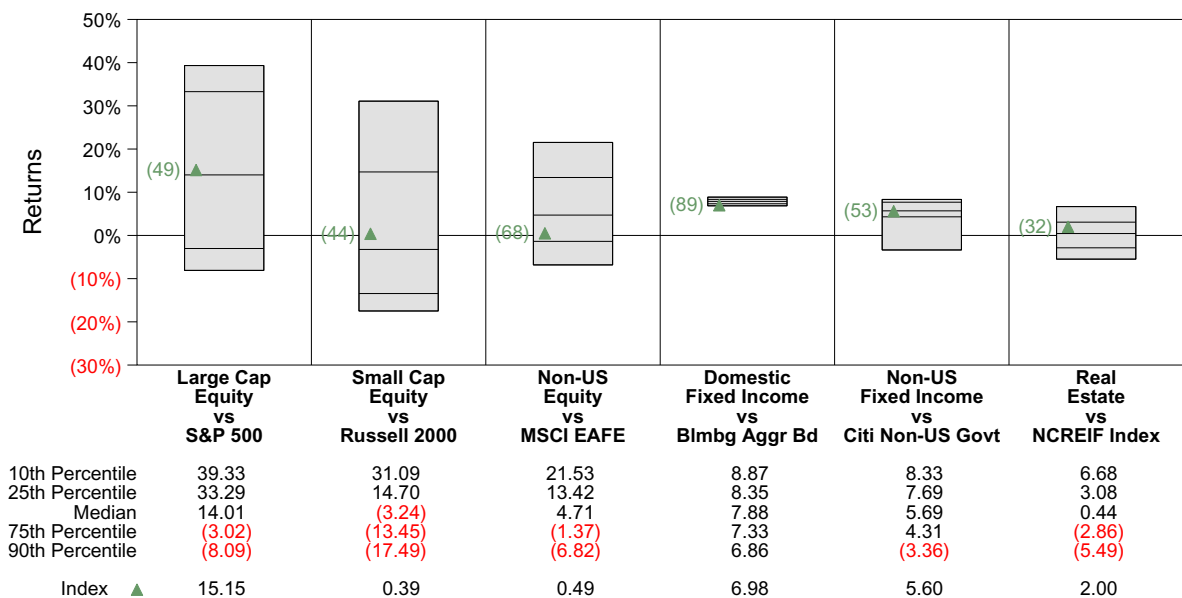
#### Market Overview

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 September 30, 2020



#### Range of Separate Account Manager Returns by Asset Class One Year Ended September 30, 2020

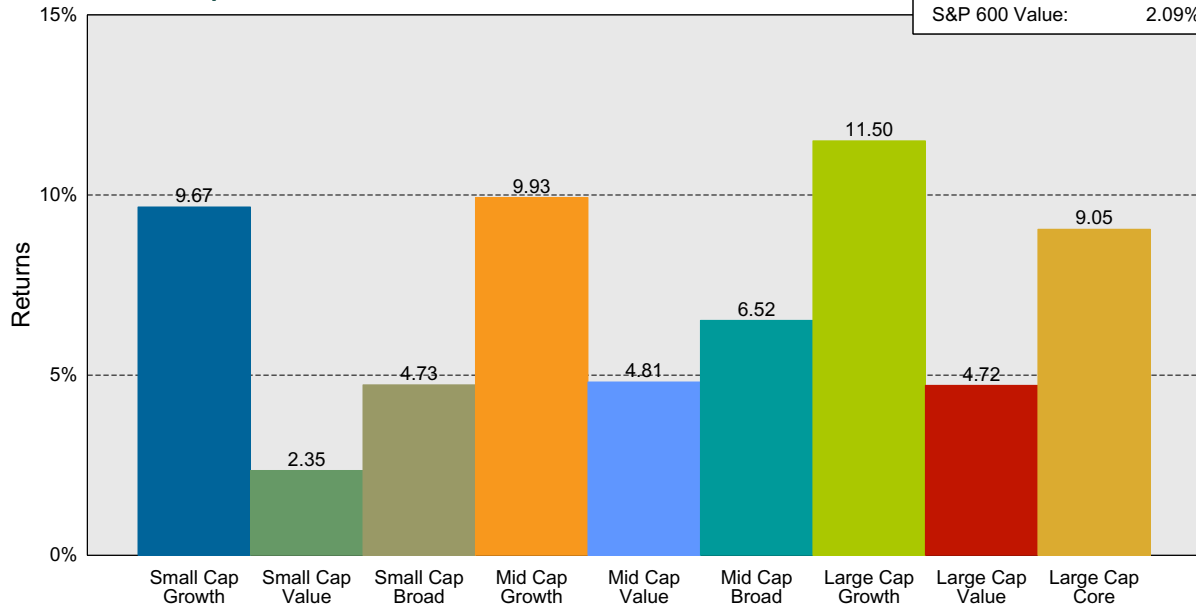


## Domestic Equity Active Management Overview

The S&P 500 Index was up 8.9% for the quarter. However, returns among constituents painted starkly different pictures. Consumer Discretionary (+15%) was the best performing sector while Energy (-20%) was the worst. Year-to-date, a handful of sectors remain in the red while others are up double digits. A similar and related picture emerges with style indices. The tech-heavy R1000 Growth Index (+13.2%) was again the best performer. Conversely, the R1000 Value Index was up only 5.6% in the quarter and it has lost nearly 12% this year. The dispersion between growth and value is near an all-time high and equally stark in small and midcap stocks for both the quarter and nine-month periods. Strong stock performance has been concentrated among a few names in the market. The top five stocks (Facebook, Microsoft, Amazon, Alphabet, and Apple) in the S&P 500 account for 23% of the Index and contributed 33% of the quarter's performance.

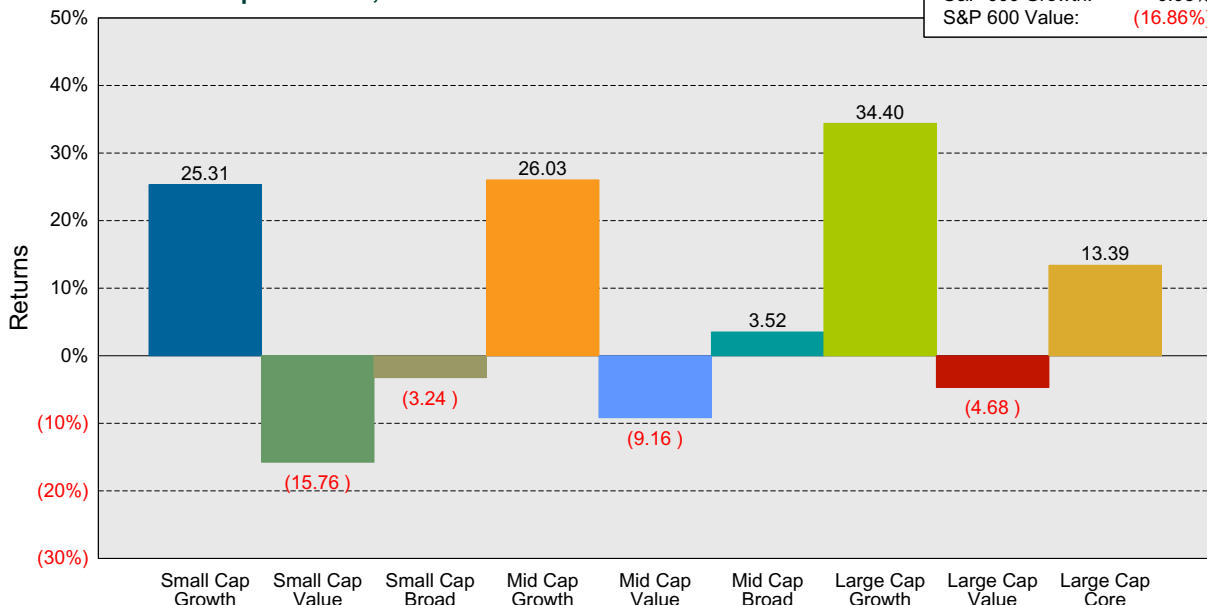
S&P 500:	8.93%
S&P 500 Growth:	11.75%
S&P 500 Value:	4.79%
S&P Mid Cap:	4.77%
S&P 600:	3.17%
S&P 600 Growth:	4.13%
S&P 600 Value:	2.09%

### Separate Account Style Group Median Returns for Quarter Ended September 30, 2020



S&P 500:	15.15%
S&P 500 Growth:	30.64%
S&P 500 Value:	(2.68%)
S&P Mid Cap:	(2.16%)
S&P 600:	(8.29%)
S&P 600 Growth:	0.08%
S&P 600 Value:	(16.86%)

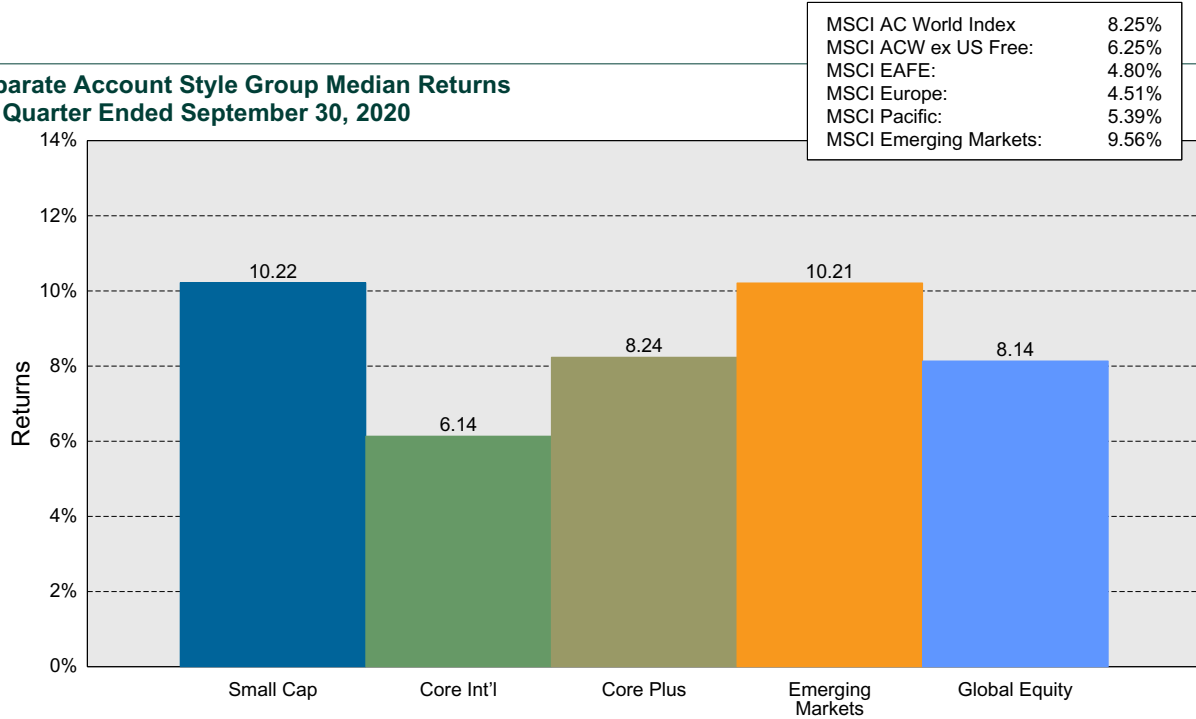
### Separate Account Style Group Median Returns for One Year Ended September 30, 2020



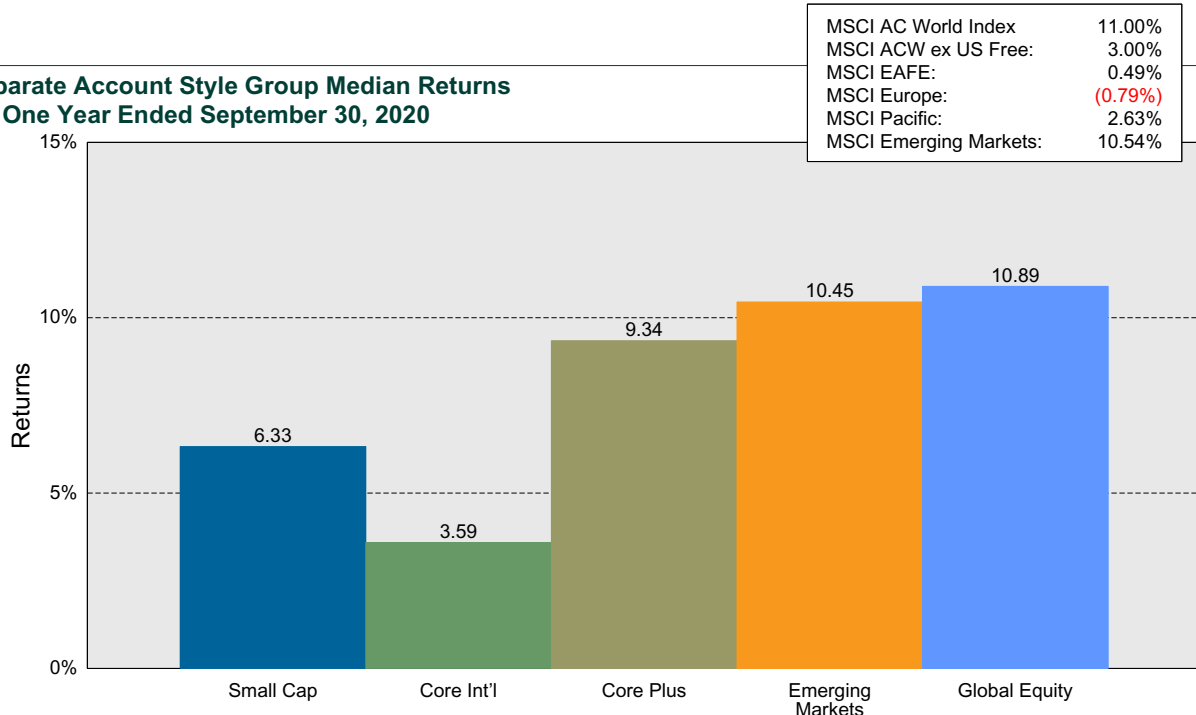
## International Equity Active Management Overview

Global equity index returns were positive across developed and emerging markets (MSCI ACWI: +8.1%; MSCI EM: +9.6%) but variable across styles, sectors, and countries. Growth continued to outperform value and, from a sector perspective, Technology was a top performer while Energy lagged. Regionally, The UK was roughly flat, Japan up 6.9%, and Europe ex-UK up 5.9%. Within Europe, some countries delivered double-digit returns while others suffered losses (Sweden and Denmark +16% vs Spain -4%). Similarly in emerging markets, Emerging Asia gained nearly 12% while Latin America and Emerging Europe fell 1.3% and 5.2%, respectively. BRIC country performance was also mixed (Brazil: -3%; Russia: -5%; India: +15% and China +13%). The U.S. dollar lost more than 4% vs the Australian dollar, the euro, and the British pound and 2% vs the yen. It was also down versus most emerging market currencies, with the Turkish lira (+11%) and the Brazilian real (+3%) being notable exceptions.

### Separate Account Style Group Median Returns for Quarter Ended September 30, 2020



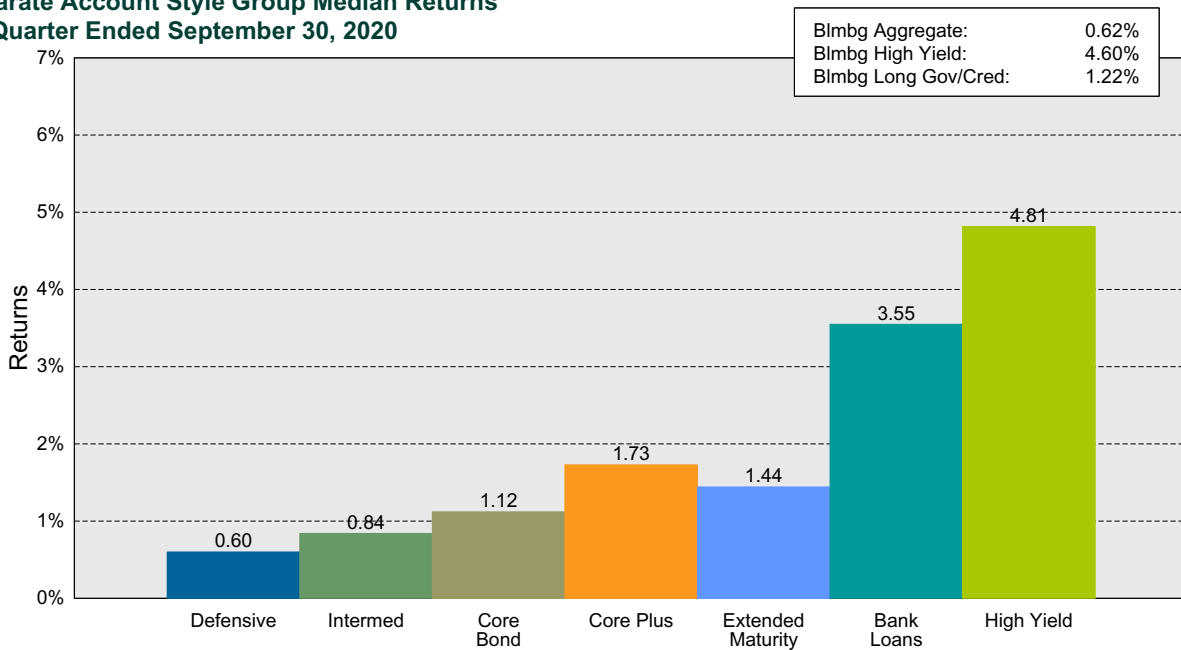
### Separate Account Style Group Median Returns for One Year Ended September 30, 2020



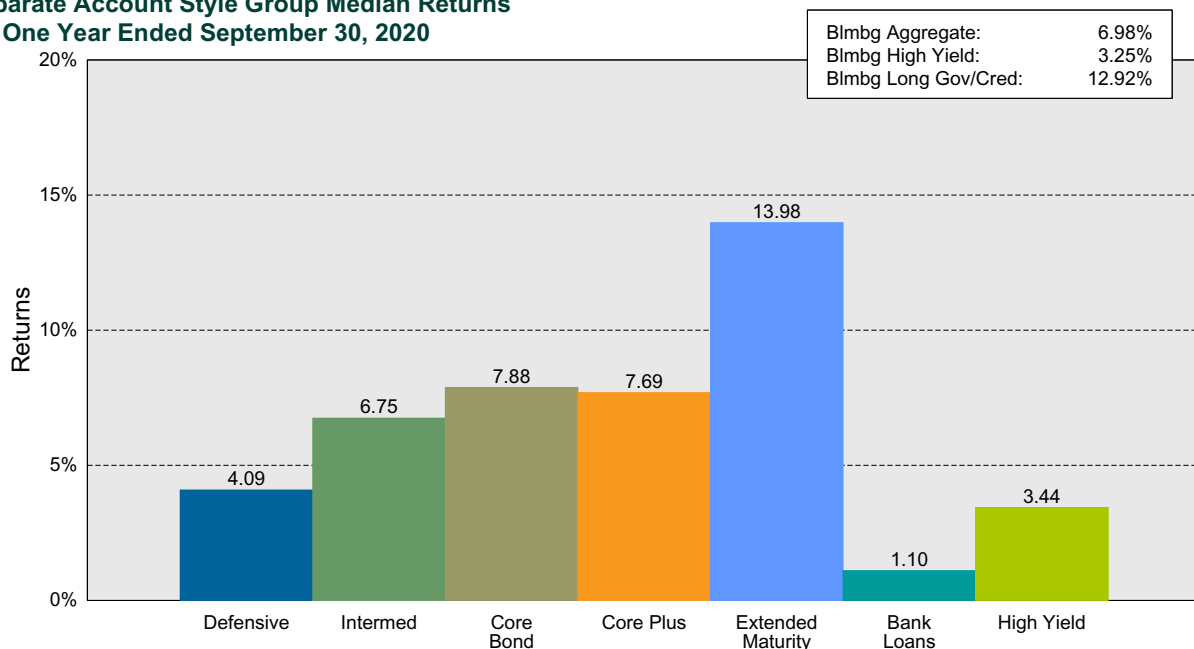
## Domestic Fixed Income Active Management Overview

U.S. Treasury yields were largely unchanged over the course of the third quarter. The 10-year U.S. Treasury yield closed the quarter at 0.69%; up 3 bps from June 30 but off far more sharply from the year-end level of 1.92%. Its yield hit an all-time low of 0.52% in August. TIPS (Bloomberg Barclays US TIPS: +3.0%) strongly outperformed nominal U.S. Treasuries for the quarter as 10-year breakeven spreads widened from 134 bps to 163 bps. The Bloomberg Barclays US Aggregate Bond Index gained 0.6%, with the corporate and commercial mortgage-backed sectors performing the best. Supply hit record levels as companies rushed to take advantage of ultra low interest rates. The Bloomberg Barclays High Yield Bond Index was up 4.6% and is now roughly flat y-t-d. High yield and leveraged loan default rates (5.8% and 4.3% y-o-y as of September) continued to trend higher but remain below levels reached in the GFC.

### Separate Account Style Group Median Returns for Quarter Ended September 30, 2020



### Separate Account Style Group Median Returns for One Year Ended September 30, 2020

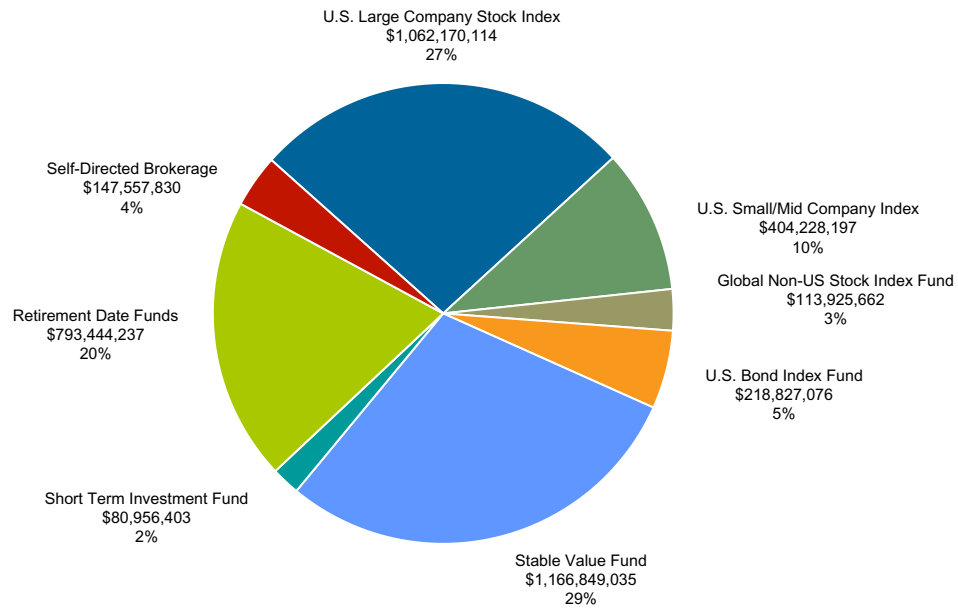




## Changes in Investment Fund Balances Period Ended September 30, 2020

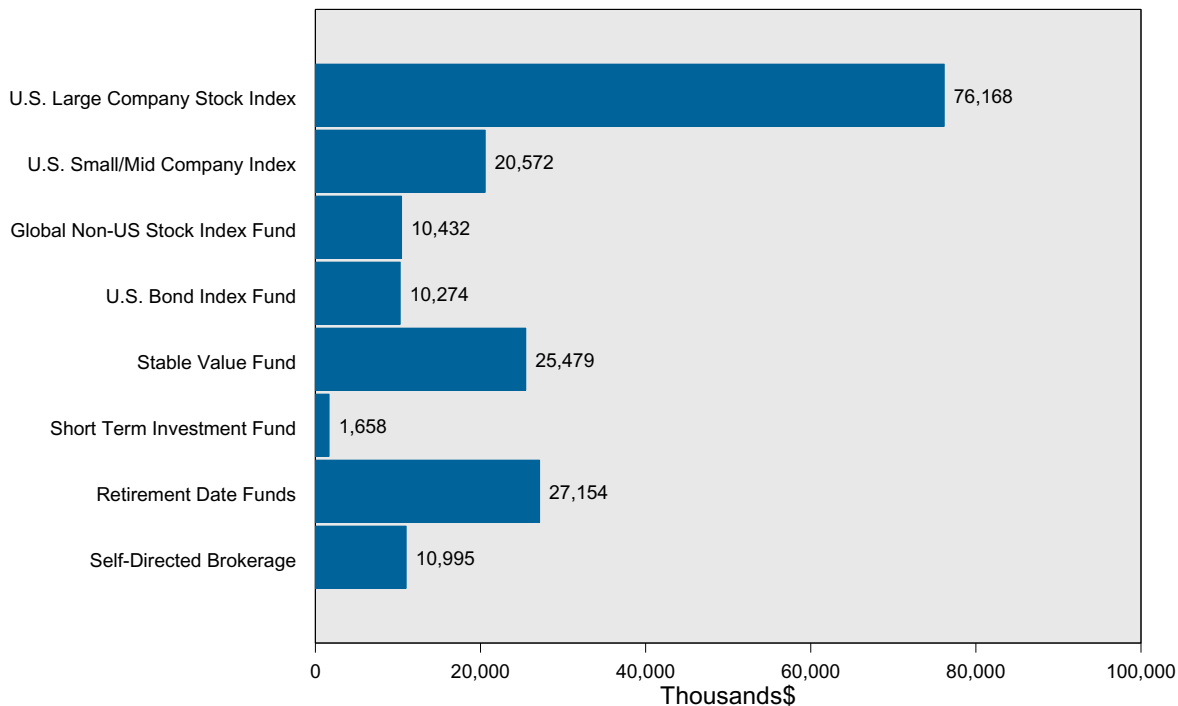
### Allocation Across Investment Options

The chart below illustrates the allocation of the aggregate fund assets across the various investment options for the quarter ended September 30, 2020.



### Changes in Fund Values

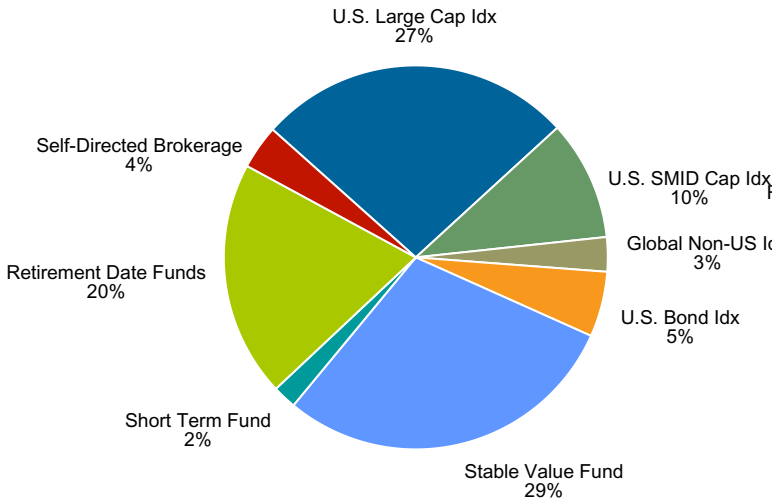
The chart below shows the net change in fund values across the various investment options for the quarter ended September 30, 2020. The change in value for each fund is the result of a combination of 3 factors: 1) market movements; 2) contributions or disbursements into or out of the funds by the participants (and any matching done by the company); and 3) transfers between funds by the participants.



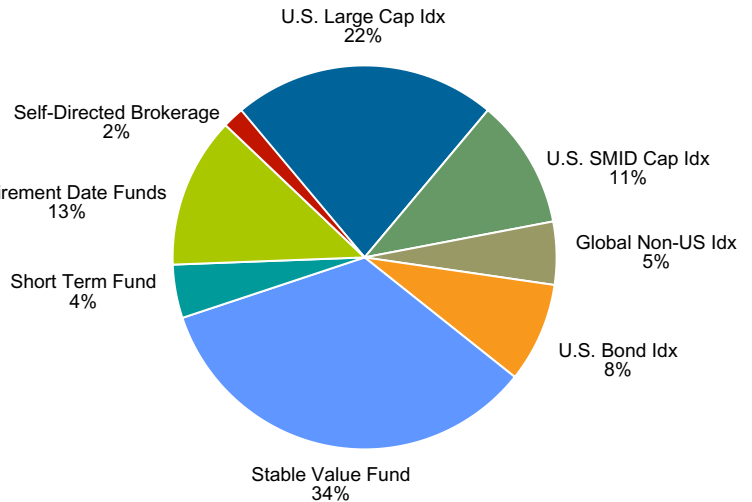
## Asset Allocation

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.

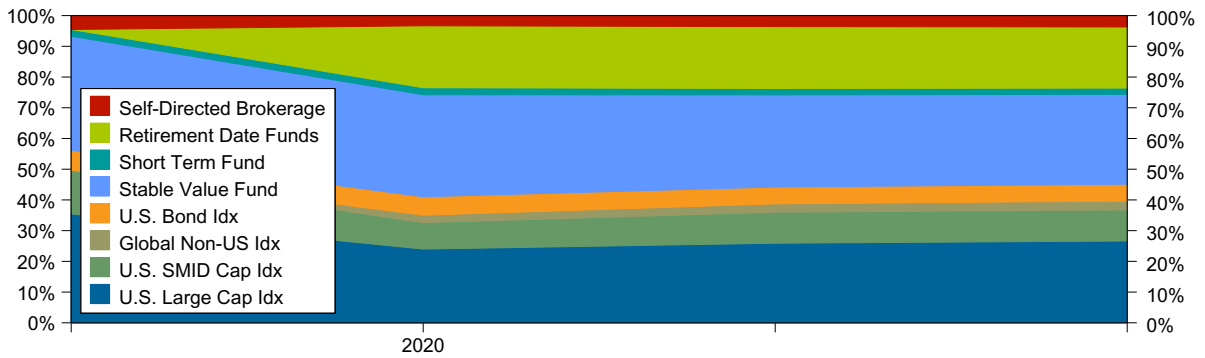
### Asset Allocation



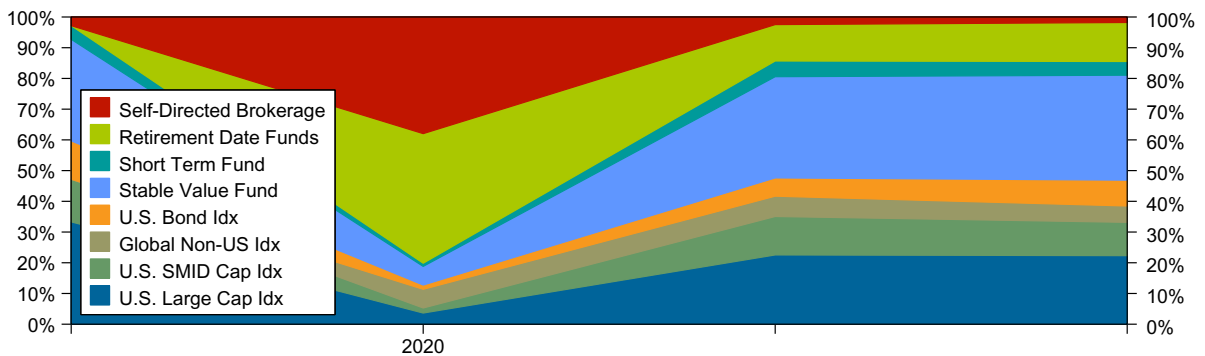
### Contributions



### Historical Asset Allocation



### Historical Allocation of Contributions



## Investment Fund Balances

The table below compares the fund's investment fund balances as of September 30, 2020 with that of June 30, 2020. 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

	September 30, 2020		Net New Inv. \$(000)	Inv. Return \$(000)	June 30, 2020	
	Market Value \$(000)	% of Total Weight			Market Value \$(000)	% of Total Weight
<b>SERS Retirement Date Funds</b>	<b>\$793,444</b>	<b>19.90%</b>	<b>\$(13,053)</b>	<b>\$40,207</b>	<b>\$766,290</b>	<b>20.14%</b>
SERS Post Retirement Fund	246,725	6.19%	(5,524)	9,137	243,112	6.39%
SERS 2025 Retirement Fund	143,537	3.60%	1,119	6,293	136,125	3.58%
SERS 2030 Retirement Fund	130,553	3.27%	(3,178)	6,879	126,853	3.33%
SERS 2035 Retirement Fund	114,530	2.87%	(4,015)	6,978	111,567	2.93%
SERS 2040 Retirement Fund	67,026	1.68%	(2,017)	4,486	64,557	1.70%
SERS 2045 Retirement Fund	49,480	1.24%	(129)	3,470	46,139	1.21%
SERS 2050 Retirement Fund	29,254	0.73%	119	2,115	27,020	0.71%
SERS 2055 Retirement Fund	8,014	0.20%	227	558	7,230	0.19%
SERS 2060 Retirement Fund	2,973	0.07%	47	214	2,712	0.07%
SERS 2065 Retirement Fund	1,351	0.03%	298	77	976	0.03%
<b>SERS U.S. Equity</b>	<b>\$1,466,398</b>	<b>36.77%</b>	<b>\$(28,196)</b>	<b>\$124,937</b>	<b>\$1,369,658</b>	<b>35.99%</b>
SERS U.S. Large Company Index	1,062,170	26.63%	(11,411)	87,580	986,002	25.91%
SERS U.S. SMID Company Index	404,228	10.14%	(16,785)	37,357	383,656	10.08%
<b>SERS Non-U.S. Equity</b>	<b>\$113,926</b>	<b>2.86%</b>	<b>\$4,235</b>	<b>\$6,197</b>	<b>\$103,493</b>	<b>2.72%</b>
SERS Global Non-US IdxFund	113,926	2.86%	4,235	6,197	103,493	2.72%
<b>SERS Fixed Income</b>	<b>\$1,466,633</b>	<b>36.78%</b>	<b>\$30,173</b>	<b>\$7,238</b>	<b>\$1,429,222</b>	<b>37.56%</b>
SERS Short Term Investment Fund	80,956	2.03%	1,634	24	79,299	2.08%
SERS Stable Value Fund	1,166,849	29.26%	19,392	6,087	1,141,370	29.99%
SERS U.S. Bond Index Fund	218,827	5.49%	9,147	1,127	208,553	5.48%
<b>Self-Directed Brokerage</b>						
Self-Directed Brokerage Account	147,558	3.70%	(215)	11,210	136,563	3.59%
<b>SERS 457(b) Total Fund</b>	<b>\$3,987,959</b>	<b>100.0%</b>	<b>\$(7,056)</b>	<b>\$189,788</b>	<b>\$3,805,226</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 September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
<b>Net Performance</b>					
<b>Retirement Date Funds</b>					
SERS Post Retirement Fund	3.76%	4.87%	8.62%	6.28%	6.71%
BlackRock Post Retirement Index	3.72%	4.72%	8.46%	6.23%	6.66%
Callan Tgt Date Ret Inc	3.28%	4.09%	7.09%	5.33%	5.78%
SERS 2025 Retirement Fund	4.62%	3.51%	8.51%	6.55%	7.88%
BlackRock 2025 Index	4.60%	3.36%	8.36%	6.48%	7.79%
Callan Target Date 2025	4.76%	3.36%	8.18%	6.25%	7.85%
SERS 2030 Retirement Fund	5.48%	2.54%	8.58%	6.74%	8.48%
BlackRock 2030 Index	5.47%	2.39%	8.42%	6.64%	8.36%
Callan Target Date 2030	5.49%	2.73%	8.59%	6.54%	8.47%
SERS 2035 Retirement Fund	6.29%	1.64%	8.64%	6.90%	9.05%
BlackRock 2035 Index	6.28%	1.53%	8.50%	6.80%	8.90%
Callan Target Date 2035	6.24%	2.19%	8.79%	6.71%	8.96%
SERS 2040 Retirement Fund	7.02%	0.78%	8.62%	7.02%	9.51%
BlackRock 2040 Index	7.01%	0.67%	8.49%	6.91%	9.36%
Callan Target Date 2040	6.78%	1.63%	9.04%	6.69%	9.23%
SERS 2045 Retirement Fund	7.58%	0.33%	8.75%	7.11%	9.81%
BlackRock 2045 Index	7.58%	0.20%	8.60%	6.97%	9.62%
Callan Target Date 2045	7.15%	1.25%	9.05%	6.77%	9.45%
SERS 2050 Retirement Fund	7.85%	0.13%	8.80%	7.13%	9.88%
BlackRock 2050 Index	7.85%	0.04%	8.70%	7.01%	9.71%
Callan Target Date 2050	7.33%	0.91%	8.69%	6.69%	9.47%
SERS 2055 Retirement Fund	7.89%	0.16%	8.86%	7.14%	9.88%
BlackRock 2055 Index	7.90%	0.04%	8.74%	7.02%	9.72%
Callan Target Date 2055	7.37%	0.91%	8.79%	6.80%	9.75%
SERS 2060 Retirement Fund	7.88%	0.15%	8.85%	7.13%	9.87%
BlackRock 2060 Index	7.90%	0.04%	8.74%	7.02%	9.72%
Callan Target Date 2060	7.37%	0.89%	9.03%	6.72%	9.86%
SERS 2065 Retirement Fund	7.89%	0.06%	8.64%	-	-
BlackRock 2065 Index	7.90%	0.04%	8.74%	-	-
Callan Target Date 2065	7.38%	1.60%	10.06%	6.73%	-

\*Target Date funds replaced risk-based funds in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last 7 Years	Last 10 Years	Last 15 Years	Last 20 Years
<b>Net Performance</b>				
<b>Retirement Date Funds</b>				
SERS Post Retirement Fund	5.58%	5.89%	5.57%	-
BlackRock Post Retirement Index	5.53%	5.85%	5.55%	5.60%
Callan Tgt Date Ret Inc	4.70%	5.10%	4.78%	4.45%
SERS 2025 Retirement Fund	6.45%	7.17%	-	-
BlackRock 2025 Index	6.37%	7.10%	5.90%	4.96%
Callan Target Date 2025	6.62%	7.72%	5.95%	-
SERS 2030 Retirement Fund	6.86%	7.65%	6.14%	-
BlackRock 2030 Index	6.75%	7.56%	6.09%	4.97%
Callan Target Date 2030	7.13%	8.31%	6.16%	4.45%
SERS 2035 Retirement Fund	7.22%	8.09%	-	-
BlackRock 2035 Index	7.10%	7.98%	6.25%	4.95%
Callan Target Date 2035	7.47%	8.54%	6.43%	-
SERS 2040 Retirement Fund	7.54%	8.46%	6.45%	-
BlackRock 2040 Index	7.39%	8.34%	6.37%	4.89%
Callan Target Date 2040	7.73%	8.97%	6.50%	4.36%
SERS 2045 Retirement Fund	7.76%	8.77%	-	-
BlackRock 2045 Index	7.59%	8.63%	6.45%	4.84%
Callan Target Date 2045	7.79%	8.95%	7.02%	-
SERS 2050 Retirement Fund	7.86%	8.98%	-	-
BlackRock 2050 Index	7.71%	8.84%	6.66%	5.00%
Callan Target Date 2050	7.93%	9.18%	6.06%	-
SERS 2055 Retirement Fund	7.91%	9.12%	-	-
BlackRock 2055 Index	7.76%	8.98%	-	-
Callan Target Date 2055	7.97%	9.41%	-	-

\*Funds not listed do not have longer term history.

\*Target Date funds replaced risk-based funds in 1Q20.

## Investment Fund Returns

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

	12/2019- 9/2020	2019	2018	2017	2016
<b>Net Performance</b>					
<b>Retirement Date Funds</b>					
SERS Post Retirement Fund	4.87%	15.65%	(3.47%)	10.18%	6.10%
BlackRock Post Retirement Index	4.72%	15.63%	(3.48%)	10.10%	6.01%
Callan Tgt Date Ret Inc	4.09%	13.21%	(3.04%)	8.76%	5.69%
SERS 2025 Retirement Fund	3.51%	18.60%	(4.86%)	13.91%	7.30%
BlackRock 2025 Index	3.36%	18.56%	(4.90%)	13.75%	7.10%
Callan Target Date 2025	3.36%	18.51%	(5.19%)	14.94%	7.07%
SERS 2030 Retirement Fund	2.54%	20.80%	(5.71%)	15.83%	7.88%
BlackRock 2030 Index	2.39%	20.70%	(5.76%)	15.64%	7.61%
Callan Target Date 2030	2.73%	20.43%	(6.12%)	16.77%	7.54%
SERS 2035 Retirement Fund	1.64%	22.84%	(6.50%)	17.72%	8.44%
BlackRock 2035 Index	1.53%	22.72%	(6.58%)	17.48%	8.08%
Callan Target Date 2035	2.19%	22.17%	(7.03%)	18.51%	8.20%
SERS 2040 Retirement Fund	0.78%	24.71%	(7.22%)	19.38%	8.88%
BlackRock 2040 Index	0.67%	24.62%	(7.33%)	19.09%	8.51%
Callan Target Date 2040	1.63%	23.59%	(7.89%)	19.84%	8.46%
SERS 2045 Retirement Fund	0.33%	26.05%	(7.85%)	20.47%	9.20%
BlackRock 2045 Index	0.20%	25.90%	(7.99%)	20.15%	8.77%
Callan Target Date 2045	1.25%	24.60%	(8.21%)	20.63%	8.63%
SERS 2050 Retirement Fund	0.13%	26.60%	(8.11%)	20.85%	9.26%
BlackRock 2050 Index	0.04%	26.48%	(8.26%)	20.55%	8.82%
Callan Target Date 2050	0.91%	24.89%	(8.44%)	20.72%	8.57%
SERS 2055 Retirement Fund	0.16%	26.67%	(8.13%)	20.82%	9.22%
BlackRock 2055 Index	0.04%	26.58%	(8.28%)	20.55%	8.82%
Callan Target Date 2055	0.91%	24.97%	(8.44%)	21.10%	8.65%
SERS 2060 Retirement Fund	0.15%	26.66%	(8.14%)	20.77%	9.25%
BlackRock 2060 Index	0.04%	26.58%	(8.28%)	20.55%	8.82%
Callan Target Date 2060	0.89%	25.08%	(8.35%)	21.15%	8.80%
SERS 2065 Retirement Fund	0.06%	-	-	-	-
BlackRock 2065 Index	0.04%	-	-	-	-
Callan Target Date 2065	1.60%	25.62%	(8.63%)	-	-

\*Target Date funds replaced risk-based funds in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
<b>Net Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Index	8.93%	5.60%	15.18%	12.29%	14.16%
S&P 500 Index	8.93%	5.57%	15.15%	12.28%	14.15%
Callan Lg Cap Broad MF	9.19%	5.49%	15.02%	11.52%	13.14%
SERS SMID Company Index	9.85%	3.56%	12.72%	8.07%	11.24%
Dow Jones US Completion	9.90%	3.74%	12.93%	7.96%	11.08%
Callan SMID Broad MFs	6.52%	(0.19%)	6.56%	9.13%	10.30%
<b>International Equity</b>					
SERS Global Non-US Index	6.22%	(4.97%)	3.34%	1.49%	6.50%
MSCI ACWI ex US	6.25%	(5.44%)	3.00%	1.16%	6.23%
Callan Non US Equity MFs	6.54%	(2.88%)	4.37%	1.35%	5.38%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.08%	0.62%	1.11%	1.77%	1.35%
3-month Treasury Bill	0.04%	0.64%	1.10%	1.69%	1.20%
Callan Cash Database(1)	0.14%	0.92%	1.49%	1.98%	1.51%
SERS Stable Value Fund	0.55%	1.79%	2.46%	2.40%	2.21%
3-month Treasury Bill	0.04%	0.64%	1.10%	1.69%	1.20%
Callan Stable Value	0.55%	1.74%	2.41%	2.38%	2.18%
SERS U.S. Bond Index Fund	0.59%	6.87%	7.05%	5.26%	4.17%
Blmbg Aggregate	0.62%	6.79%	6.98%	5.24%	4.18%
Callan Core Bond MFs	1.17%	7.45%	7.58%	5.43%	4.46%

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

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last 7 Years	Last 10 Years	Last 15 Years	Last 20 Years
<b>Net Performance</b>				
<b>Domestic Equity</b>				
SERS U.S. Large Company Index	12.69%	13.76%	9.24%	6.47%
S&P 500 Index	12.68%	13.74%	9.19%	6.42%
Callan Lg Cap Broad MF	12.04%	13.12%	9.16%	6.45%
SERS SMID Company Index	9.36%	12.12%	9.09%	7.40%
Dow Jones US Completion	9.20%	11.93%	8.90%	7.11%
Callan SMID Broad MFs	8.73%	11.25%	8.83%	7.96%
<b>International Equity</b>				
SERS Global Non-US Index	3.43%	4.26%	-	-
MSCI ACWI ex US	3.18%	4.00%	4.09%	-
Callan Non US Equity MFs	3.48%	5.20%	4.52%	4.30%
<b>Domestic Fixed Income</b>				
SERS Short Term Investment Fund	1.01%	0.77%	1.47%	-
3-month Treasury Bill	0.86%	0.64%	1.29%	1.59%
Callan Cash Database(1)	1.18%	0.95%	1.71%	2.05%
SERS Stable Value Fund	2.23%	2.49%	3.19%	-
3-month Treasury Bill	0.86%	0.64%	1.29%	1.59%
Callan Stable Value	2.09%	2.12%	2.77%	3.41%
SERS U.S. Bond Index Fund	3.95%	3.60%	4.45%	4.98%
Blmbg Aggregate	3.97%	3.64%	4.48%	5.01%
Callan Core Bond MFs	4.03%	3.86%	4.73%	5.09%

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

\*Funds not listed do not have longer term history.

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Investment Fund Returns

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

	12/2019- 9/2020	2019	2018	2017	2016
<b>Net Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Index	5.60%	31.51%	(4.39%)	21.84%	11.98%
S&P 500 Index	5.57%	31.49%	(4.38%)	21.83%	11.96%
Callan Lg Cap Broad MF	5.49%	30.14%	(4.54%)	23.56%	8.43%
SERS SMID Company Index	3.56%	28.20%	(9.32%)	18.21%	16.08%
Dow Jones US Completion	3.74%	27.94%	(9.57%)	18.12%	15.75%
Callan SMID Broad MFs	(0.19%)	29.40%	(8.69%)	17.14%	13.80%
<b>International Equity</b>					
SERS Global Non-US Index	(4.97%)	21.77%	(13.86%)	27.63%	5.05%
MSCI ACWI ex US	(5.44%)	21.51%	(14.20%)	27.19%	4.50%
Callan Non US Equity MFs	(2.88%)	22.83%	(15.04%)	26.90%	0.23%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.62%	2.31%	2.09%	1.08%	0.59%
3-month Treasury Bill	0.64%	2.28%	1.87%	0.86%	0.33%
Callan Cash Database(1)	0.92%	2.69%	2.00%	1.19%	0.95%
SERS Stable Value Fund	1.79%	2.59%	2.34%	1.85%	1.99%
3-month Treasury Bill	0.64%	2.28%	1.87%	0.86%	0.33%
Callan Stable Value	1.74%	2.55%	2.24%	1.97%	1.89%
SERS U.S. Bond Index Fund	6.87%	8.69%	0.02%	3.53%	2.59%
Bimbg Aggregate	6.79%	8.72%	0.01%	3.54%	2.65%
Callan Core Bond MFs	7.45%	9.17%	(0.35%)	3.71%	3.03%

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

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
<b>Gross Performance</b>					
<b>Retirement Date Funds</b>					
SERS Post Retirement Fund	3.77%	4.92%	8.70%	6.35%	6.78%
BlackRock Post Retirement Index	3.72%	4.72%	8.46%	6.23%	6.66%
Callan Tgt Date Ret Inc	3.28%	4.09%	7.09%	5.33%	5.78%
SERS 2025 Retirement Fund	4.64%	3.56%	8.58%	6.62%	7.95%
BlackRock 2025 Index	4.60%	3.36%	8.36%	6.48%	7.79%
Callan Target Date 2025	4.76%	3.36%	8.18%	6.25%	7.85%
SERS 2030 Retirement Fund	5.50%	2.59%	8.65%	6.81%	8.55%
BlackRock 2030 Index	5.47%	2.39%	8.42%	6.64%	8.36%
Callan Target Date 2030	5.49%	2.73%	8.59%	6.54%	8.47%
SERS 2035 Retirement Fund	6.31%	1.69%	8.71%	6.98%	9.12%
BlackRock 2035 Index	6.28%	1.53%	8.50%	6.80%	8.90%
Callan Target Date 2035	6.24%	2.19%	8.79%	6.71%	8.96%
SERS 2040 Retirement Fund	7.04%	0.83%	8.70%	7.09%	9.58%
BlackRock 2040 Index	7.01%	0.67%	8.49%	6.91%	9.36%
Callan Target Date 2040	6.78%	1.63%	9.04%	6.69%	9.23%
SERS 2045 Retirement Fund	7.60%	0.38%	8.83%	7.18%	9.87%
BlackRock 2045 Index	7.58%	0.20%	8.60%	6.97%	9.62%
Callan Target Date 2045	7.15%	1.25%	9.05%	6.77%	9.45%
SERS 2050 Retirement Fund	7.87%	0.17%	8.87%	7.20%	9.95%
BlackRock 2050 Index	7.85%	0.04%	8.70%	7.01%	9.71%
Callan Target Date 2050	7.33%	0.91%	8.69%	6.69%	9.47%
SERS 2055 Retirement Fund	7.91%	0.21%	8.93%	7.22%	9.96%
BlackRock 2055 Index	7.90%	0.04%	8.74%	7.02%	9.72%
Callan Target Date 2055	7.37%	0.91%	8.79%	6.80%	9.75%
SERS 2060 Retirement Fund	7.90%	0.20%	8.92%	7.20%	9.94%
BlackRock 2060 Index	7.90%	0.04%	8.74%	7.02%	9.72%
Callan Target Date 2060	7.37%	0.89%	9.03%	6.72%	9.86%
SERS 2065 Retirement Fund	7.91%	0.10%	8.71%	-	-
BlackRock 2065 Index	7.90%	0.04%	8.74%	-	-
Callan Target Date 2065	7.38%	1.60%	10.06%	6.73%	-

\*Target Date funds replaced risk-based funds in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last 7 Years	Last 10 Years	Last 15 Years	Last 20 Years
<b>Gross Performance</b>				
<b>Retirement Date Funds</b>				
SERS Post Retirement Fund	5.66%	5.96%	5.64%	-
BlackRock Post Retirement Index	5.53%	5.85%	5.55%	5.60%
Callan Tgt Date Ret Inc	4.70%	5.10%	4.78%	4.45%
SERS 2025 Retirement Fund	6.52%	7.24%	-	-
BlackRock 2025 Index	6.37%	7.10%	5.90%	4.96%
Callan Target Date 2025	6.62%	7.72%	5.95%	-
SERS 2030 Retirement Fund	6.93%	7.73%	6.21%	-
BlackRock 2030 Index	6.75%	7.56%	6.09%	4.97%
Callan Target Date 2030	7.13%	8.31%	6.16%	4.45%
SERS 2035 Retirement Fund	7.29%	8.17%	-	-
BlackRock 2035 Index	7.10%	7.98%	6.25%	4.95%
Callan Target Date 2035	7.47%	8.54%	6.43%	-
SERS 2040 Retirement Fund	7.61%	8.53%	6.52%	-
BlackRock 2040 Index	7.39%	8.34%	6.37%	4.89%
Callan Target Date 2040	7.73%	8.97%	6.50%	4.36%
SERS 2045 Retirement Fund	7.83%	8.84%	-	-
BlackRock 2045 Index	7.59%	8.63%	6.45%	4.84%
Callan Target Date 2045	7.79%	8.95%	7.02%	-
SERS 2050 Retirement Fund	7.93%	9.05%	-	-
BlackRock 2050 Index	7.71%	8.84%	6.66%	5.00%
Callan Target Date 2050	7.93%	9.18%	6.06%	-
SERS 2055 Retirement Fund	7.98%	9.19%	-	-
BlackRock 2055 Index	7.76%	8.98%	-	-
Callan Target Date 2055	7.97%	9.41%	-	-

\*Funds not listed do not have longer term history.

\*Target Date funds replaced risk-based funds in 1Q20.



## Investment Fund Returns

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

	12/2019- 9/2020	2019	2018	2017	2016
<b>Gross Performance</b>					
<b>Retirement Date Funds</b>					
SERS Post Retirement Fund	4.92%	15.72%	(3.41%)	10.25%	6.18%
BlackRock Post Retirement Index	4.72%	15.63%	(3.48%)	10.10%	6.01%
Callan Tgt Date Ret Inc	4.09%	13.21%	(3.04%)	8.76%	5.69%
SERS 2025 Retirement Fund	3.56%	18.67%	(4.80%)	13.99%	7.37%
BlackRock 2025 Index	3.36%	18.56%	(4.90%)	13.75%	7.10%
Callan Target Date 2025	3.36%	18.51%	(5.19%)	14.94%	7.07%
SERS 2030 Retirement Fund	2.59%	20.86%	(5.63%)	15.91%	7.95%
BlackRock 2030 Index	2.39%	20.70%	(5.76%)	15.64%	7.61%
Callan Target Date 2030	2.73%	20.43%	(6.12%)	16.77%	7.54%
SERS 2035 Retirement Fund	1.69%	22.93%	(6.43%)	17.77%	8.50%
BlackRock 2035 Index	1.53%	22.72%	(6.58%)	17.48%	8.08%
Callan Target Date 2035	2.19%	22.17%	(7.03%)	18.51%	8.20%
SERS 2040 Retirement Fund	0.83%	24.80%	(7.17%)	19.45%	8.95%
BlackRock 2040 Index	0.67%	24.62%	(7.33%)	19.09%	8.51%
Callan Target Date 2040	1.63%	23.59%	(7.89%)	19.84%	8.46%
SERS 2045 Retirement Fund	0.38%	26.12%	(7.78%)	20.54%	9.25%
BlackRock 2045 Index	0.20%	25.90%	(7.99%)	20.15%	8.77%
Callan Target Date 2045	1.25%	24.60%	(8.21%)	20.63%	8.63%
SERS 2050 Retirement Fund	0.17%	26.70%	(8.05%)	20.94%	9.31%
BlackRock 2050 Index	0.04%	26.48%	(8.26%)	20.55%	8.82%
Callan Target Date 2050	0.91%	24.89%	(8.44%)	20.72%	8.57%
SERS 2055 Retirement Fund	0.21%	26.75%	(8.07%)	20.90%	9.30%
BlackRock 2055 Index	0.04%	26.58%	(8.28%)	20.55%	8.82%
Callan Target Date 2055	0.91%	24.97%	(8.44%)	21.10%	8.65%
SERS 2060 Retirement Fund	0.20%	26.74%	(8.08%)	20.85%	9.32%
BlackRock 2060 Index	0.04%	26.58%	(8.28%)	20.55%	8.82%
Callan Target Date 2060	0.89%	25.08%	(8.35%)	21.15%	8.80%
SERS 2065 Retirement Fund	0.10%	-	-	-	-
BlackRock 2065 Index	0.04%	-	-	-	-
Callan Target Date 2065	1.60%	25.62%	(8.63%)	-	-

\*Target Date funds replaced risk-based funds in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
<b>Gross Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Index	8.93%	5.60%	15.18%	12.30%	14.17%
S&P 500 Index	8.93%	5.57%	15.15%	12.28%	14.15%
Callan Lg Cap Broad MF	9.19%	5.49%	15.02%	11.52%	13.14%
SERS SMID Company Index	9.85%	3.56%	12.72%	8.08%	11.25%
Dow Jones US Completion	9.90%	3.74%	12.93%	7.96%	11.08%
Callan SMID Broad MFs	6.52%	(0.19%)	6.56%	9.13%	10.30%
<b>International Equity</b>					
SERS Global Non-US Index	6.22%	(4.96%)	3.35%	1.51%	6.51%
MSCI ACWI ex US	6.25%	(5.44%)	3.00%	1.16%	6.23%
Callan Non US Equity MFs	6.54%	(2.88%)	4.37%	1.35%	5.38%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.08%	0.62%	1.11%	1.77%	1.35%
3-month Treasury Bill	0.04%	0.64%	1.10%	1.69%	1.20%
Callan Cash Database(1)	0.14%	0.92%	1.49%	1.98%	1.51%
SERS Stable Value Fund	0.57%	1.84%	2.53%	2.49%	2.39%
3-month Treasury Bill	0.04%	0.64%	1.10%	1.69%	1.20%
Callan Stable Value	0.55%	1.74%	2.41%	2.38%	2.18%
SERS U.S. Bond Index Fund	0.59%	6.87%	7.06%	5.26%	4.17%
Blmbg Aggregate	0.62%	6.79%	6.98%	5.24%	4.18%
Callan Core Bond MFs	1.17%	7.45%	7.58%	5.43%	4.46%

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

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2020. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

### Returns for Periods Ended September 30, 2020

	Last 7 Years	Last 10 Years	Last 15 Years	Last 20 Years
<b>Gross Performance</b>				
<b>Domestic Equity</b>				
SERS U.S. Large Company Index	12.70%	13.77%	9.24%	6.47%
S&P 500 Index	12.68%	13.74%	9.19%	6.42%
Callan Lg Cap Broad MF	12.04%	13.12%	9.16%	6.45%
SERS SMID Company Index	9.36%	12.12%	9.09%	7.41%
Dow Jones US Completion	9.20%	11.93%	8.90%	7.11%
Callan SMID Broad MFs	8.73%	11.25%	8.83%	7.96%
<b>International Equity</b>				
SERS Global Non-US Index	3.45%	4.28%	-	-
MSCI ACWI ex US	3.18%	4.00%	4.09%	-
Callan Non US Equity MFs	3.48%	5.20%	4.52%	4.30%
<b>Domestic Fixed Income</b>				
SERS Short Term Investment Fund	1.01%	0.77%	1.47%	-
3-month Treasury Bill	0.86%	0.64%	1.29%	1.59%
Callan Cash Database(1)	1.18%	0.95%	1.71%	2.05%
SERS Stable Value Fund	2.46%	2.75%	3.45%	-
3-month Treasury Bill	0.86%	0.64%	1.29%	1.59%
Callan Stable Value	2.09%	2.12%	2.77%	3.41%
SERS U.S. Bond Index Fund	3.96%	3.60%	4.45%	4.98%
Blmbg Aggregate	3.97%	3.64%	4.48%	5.01%
Callan Core Bond MFs	4.03%	3.86%	4.73%	5.09%

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

\*Funds not listed do not have longer term history.

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Investment Fund Returns

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

	12/2019- 9/2020	2019	2018	2017	2016
<b>Gross Performance</b>					
<b>Domestic Equity</b>					
SERS U.S. Large Company Index	5.60%	31.51%	(4.38%)	21.85%	11.99%
S&P 500 Index	5.57%	31.49%	(4.38%)	21.83%	11.96%
Callan Lg Cap Broad MF	5.49%	30.14%	(4.54%)	23.56%	8.43%
SERS SMID Company Index	3.56%	28.21%	(9.32%)	18.21%	16.08%
Dow Jones US Completion	3.74%	27.94%	(9.57%)	18.12%	15.75%
Callan SMID Broad MFs	(0.19%)	29.40%	(8.69%)	17.14%	13.80%
<b>International Equity</b>					
SERS Global Non-US Index	(4.96%)	21.79%	(13.85%)	27.65%	5.06%
MSCI ACWI ex US	(5.44%)	21.51%	(14.20%)	27.19%	4.50%
Callan Non US Equity MFs	(2.88%)	22.83%	(15.04%)	26.90%	0.23%
<b>Domestic Fixed Income</b>					
SERS Short Term Investment Fund	0.62%	2.31%	2.09%	1.08%	0.59%
3-month Treasury Bill	0.64%	2.28%	1.87%	0.86%	0.33%
Callan Cash Database(1)	0.92%	2.69%	2.00%	1.19%	0.95%
SERS Stable Value Fund	1.84%	2.66%	2.41%	2.16%	2.31%
3-month Treasury Bill	0.64%	2.28%	1.87%	0.86%	0.33%
Callan Stable Value	1.74%	2.55%	2.24%	1.97%	1.89%
SERS U.S. Bond Index Fund	6.87%	8.69%	0.03%	3.53%	2.59%
Bimbg Aggregate	6.79%	8.72%	0.01%	3.54%	2.65%
Callan Core Bond MFs	7.45%	9.17%	(0.35%)	3.71%	3.03%

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

\*The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

**Pennsylvania SERS 457(b)**  
**Investment Manager Performance Monitoring Summary Report**  
**September 30, 2020**

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>Net of Fee Performance</b>									
<b>Retirement Date Funds</b>									
<b>SERS Post Retirement Fund</b> Callan Tgt Date Ret Inc	3.8 27	8.6 9	6.3 8	6.7 15	5.6 14	5.9 14			0.07 96
BlackRock Post Retirement Idx	3.7 30	8.5 10	6.2 9	6.7 16	5.5 15	5.9 16			
<b>SERS 2025 Retirement Fund</b> Callan Target Date 2025	4.6 55	8.5 43	6.6 33	7.9 50	6.5 58	7.2 69			0.07 96
BlackRock 2025 Index	4.6 56	8.4 47	6.5 39	7.8 55	6.4 62	7.1 69			
<b>SERS 2030 Retirement Fund</b> Callan Target Date 2030	5.5 51	8.6 50	6.7 35	8.5 49	6.9 63	7.7 71			0.07 96
BlackRock 2030 Index	5.5 51	8.4 52	6.6 41	8.4 54	6.7 66	7.6 74			
<b>SERS 2035 Retirement Fund</b> Callan Target Date 2035	6.3 44	8.6 54	6.9 36	9.0 42	7.2 62	8.1 70			0.07 96
BlackRock 2035 Index	6.3 44	8.5 57	6.8 43	8.9 53	7.1 68	8.0 73			
<b>SERS 2040 Retirement Fund</b> Callan Target Date 2040	7.0 28	8.6 54	7.0 35	9.5 35	7.5 59	8.5 68			0.07 96
BlackRock 2040 Index	7.0 29	8.5 56	6.9 40	9.4 42	7.4 66	8.3 71			
<b>SERS 2045 Retirement Fund</b> Callan Target Date 2045	7.6 15	8.8 52	7.1 34	9.8 38	7.8 52	8.8 55			0.07 97
BlackRock 2045 Index	7.6 15	8.6 56	7.0 39	9.6 44	7.6 65	8.6 63			
<b>SERS 2050 Retirement Fund</b> Callan Target Date 2050	7.9 10	8.8 49	7.1 33	9.9 36	7.9 53	9.0 58			0.07 97
BlackRock 2050 Index	7.9 10	8.7 50	7.0 38	9.7 42	7.7 59	8.8 61			
<b>SERS 2055 Retirement Fund</b> Callan Target Date 2055	7.9 11	8.9 48	7.1 32	9.9 40	7.9 54	9.1 57			0.07 97
BlackRock 2055 Index	7.9 11	8.7 52	7.0 37	9.7 51	7.8 62	9.0 61			
<b>SERS 2060 Retirement Fund</b> Callan Target Date 2060	7.9 16	8.8 51	7.1 34	9.9 49					0.07 96
BlackRock 2060 Index	7.9 13	8.7 52	7.0 38	9.7 60					

Returns:  
■ above median  
■ third quartile  
■ fourth quartile

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

Risk Quadrant:  


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

**Pennsylvania SERS 457(b)**  
**Investment Manager Performance Monitoring Summary Report**  
**September 30, 2020**

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 2065 Retirement Fund</b> Callan Target Date 2065	7.9 25	8.6 69							0.07 84
LifePath Index 2065	7.9 25	8.7 69							
<b>Domestic Equity</b>									
<b>SERS U.S. Large Company Index</b> Callan Lg Cap Broad MF	8.9 52	15.2 50	12.3 48	14.2 45	12.7 45	13.8 44			0.02 99
S&P 500 Index	8.9 52	15.1 50	12.3 48	14.1 45	12.7 45	13.7 45			
<b>SERS U.S. Small/Mid Company Index</b> Callan SMID Broad MFs	9.9 17	12.7 41	8.1 55	11.2 48	9.4 43	12.1 42			0.03 100
Dow Jones US Completion	9.9 16	12.9 41	8.0 55	11.1 48	9.2 44	11.9 46			
<b>International Equity</b>									
<b>SERS Global Non-U.S. Index Fund</b> Callan Non US Equity MFs	6.2 54	3.3 55	1.5 50	6.5 43	3.4 52	4.3 62			0.06 99
MSCI ACWI ex US	6.3 53	3.0 56	1.2 51	6.2 44	3.2 55	4.0 66			
<b>Domestic Fixed Income</b>									
<b>SERS Short Term Investment Fund</b> Callan Cash Database	0.1 60	1.1 84	1.8 81	1.3 79	1.0 81	0.8 82			0.00 100
3-month Treasury Bill	0.0 95	1.1 84	1.7 84	1.2 92	0.9 93	0.6 96			
<b>Comments:</b> Callan Cash Database includes STIF, enhanced cash, and money market funds.									
<b>SERS Stable Value Fund</b> Callan Stable Value	0.5 5	2.5 1	2.4 2	2.2 3	2.2 1	2.5 1			
3-month Treasury Bill	0.0 99	1.1 99	1.7 82	1.2 99	0.9 99	0.6 99			
<b>SERS U.S. Bond Index Fund</b> Callan Core Bond MFs	0.6 95	7.1 69	5.3 63	4.2 75	4.0 63	3.6 85			0.03 98
Blmbg Aggregate	0.6 95	7.0 71	5.2 64	4.2 74	4.0 62	3.6 79			

Returns:  
■ above median  
■ third quartile  
■ fourth quartile

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

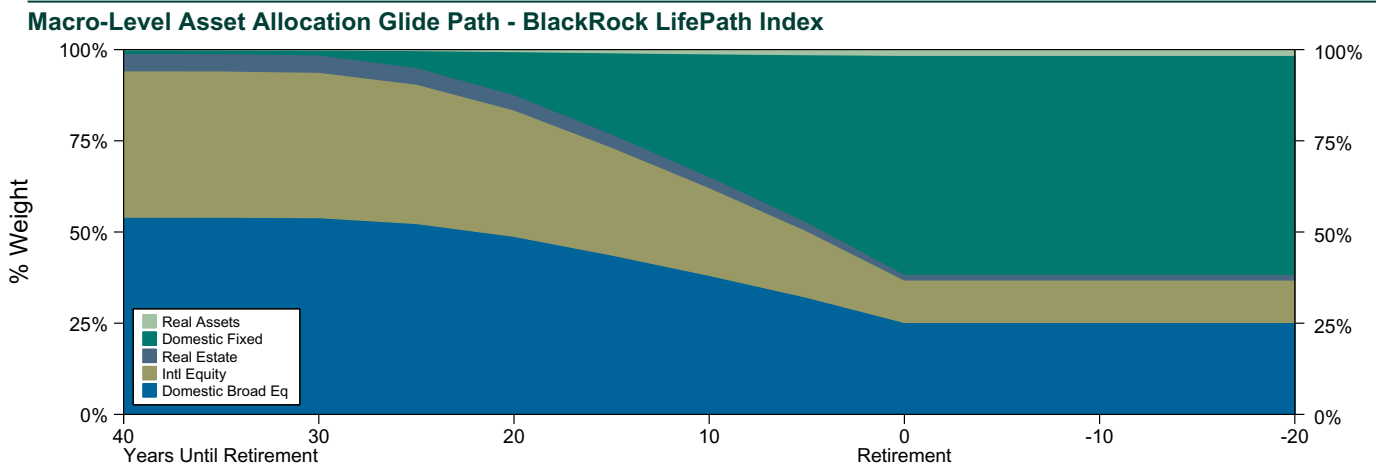
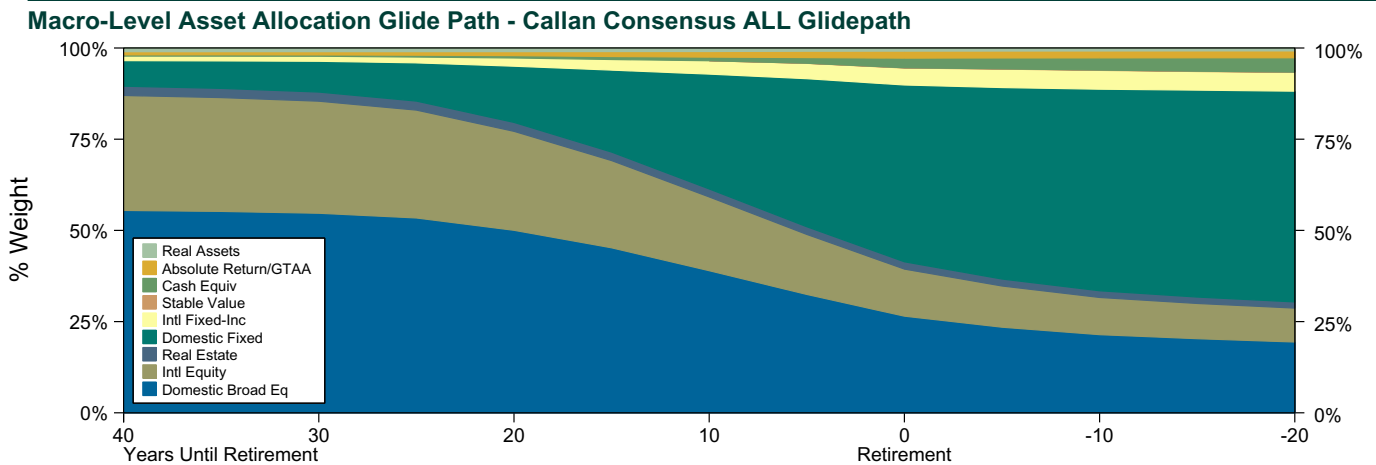
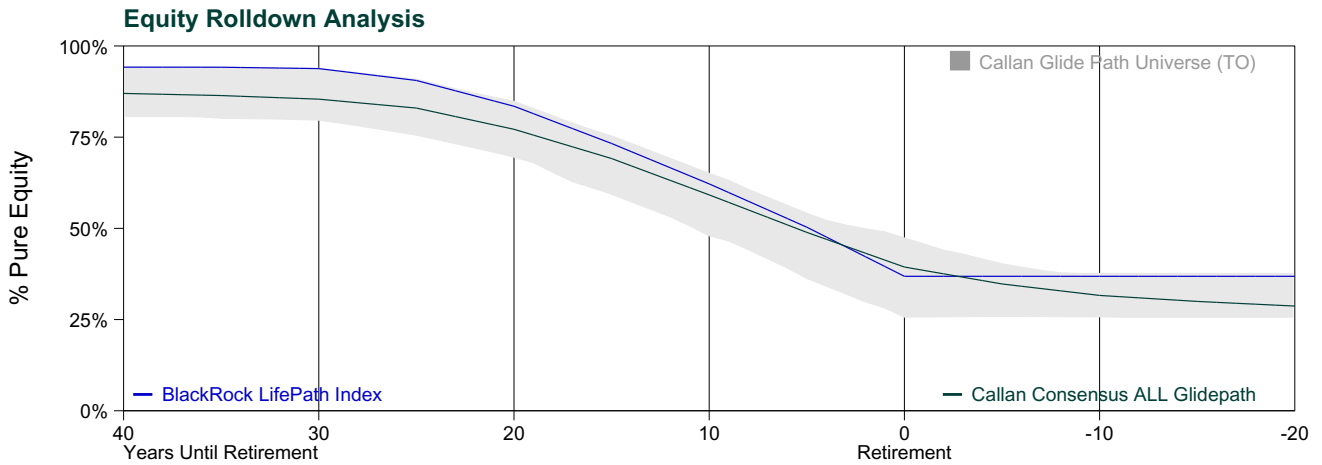
Risk Quadrant:  
  
Return  
Risk

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



# Callan Consensus ALL Glidepath Target Date Glide Path Analysis as of September 30, 2020

The following charts illustrate the asset allocation "glide path" underlying the relevant suite of target date funds. This analysis covers forty years of investor wealth accumulation up to retirement, as well as twenty years of wealth decumulation following retirement. The top chart shows the "pure" equity exposure (public equities excluding REITs) versus the peer group and index. The subsequent charts show more asset allocation detail at the high "macro" level.

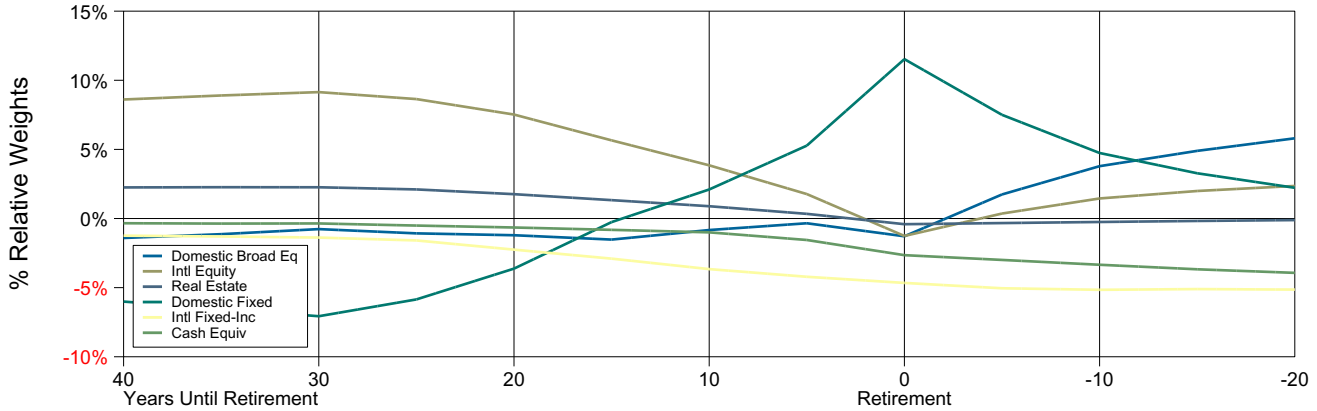




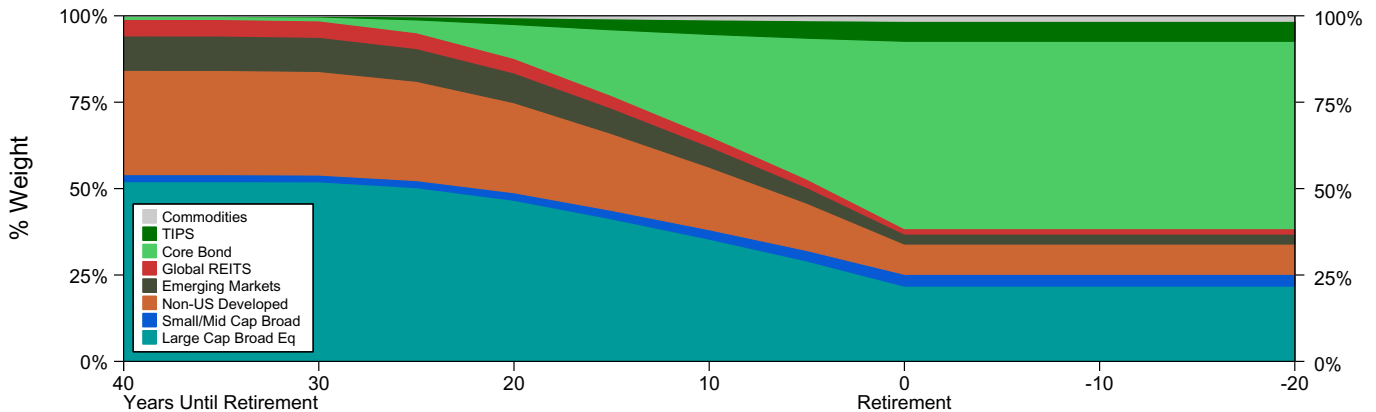
# BlackRock LifePath Index Target Date Glide Path Analysis as of September 30, 2020

The following charts illustrate the asset allocation "glide path" underlying the relevant suite of target date funds. This analysis covers forty years of investor wealth accumulation up to retirement, as well as twenty years of wealth decumulation following retirement. The top chart highlights any significant "macro-level" differences between the manager's asset allocation glide path and that of the glide path index. The bottom two charts illustrate the asset allocation glide paths of both the manager and index at the more detailed "micro" level.

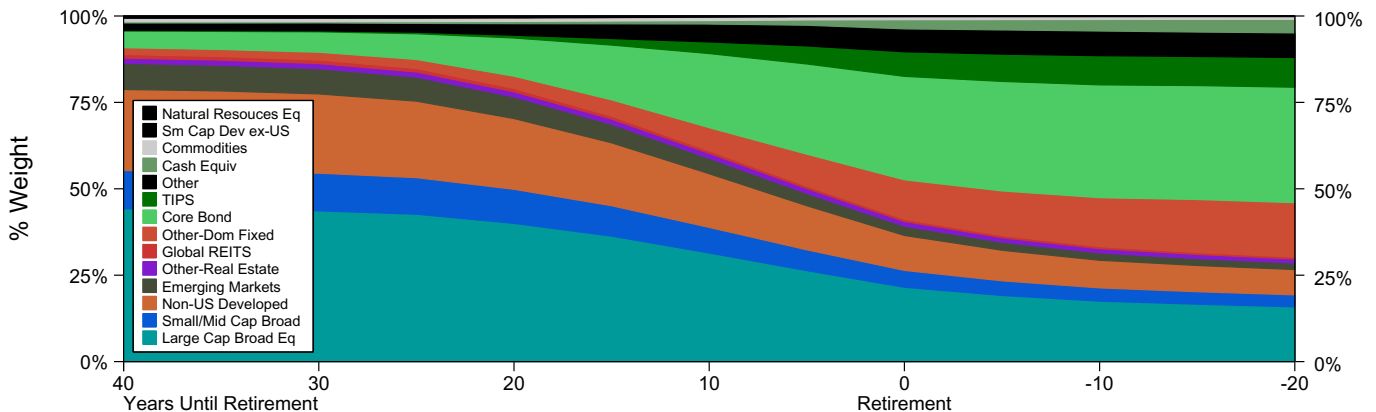
**Relative Macro Asset Allocation - BlackRock LifePath Index vs. Callan Consensus ALL Glidep**



**Micro-Level Asset Allocation Glide Path - BlackRock LifePath Index**



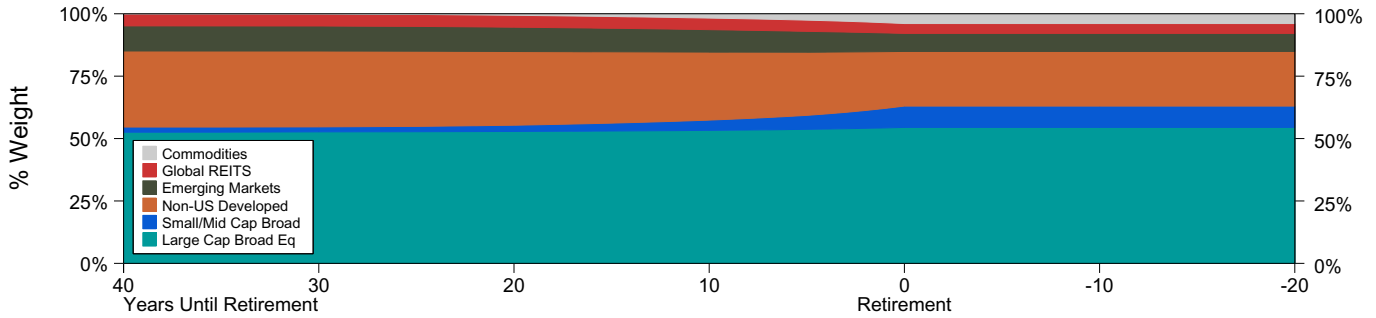
**Micro-Level Asset Allocation Glide Path - Callan Consensus ALL Glidepath**



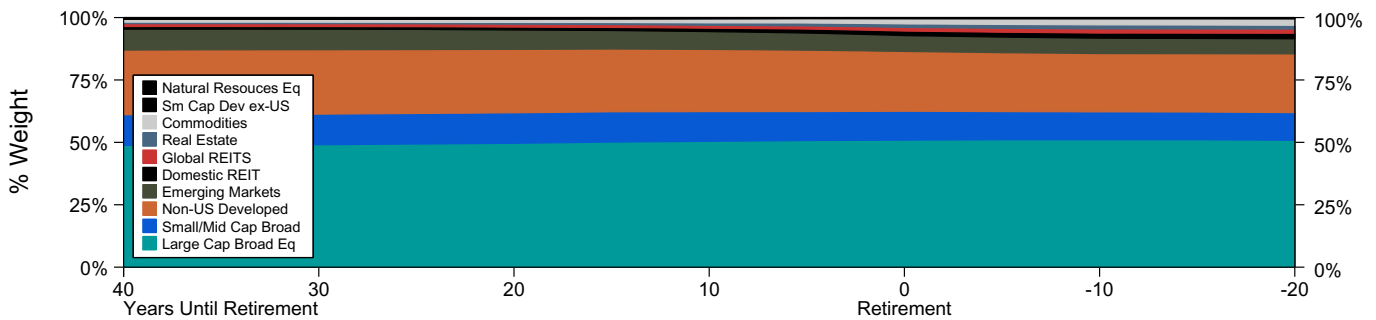
# BlackRock LifePath Index Target Date Glide Path Analysis as of September 30, 2020

The first two charts below illustrate the detailed composition over time of the "risky", or "growth" portion of the glide paths for both the manager and index, defined to be all public equity and real estate asset classes. These charts highlight both the levels of diversification and aggressiveness within the wealth creation portion of the glide paths. The last two charts serve a similar purpose but focus on the composition over time of the remaining wealth preservation portion (non-equity) of the manager and index glide paths.

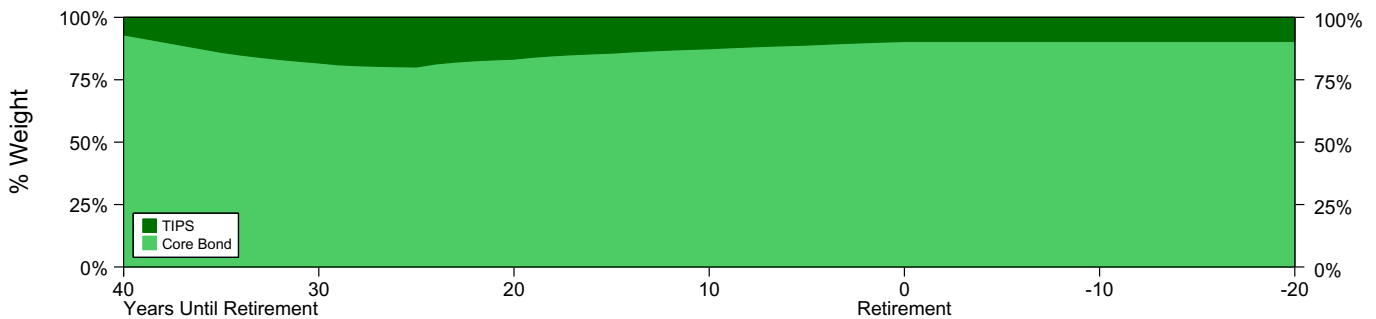
## Micro-Level Equity Allocation Glide Path - BlackRock LifePath Index



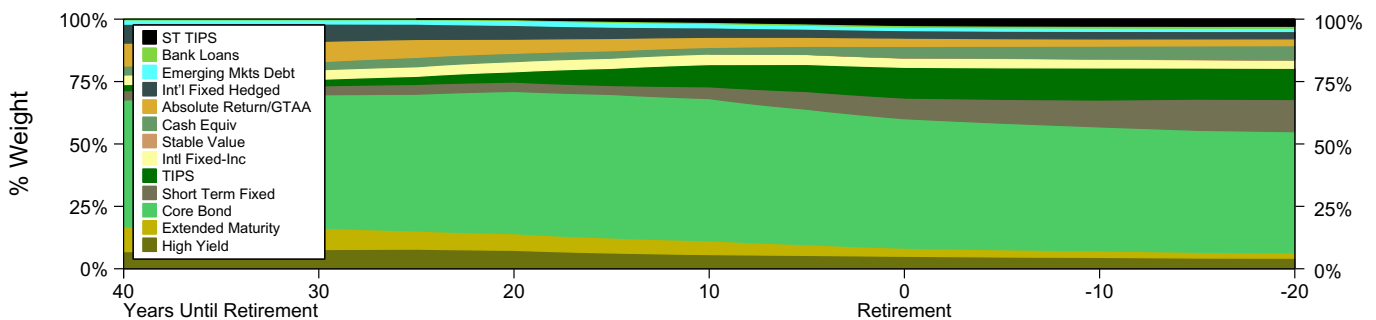
## Micro-Level Equity Asset Allocation Glide Path - Callan Consensus ALL Glidepath



## Micro-Level Non-Equity Allocation Glide Path - BlackRock LifePath Index



## Micro-Level Non-Equity Asset Allocation Glide Path - Callan Consensus ALL Glidep



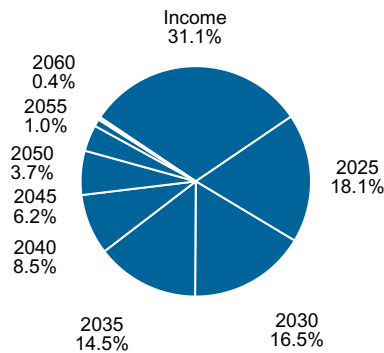
# Pennsylvania SERS 457(b) - BlackRock LifePath Index Target Date Fund Family Analysis as of September 30, 2020

The following is an analysis of the client's suite of target date funds as an aggregated portfolio using actual proportions held by the client's participants. The upper-left pie chart shows the current client weights across target dates. The rest of the charts compare different attributes of the aggregated client target date portfolio to a peer group of target date fund families, as well as target date indices, by mimicking the client target date weights using these alternatives. The first two charts evaluate the aggregate client equity exposure and expense ratio via target date funds. The last two charts analyze aggregate client target date performance on both an actual return basis as well as a "glide path return" basis (simulated returns using each funds' asset allocation "glide path" weights and index returns).

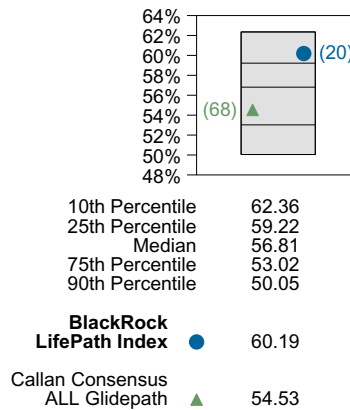
Glidepath Peer Group: ALL

Fee/Return Type: Gross

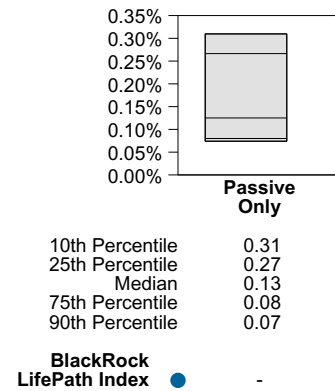
## Fund Family Allocation



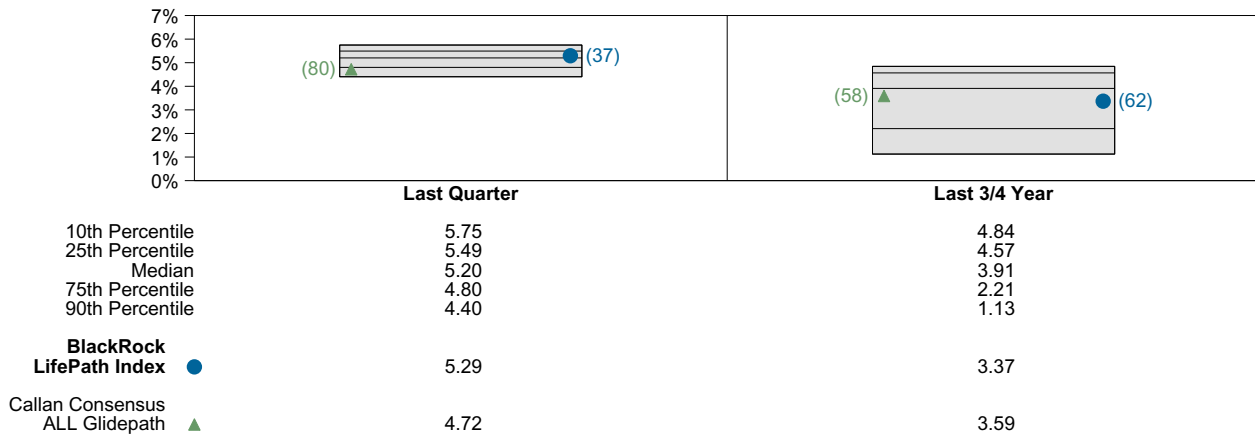
## Equity Exposure



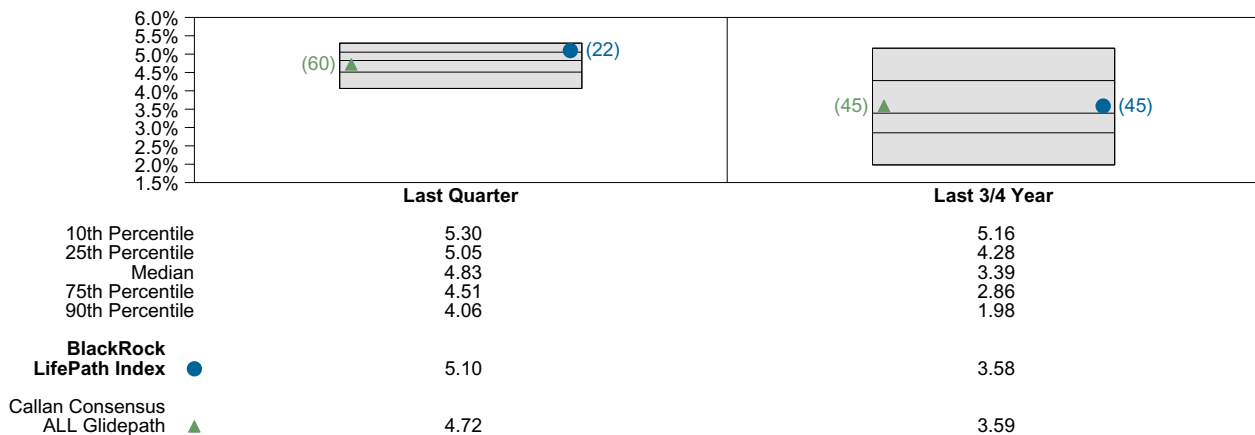
## Expense Ratio



## Target Date Family Performance vs Peer Families



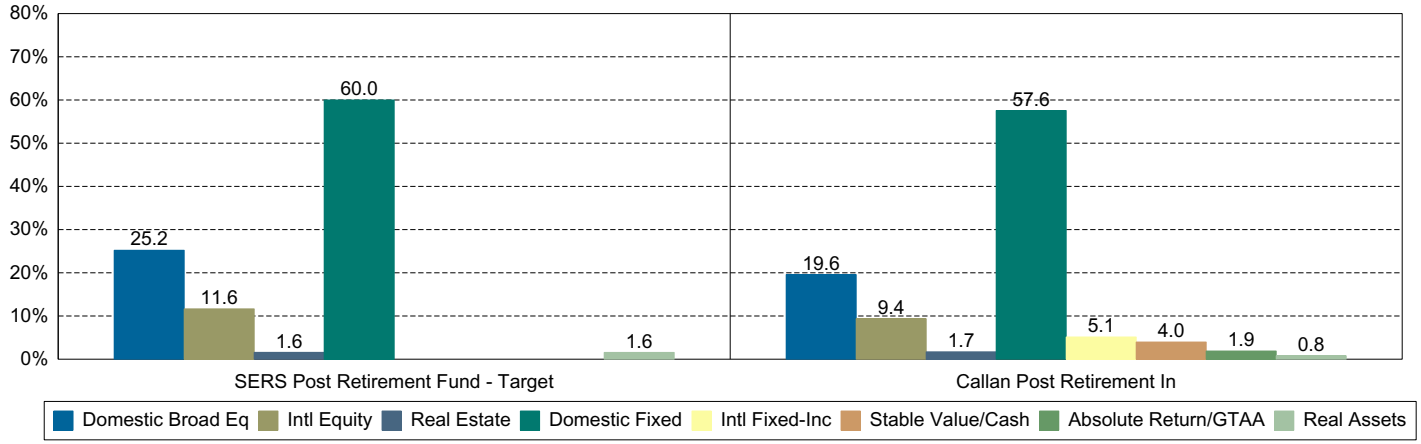
## Target Date Family Glide Path Returns vs Peer Families



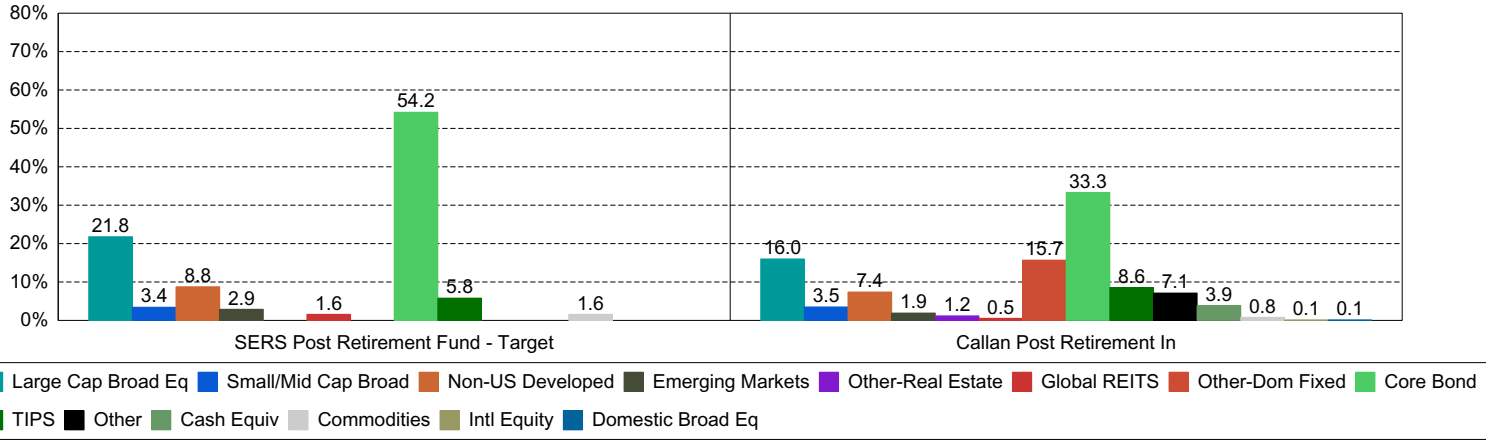
# SERS Post Retirement Fund Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

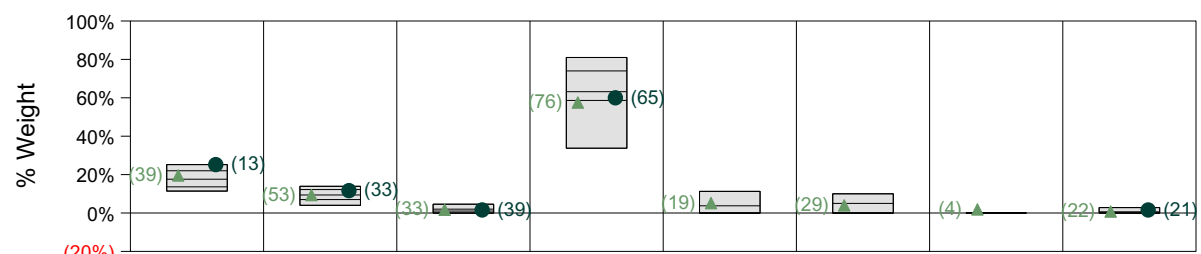
## Macro-Level Asset Allocation



## Micro-Level Asset Allocation



## Macro Asset Allocation Rankings vs. Callan Target Date Retirement Income



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	25.21	13.90	4.58	81.00	11.26	10.00	0.00	2.82
25th Percentile	22.00	12.21	1.99	74.00	3.75	5.00	0.00	0.62
Median	17.60	9.39	1.01	63.18	0.00	0.00	0.00	0.00
75th Percentile	13.62	7.00	0.00	58.62	0.00	0.00	0.00	0.00
90th Percentile	11.40	4.00	0.00	33.74	0.00	0.00	0.00	0.00

<b>SERS Post Retirement Fund - Target</b>	●	25.21	11.65	1.58	59.99	-	-	-	1.57
Callan Post Retirement In	▲	19.59	9.37	1.71	57.56	5.13	3.97	1.89	0.79

# SERS Post Retirement Fund Period Ended September 30, 2020

## Investment Philosophy

The BlackRock LifePath(R) Index Retirement Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

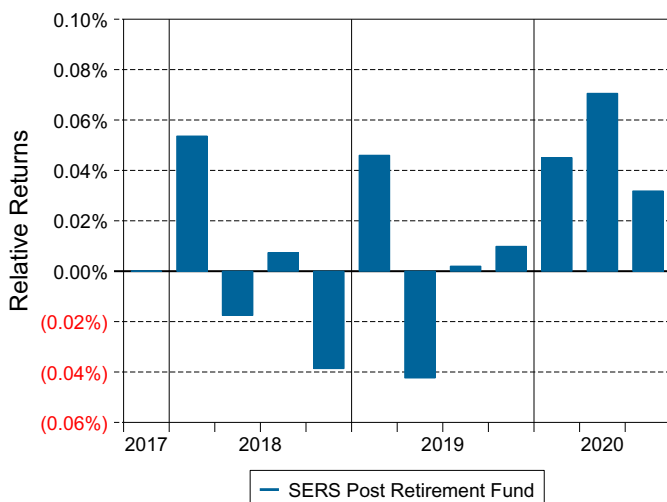
## Quarterly Summary and Highlights

- SERS Post Retirement Fund's portfolio posted a 3.76% return for the quarter placing it in the 27 percentile of the Callan Target Date Retirement Income group for the quarter and in the 9 percentile for the last year.
- SERS Post Retirement Fund's portfolio outperformed the BlackRock Post Retirement Index by 0.03% for the quarter and outperformed the BlackRock Post Retirement Index for the year by 0.17%.

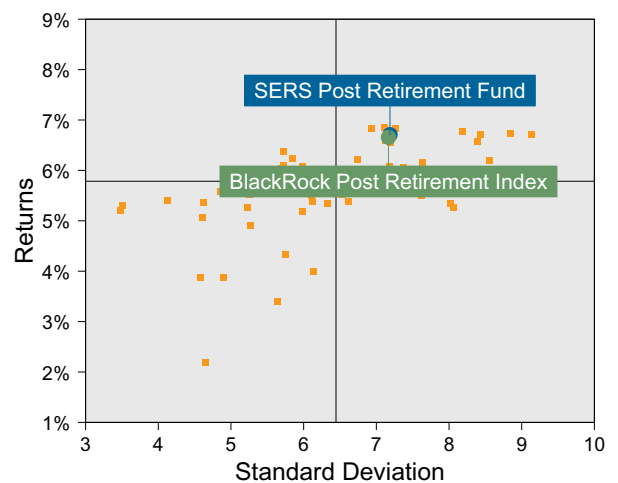
## Performance vs Callan Target Date Retirement Income (Net)



## Relative Returns vs BlackRock Post Retirement Index



## Callan Target Date Retirement Income (Net) Annualized Five Year Risk vs Return

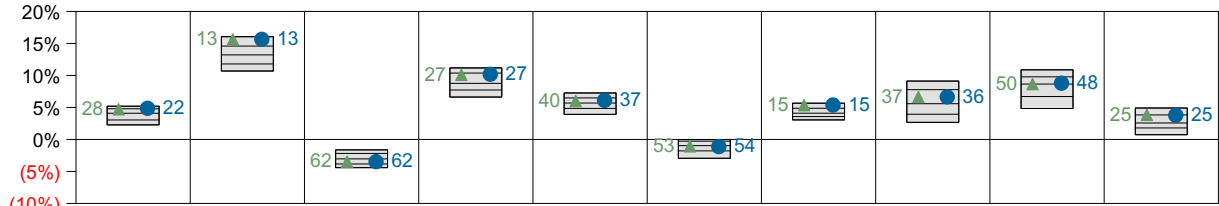


# SERS Post Retirement Fund Return Analysis Summary

## Return Analysis

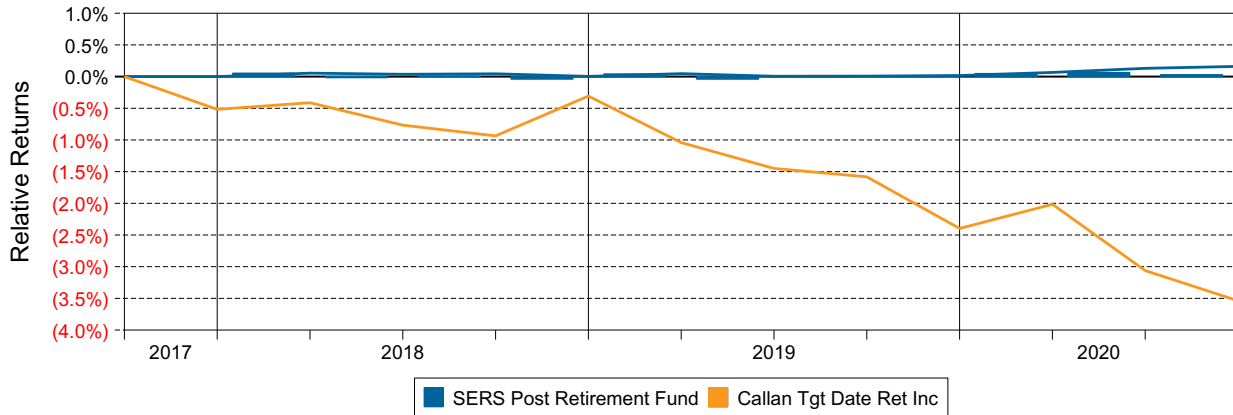
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date Retirement Income (Net)

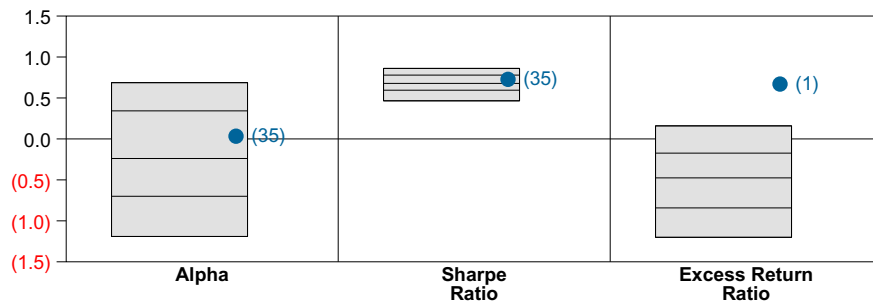


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	5.19	16.05	(1.63)	11.17	7.26	(0.02)	5.66	9.12	10.88	4.91
25th Percentile	4.79	14.59	(2.19)	10.37	6.49	(0.27)	4.87	7.78	9.78	3.83
Median	4.09	13.21	(3.04)	8.76	5.69	(0.97)	4.10	5.58	8.66	2.57
75th Percentile	3.04	11.80	(3.83)	7.72	4.85	(1.79)	3.57	3.94	6.70	1.80
90th Percentile	2.27	10.69	(4.41)	6.62	3.91	(2.95)	3.05	2.67	4.83	0.74
<b>SERS Post Retirement Fund</b>	● 4.87	15.65	(3.47)	10.18	6.10	(1.12)	5.38	6.64	8.79	3.78
BlackRock Post Retirement Index	▲ 4.72	15.63	(3.48)	10.10	6.01	(1.07)	5.36	6.63	8.65	3.85

### Cumulative and Quarterly Relative Return vs BlackRock Post Retirement Index



### Risk Adjusted Return Measures vs BlackRock Post Retirement Index Rankings Against Callan Target Date Retirement Income (Net) Seven Years Ended September 30, 2020

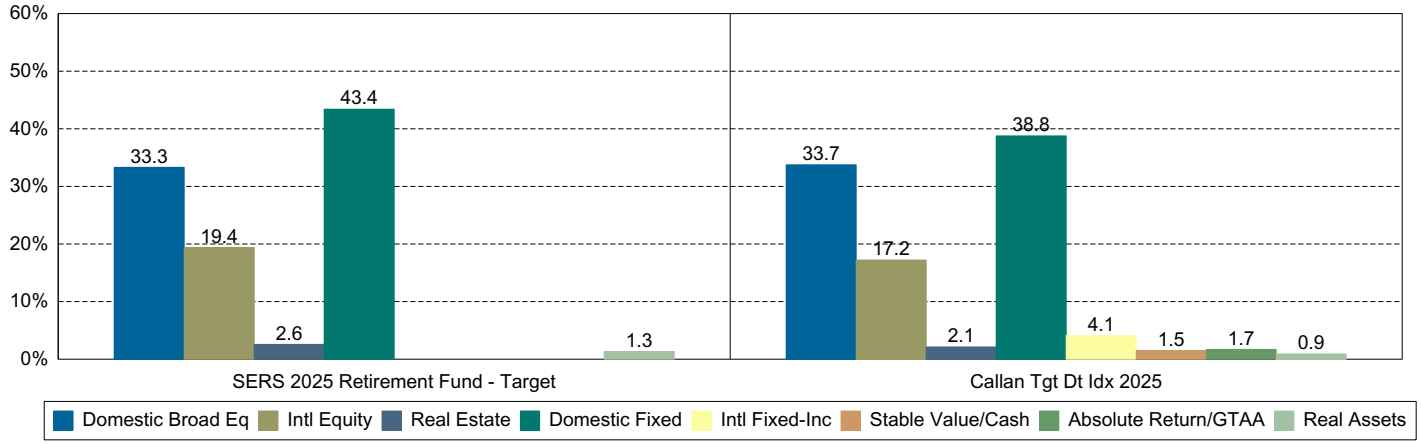


10th Percentile	0.69	0.86	0.16
25th Percentile	0.34	0.78	(0.17)
Median	(0.24)	0.68	(0.48)
75th Percentile	(0.70)	0.59	(0.84)
90th Percentile	(1.19)	0.47	(1.20)
<b>SERS Post Retirement Fund</b>	● 0.03	0.73	0.67

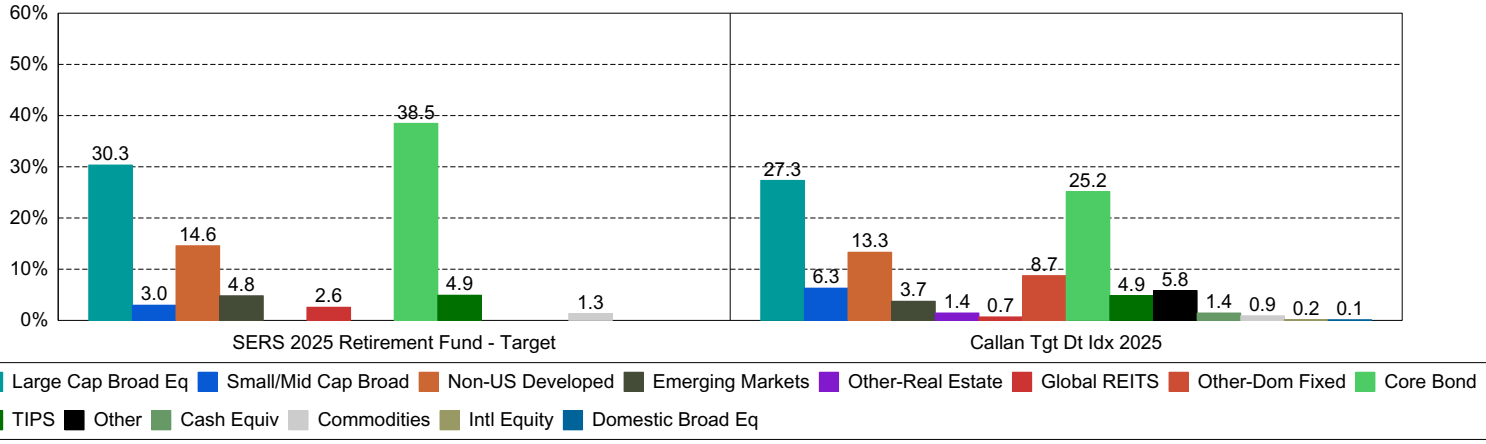
# SERS 2025 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

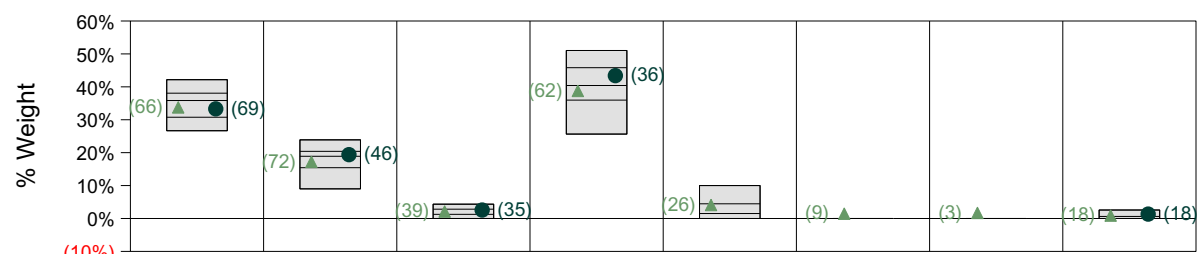
## Macro-Level Asset Allocation



## Micro-Level Asset Allocation



## Macro Asset Allocation Rankings vs. Callan Target Date 2025



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	42.17	23.89	4.35	51.04	10.00	0.00	0.00	2.57
25th Percentile	38.07	20.40	2.83	45.81	4.46	0.00	0.00	0.62
Median	35.84	18.90	1.26	40.40	1.50	0.00	0.00	0.00
75th Percentile	30.76	15.43	0.00	35.96	0.00	0.00	0.00	0.00
90th Percentile	26.66	9.00	0.00	25.64	0.00	0.00	0.00	0.00
<b>SERS 2025 Retirement Fund - Target</b>	● 33.31	19.39	2.57	43.40	-	-	-	1.33
Callan Tgt Dt Idx 2025	▲ 33.75	17.21	2.12	38.76	4.10	1.46	1.70	0.90

# SERS 2025 Retirement Fund Period Ended September 30, 2020

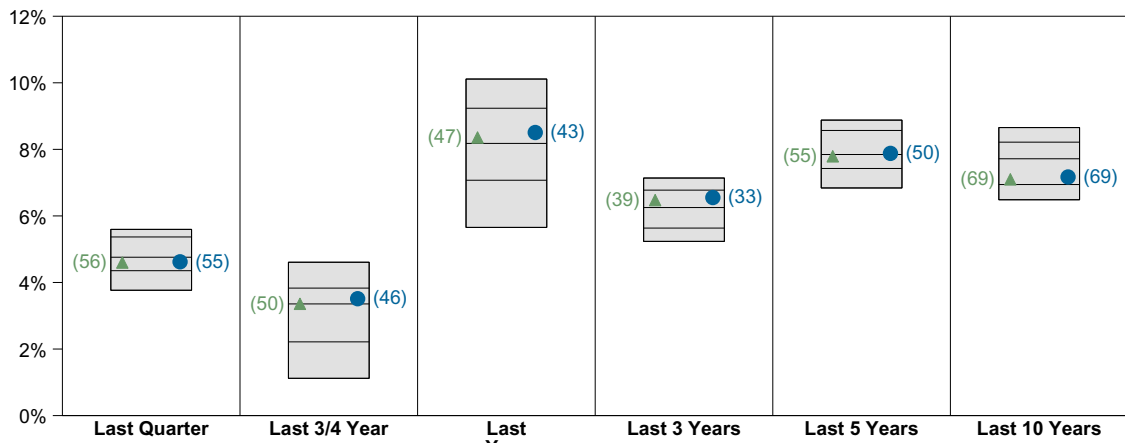
## Investment Philosophy

The BlackRock LifePath(R) Index 2025 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

## Quarterly Summary and Highlights

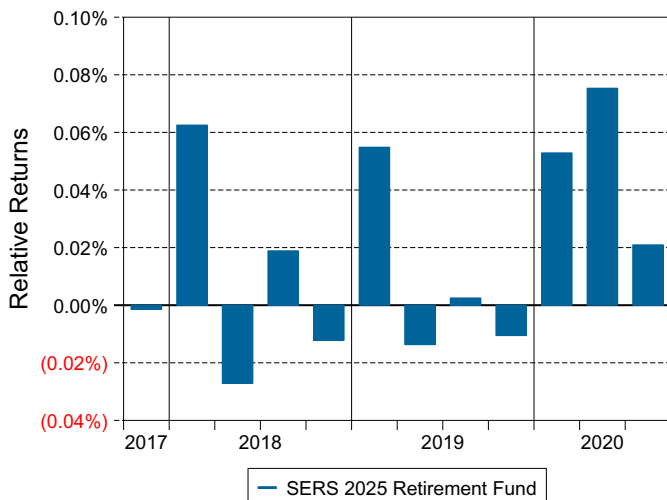
- SERS 2025 Retirement Fund's portfolio posted a 4.62% return for the quarter placing it in the 55 percentile of the Callan Target Date 2025 group for the quarter and in the 43 percentile for the last year.
- SERS 2025 Retirement Fund's portfolio outperformed the LifePath Index 2025 CB by 0.02% for the quarter and outperformed the LifePath Index 2025 CB for the year by 0.15%.

## Performance vs Callan Target Date 2025 (Net)

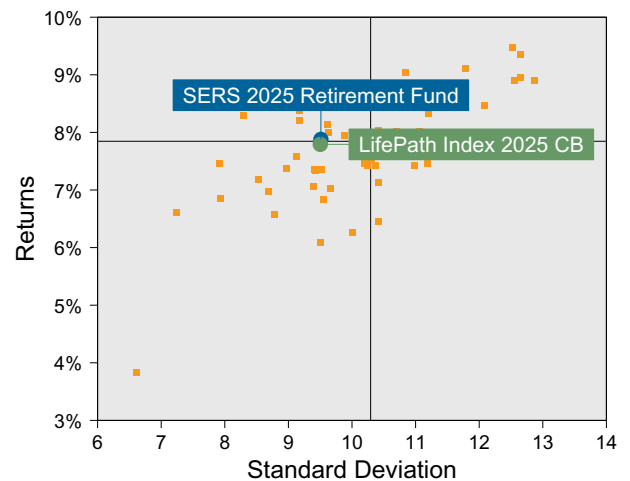


10th Percentile	5.60	4.61	10.11	7.14	8.88	8.65
25th Percentile	5.37	3.83	9.24	6.77	8.57	8.22
Median	4.76	3.36	8.18	6.25	7.85	7.72
75th Percentile	4.35	2.22	7.07	5.63	7.43	6.94
90th Percentile	3.77	1.12	5.65	5.24	6.84	6.49
<b>SERS 2025 Retirement Fund</b>	<b>● 4.62</b>	<b>3.51</b>	<b>8.51</b>	<b>6.55</b>	<b>7.88</b>	<b>7.17</b>
LifePath Index 2025 CB	▲ 4.60	3.36	8.36	6.48	7.79	7.10

## Relative Return vs LifePath Index 2025 CB



## Callan Target Date 2025 (Net) Annualized Five Year Risk vs Return



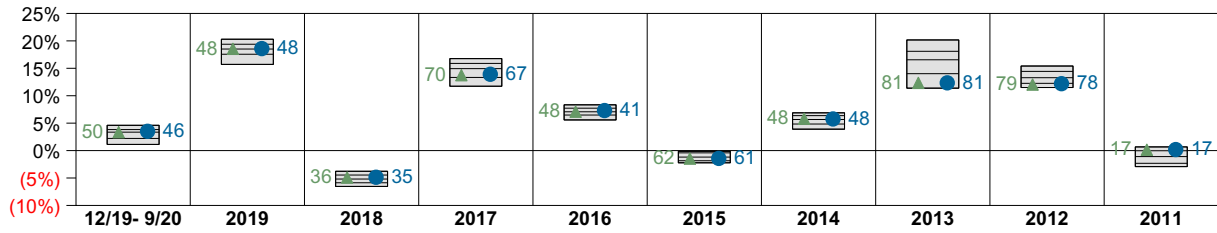


# SERS 2025 Retirement Fund Return Analysis Summary

## Return Analysis

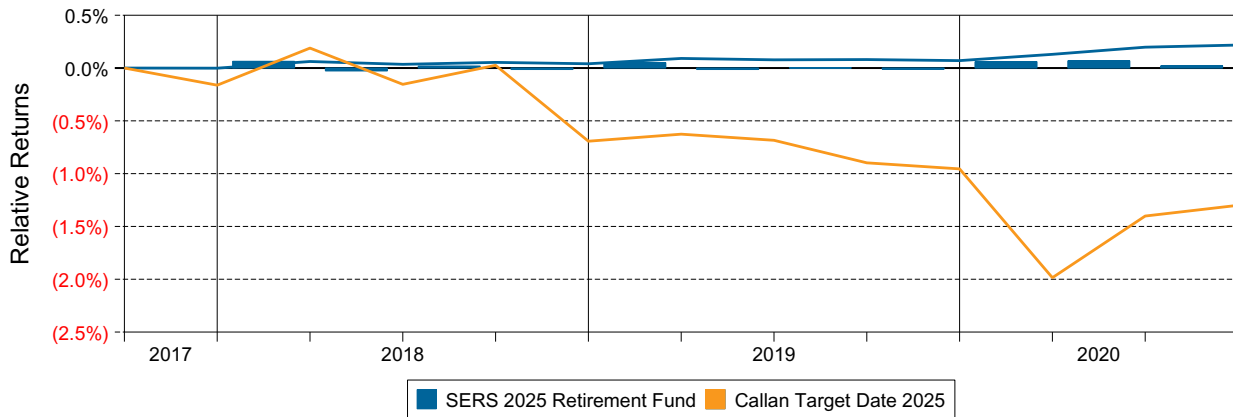
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2025 (Net)

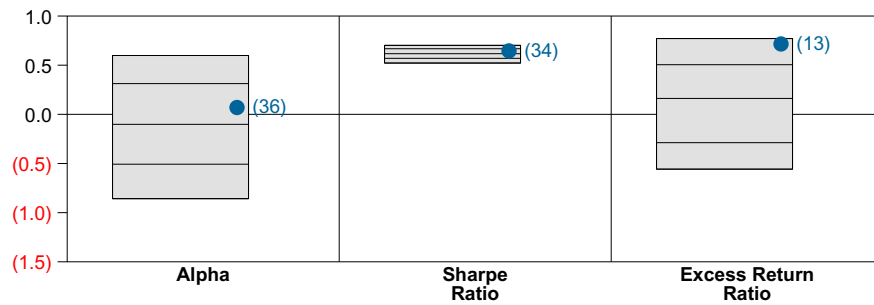


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	4.61	20.30	(3.77)	16.77	8.34	(0.13)	6.88	20.17	15.41	0.67
25th Percentile	3.83	19.39	(4.46)	15.89	7.73	(0.41)	6.37	18.10	14.44	(0.03)
Median	3.36	18.51	(5.19)	14.94	7.07	(1.19)	5.67	16.55	13.28	(1.09)
75th Percentile	2.22	17.56	(5.87)	13.33	6.48	(1.85)	4.84	14.02	12.26	(2.32)
90th Percentile	1.12	15.71	(6.53)	11.73	5.59	(2.23)	3.90	11.38	11.50	(2.92)
<b>SERS 2025 Retirement Fund</b>	3.51	18.60	(4.86)	13.91	7.30	(1.43)	5.77	12.34	12.20	0.18
LifePath Index 2025 CB	3.36	18.56	(4.90)	13.75	7.10	(1.45)	5.82	12.35	12.04	0.16

### Cumulative and Quarterly Relative Return vs LifePath Index 2025 CB



### Risk Adjusted Return Measures vs LifePath Index 2025 CB Rankings Against Callan Target Date 2025 (Net) Seven Years Ended September 30, 2020



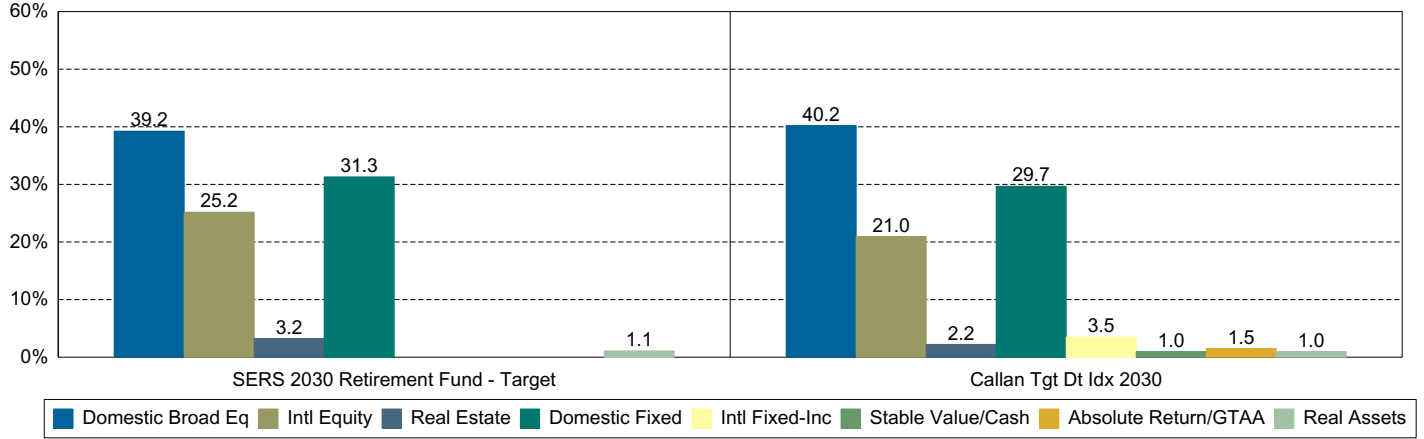
10th Percentile	0.60	0.70	0.77
25th Percentile	0.31	0.67	0.50
Median	(0.10)	0.62	0.16
75th Percentile	(0.51)	0.57	(0.29)
90th Percentile	(0.86)	0.52	(0.56)
<b>SERS 2025 Retirement Fund</b>	0.07	0.65	0.72

# SERS 2030 Retirement Fund

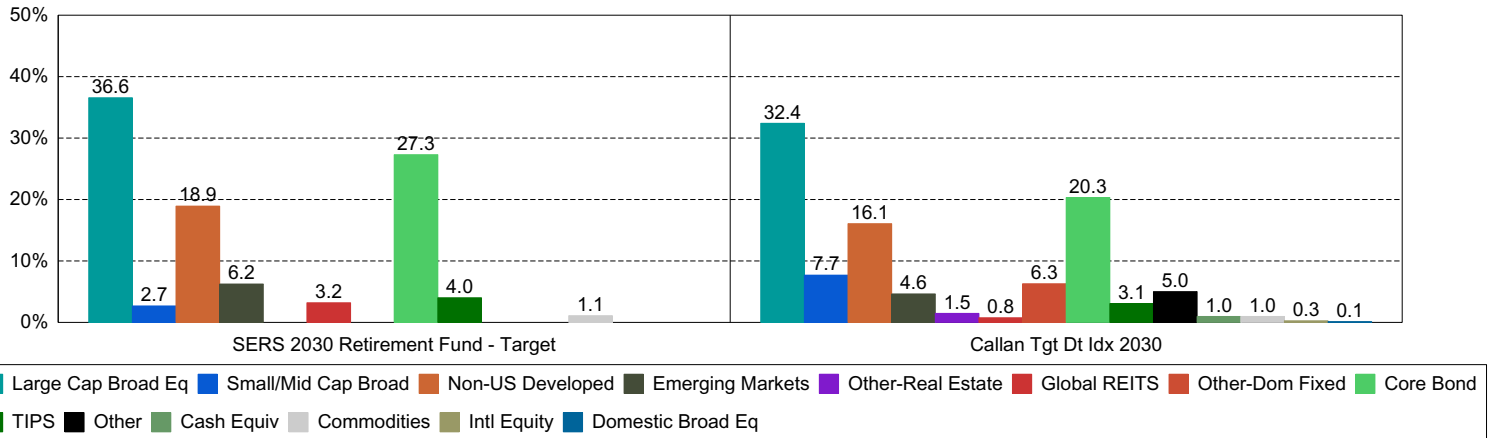
## Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

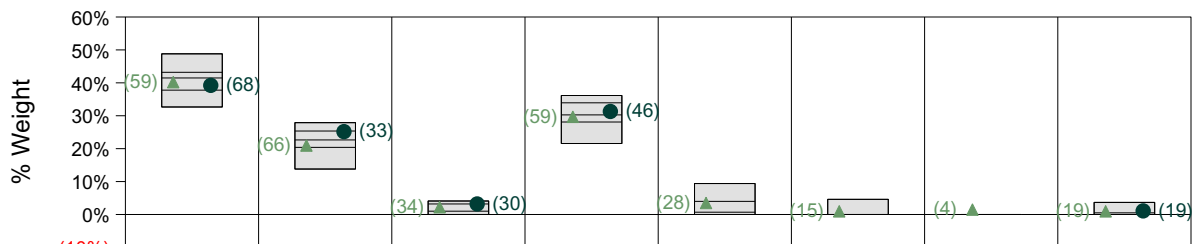
### Macro-Level Asset Allocation



### Micro-Level Asset Allocation



### Macro Asset Allocation Rankings vs. Callan Target Date 2030



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	48.81	27.90	4.10	36.14	9.40	4.60	0.00	3.67
25th Percentile	43.20	25.36	3.20	33.93	3.98	0.00	0.00	0.50
Median	41.48	22.65	1.00	30.26	0.70	0.00	0.00	0.00
75th Percentile	37.78	20.39	0.00	28.09	0.00	0.00	0.00	0.00
90th Percentile	32.66	13.81	0.00	21.56	0.00	0.00	0.00	0.00

<b>SERS 2030 Retirement Fund - Target</b>	●	39.24	25.17	3.20	31.31	-	-	1.09
Callan Tgt Dt Idx 2030	▲	40.21	20.96	2.22	29.68	3.51	0.96	1.50

# SERS 2030 Retirement Fund Period Ended September 30, 2020

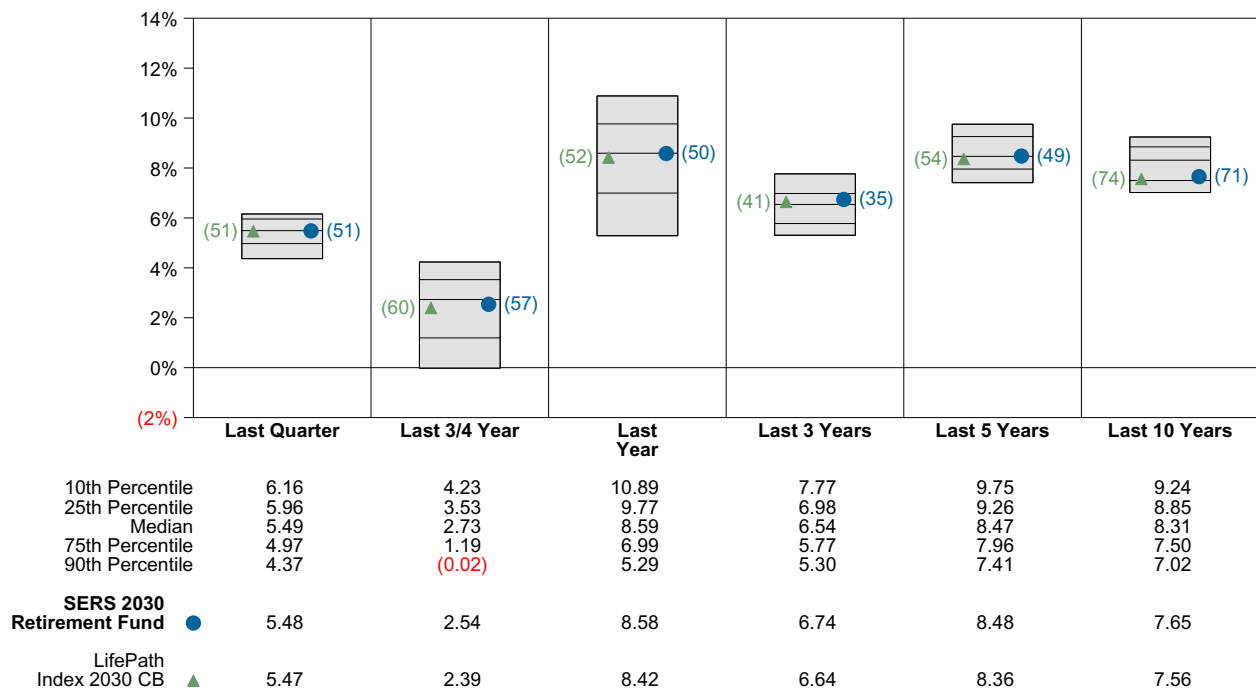
## Investment Philosophy

The BlackRock LifePath(R) Index 2030 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

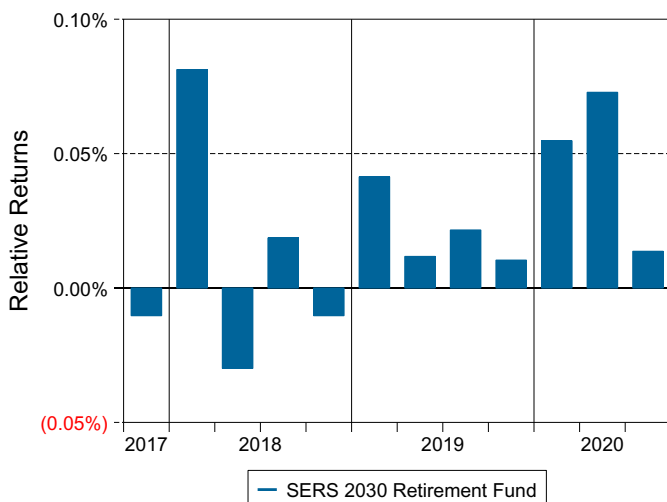
## Quarterly Summary and Highlights

- SERS 2030 Retirement Fund's portfolio posted a 5.48% return for the quarter placing it in the 51 percentile of the Callan Target Date 2030 group for the quarter and in the 50 percentile for the last year.
- SERS 2030 Retirement Fund's portfolio outperformed the LifePath Index 2030 CB by 0.01% for the quarter and outperformed the LifePath Index 2030 CB for the year by 0.16%.

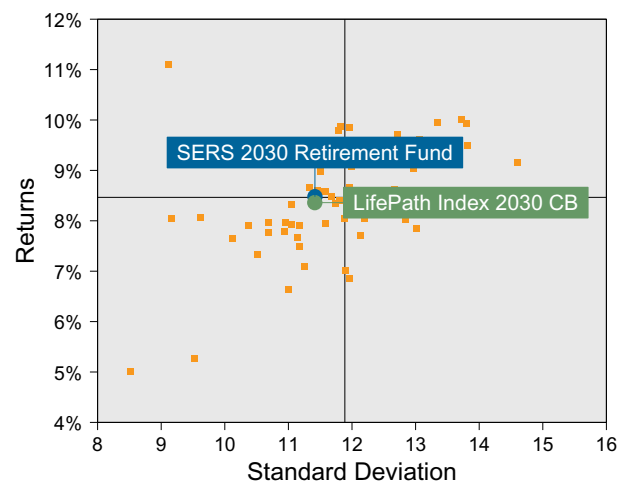
## Performance vs Callan Target Date 2030 (Net)



## Relative Return vs LifePath Index 2030 CB



## Callan Target Date 2030 (Net) Annualized Five Year Risk vs Return

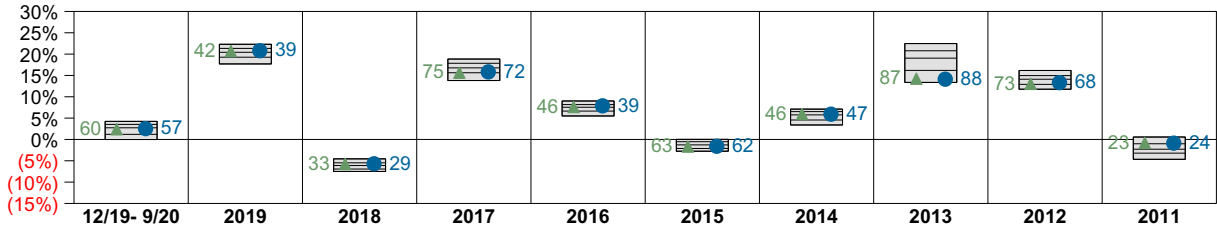


# SERS 2030 Retirement Fund Return Analysis Summary

## Return Analysis

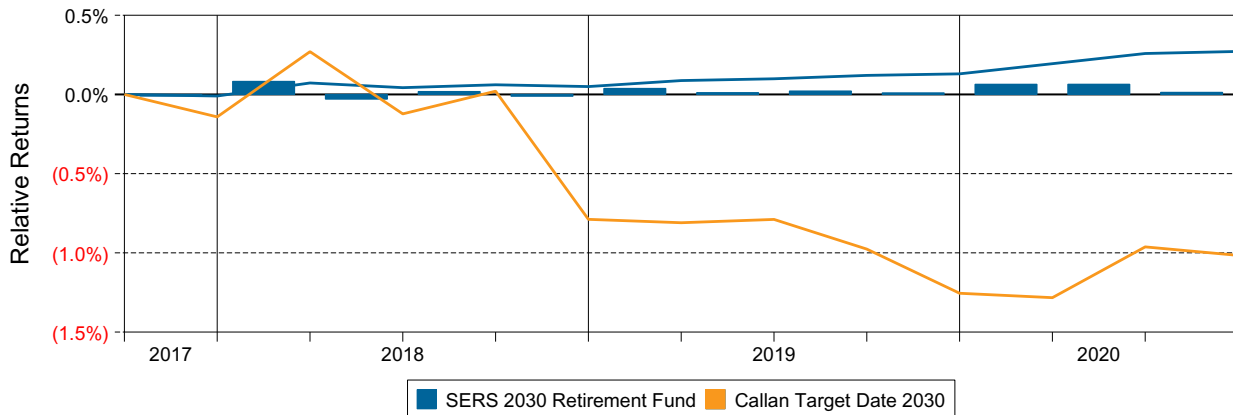
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2030 (Net)

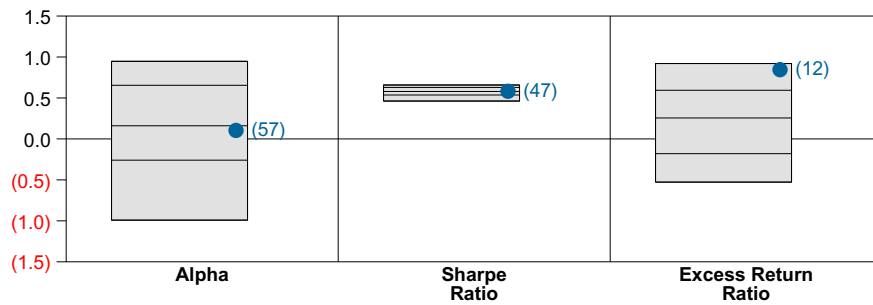


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	4.23	22.30	(4.55)	18.85	9.01	0.01	7.11	22.47	16.16	0.57
25th Percentile	3.53	21.34	(5.48)	17.85	8.17	(0.53)	6.53	20.78	14.96	(1.02)
Median	2.73	20.43	(6.12)	16.77	7.54	(1.27)	5.76	19.05	14.11	(2.29)
75th Percentile	1.19	19.28	(6.94)	15.63	6.64	(2.12)	4.56	16.18	12.91	(3.21)
90th Percentile	(0.02)	17.70	(7.50)	13.81	5.50	(2.77)	3.39	13.36	11.77	(4.66)
<b>SERS 2030 Retirement Fund</b>	● 2.54	20.80	(5.71)	15.83	7.88	(1.60)	5.92	14.12	13.31	(0.87)
LifePath Index 2030 CB	▲ 2.39	20.70	(5.76)	15.64	7.61	(1.66)	5.95	14.26	13.04	(0.81)

### Cumulative and Quarterly Relative Return vs LifePath Index 2030 CB



### Risk Adjusted Return Measures vs LifePath Index 2030 CB Rankings Against Callan Target Date 2030 (Net) Seven Years Ended September 30, 2020

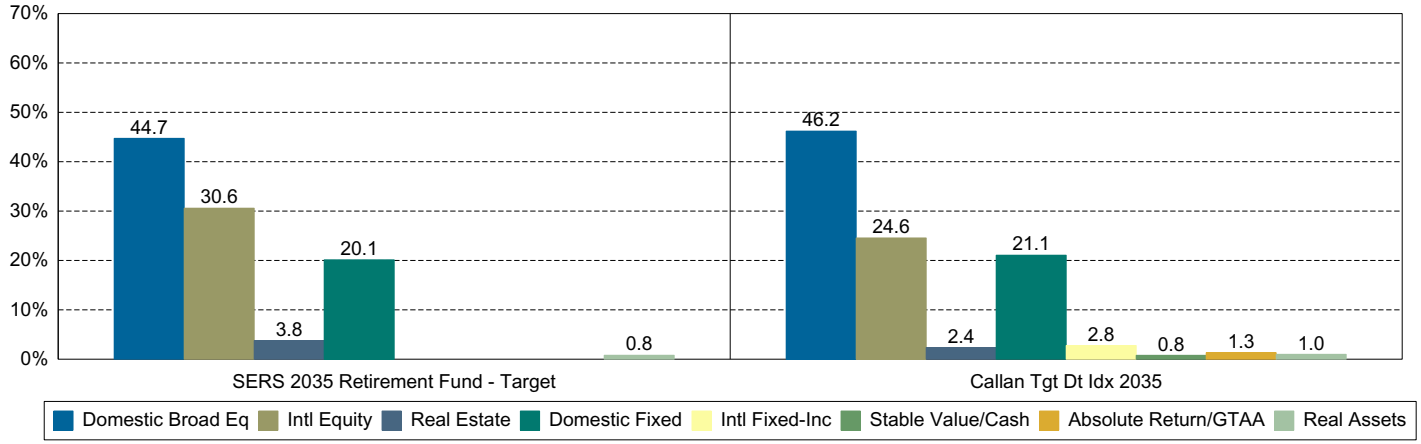


	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.95	0.66	0.92
25th Percentile	0.65	0.63	0.59
Median	0.16	0.58	0.26
75th Percentile	(0.26)	0.54	(0.18)
90th Percentile	(0.99)	0.46	(0.53)
<b>SERS 2030 Retirement Fund</b>	● 0.10	0.58	0.85

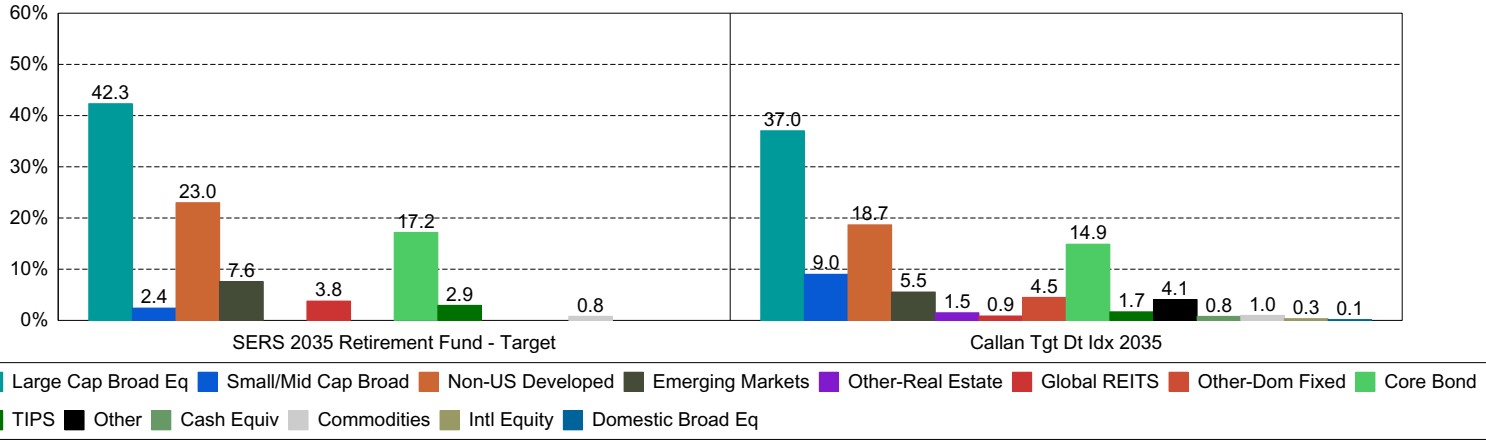
# SERS 2035 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

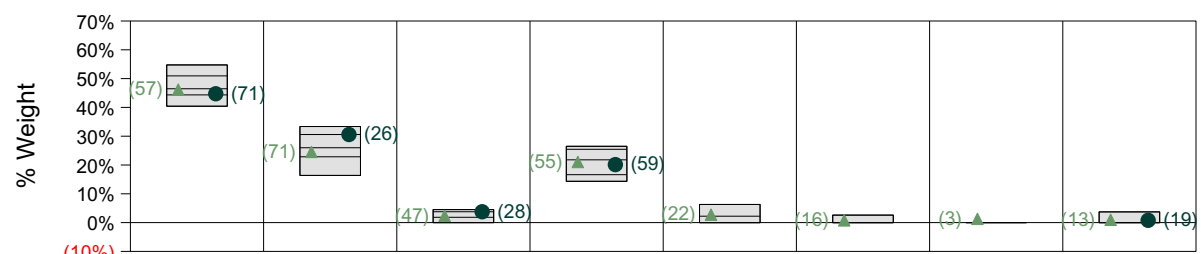
## Macro-Level Asset Allocation



## Micro-Level Asset Allocation



## Macro Asset Allocation Rankings vs. Callan Target Date 2035



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	54.75	33.36	4.52	26.49	6.30	2.60	0.00	3.72
25th Percentile	50.94	30.58	3.77	25.45	2.23	0.00	0.00	0.00
Median	46.47	25.99	1.84	21.80	0.00	0.00	0.00	0.00
75th Percentile	44.34	22.85	0.00	16.64	0.00	0.00	0.00	0.00
90th Percentile	40.41	16.38	0.00	14.33	0.00	0.00	0.00	0.00
<b>SERS 2035 Retirement Fund - Target</b>	● 44.73	30.58	3.77	20.13	-	-	-	0.80
Callan Tgt Dt Idx 2035	▲ 46.19	24.55	2.35	21.06	2.77	0.79	1.31	0.98

# SERS 2035 Retirement Fund Period Ended September 30, 2020

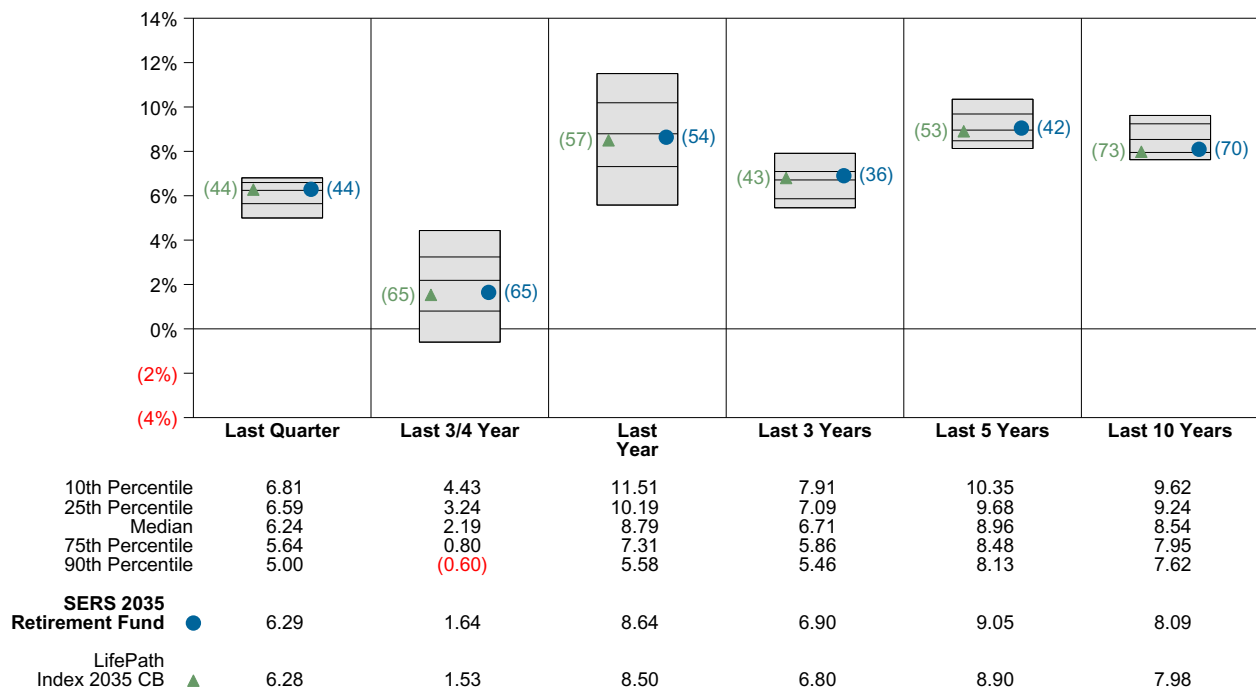
## Investment Philosophy

The BlackRock LifePath(R) Index 2035 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

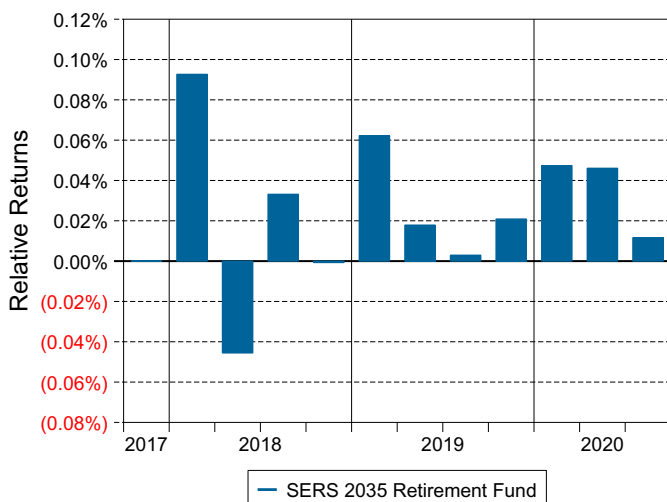
## Quarterly Summary and Highlights

- SERS 2035 Retirement Fund's portfolio posted a 6.29% return for the quarter placing it in the 44 percentile of the Callan Target Date 2035 group for the quarter and in the 54 percentile for the last year.
- SERS 2035 Retirement Fund's portfolio outperformed the LifePath Index 2035 CB by 0.01% for the quarter and outperformed the LifePath Index 2035 CB for the year by 0.14%.

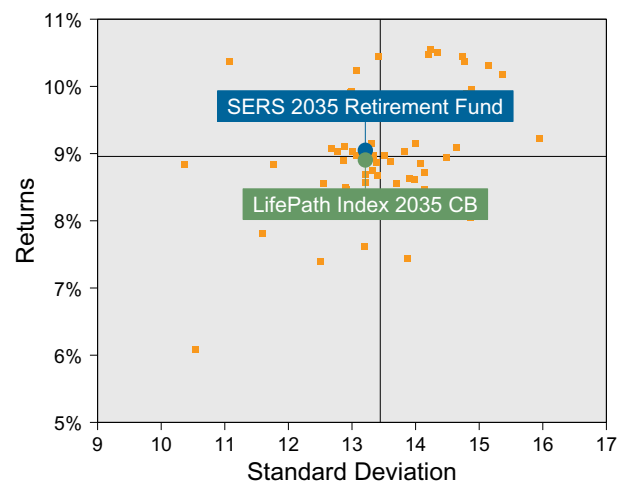
## Performance vs Callan Target Date 2035 (Net)



## Relative Return vs LifePath Index 2035 CB



## Callan Target Date 2035 (Net) Annualized Five Year Risk vs Return

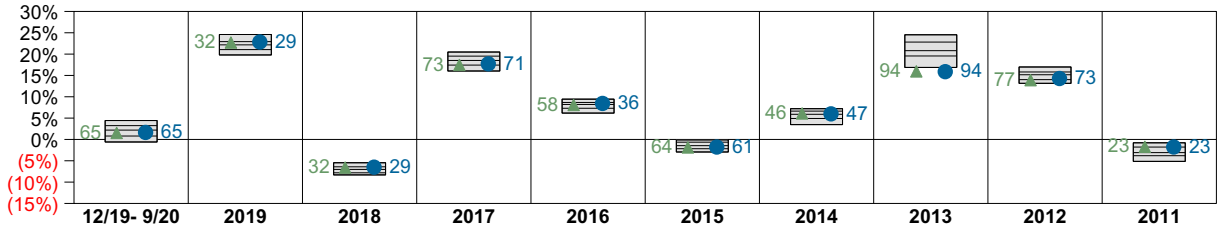


# SERS 2035 Retirement Fund Return Analysis Summary

## Return Analysis

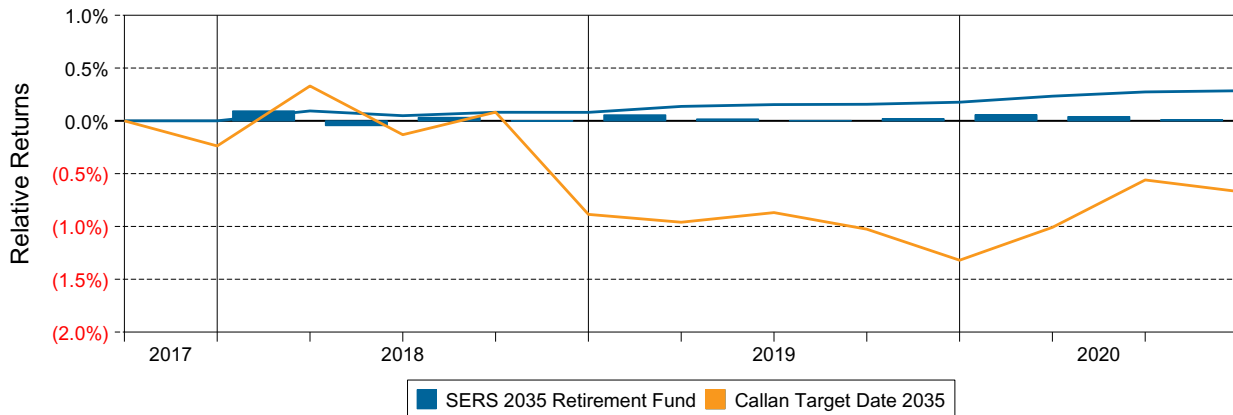
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2035 (Net)

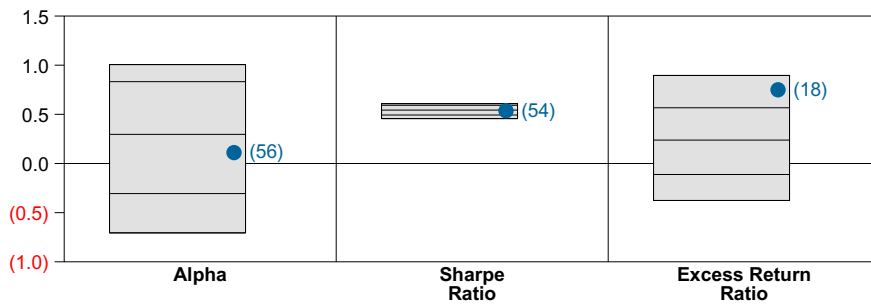


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
<b>SERS 2035 Retirement Fund</b> ●	1.64	22.84	(6.50)	17.72	8.44	(1.78)	5.99	15.88	14.28	(1.77)
LifePath Index 2035 CB ▲	1.53	22.72	(6.58)	17.48	8.08	(1.86)	6.11	15.96	13.90	(1.71)

### Cumulative and Quarterly Relative Return vs LifePath Index 2035 CB



### Risk Adjusted Return Measures vs LifePath Index 2035 CB Rankings Against Callan Target Date 2035 (Net) Seven Years Ended September 30, 2020



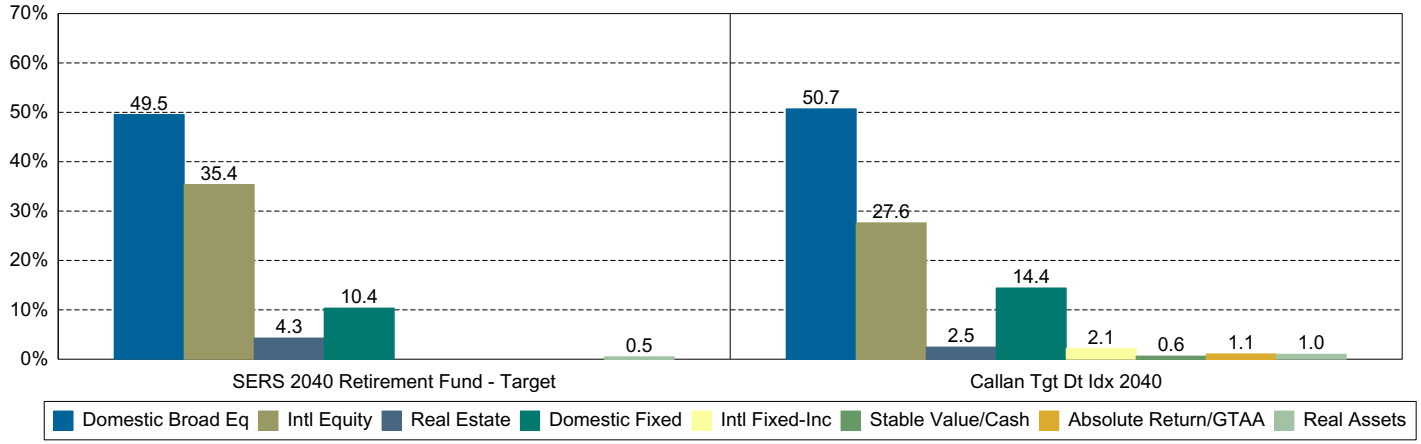
<b>SERS 2035 Retirement Fund</b> ●	0.11	0.54	0.75
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# SERS 2040 Retirement Fund

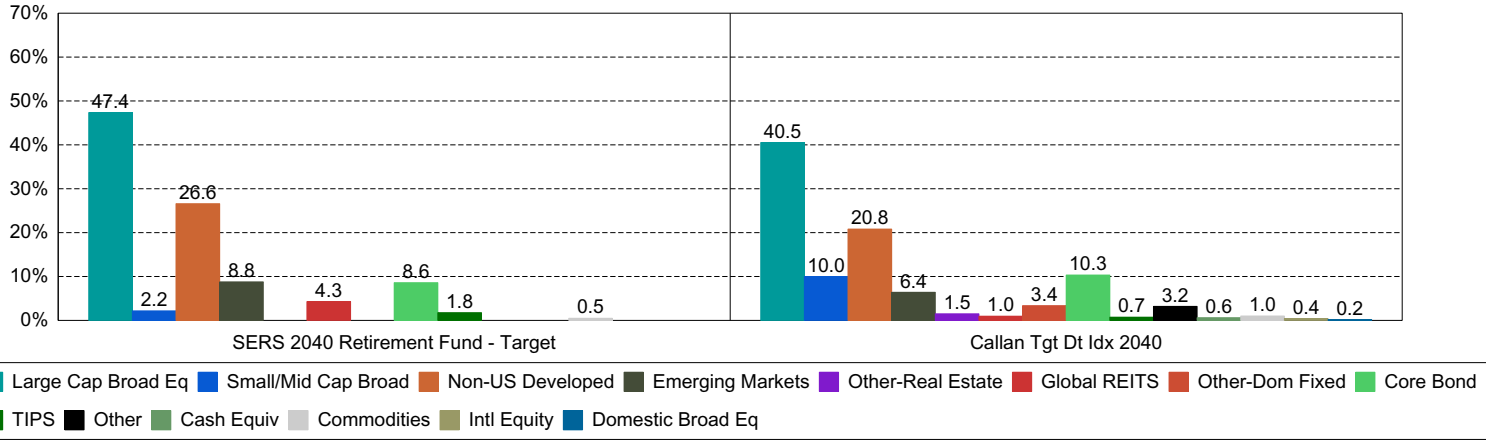
## Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

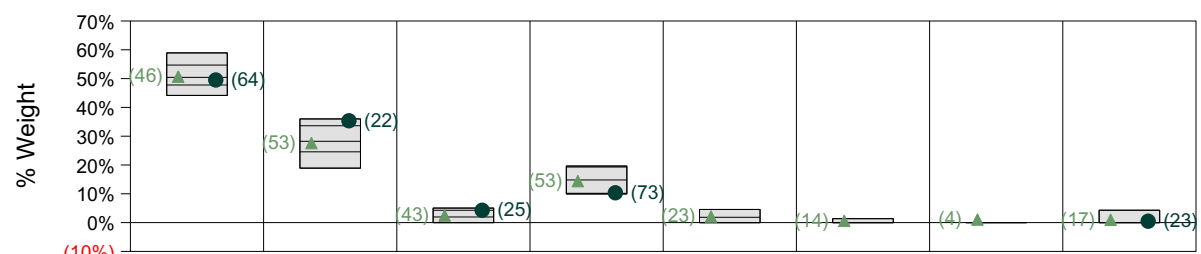
### Macro-Level Asset Allocation



### Micro-Level Asset Allocation



### Macro Asset Allocation Rankings vs. Callan Target Date 2040



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	58.93	36.00	5.05	19.64	4.56	1.37	0.00	4.30
25th Percentile	54.69	33.63	4.28	19.30	1.84	0.00	0.00	0.00
Median	50.43	28.23	1.95	14.80	0.00	0.00	0.00	0.00
75th Percentile	47.78	24.57	0.00	10.18	0.00	0.00	0.00	0.00
90th Percentile	44.16	18.90	0.00	9.95	0.00	0.00	0.00	0.00
<b>SERS 2040 Retirement Fund - Target</b>	● 49.52	35.36	4.28	10.35	-	-	-	0.48
Callan Tgt Dt Idx 2040	▲ 50.70	27.62	2.45	14.42	2.12	0.62	1.07	1.00



# SERS 2040 Retirement Fund Period Ended September 30, 2020

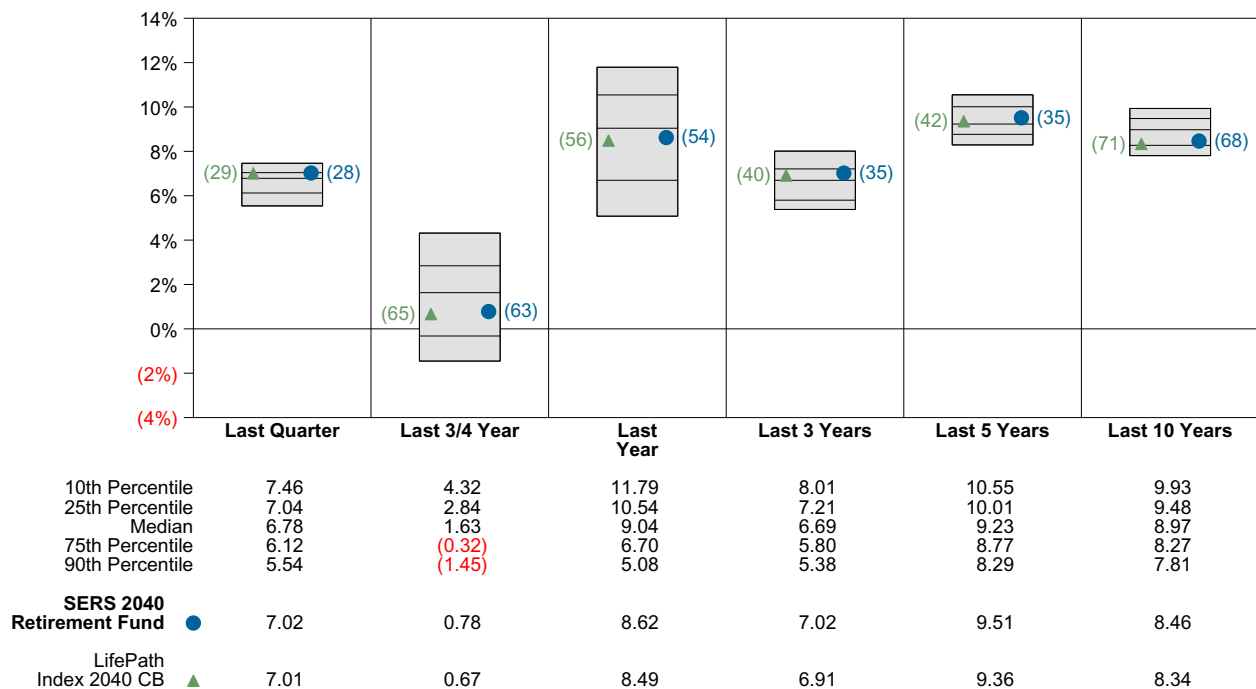
## Investment Philosophy

The BlackRock LifePath(R) Index 2040 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

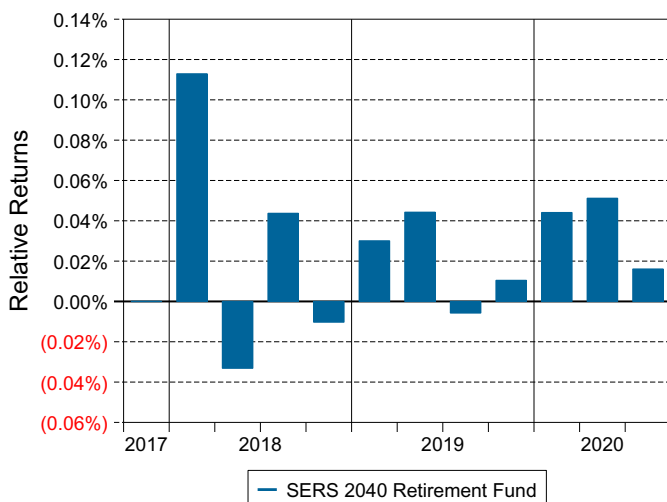
## Quarterly Summary and Highlights

- SERS 2040 Retirement Fund's portfolio posted a 7.02% return for the quarter placing it in the 28 percentile of the Callan Target Date 2040 group for the quarter and in the 54 percentile for the last year.
- SERS 2040 Retirement Fund's portfolio outperformed the LifePath Index 2040 CB by 0.02% for the quarter and outperformed the LifePath Index 2040 CB for the year by 0.13%.

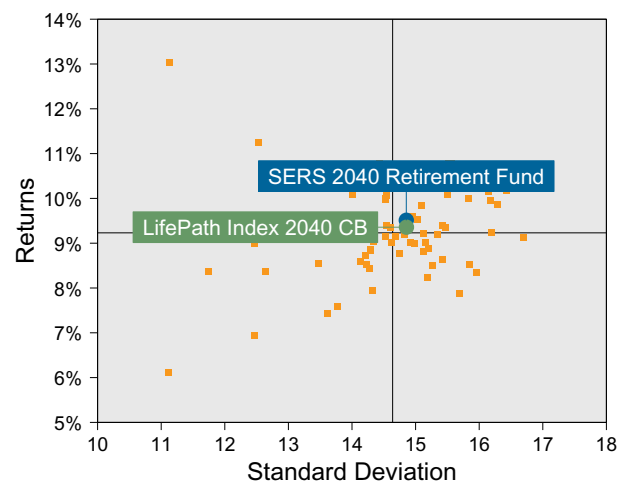
## Performance vs Callan Target Date 2040 (Net)



## Relative Return vs LifePath Index 2040 CB



## Callan Target Date 2040 (Net) Annualized Five Year Risk vs Return

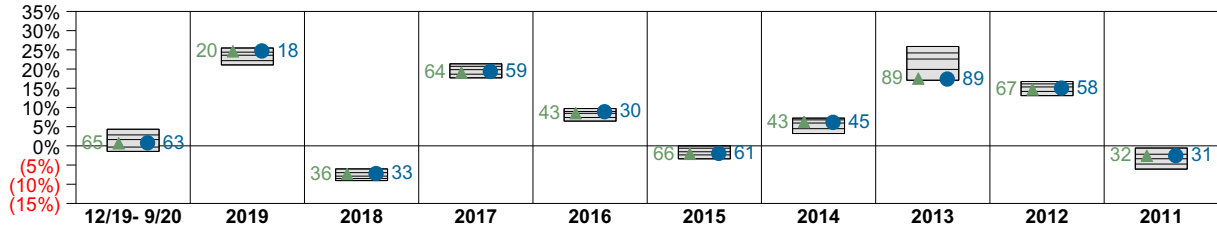


# SERS 2040 Retirement Fund Return Analysis Summary

## Return Analysis

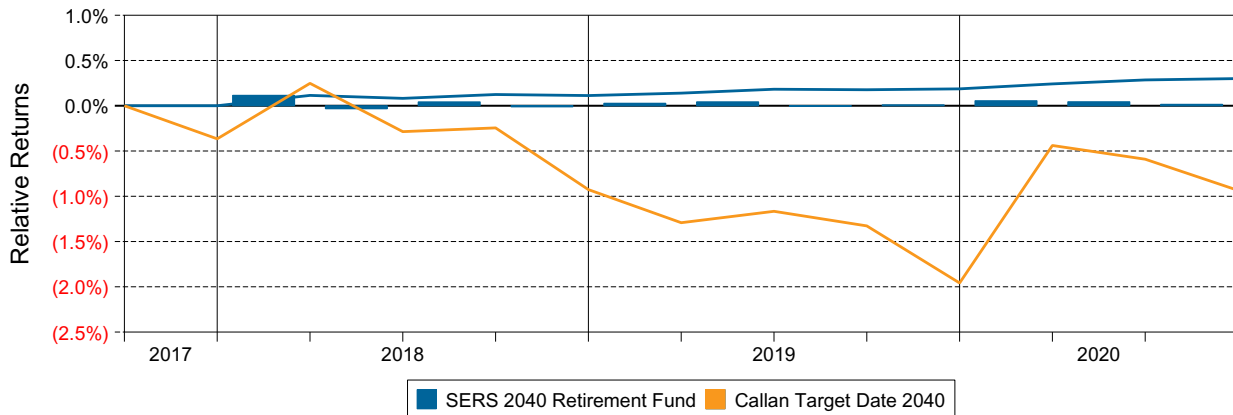
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2040 (Net)

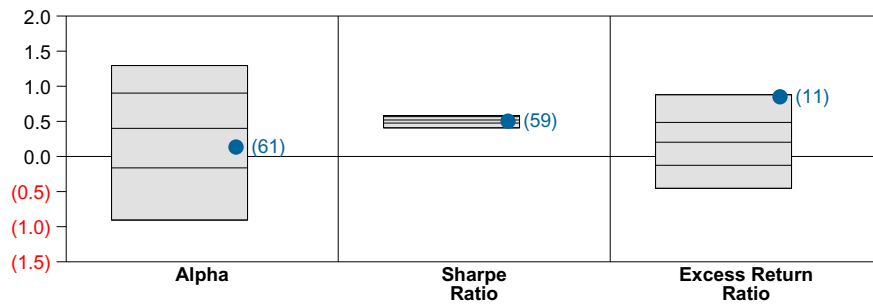


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	4.32	25.48	(6.01)	21.35	9.71	(0.03)	7.22	25.88	16.76	(0.57)
25th Percentile	2.84	24.40	(6.99)	20.71	8.94	(0.62)	6.76	24.20	16.13	(2.19)
Median	1.63	23.59	(7.89)	19.84	8.46	(1.54)	5.94	22.61	15.34	(3.36)
75th Percentile	(0.32)	22.18	(8.52)	18.66	7.38	(2.36)	4.47	19.90	14.17	(4.74)
90th Percentile	(1.45)	21.07	(9.05)	17.70	6.44	(3.38)	3.21	17.07	13.07	(6.06)
<b>SERS 2040 Retirement Fund</b>	● 0.78	24.71	(7.22)	19.38	8.88	(1.98)	6.12	17.39	15.04	(2.54)
LifePath Index 2040 CB	▲ 0.67	24.62	(7.33)	19.09	8.51	(2.08)	6.21	17.52	14.70	(2.58)

### Cumulative and Quarterly Relative Return vs LifePath Index 2040 CB



### Risk Adjusted Return Measures vs LifePath Index 2040 CB Rankings Against Callan Target Date 2040 (Net) Seven Years Ended September 30, 2020

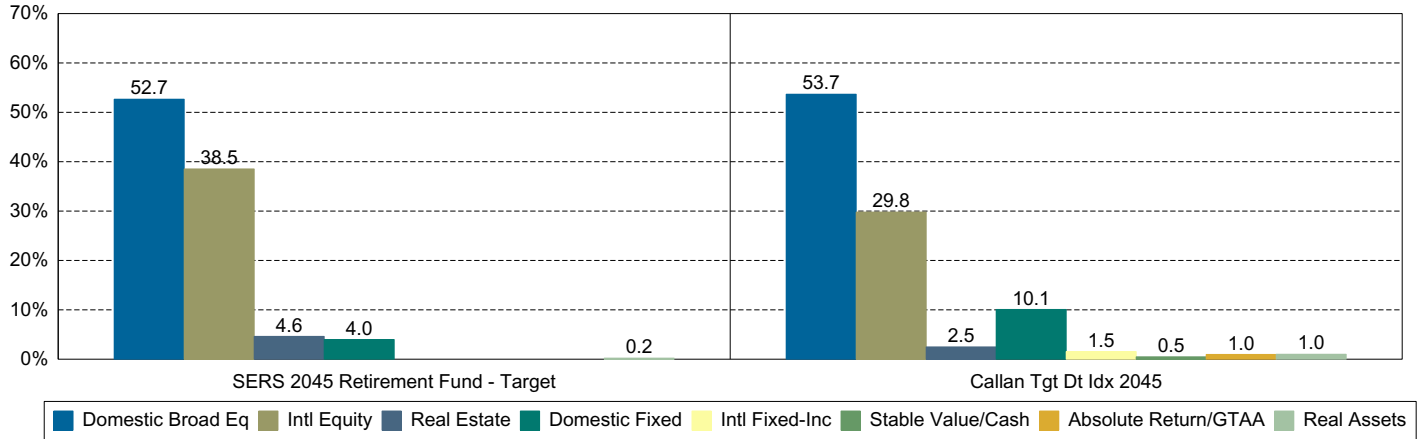


	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.30	0.58	0.88
25th Percentile	0.90	0.57	0.49
Median	0.40	0.52	0.20
75th Percentile	(0.16)	0.48	(0.13)
90th Percentile	(0.91)	0.41	(0.45)
<b>SERS 2040 Retirement Fund</b>	● 0.13	0.50	0.85

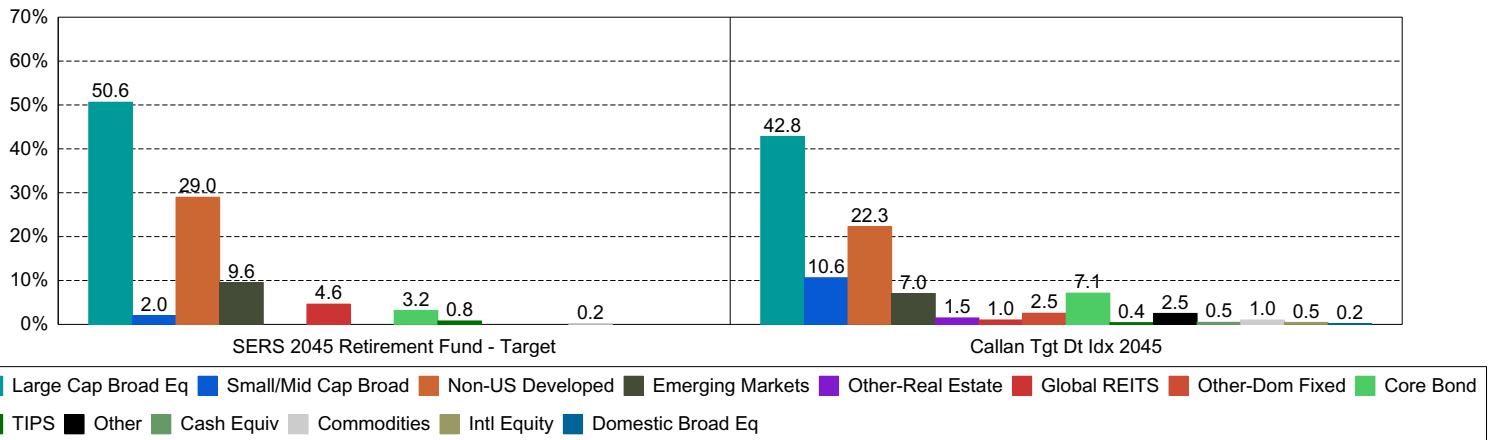
# SERS 2045 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

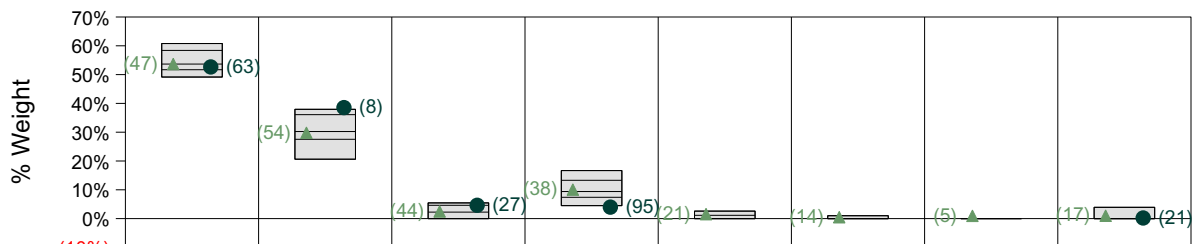
## Macro-Level Asset Allocation



## Micro-Level Asset Allocation



## Macro Asset Allocation Rankings vs. Callan Target Date 2045



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	60.79	37.95	5.45	16.68	2.60	1.00	0.00	3.92
25th Percentile	58.40	36.09	4.62	13.30	1.14	0.00	0.00	0.00
Median	53.66	30.23	2.25	9.40	0.00	0.00	0.00	0.00
75th Percentile	51.70	27.54	0.00	7.40	0.00	0.00	0.00	0.00
90th Percentile	49.15	20.62	0.00	4.50	0.00	0.00	0.00	0.00
<b>SERS 2045 Retirement Fund - Target</b>	● 52.66	38.53	4.62	3.98	-	-	-	0.21
Callan Tgt Dt Idx 2045	▲ 53.67	29.79	2.48	10.07	1.54	0.48	0.96	1.00

# SERS 2045 Retirement Fund Period Ended September 30, 2020

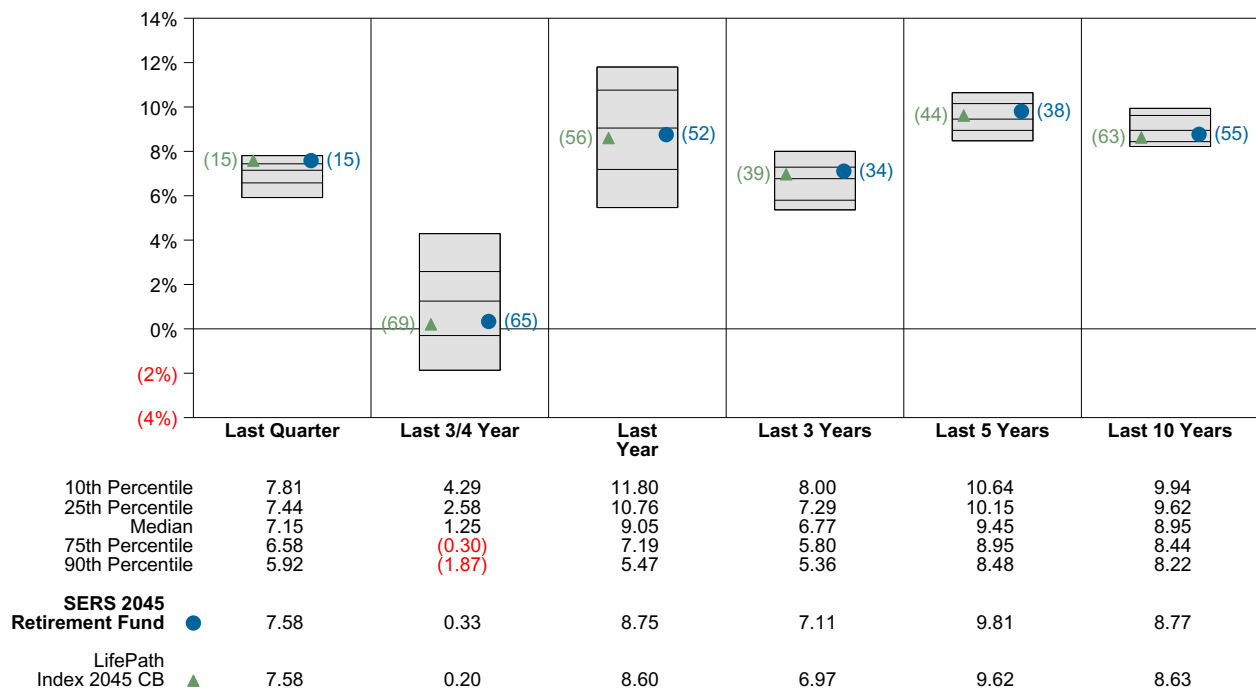
## Investment Philosophy

The BlackRock LifePath(R) Index 2045 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

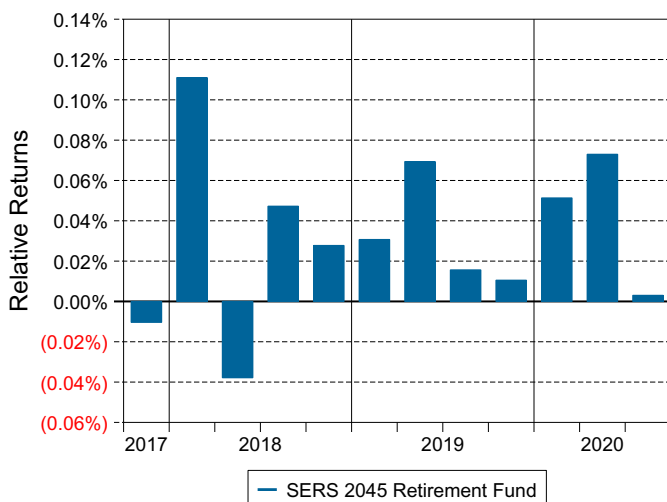
## Quarterly Summary and Highlights

- SERS 2045 Retirement Fund's portfolio posted a 7.58% return for the quarter placing it in the 15 percentile of the Callan Target Date 2045 group for the quarter and in the 52 percentile for the last year.
- SERS 2045 Retirement Fund's portfolio outperformed the LifePath Index 2045 CB by 0.00% for the quarter and outperformed the LifePath Index 2045 CB for the year by 0.15%.

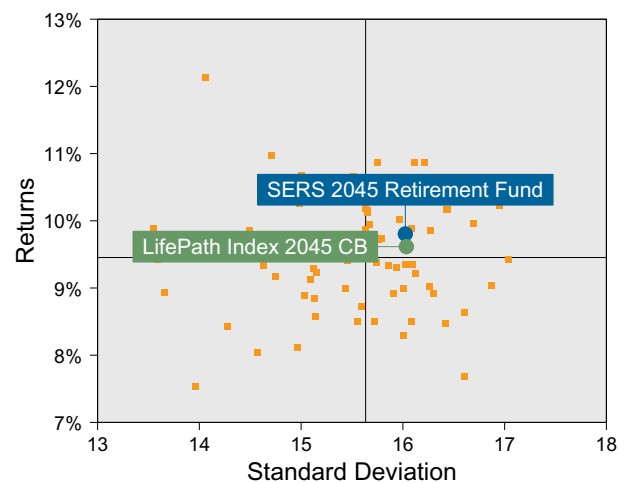
## Performance vs Callan Target Date 2045 (Net)



## Relative Return vs LifePath Index 2045 CB



## Callan Target Date 2045 (Net) Annualized Five Year Risk vs Return

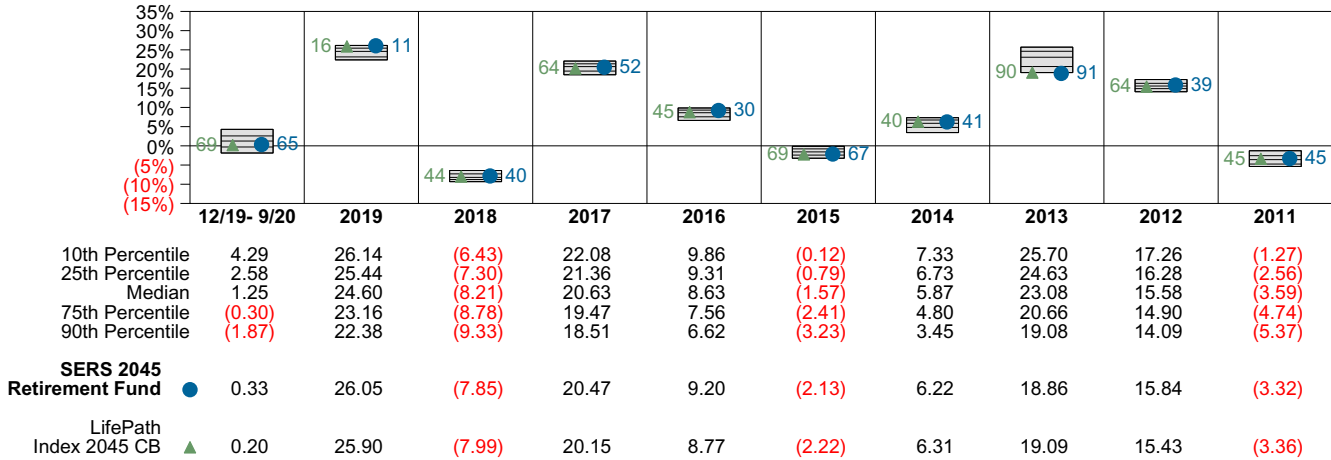


# SERS 2045 Retirement Fund Return Analysis Summary

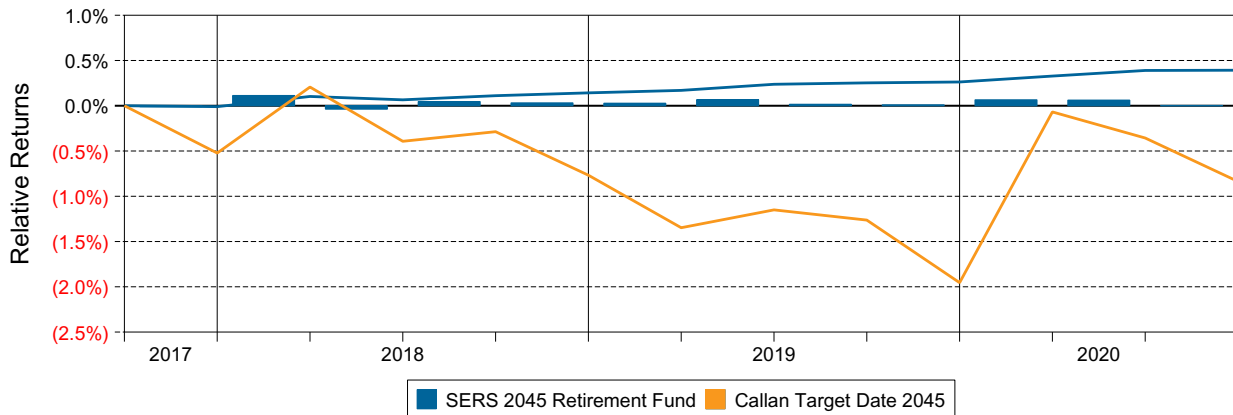
## Return Analysis

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.

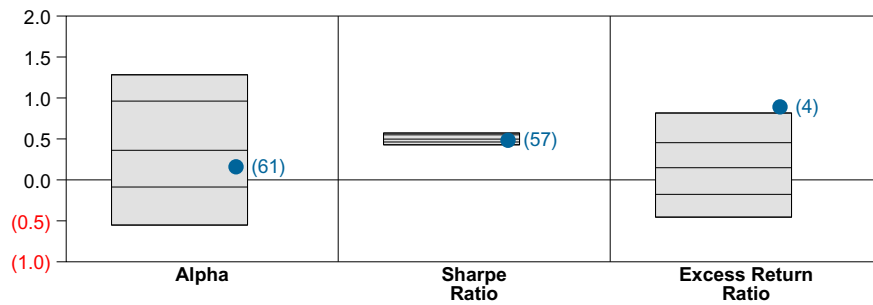
### Performance vs Callan Target Date 2045 (Net)



### Cumulative and Quarterly Relative Return vs LifePath Index 2045 CB



### Risk Adjusted Return Measures vs LifePath Index 2045 CB Rankings Against Callan Target Date 2045 (Net) Seven Years Ended September 30, 2020

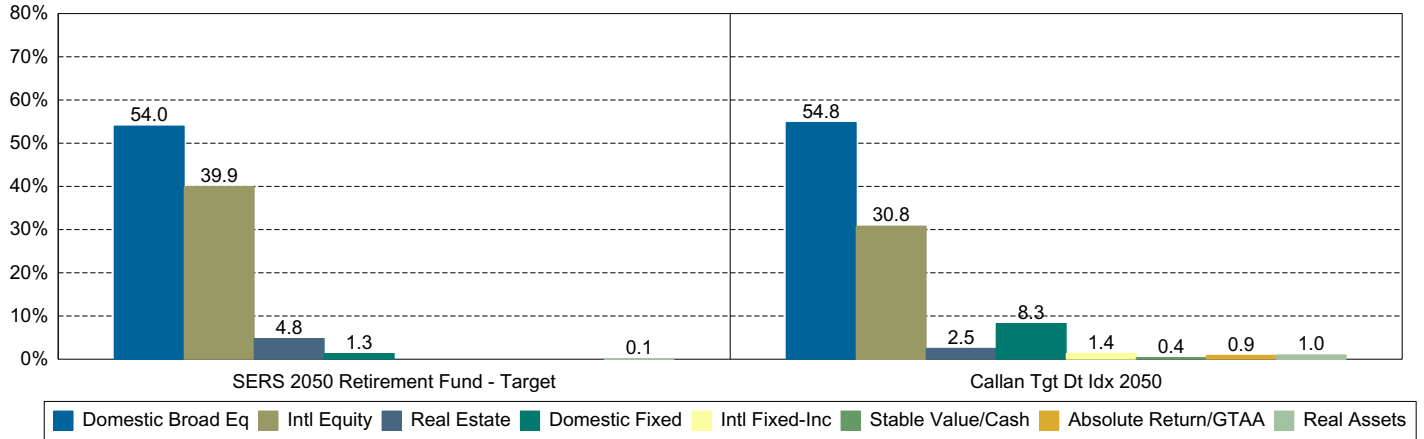


# SERS 2050 Retirement Fund

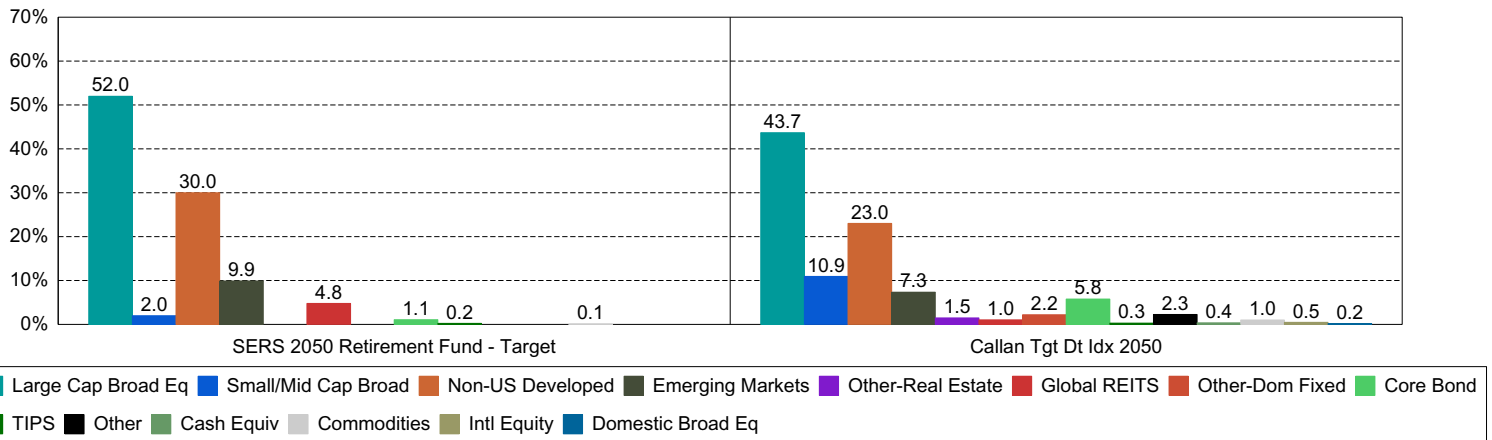
## Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

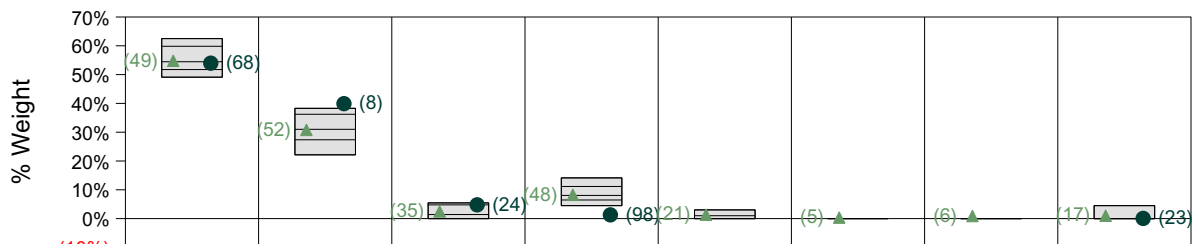
### Macro-Level Asset Allocation



### Micro-Level Asset Allocation



### Macro Asset Allocation Rankings vs. Callan Target Date 2050



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	62.50	38.29	5.45	14.14	3.03	0.00	0.00	4.50
25th Percentile	59.83	36.22	4.77	11.16	1.00	0.00	0.00	0.00
Median	54.47	31.00	1.40	8.05	0.00	0.00	0.00	0.00
75th Percentile	51.75	27.37	0.00	6.46	0.00	0.00	0.00	0.00
90th Percentile	49.10	22.14	0.00	4.50	0.00	0.00	0.00	0.00
<b>SERS 2050 Retirement Fund - Target</b>	● 53.96	39.90	4.77	1.30	-	-	-	0.06
Callan Tgt Dt Idx 2050	▲ 54.80	30.81	2.51	8.26	1.36	0.36	0.90	1.00

# SERS 2050 Retirement Fund Period Ended September 30, 2020

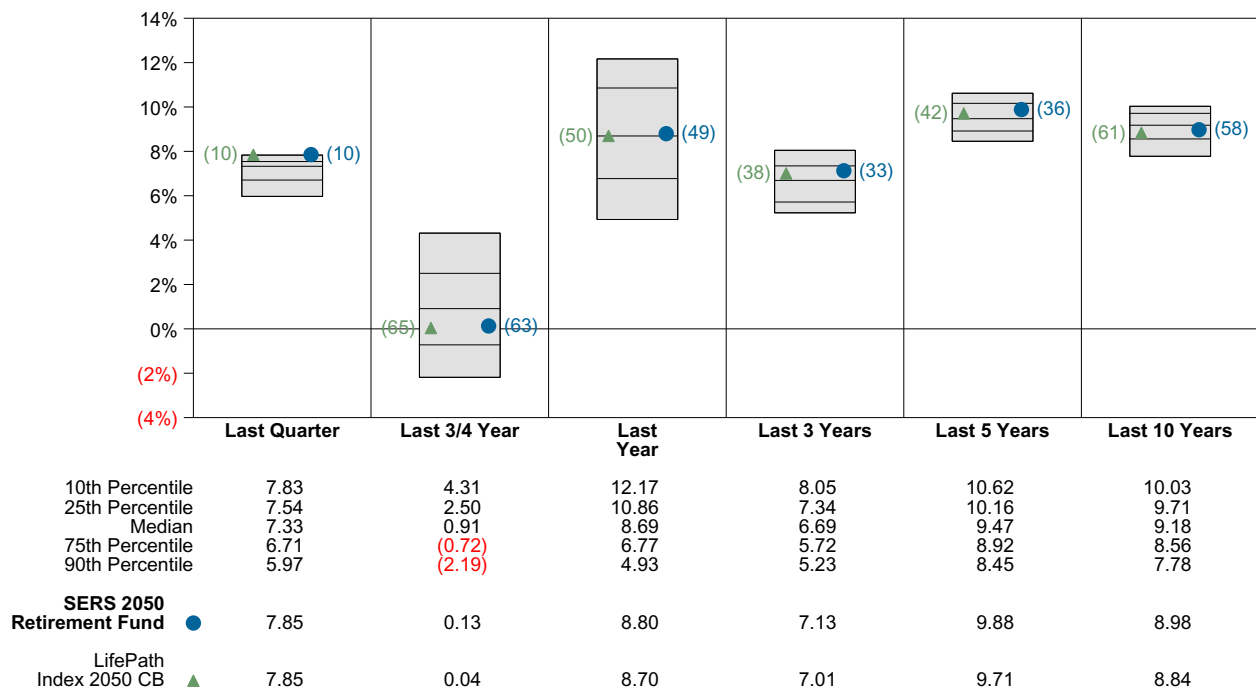
## Investment Philosophy

The BlackRock LifePath(R) Index 2050 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

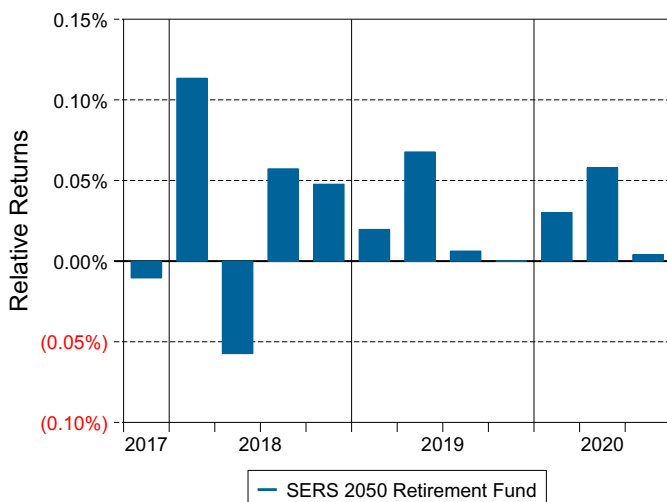
## Quarterly Summary and Highlights

- SERS 2050 Retirement Fund's portfolio posted a 7.85% return for the quarter placing it in the 10 percentile of the Callan Target Date 2050 group for the quarter and in the 49 percentile for the last year.
- SERS 2050 Retirement Fund's portfolio outperformed the LifePath Index 2050 CB by 0.00% for the quarter and outperformed the LifePath Index 2050 CB for the year by 0.10%.

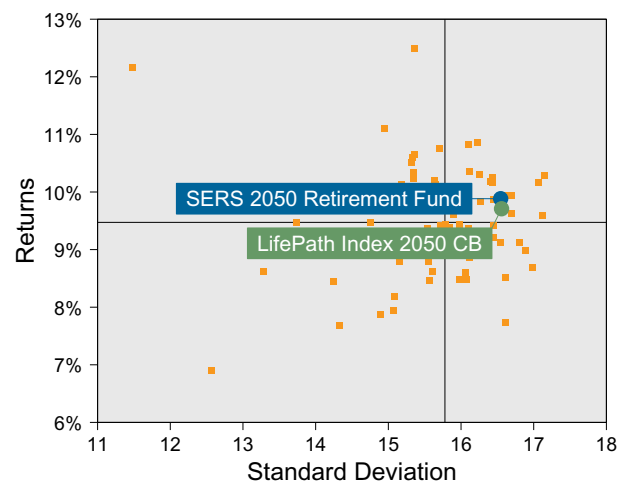
## Performance vs Callan Target Date 2050 (Net)



## Relative Return vs LifePath Index 2050 CB



## Callan Target Date 2050 (Net) Annualized Five Year Risk vs Return

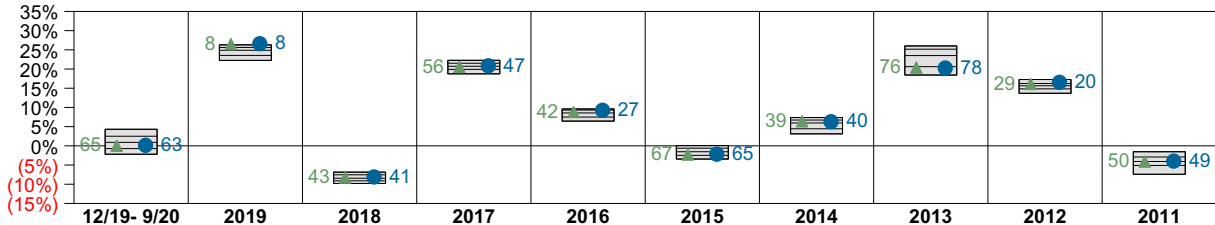


# SERS 2050 Retirement Fund Return Analysis Summary

## Return Analysis

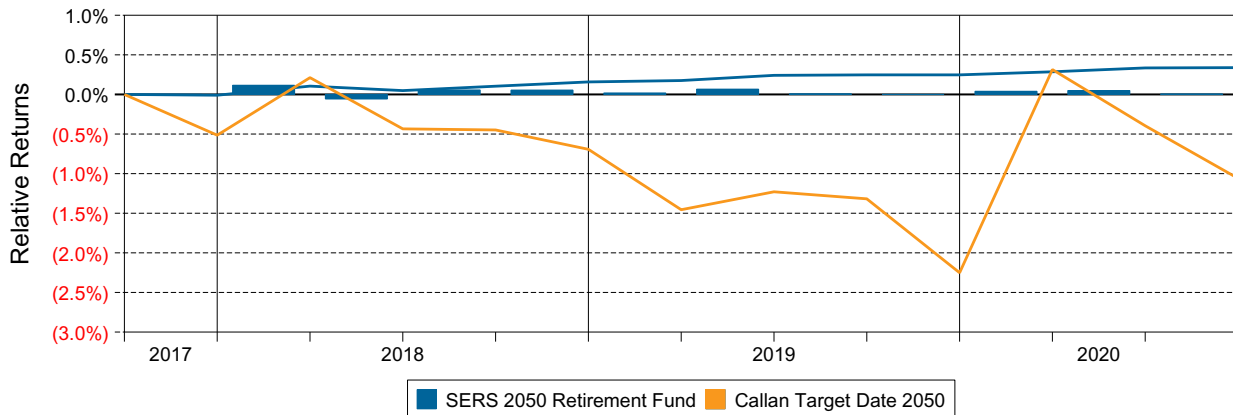
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2050 (Net)

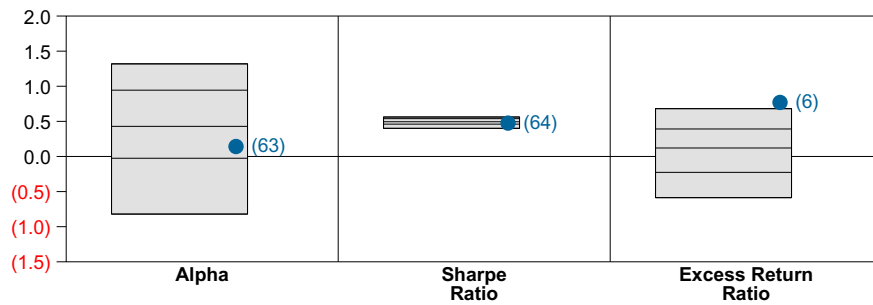


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	4.31	26.30	(6.84)	22.27	9.60	0.05	7.37	26.02	17.27	(1.53)
25th Percentile	2.50	25.62	(7.54)	21.51	9.32	(0.61)	6.72	25.17	16.24	(2.91)
Median	0.91	24.89	(8.44)	20.72	8.57	(1.54)	5.96	23.50	15.65	(4.08)
75th Percentile	(0.72)	23.55	(9.11)	19.91	7.49	(2.48)	4.45	20.62	14.84	(5.11)
90th Percentile	(2.19)	22.25	(9.80)	18.75	6.44	(3.45)	3.12	18.44	13.68	(7.41)
<b>SERS 2050 Retirement Fund</b>	● 0.13	26.60	(8.11)	20.85	9.26	(2.17)	6.28	20.26	16.54	(3.98)
LifePath Index 2050 CB	▲ 0.04	26.48	(8.26)	20.55	8.82	(2.26)	6.41	20.40	16.12	(4.08)

### Cumulative and Quarterly Relative Return vs LifePath Index 2050 CB



### Risk Adjusted Return Measures vs LifePath Index 2050 CB Rankings Against Callan Target Date 2050 (Net) Seven Years Ended September 30, 2020



10th Percentile	1.32	0.56	0.68
25th Percentile	0.94	0.54	0.39
Median	0.43	0.49	0.12
75th Percentile	(0.03)	0.46	(0.23)
90th Percentile	(0.82)	0.40	(0.59)
<b>SERS 2050 Retirement Fund</b>	● 0.14	0.48	0.77

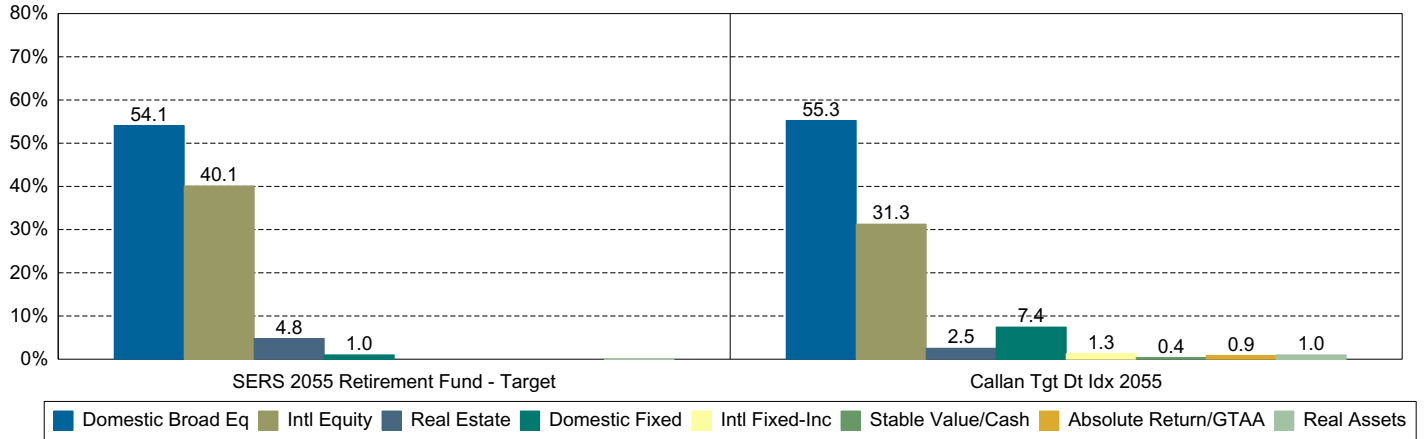


# SERS 2055 Retirement Fund

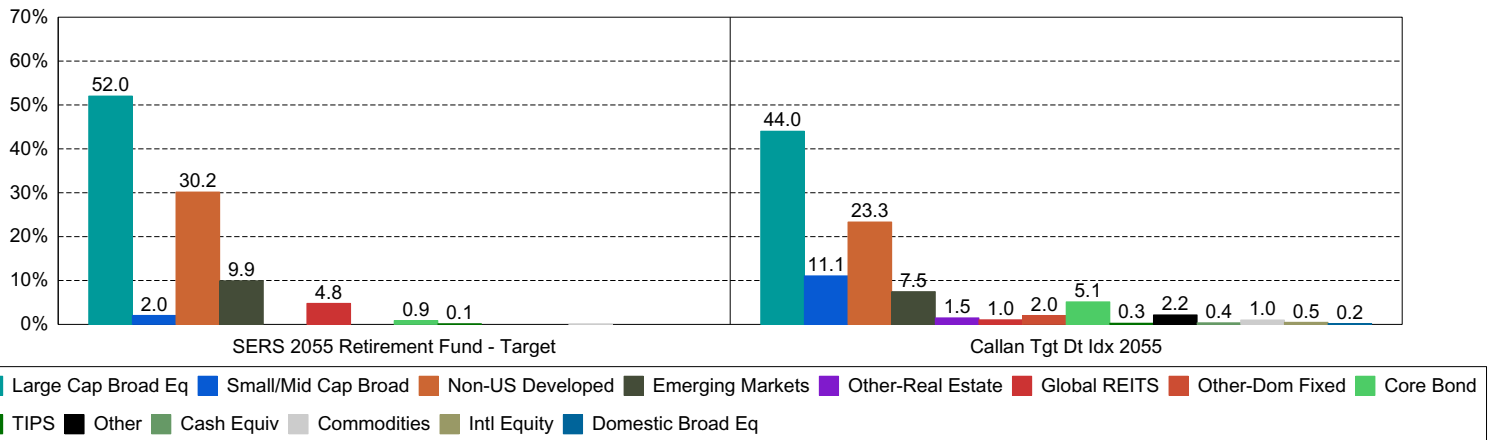
## Target Date Fund Asset Allocation as of September 30, 2020

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

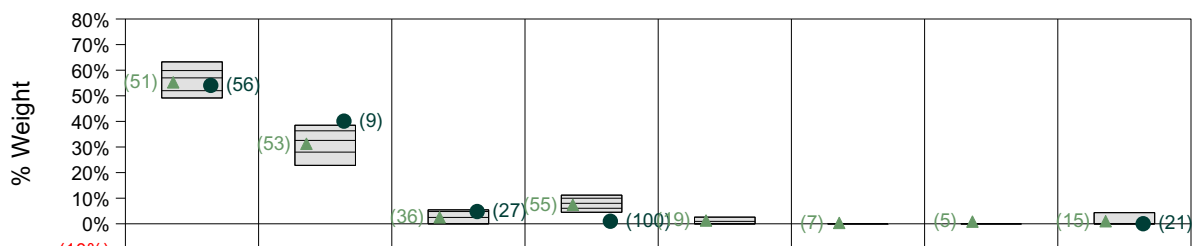
### Macro-Level Asset Allocation



### Micro-Level Asset Allocation



### Macro Asset Allocation Rankings vs. Callan Target Date 2055



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	63.25	38.50	5.45	11.20	2.60	0.00	0.00	4.36
25th Percentile	59.85	36.33	4.79	9.99	0.95	0.00	0.00	0.00
Median	57.00	32.57	2.49	8.00	0.00	0.00	0.00	0.00
75th Percentile	52.00	28.00	0.00	6.06	0.00	0.00	0.00	0.00
90th Percentile	49.15	22.82	0.00	4.50	0.00	0.00	0.00	0.00

<b>SERS 2055 Retirement Fund - Target</b>	●	54.07	40.11	4.79	1.00	-	-	0.04
Callan Tgt Dt Idx 2055	▲	55.26	31.26	2.53	7.43	1.29	0.36	0.87

# SERS 2055 Retirement Fund Period Ended September 30, 2020

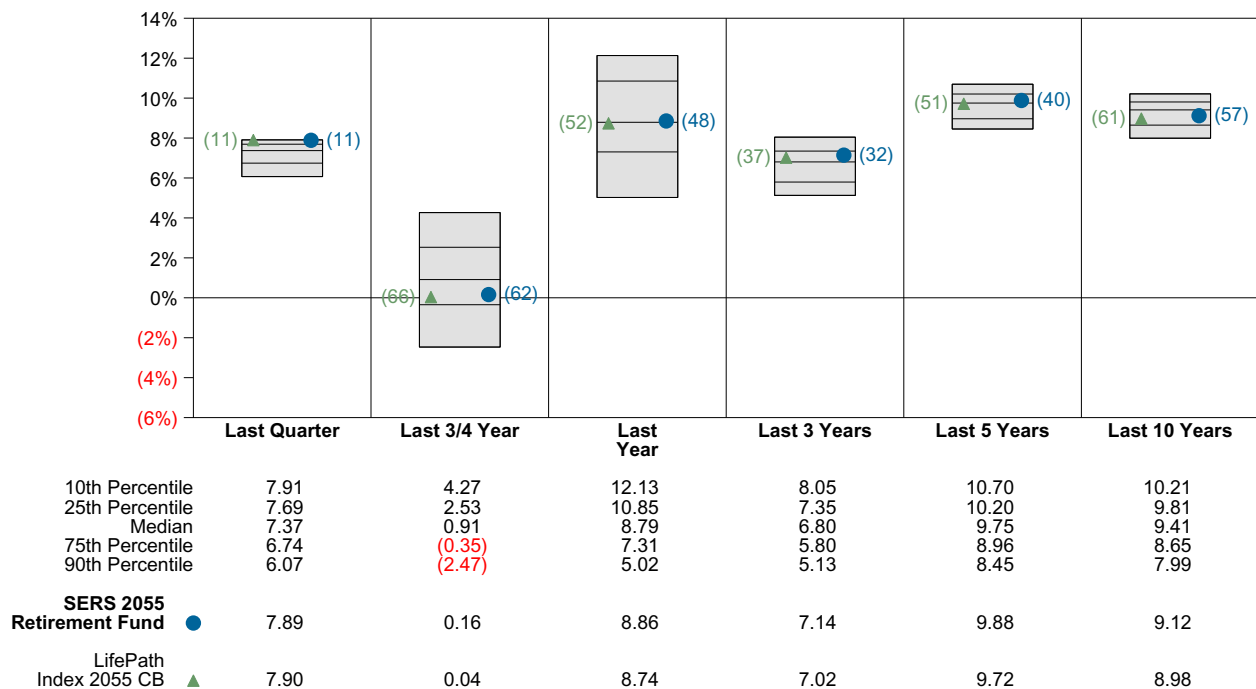
## Investment Philosophy

The BlackRock LifePath(R) Index 2055 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

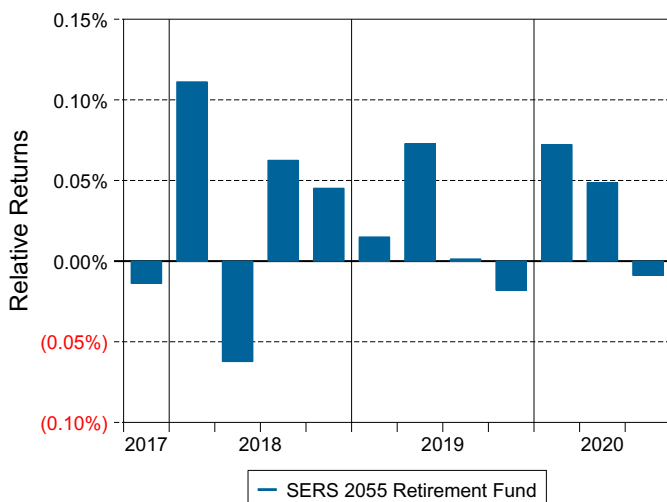
## Quarterly Summary and Highlights

- SERS 2055 Retirement Fund's portfolio posted a 7.89% return for the quarter placing it in the 11 percentile of the Callan Target Date 2055 group for the quarter and in the 48 percentile for the last year.
- SERS 2055 Retirement Fund's portfolio underperformed the LifePath Index 2055 CB by 0.01% for the quarter and outperformed the LifePath Index 2055 CB for the year by 0.12%.

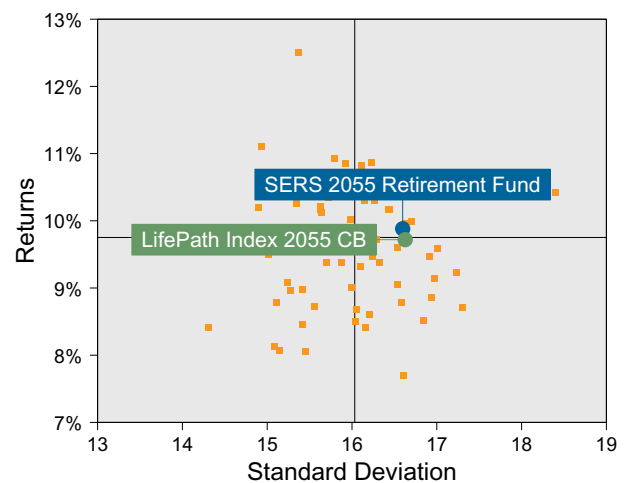
## Performance vs Callan Target Date 2055 (Net)



## Relative Return vs LifePath Index 2055 CB



## Callan Target Date 2055 (Net) Annualized Five Year Risk vs Return

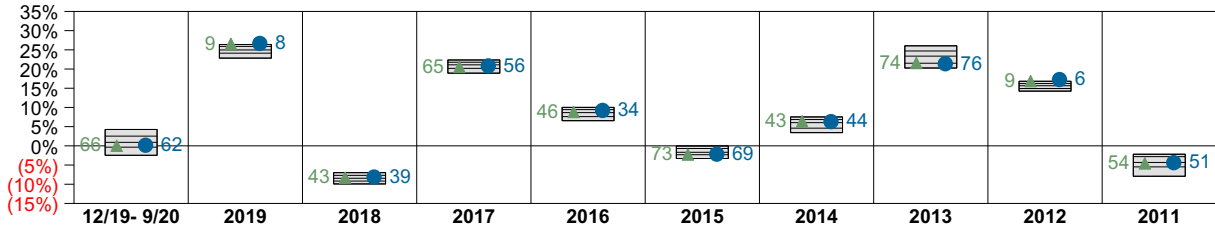


# SERS 2055 Retirement Fund Return Analysis Summary

## Return Analysis

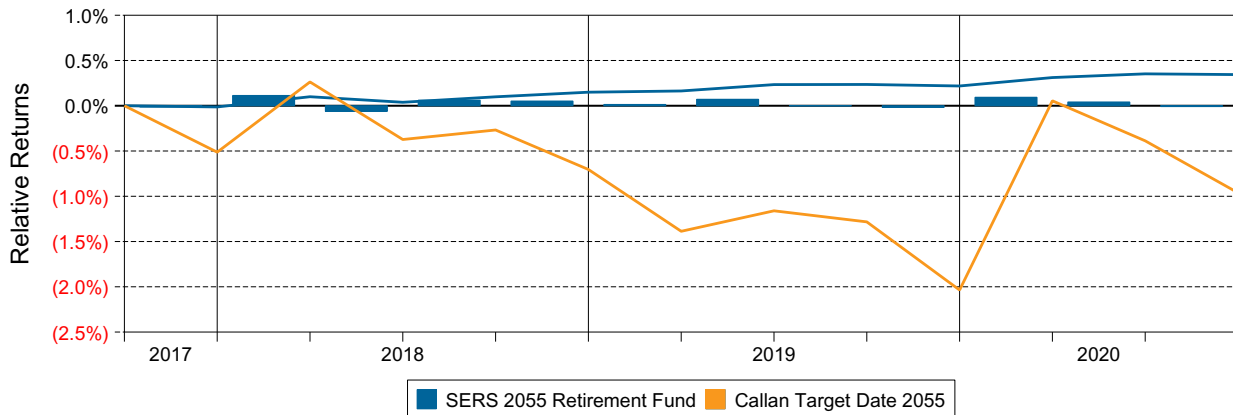
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

### Performance vs Callan Target Date 2055 (Net)

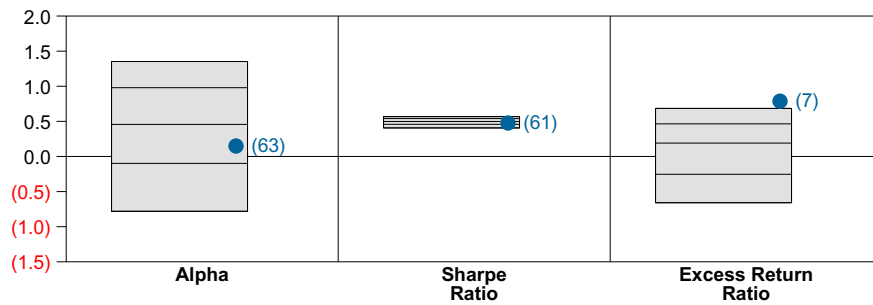


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	4.27	26.39	(6.98)	22.36	10.01	(0.05)	7.53	26.05	16.82	(2.19)
25th Percentile	2.53	25.90	(7.69)	21.77	9.44	(0.69)	6.85	24.70	16.22	(2.81)
Median	0.91	24.97	(8.44)	21.10	8.65	(1.68)	6.04	23.36	15.65	(4.33)
75th Percentile	(0.35)	24.13	(9.18)	20.17	7.61	(2.31)	4.60	21.51	14.93	(5.48)
90th Percentile	(2.47)	22.84	(9.93)	18.92	6.55	(3.30)	3.44	20.26	14.25	(7.93)
<b>SERS 2055 Retirement Fund</b>	● 0.16	26.67	(8.13)	20.82	9.22	(2.17)	6.31	21.37	17.27	(4.38)
LifePath Index 2055 CB	▲ 0.04	26.58	(8.28)	20.55	8.82	(2.26)	6.41	21.58	16.87	(4.56)

### Cumulative and Quarterly Relative Return vs LifePath Index 2055 CB



### Risk Adjusted Return Measures vs LifePath Index 2055 CB Rankings Against Callan Target Date 2055 (Net) Seven Years Ended September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.35	0.57	0.68
25th Percentile	0.98	0.54	0.46
Median	0.46	0.50	0.19
75th Percentile	(0.10)	0.46	(0.25)
90th Percentile	(0.78)	0.41	(0.66)
<b>SERS 2055 Retirement Fund</b>	● 0.15	0.48	0.79

# SERS 2060 Retirement Fund Period Ended September 30, 2020

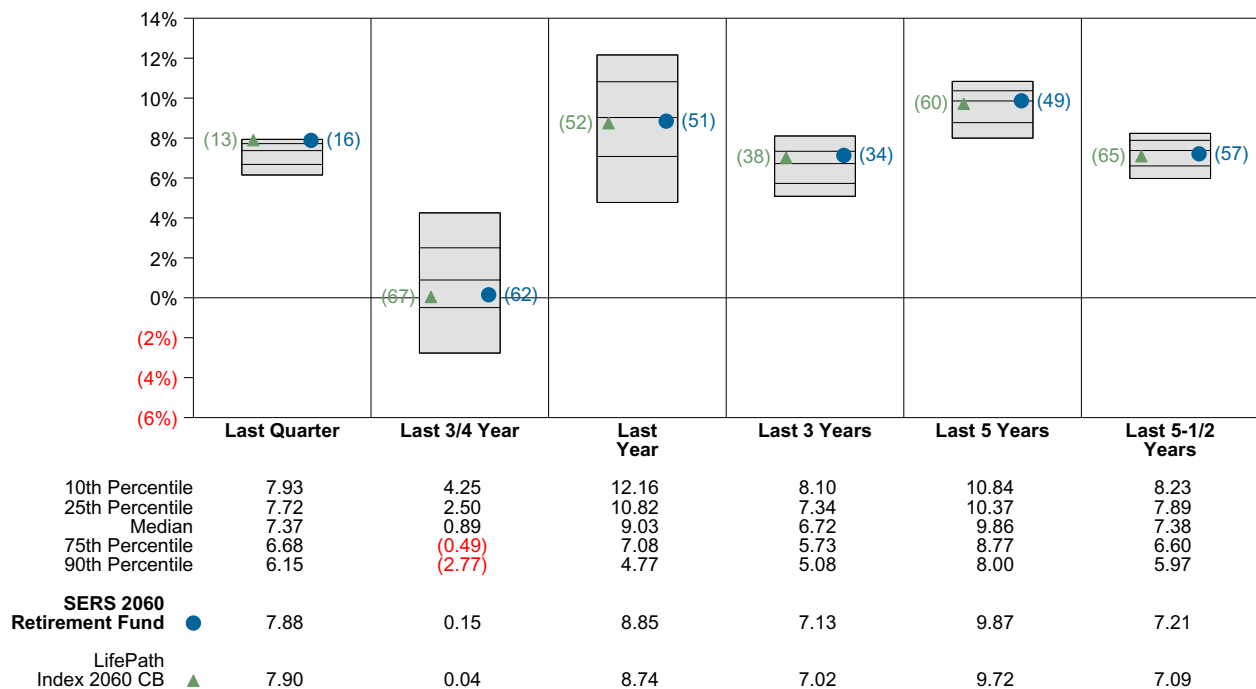
## Investment Philosophy

The BlackRock LifePath(R) Index 2060 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

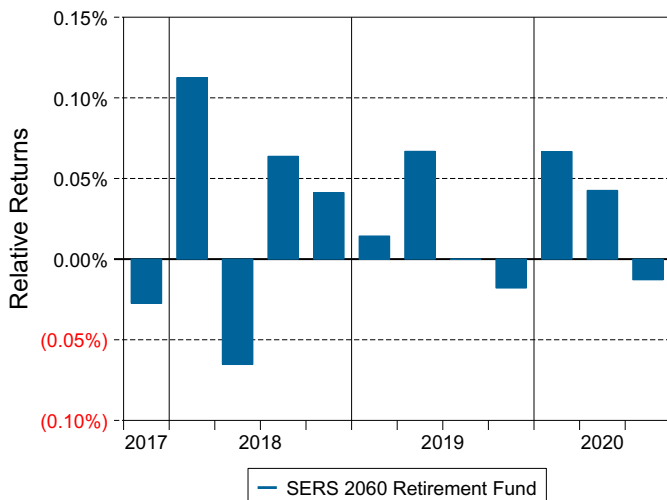
## Quarterly Summary and Highlights

- SERS 2060 Retirement Fund's portfolio posted a 7.88% return for the quarter placing it in the 16 percentile of the Callan Target Date 2060 group for the quarter and in the 51 percentile for the last year.
- SERS 2060 Retirement Fund's portfolio underperformed the LifePath Index 2060 CB by 0.01% for the quarter and outperformed the LifePath Index 2060 CB for the year by 0.10%.

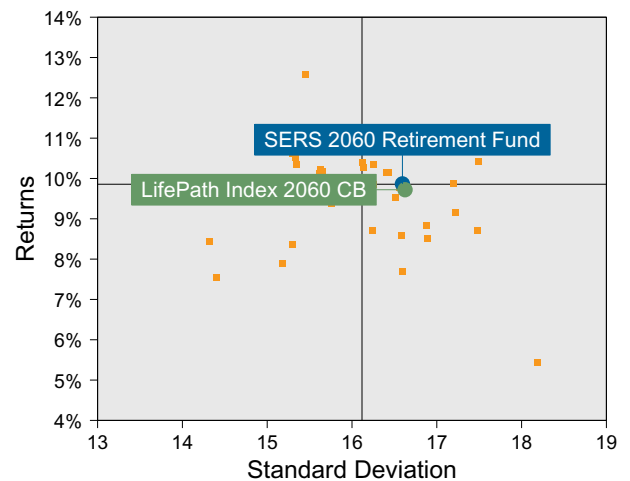
## Performance vs Callan Target Date 2060 (Net)



## Relative Return vs LifePath Index 2060 CB



## Callan Target Date 2060 (Net) Annualized Five Year Risk vs Return

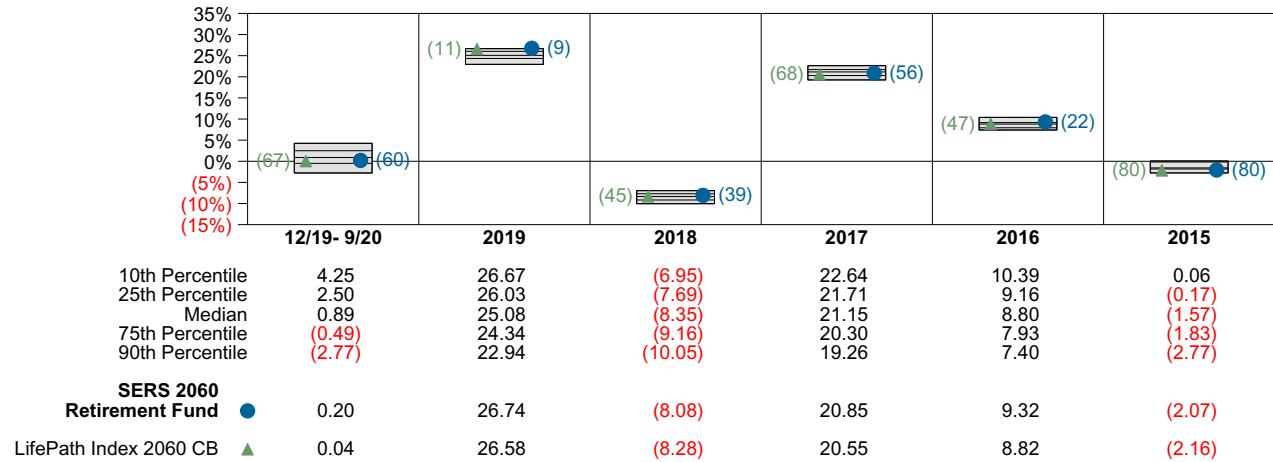


# SERS 2060 Retirement Fund Return Analysis Summary

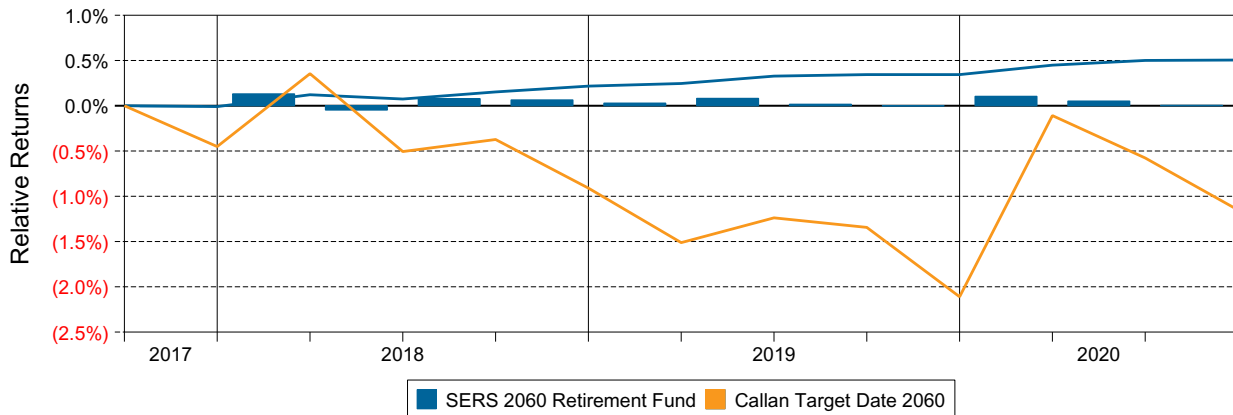
## Return Analysis

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.

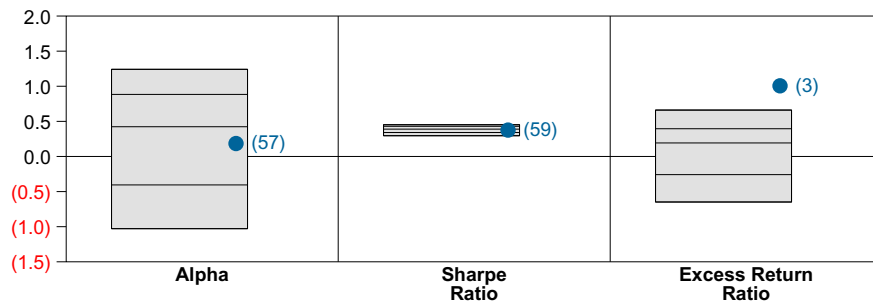
### Performance vs Callan Target Date 2060 (Net)



### Cumulative and Quarterly Relative Return vs LifePath Index 2060 CB



### Risk Adjusted Return Measures vs LifePath Index 2060 CB Rankings Against Callan Target Date 2060 (Net) Five and One-Half Years Ended September 30, 2020



# SERS 2065 Retirement Fund

## Period Ended September 30, 2020

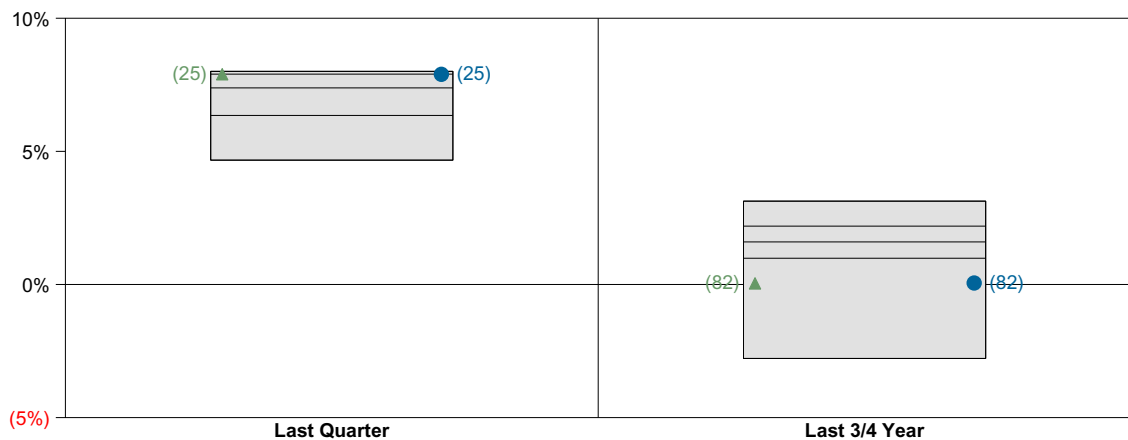
### Investment Philosophy

The BlackRock LifePath(R) Index 2065 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches. Target Date funds replaced risk-based funds in 1Q20.

### Quarterly Summary and Highlights

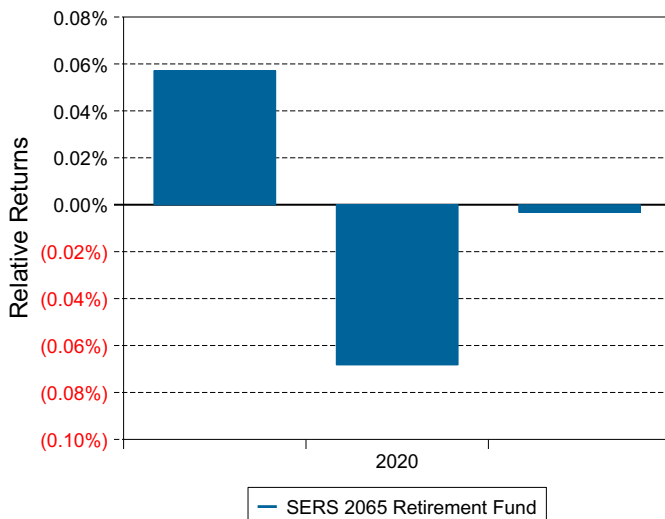
- SERS 2065 Retirement Fund's portfolio posted a 7.89% return for the quarter placing it in the 25 percentile of the Callan Target Date 2065 group for the quarter and in the 82 percentile for the last three-quarter year.
- SERS 2065 Retirement Fund's portfolio underperformed the LifePath Index 2065 CB by 0.00% for the quarter and outperformed the LifePath Index 2065 CB for the three-quarter year by 0.01%.

### Performance vs Callan Target Date 2065 (Net)

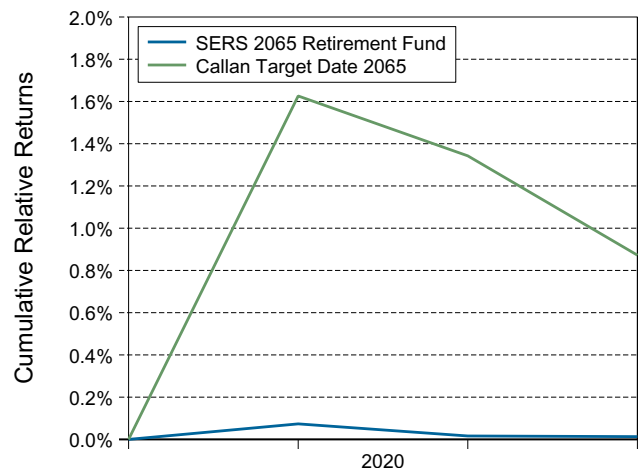


	Last Quarter	Last 3/4 Year
10th Percentile	8.00	3.13
25th Percentile	7.90	2.19
Median	7.38	1.60
75th Percentile	6.35	0.99
90th Percentile	4.67	(2.78)
<b>SERS 2065 Retirement Fund</b>	7.89	0.06
LifePath Index 2065 CB	7.90	0.04

### Relative Return vs LifePath Index 2065 CB



### Cumulative Returns vs LifePath Index 2065 CB





# SERS U.S. Large Company Index Fund

## Period Ended September 30, 2020

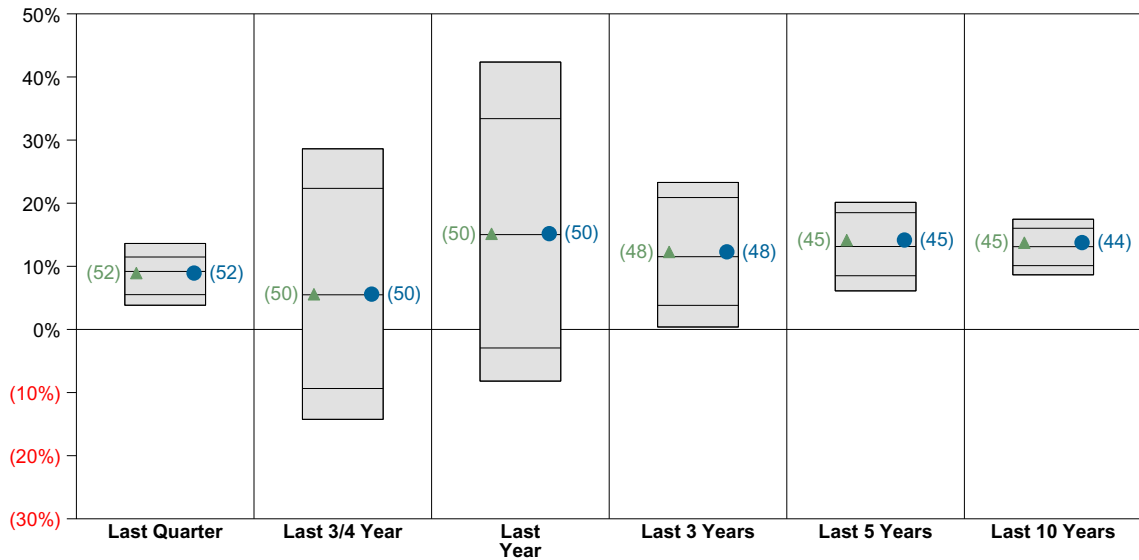
### Investment Philosophy

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

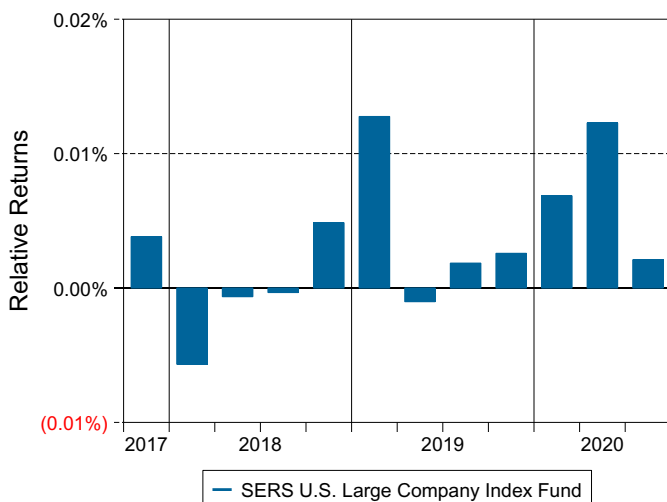
- SERS U.S. Large Company Index Fund's portfolio posted a 8.93% return for the quarter placing it in the 52 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 50 percentile for the last year.
- SERS U.S. Large Company Index Fund's portfolio outperformed the S&P 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)

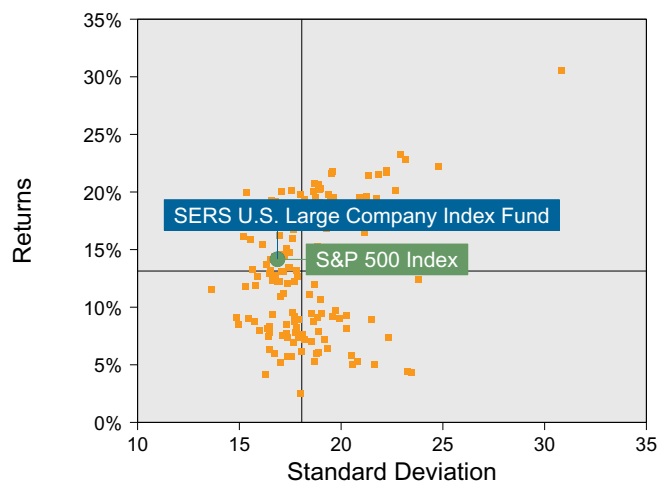


10th Percentile	13.62	28.62	42.36	23.29	20.13	17.46	
25th Percentile	11.47	22.35	33.40	20.89	18.50	16.03	
Median	9.19	5.49	15.02	11.52	13.14	13.12	
75th Percentile	5.51	(9.36)	(2.93)	3.81	8.51	10.11	
90th Percentile	3.83	(14.25)	(8.19)	0.38	6.11	8.65	
<b>SERS U.S. Large Company Index Fund</b>	●	8.93	5.60	15.18	12.29	14.16	13.76
<b>S&amp;P 500 Index</b>	▲	8.93	5.57	15.15	12.28	14.15	13.74

### Relative Return vs S&P 500 Index



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



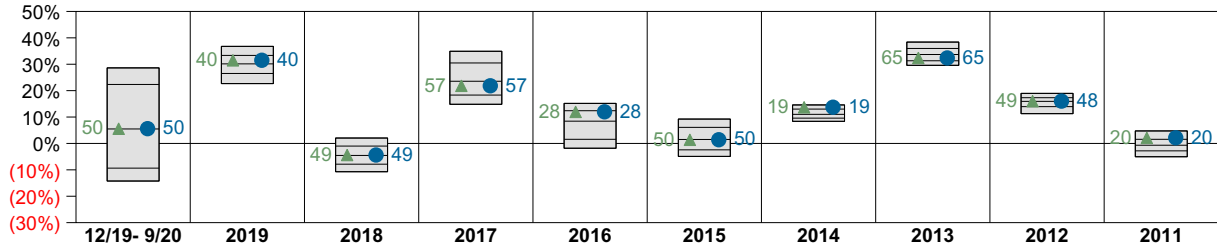


# SERS U.S. Large Company Index Fund Return Analysis Summary

## Return Analysis

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

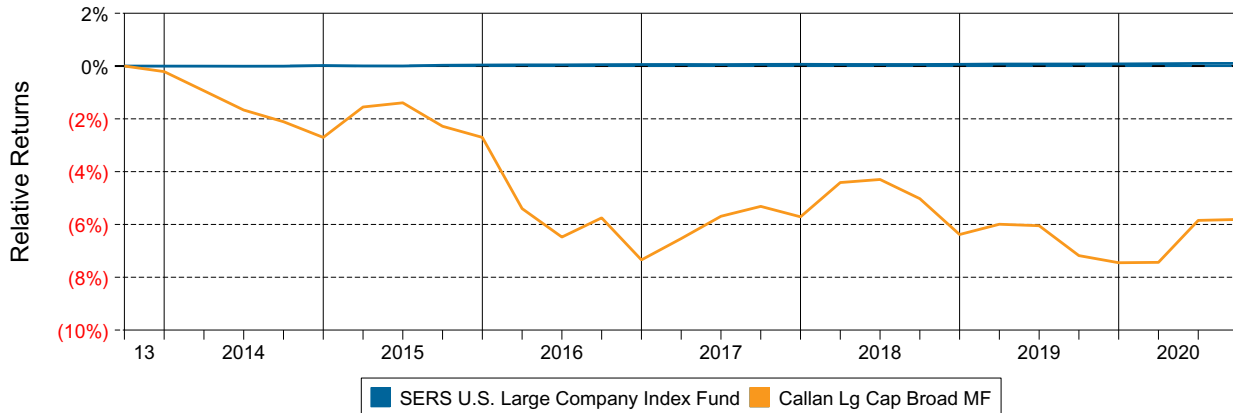
### Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



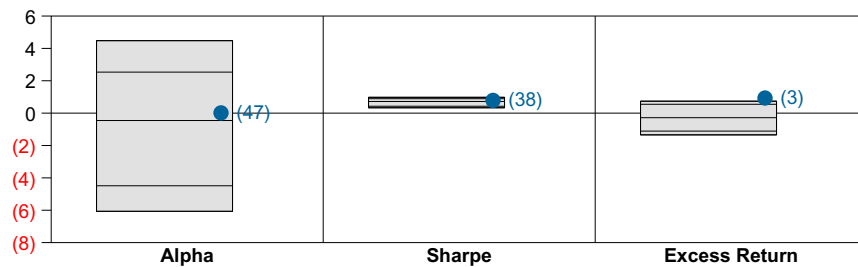
	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	28.62	36.76	2.05	34.91	15.17	9.23	14.58	38.40	18.96	4.74
25th Percentile	22.35	33.34	(1.00)	30.48	12.39	6.09	13.01	35.98	17.33	1.57
Median	5.49	30.14	(4.54)	23.56	8.43	1.50	11.02	33.69	15.94	(0.67)
75th Percentile	(9.36)	26.51	(7.86)	18.33	1.56	(2.42)	9.59	31.31	13.94	(2.81)
90th Percentile	(14.25)	22.66	(10.72)	14.82	(1.82)	(4.91)	8.38	29.58	11.29	(5.04)

	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
<b>SERS U.S. Large Company Index Fund</b>	● 5.60	31.51	(4.39)	21.84	11.98	1.40	13.71	32.38	16.03	2.14
S&P 500 Index	▲ 5.57	31.49	(4.38)	21.83	11.96	1.38	13.69	32.39	16.00	2.11

### 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 September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.48	0.98	0.74
25th Percentile	2.53	0.89	0.55
Median	(0.46)	0.72	(0.28)
75th Percentile	(4.49)	0.43	(1.11)
90th Percentile	(6.07)	0.33	(1.34)

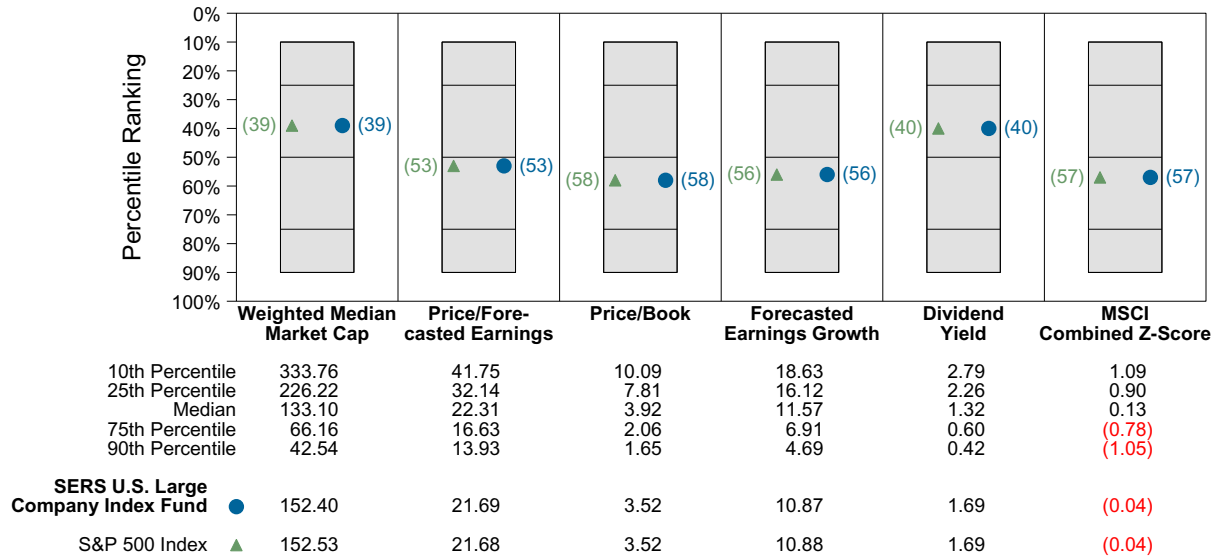
<b>SERS U.S. Large Company Index Fund</b>	● 0.01	0.79	0.93
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# SERS U.S. Large Company Index Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

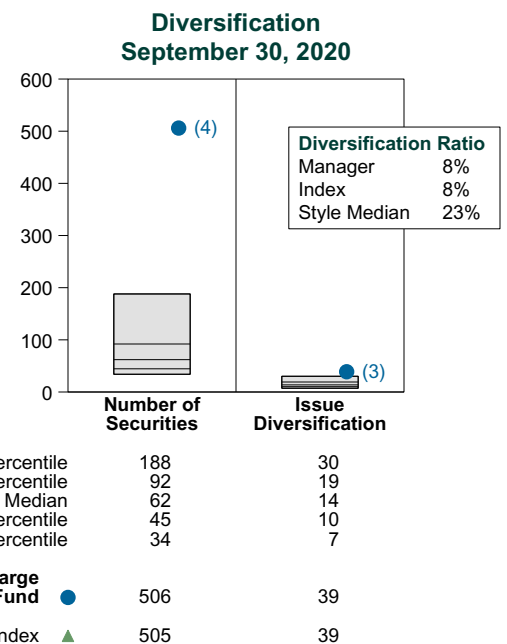
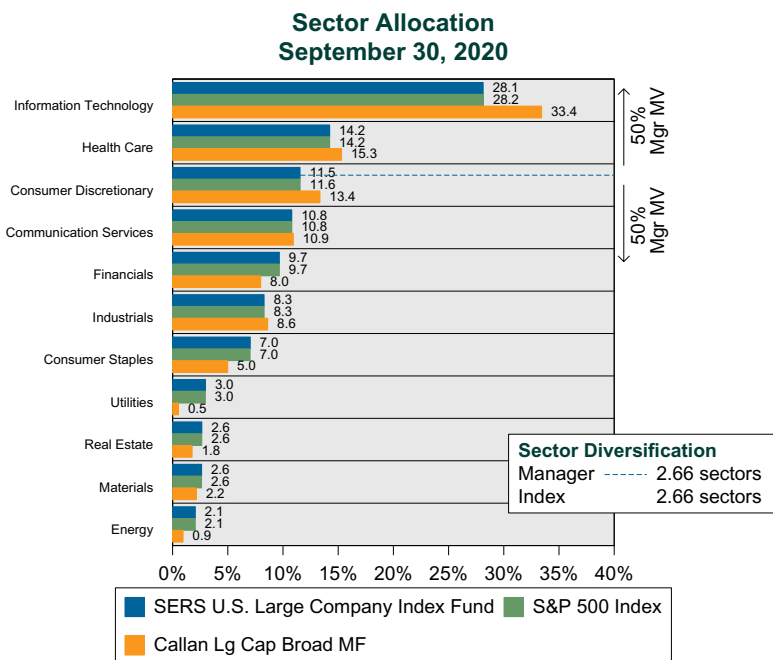
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Large Cap Broad Equity Mut Funds as of September 30, 2020



## 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 September 30, 2020

### 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	\$70,860,769	6.7%	27.22%	1980.65	29.93	0.71%	11.60%
Microsoft Corp	Information Technology	\$60,580,260	5.7%	3.60%	1591.70	31.48	1.06%	15.60%
Amazon.Com	Consumer Discretionary	\$51,025,267	4.8%	14.13%	1577.17	76.84	0.00%	37.00%
Facebook Inc Cl A	Communication Services	\$23,964,022	2.3%	15.34%	629.68	27.20	0.00%	16.40%
Alphabet Inc Cl A	Communication Services	\$16,758,558	1.6%	3.35%	440.37	27.38	0.00%	14.93%
Alphabet Inc Cl C	Communication Services	\$16,419,693	1.5%	3.96%	490.30	27.53	0.00%	22.02%
Berkshire Hathaway Inc Del Cl B New	Financials	\$16,065,571	1.5%	19.29%	298.40	20.23	0.00%	(15.10)%
Johnson & Johnson	Health Care	\$14,916,532	1.4%	6.57%	391.97	17.02	2.71%	5.42%
Procter & Gamble Co	Consumer Staples	\$13,175,886	1.2%	16.97%	346.03	25.35	2.28%	7.60%
Visa Inc Com Cl A	Information Technology	\$12,837,634	1.2%	3.68%	337.15	34.30	0.60%	8.95%

### 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
L Brands Inc	Consumer Discretionary	\$282,626	0.0%	112.49%	8.84	17.87	0.00%	7.10%
Fedex Corp	Industrials	\$2,313,315	0.2%	79.90%	66.05	16.31	1.03%	24.67%
Advanced Micro Devices Inc	Information Technology	\$3,661,115	0.3%	55.84%	96.26	53.94	0.00%	41.68%
United Parcel Service B	Industrials	\$4,485,492	0.4%	50.83%	117.82	21.58	2.42%	5.05%
Twitter Inc	Communication Services	\$1,331,218	0.1%	49.38%	35.20	135.67	0.00%	51.68%
Mosaic Co New	Materials	\$241,949	0.0%	46.43%	6.93	22.47	1.09%	(15.11)%
Whirlpool Corp	Consumer Discretionary	\$440,765	0.0%	42.93%	11.46	12.29	2.61%	6.31%
Nvidia Corp	Information Technology	\$12,707,293	1.2%	42.50%	333.93	52.06	0.12%	15.00%
Deere & Co	Industrials	\$2,649,953	0.2%	41.52%	69.45	22.19	1.37%	8.94%
Hanesbrands Inc	Consumer Discretionary	\$212,918	0.0%	40.83%	5.48	10.00	3.81%	1.10%

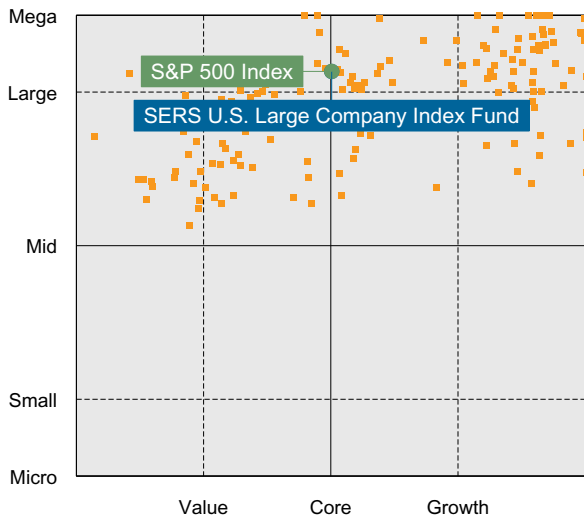
### 10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Occidental Petroleum	Energy	\$321,711	0.0%	(45.25)%	9.31	(5.27)	0.40%	(26.00)%
Marathon Oil Corp	Energy	\$126,289	0.0%	(33.17)%	3.23	(5.28)	0.00%	(4.00)%
Hollyfrontier Corp	Energy	\$114,642	0.0%	(31.59)%	3.19	29.64	7.10%	(23.09)%
Apache Corp	Energy	\$135,490	0.0%	(29.73)%	3.57	(23.97)	1.06%	(25.81)%
Eog Resources	Energy	\$797,961	0.1%	(28.50)%	20.93	22.43	4.17%	(4.34)%
Diamondback Energy Inc	Energy	\$182,623	0.0%	(27.37)%	4.75	9.68	4.98%	13.45%
Phillips 66	Energy	\$863,608	0.1%	(26.86)%	22.64	12.76	6.94%	(12.75)%
National Oilwell Varco	Energy	\$133,769	0.0%	(26.04)%	3.52	(30.20)	0.00%	(28.78)%
Valero Energy Corp New	Energy	\$675,406	0.1%	(25.01)%	17.66	28.22	9.05%	(2.00)%
Firstenergy Corp	Utilities	\$592,186	0.1%	(24.98)%	15.56	11.06	5.43%	(2.40)%

# Historical Holdings Based Style Analysis SERS U.S. Large Company Index Fund For Three Years Ended September 30, 2020

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.

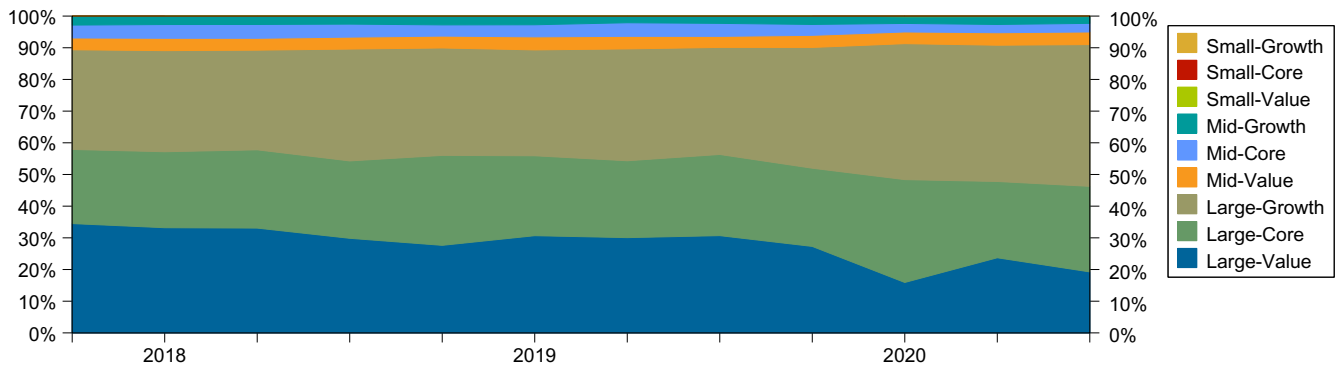
**Average Style Map vs Callan Lg Cap Broad MF Holdings for Three Years Ended September 30, 2020**



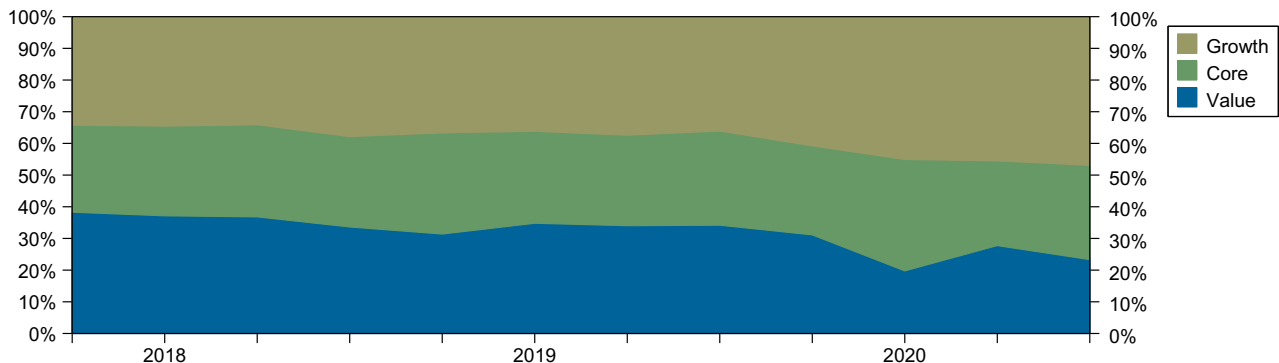
**Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2020**

	Value	Core	Growth	Total
Large	28.0% (99)	25.7% (94)	36.3% (87)	90.0% (280)
	28.0% (100)	25.7% (94)	36.3% (87)	90.0% (281)
Mid	3.8% (91)	3.7% (77)	2.5% (49)	10.0% (217)
	3.8% (91)	3.7% (77)	2.5% (49)	9.9% (217)
Small	0.0% (4)	0.0% (1)	0.0% (1)	0.1% (6)
	0.0% (4)	0.0% (1)	0.0% (1)	0.1% (6)
Micro	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total	31.9% (194)	29.4% (172)	38.8% (137)	100.0% (503)
	31.8% (195)	29.4% (172)	38.8% (137)	100.0% (504)

## 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 Stock Idx Period Ended September 30, 2020

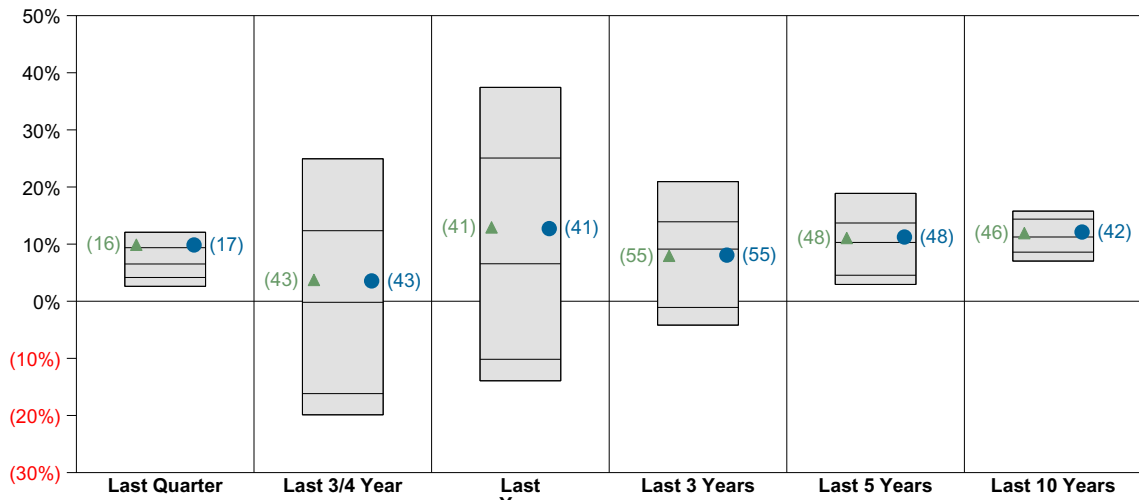
## Investment Philosophy

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

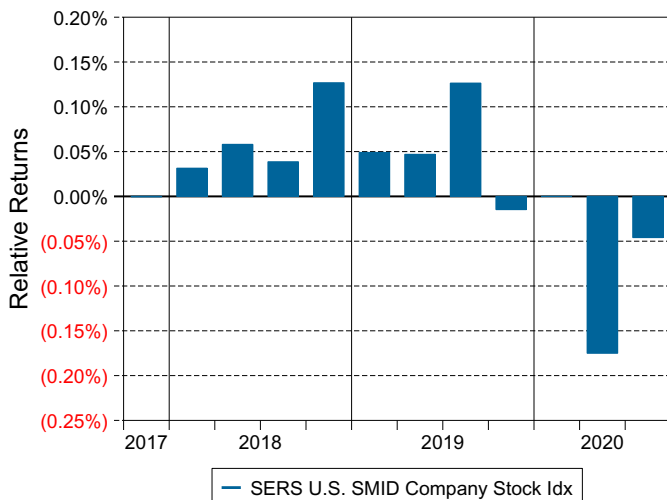
- SERS U.S. SMID Company Stock Idx's portfolio posted a 9.85% return for the quarter placing it in the 17 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 41 percentile for the last year.
- SERS U.S. SMID Company Stock Idx's portfolio underperformed the Dow Jones US Completion by 0.05% for the quarter and underperformed the Dow Jones US Completion for the year by 0.21%.

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

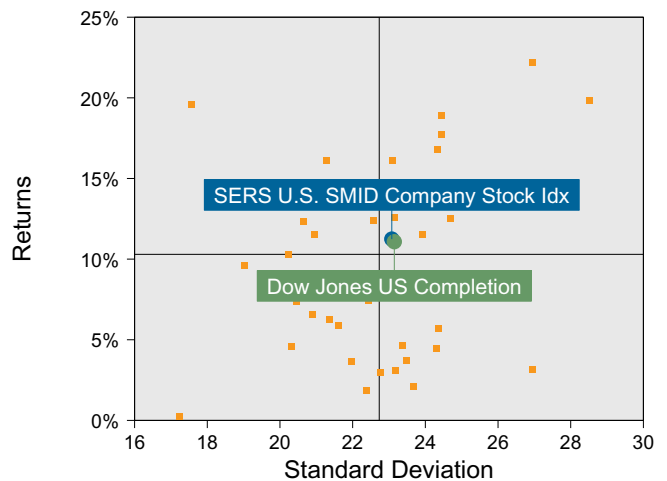


	Last Quarter	Last 3/4 Year	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	12.08	24.94	37.44	20.94	18.88	15.78
25th Percentile	9.38	12.35	25.07	13.91	13.70	14.37
Median	6.52	(0.19)	6.56	9.13	10.30	11.25
75th Percentile	4.16	(16.17)	(10.16)	(1.08)	4.55	8.60
90th Percentile	2.61	(19.89)	(13.93)	(4.18)	2.94	7.03
<b>SERS U.S. SMID Company Stock Idx</b>	● 9.85	3.56	12.72	8.07	11.24	12.12
Dow Jones US Completion	▲ 9.90	3.74	12.93	7.96	11.08	11.93

## Relative Return vs Dow Jones US Completion



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

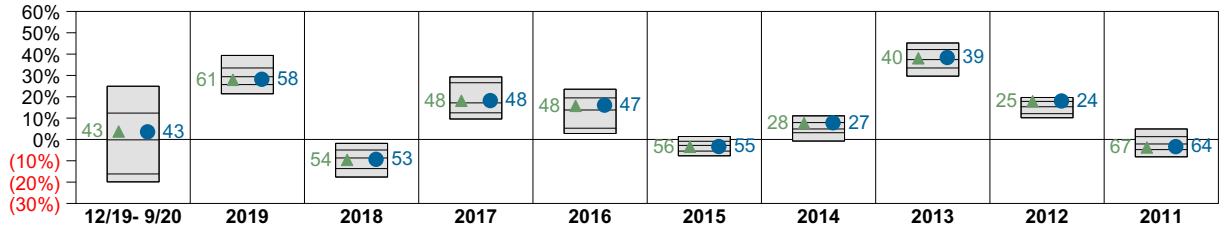


# SERS U.S. SMID Company Stock Idx Return Analysis Summary

## 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.

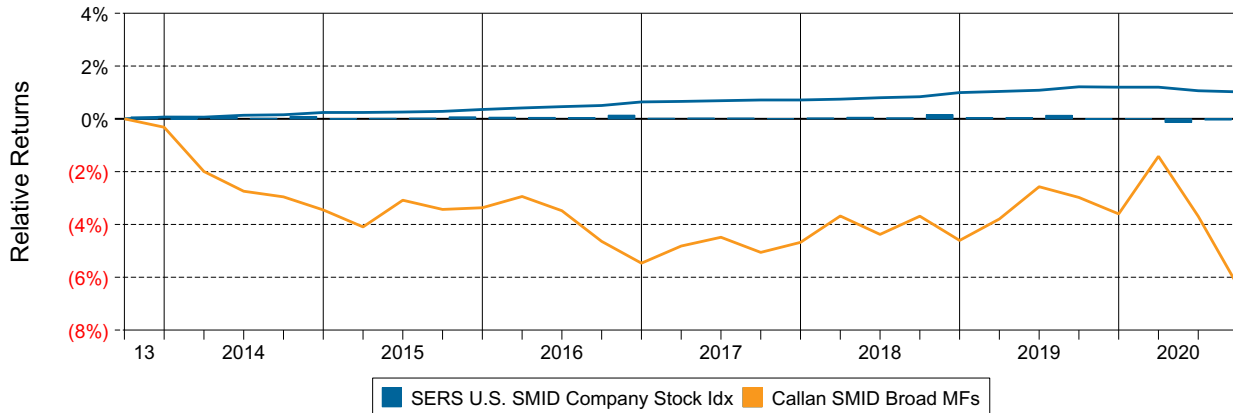
### Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



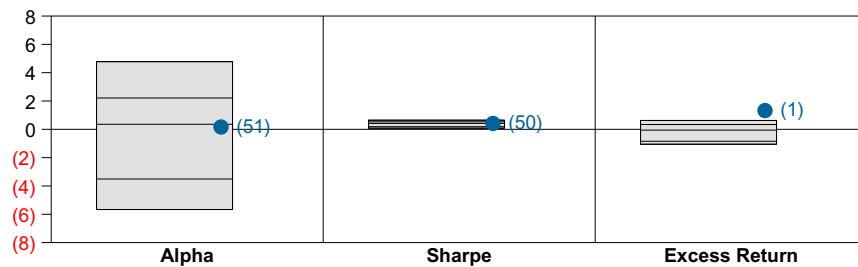
10th Percentile	24.94	39.38	(1.83)	29.31	23.54	1.38	11.06	45.21	19.66	4.92
25th Percentile	12.35	33.51	(4.95)	26.58	19.48	(0.87)	7.90	42.13	17.83	1.30
Median	(0.19)	29.40	(8.69)	17.14	13.80	(2.80)	4.92	37.43	15.32	(2.13)
75th Percentile	(16.17)	25.71	(13.66)	12.47	5.26	(5.46)	3.15	33.50	12.08	(4.76)
90th Percentile	(19.89)	21.40	(17.62)	9.57	2.79	(7.67)	(0.76)	29.67	10.16	(8.15)

<b>SERS U.S. SMID Company Stock Idx</b>	●	3.56	28.20	(9.32)	18.21	16.08	(3.31)	7.81	38.40	18.04	(3.38)
Dow Jones US Completion	▲	3.74	27.94	(9.57)	18.12	15.75	(3.42)	7.63	38.05	17.89	(3.76)

### 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 September 30, 2020



10th Percentile	4.78	0.64	0.62
25th Percentile	2.21	0.53	0.34
Median	0.36	0.42	(0.06)
75th Percentile	(3.51)	0.19	(0.84)
90th Percentile	(5.67)	0.08	(1.05)

<b>SERS U.S. SMID Company Stock Idx</b>	●	0.16	0.41	1.32
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# SERS U.S. SMID Company Idx Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

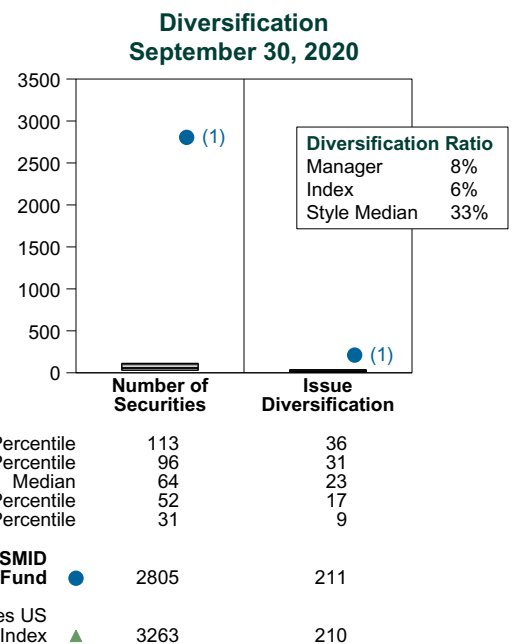
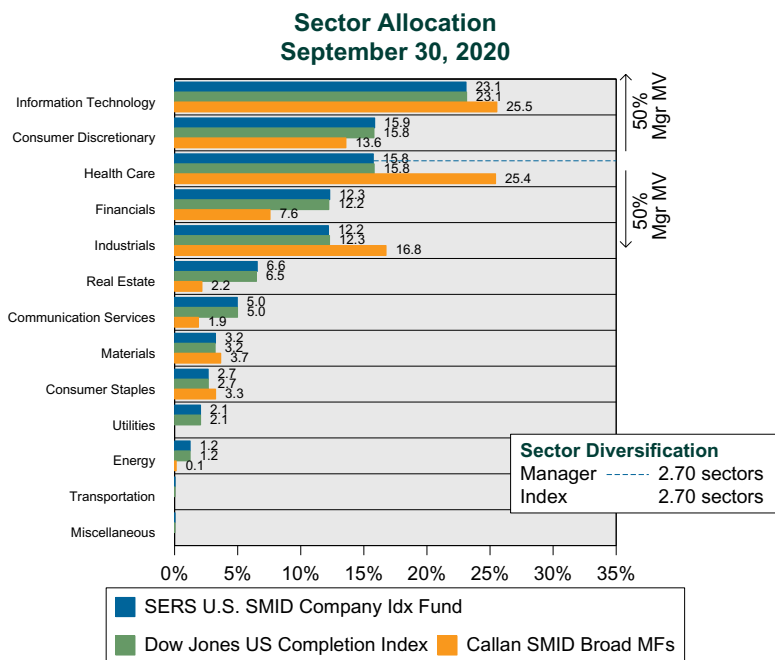
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Small/MidCap Broad Mutual Funds as of September 30, 2020



## 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 September 30, 2020

### 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	\$22,491,478	5.6%	98.65%	399.76	155.33	0.00%	395.60%
Zoom Video Communications Inc Cl A	Information Technology	\$6,022,484	1.5%	85.42%	91.56	171.76	0.00%	38.46%
Square Inc Cl A	Information Technology	\$4,240,490	1.0%	54.90%	60.35	155.25	0.00%	29.86%
Uber Technologies Inc	Industrials	\$3,516,249	0.9%	17.38%	63.94	(16.40)	0.00%	64.30%
Lululemon Athletica Inc	Consumer Discretionary	\$2,746,625	0.7%	5.86%	41.15	58.12	0.00%	15.23%
Docusign Inc	Information Technology	\$2,737,488	0.7%	24.99%	39.85	265.73	0.00%	31.20%
Veeva Sys Inc Cl A Com	Health Care	\$2,673,249	0.7%	19.95%	38.16	95.22	0.00%	19.00%
Workday Inc Cl A	Information Technology	\$2,633,005	0.7%	14.82%	38.08	76.21	0.00%	24.95%
Blackstone Group Inc Com Cl A	Financials	\$2,467,052	0.6%	(7.23)%	35.03	19.50	3.56%	14.77%
Nxp Semiconductors	Information Technology	\$2,462,419	0.6%	8.86%	34.85	19.76	1.20%	9.21%

### 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
Pacific Ethanol Inc Com Par \$.001	Energy	\$23,908	0.0%	919.44%	0.46	7.67	0.00%	-
Seres Therapeutics Inc	Health Care	\$103,093	0.0%	494.74%	2.48	(22.20)	0.00%	-
Cleantek Inc	Information Technology	\$12,049	0.0%	382.23%	0.22	(24.98)	0.00%	-
Vivint Solar Inc	Industrials	\$142,270	0.0%	327.76%	5.33	550.00	0.00%	-
Tupperware Brands Corp	Consumer Discretionary	\$69,831	0.0%	324.45%	0.99	8.81	0.00%	(1.32)%
Eastman Kodak Co	Information Technology	\$34,714	0.0%	295.48%	0.67	(1.99)	0.00%	-
Big 5 Sporting Goods Corp	Consumer Discretionary	\$14,457	0.0%	292.08%	0.16	23.23	5.35%	-
Sunrun	Industrials	\$654,904	0.2%	290.82%	9.78	159.57	0.00%	(0.10)%
Cassava Sciences Inc	Health Care	\$8,937	0.0%	274.04%	0.29	(37.13)	0.00%	58.11%
New Fortress Energy LLC Cl A Shs Rp	Energy	\$44,378	0.0%	240.80%	7.42	41.99	0.91%	-

### 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
Abeona Therapeutics Inc	Health Care	\$6,990	0.0%	-	0.09	(1.29)	0.00%	-
Satsuma Pharmaceuticals	Health Care	\$1,268	0.0%	(86.47)%	0.07	(2.21)	0.00%	-
Akebia Therapeutics Inc	Health Care	\$27,239	0.0%	(81.52)%	0.35	(2.31)	0.00%	-
Celsion Corporation Com Par New	Health Care	\$2,573	0.0%	(79.53)%	0.02	(1.63)	0.00%	-
Corbus Pharmaceuticals Hldgs	Health Care	\$8,887	0.0%	(78.55)%	0.15	(1.30)	0.00%	-
Ashford Hospitality Tr Inc Com Shs	Real Estate	\$1,402	0.0%	(77.17)%	0.02	(0.06)	0.00%	57.69%
Nikola Corp	Industrials	\$173,999	0.0%	(69.67)%	7.76	(18.29)	0.00%	-
Odonate Therapeutics Inc	Health Care	\$11,253	0.0%	(68.28)%	0.52	(3.60)	0.00%	-
Tricida Inc	Health Care	\$19,891	0.0%	(67.03)%	0.45	(1.94)	0.00%	-
Mallinckrodt Pub Ltd Co Shs	Health Care	\$7,130	0.0%	(63.76)%	0.08	0.21	0.00%	2.23%



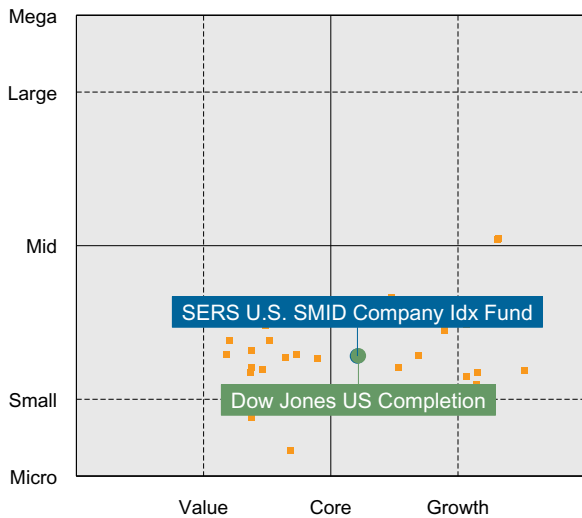
# Historical Holdings Based Style Analysis

## SERS U.S. SMID Company Idx Fund

### For Three Years Ended September 30, 2020

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.

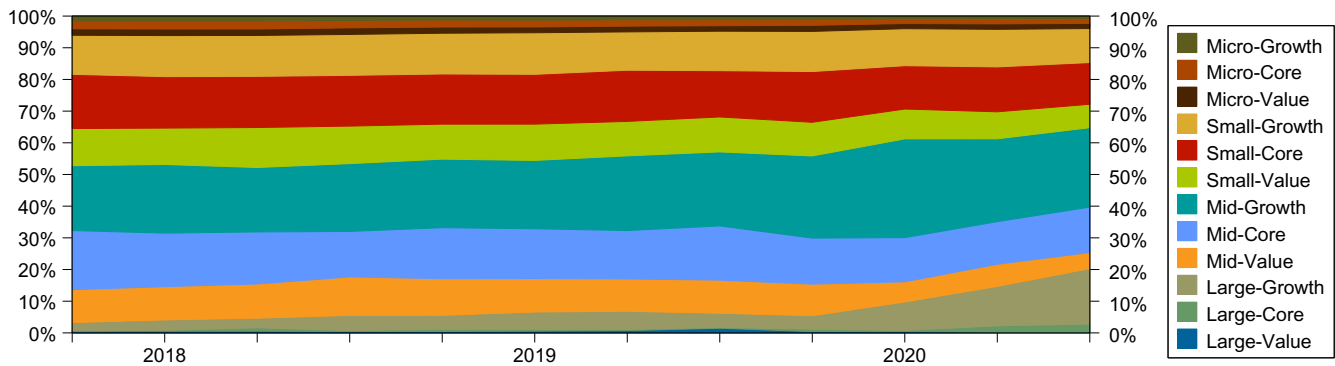
**Average Style Map vs Callan SMID Broad MFs Holdings for Three Years Ended September 30, 2020**



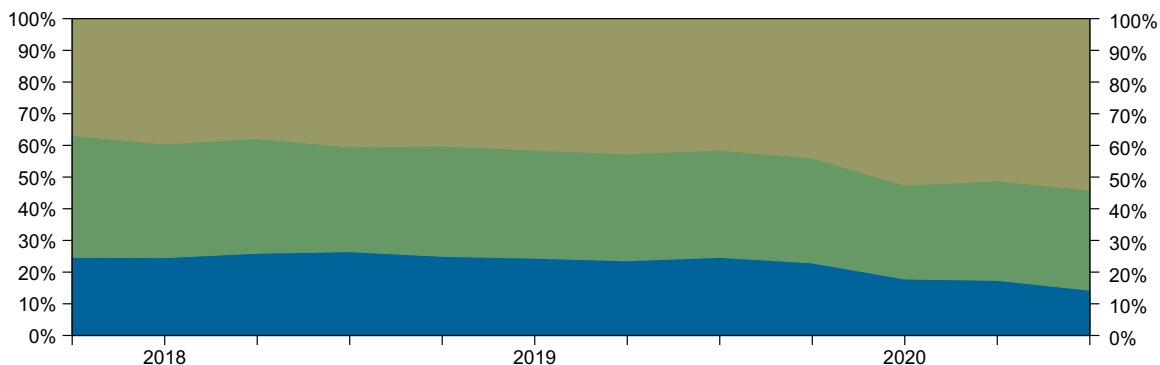
**Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2020**

	0.5% (2)	0.8% (3)	6.4% (12)	7.7% (17)
Large	0.5% (2)	0.7% (3)	6.4% (12)	7.7% (17)
Mid	9.6% (81)	15.6% (130)	23.5% (171)	48.7% (382)
Small	10.7% (315)	15.4% (492)	12.4% (380)	38.5% (1187)
Micro	1.9% (464)	2.1% (569)	1.2% (240)	5.1% (1273)
	1.8% (571)	2.2% (811)	1.2% (290)	5.2% (1672)
<b>Total</b>	<b>22.7% (862)</b>	<b>33.8% (1194)</b>	<b>43.5% (803)</b>	<b>100.0% (2859)</b>
	<b>22.5% (968)</b>	<b>33.9% (1437)</b>	<b>43.6% (856)</b>	<b>100.0% (3261)</b>
	Value	Core	Growth	Total

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



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





# SERS Global Non-U.S.Index Fund Period Ended September 30, 2020

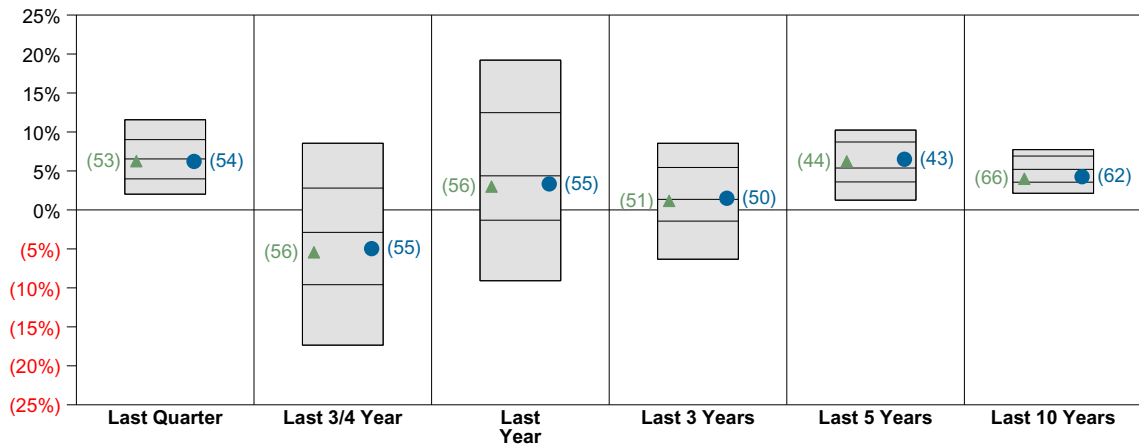
## Investment Philosophy

The Global Non-U.S. Stock Index Fund seeks to track the performance of the MSCI All Country World Index (ACWI) ex-U.S. Index. In meeting this objective, the assets of the Fund may be invested in securities, and a combination of other collective funds that are designed to track the performance of such Index. The Fund will principally invest in a combination of other affiliated bank collective funds, equity securities and derivatives, including common stock of foreign companies, depository receipts, financial futures and over-the-counter derivatives that represent developed and emerging market equity securities. This fund is managed by Mellon Capital Management. The Global Non-U.S. Stock Index Fund replaced the International Company Stock Index Fund in 1Q20.

## Quarterly Summary and Highlights

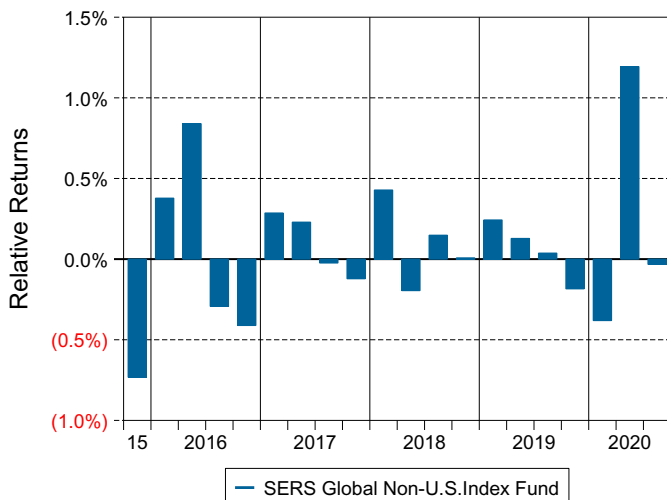
- SERS Global Non-U.S.Index Fund's portfolio posted a 6.22% return for the quarter placing it in the 54 percentile of the Callan Non US Equity Mutual Funds group for the quarter and in the 55 percentile for the last year.
- SERS Global Non-U.S.Index Fund's portfolio underperformed the MSCI ACWI ex US by 0.03% for the quarter and outperformed the MSCI ACWI ex US for the year by 0.34%.

## Performance vs Callan Non US Equity Mutual Funds (Institutional Net)

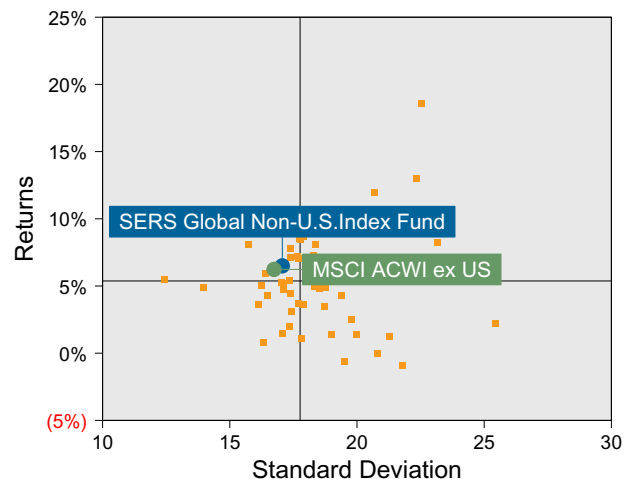


	Last Quarter	Last 3/4 Year	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
<b>SERS Global Non-U.S.Index Fund</b> ●	6.22	(4.97)	3.34	1.49	6.50	4.26
<b>MSCI ACWI ex US</b> ▲	6.25	(5.44)	3.00	1.16	6.23	4.00

## Relative Return vs MSCI ACWI ex US



## Callan Non US Equity Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

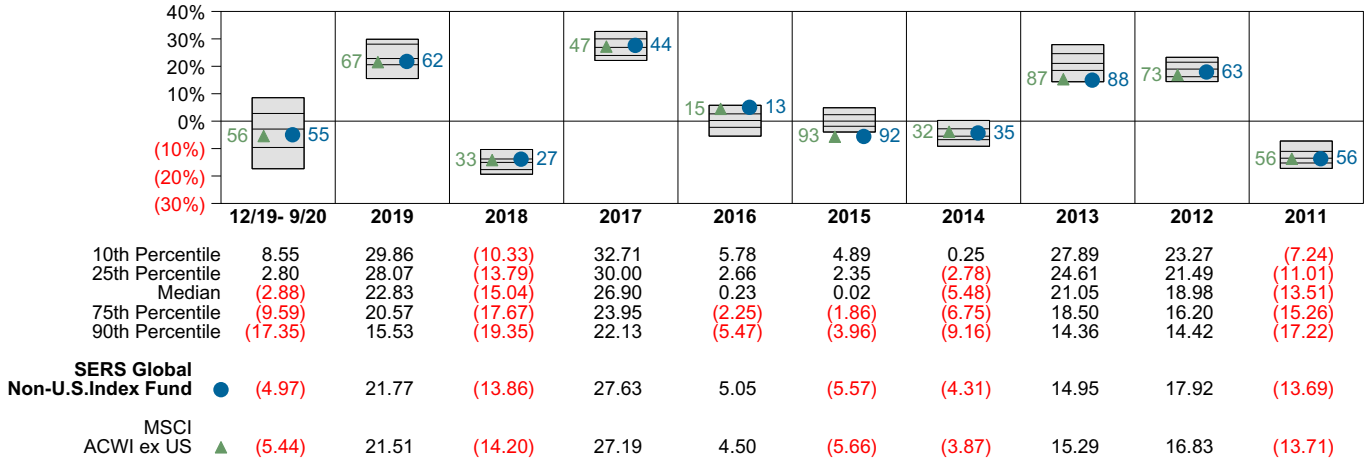


# SERS Global Non-U.S.Index Fund Return Analysis Summary

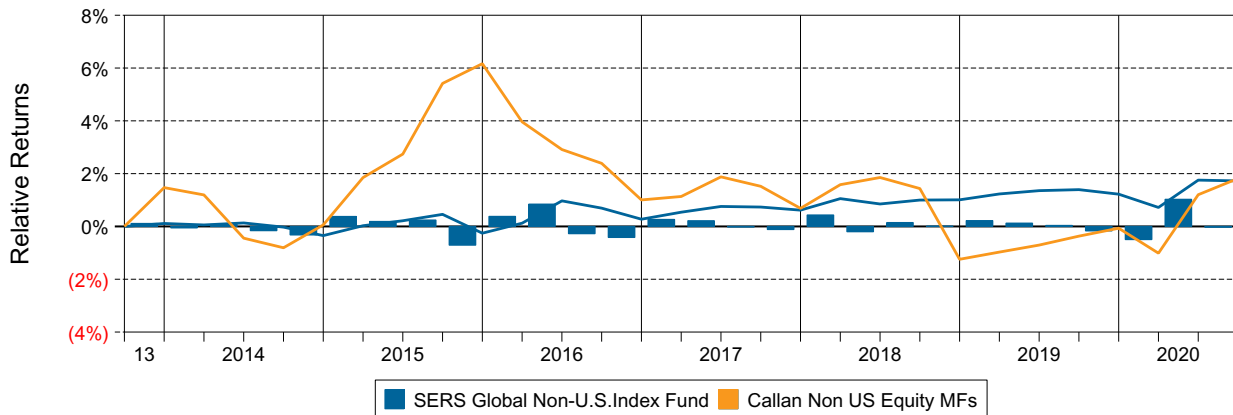
## Return Analysis

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.

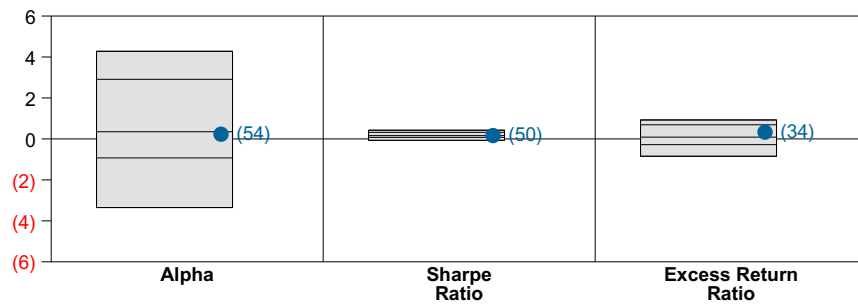
### Performance vs Callan Non US Equity Mutual Funds (Institutional Net)



### Cumulative and Quarterly Relative Return vs MSCI ACWI ex US



### Risk Adjusted Return Measures vs MSCI ACWI ex US Rankings Against Callan Non US Equity Mutual Funds (Institutional Net) Seven Years Ended September 30, 2020



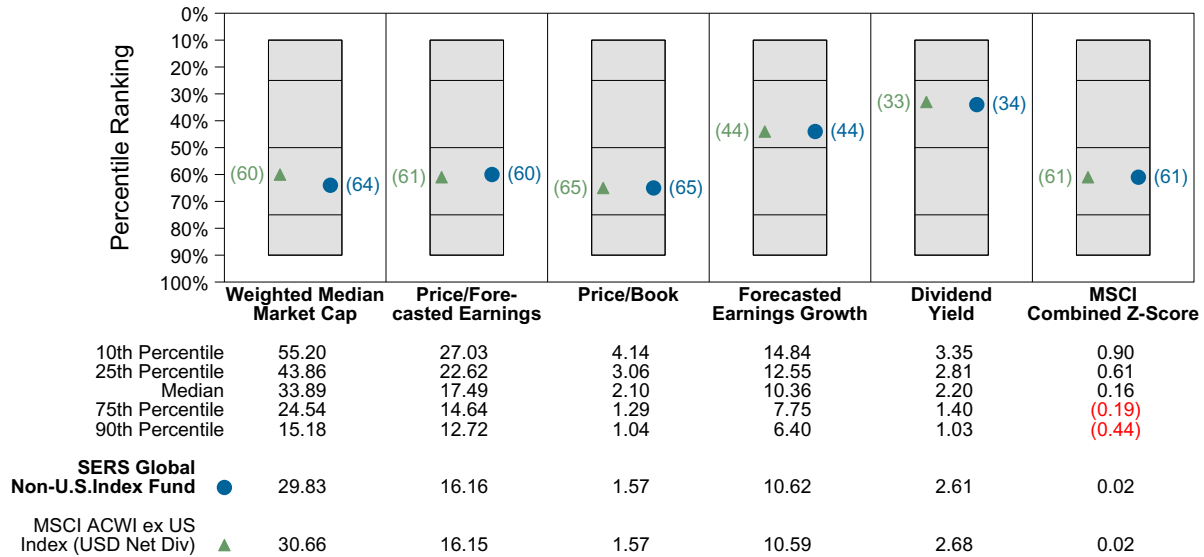
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.28	0.42	0.93
25th Percentile	2.91	0.32	0.69
Median	0.35	0.16	0.09
75th Percentile	(0.93)	0.08	(0.28)
90th Percentile	(3.35)	(0.07)	(0.85)
<b>SERS Global Non-U.S.Index Fund</b>	● 0.23	0.16	0.33

# SERS Global Non-U.S. Index Fund Equity Characteristics Analysis Summary

## Portfolio Characteristics

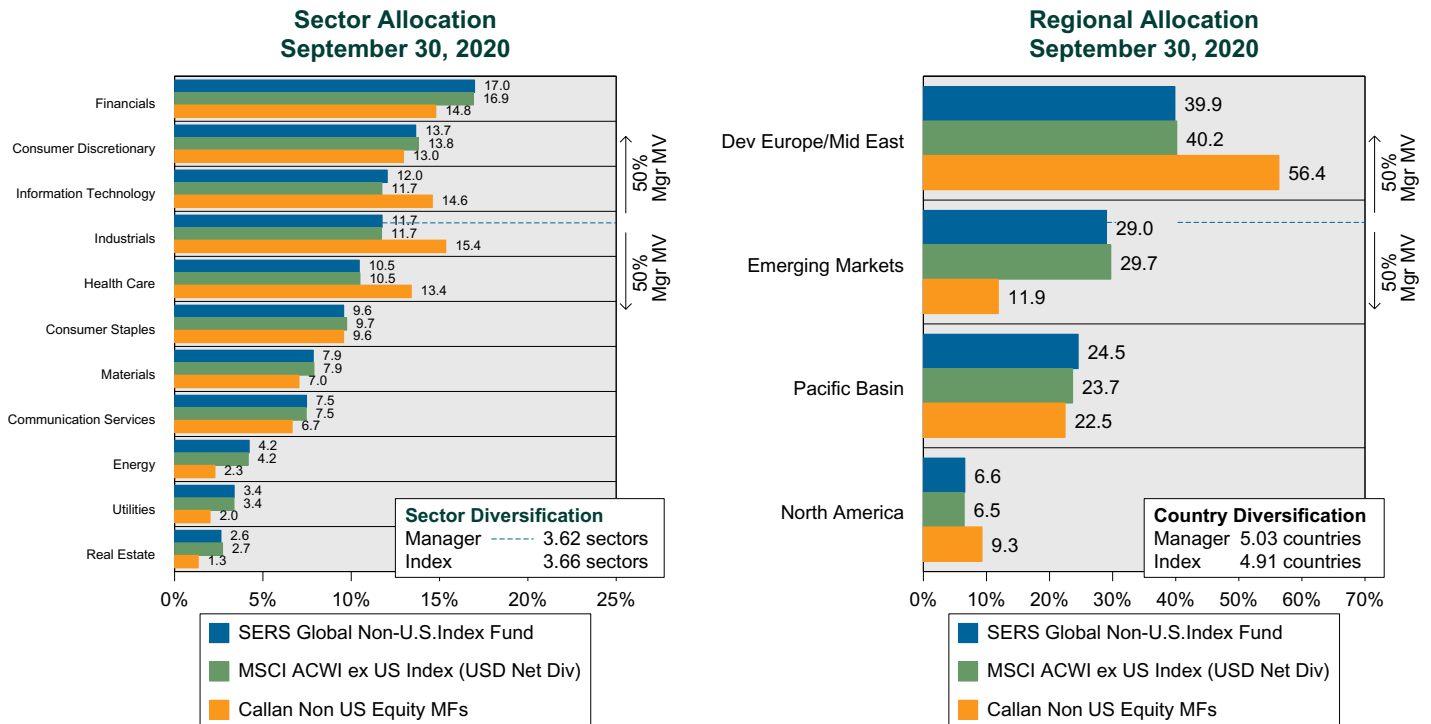
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

## Portfolio Characteristics Percentile Rankings Rankings Against Callan Non US Equity Mutual Funds as of September 30, 2020



## 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.



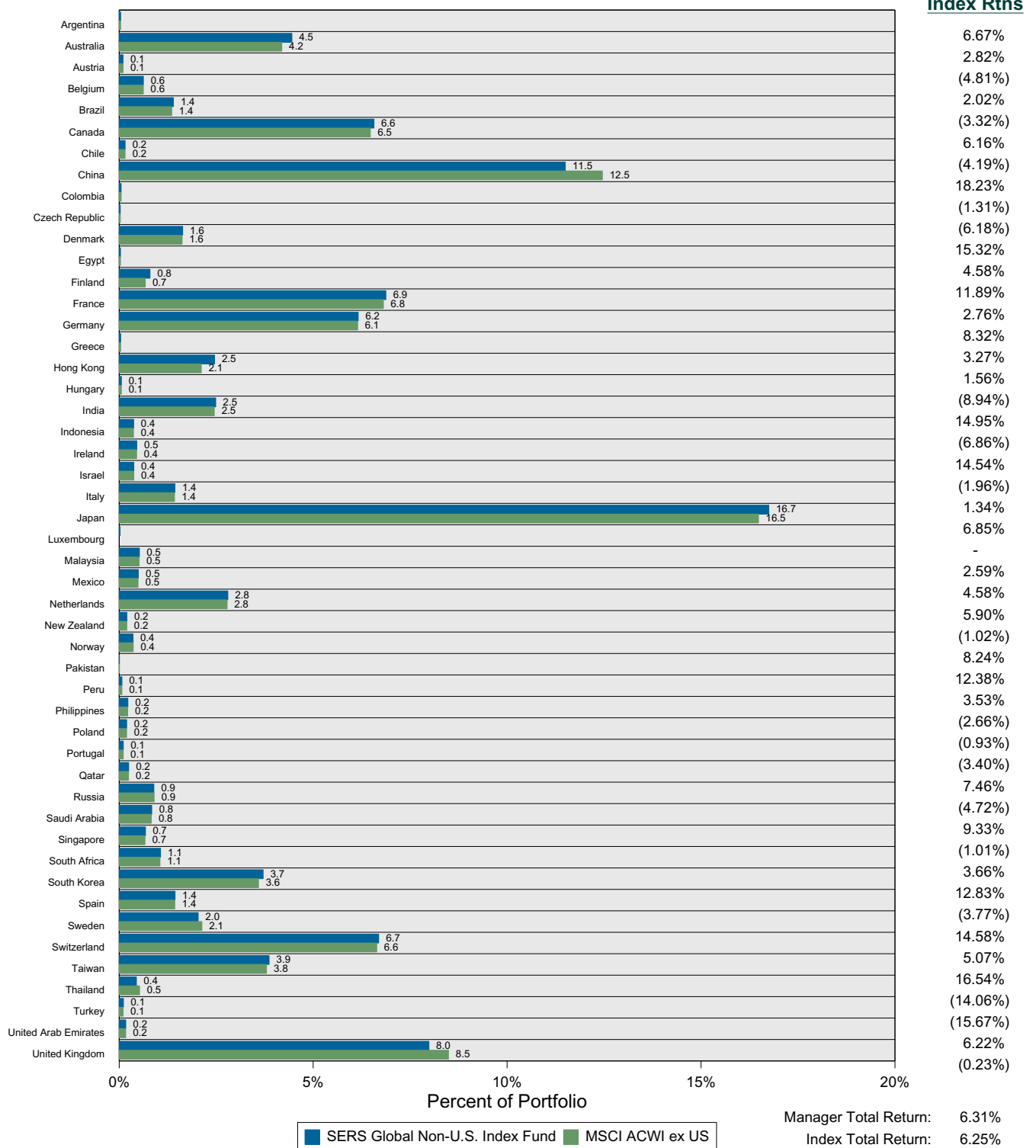
# Country Allocation

## SERS Global Non-U.S. Index Fund VS MSCI ACWI ex US Index (USD Net Div)

### Country Allocation

The chart below contrasts the portfolio's country allocation with that of the index as of September 30, 2020. 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 September 30, 2020



## SERS Global Non-U.S. Index Fund Top 10 Portfolio Holdings Characteristics as of September 30, 2020

### 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
Alibaba Group Hldg Ltd Sponsored Ads	Consumer Discretionary	\$2,939,636	2.6%	40.12%	0.80	28.05	0.00%	23.00%
Tencent Holdings Limited Shs Par Hkd	Communication Services	\$2,013,250	1.8%	5.17%	632.46	30.80	0.23%	25.47%
Taiwan Semicond Manufac Co L Shs	Information Technology	\$1,968,707	1.7%	41.72%	387.67	22.31	2.31%	17.11%
Nestle S A Shs Nom New	Consumer Staples	\$1,870,985	1.6%	7.79%	342.88	24.53	2.47%	3.80%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	\$1,272,965	1.1%	(1.73)%	241.01	15.19	2.86%	6.00%
Samsung Electronics Co Ltd Ord	Information Technology	\$1,271,896	1.1%	14.14%	297.09	12.05	2.43%	17.45%
Novartis	Health Care	\$1,016,273	0.9%	(1.43)%	214.59	14.07	3.69%	7.83%
Sap Se Shs	Information Technology	\$858,516	0.8%	13.43%	192.40	24.05	1.18%	8.31%
Asml Holding N V Asml Rev Stk Spl	Information Technology	\$829,530	0.7%	(1.13)%	157.08	33.09	0.76%	23.44%
Astrazeneca Plc Ord	Health Care	\$757,614	0.7%	3.66%	143.48	23.32	2.58%	18.45%

### 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
Shin Poong Pharmaceutical Co Shs	Health Care	\$16,530	0.0%	330.82%	5.73	7726.43	0.00%	-
Inmong.Junzheng E&c.'a'	Materials	\$187	0.0%	196.04%	8.95	20.38	4.85%	27.10%
Nio Inc Ads	Consumer Discretionary	\$120,417	0.1%	182.61%	22.95	(40.42)	0.00%	-
Seegene	Health Care	\$21,515	0.0%	137.43%	5.84	18.23	0.04%	41.99%
Byd Electronic Intl Co Ltd Shs	Information Technology	\$18,461	0.0%	123.97%	11.32	16.64	0.20%	25.81%
Supermax	Health Care	\$16,156	0.0%	117.06%	5.51	14.47	0.38%	(1.18)%
Byd Co Ltd Shs H	Consumer Discretionary	\$53,377	0.0%	108.71%	14.33	79.92	0.06%	30.70%
Hanwha Chemical Corp	Materials	\$18,093	0.0%	105.44%	5.26	12.60	0.52%	92.90%
Great Wall Autom.H	Consumer Discretionary	\$21,245	0.0%	97.23%	3.93	14.09	2.88%	14.71%
United Microelectronics Corp Shs	Information Technology	\$60,730	0.1%	92.11%	12.05	17.07	2.82%	29.84%

### 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
Daiichi Sankyo Co	Health Care	\$276,325	0.2%	(60.52)%	65.08	82.48	0.72%	1.18%
Rolls Royce Holdings Plc Lon Shs	Industrials	\$17,288	0.0%	(51.92)%	3.25	(5.83)	0.00%	(5.78)%
Sino Biopharmaceutical	Health Care	\$60,326	0.1%	(41.07)%	20.55	37.55	0.71%	7.90%
Ypf Sociedad Anonima Spon Adr Cl D	Energy	\$3,231	0.0%	(40.84)%	2.67	(49.13)	1.38%	39.06%
Lotos Group	Energy	\$4,392	0.0%	(39.63)%	1.65	8.01	2.90%	125.32%
Klepierre Sa Act	Real Estate	\$14,552	0.0%	(36.16)%	4.22	4.74	17.94%	(3.39)%
Barito Pacific Timber	Materials	\$7,712	0.0%	(34.62)%	4.96	-	0.36%	(32.73)%
Sun Art Retail Group Ltd	Consumer Staples	\$14,108	0.0%	(32.74)%	10.52	20.81	1.75%	12.72%
Semiconductor Mfg Intl Cp Shs New	Information Technology	\$43,889	0.0%	(32.32)%	13.47	54.37	0.00%	8.93%
Pt Perusahaan Gas Negara Tbk Shs Ser	Utilities	\$3,628	0.0%	(30.79)%	1.51	-	4.49%	(12.38)%

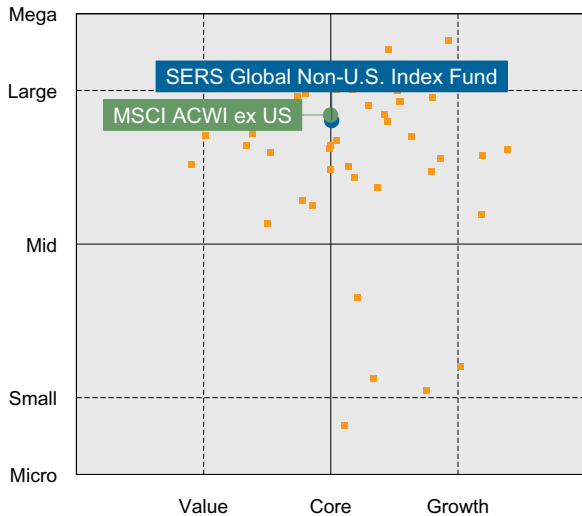
# Historical Holdings Based Style Analysis

## SERS Global Non-U.S. Index Fund

### For Three Years Ended September 30, 2020

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.

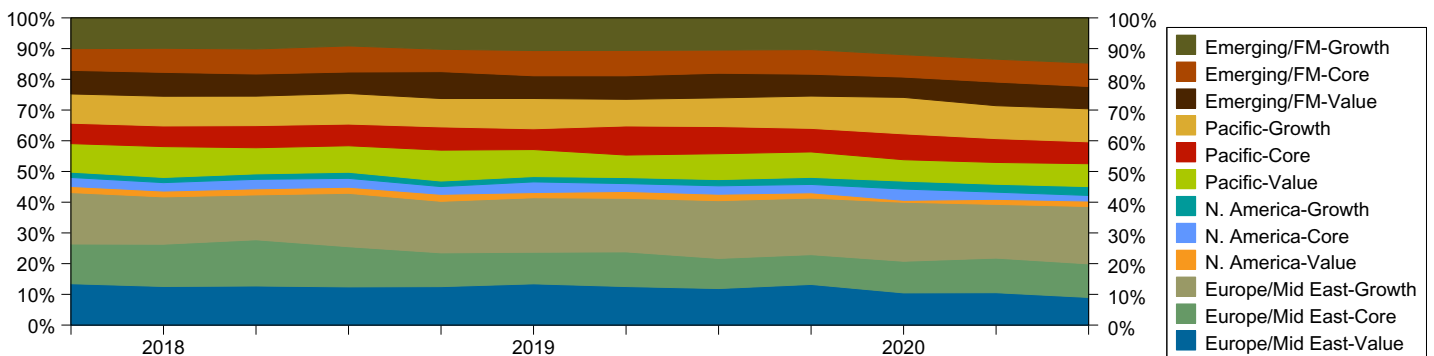
**Average Style Map vs Callan Non US Equity MFs Holdings for Three Years Ended September 30, 2020**



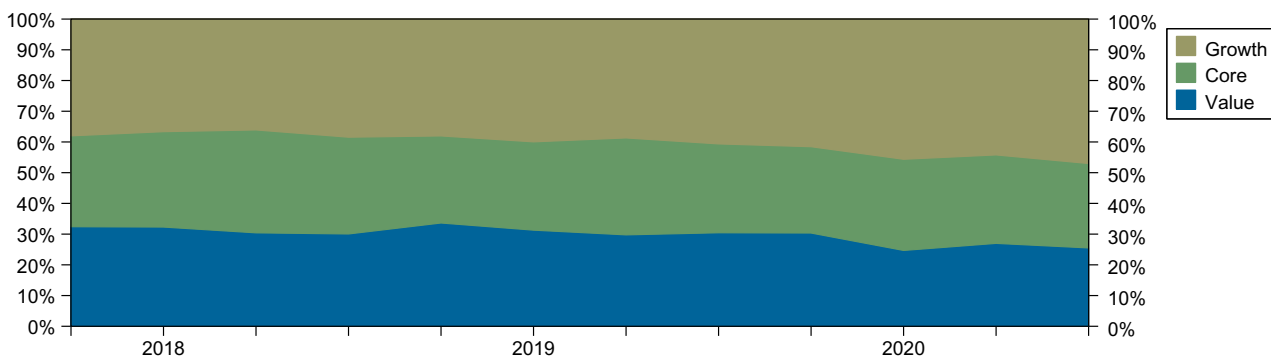
**Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2020**

Europe/ Mid East	12.1% (125)	11.6% (121)	17.4% (172)	41.1% (418)
	12.4% (137)	11.4% (126)	17.4% (185)	41.3% (448)
N. America	1.8% (28)	2.8% (28)	2.1% (31)	6.7% (87)
	1.8% (29)	2.8% (29)	2.1% (32)	6.7% (90)
Pacific	8.4% (151)	7.6% (144)	10.0% (172)	26.0% (467)
	8.1% (152)	7.2% (144)	9.5% (171)	24.9% (467)
Emerging/ FM	7.5% (369)	7.8% (310)	11.0% (310)	26.2% (989)
	7.9% (423)	8.0% (366)	11.3% (364)	27.2% (1153)
<b>Total</b>	<b>29.8% (673)</b>	<b>29.8% (603)</b>	<b>40.4% (685)</b>	<b>100.0% (1961)</b>
	<b>30.3% (741)</b>	<b>29.5% (665)</b>	<b>40.2% (752)</b>	<b>100.0% (2158)</b>
	Value	Core	Growth	Total

**SERS Global Non-U.S. Index Fund Historical Region/Style Exposures**



**SERS Global Non-U.S. Index Fund Historical Style Only Exposures**







# SERS Short Term Investment Fund Period Ended September 30, 2020

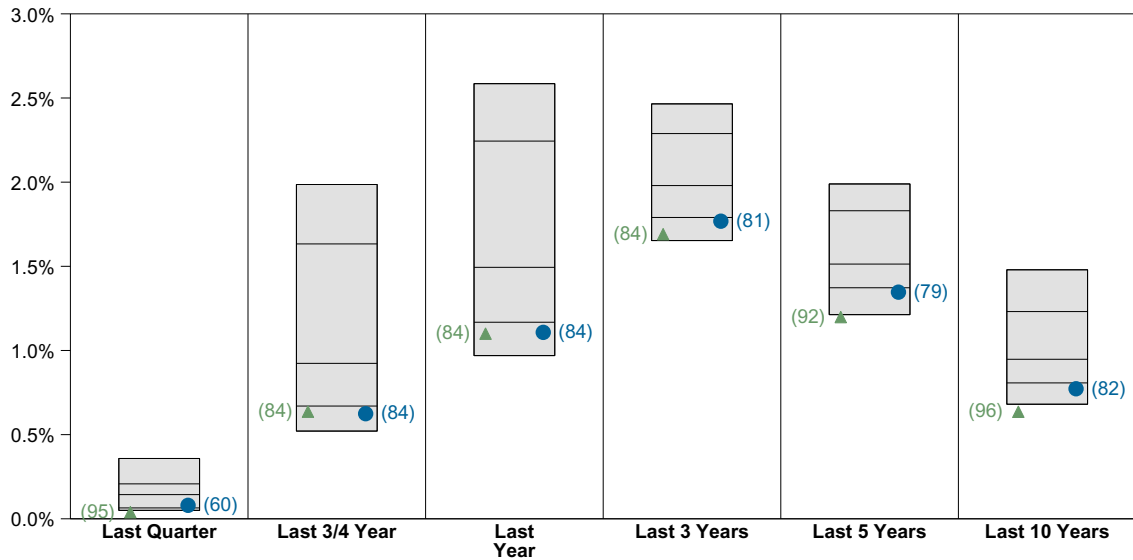
## Investment Philosophy

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

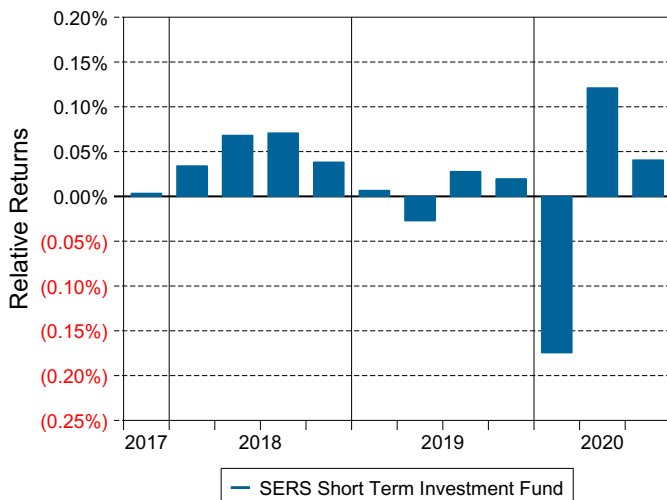
- SERS Short Term Investment Fund's portfolio posted a 0.08% return for the quarter placing it in the 60 percentile of the Callan Cash Database group for the quarter and in the 84 percentile for the last year.
- SERS Short Term Investment Fund's portfolio outperformed the 3-month Treasury Bill by 0.04% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.01%.

## Performance vs Callan Cash Database (Gross)

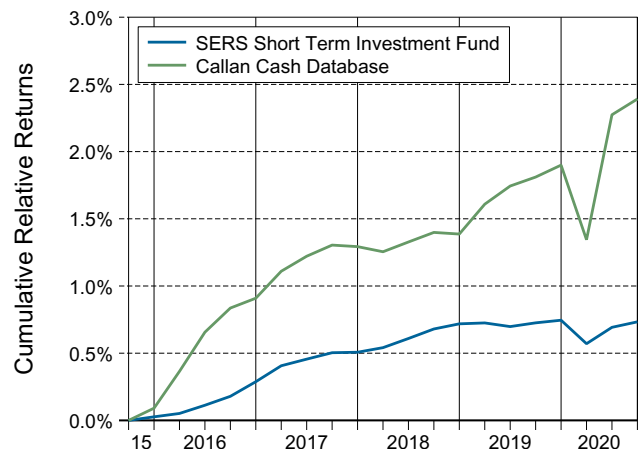


10th Percentile	0.36	1.99	2.59	2.47	1.99	1.48
25th Percentile	0.21	1.63	2.24	2.29	1.83	1.23
Median	0.14	0.92	1.49	1.98	1.51	0.95
75th Percentile	0.06	0.67	1.17	1.79	1.37	0.81
90th Percentile	0.05	0.52	0.97	1.65	1.21	0.68
<b>SERS Short Term Investment Fund</b>	● 0.08	0.62	1.11	1.77	1.35	0.77
3-month Treasury Bill	▲ 0.04	0.64	1.10	1.69	1.20	0.64

## Relative Return vs 3-month Treasury Bill



## Cumulative Returns vs 3-month Treasury Bill

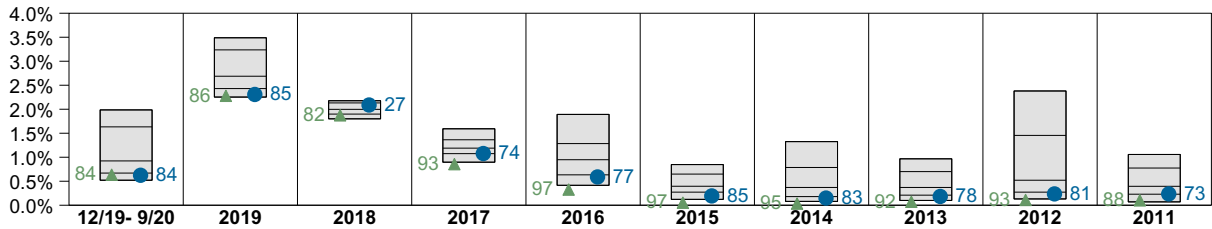


# SERS Short Term Investment Fund Return Analysis Summary

## Return Analysis

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

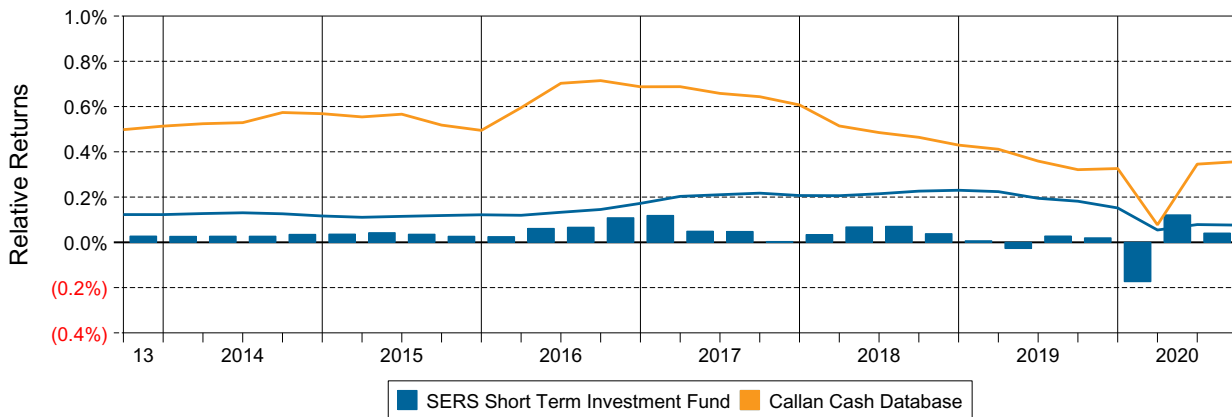
## Performance vs Callan Cash Database (Gross)



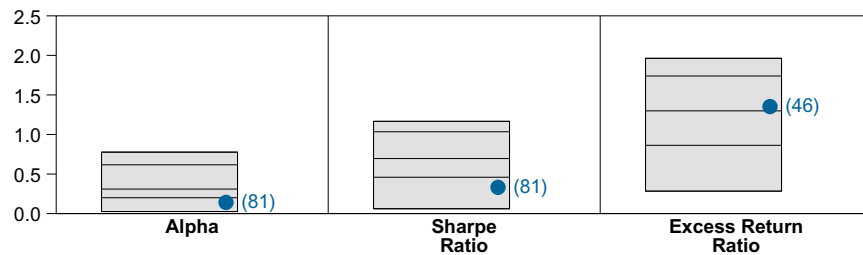
	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
10th Percentile	1.99	3.49	2.18	1.59	1.89	0.85	1.33	0.97	2.38	1.06
25th Percentile	1.63	3.24	2.13	1.36	1.28	0.65	0.79	0.70	1.45	0.78
Median	0.92	2.69	2.00	1.19	0.95	0.40	0.37	0.37	0.52	0.39
75th Percentile	0.67	2.43	1.90	1.08	0.63	0.27	0.18	0.21	0.27	0.23
90th Percentile	0.52	2.25	1.80	0.90	0.41	0.12	0.08	0.10	0.13	0.07

SERS Short Term Investment Fund	●	0.62	2.31	2.09	1.08	0.59	0.19	0.15	0.18	0.24	0.24
3-month Treasury Bill	▲	0.64	2.28	1.87	0.86	0.33	0.05	0.03	0.07	0.11	0.10

## 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 September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.78	1.17	1.96
25th Percentile	0.62	1.03	1.74
Median	0.31	0.70	1.30
75th Percentile	0.20	0.46	0.86
90th Percentile	0.03	0.06	0.28
SERS Short Term Investment Fund	● 0.14	0.33	1.35

# SERS Stable Value Fund

## Period Ended September 30, 2020

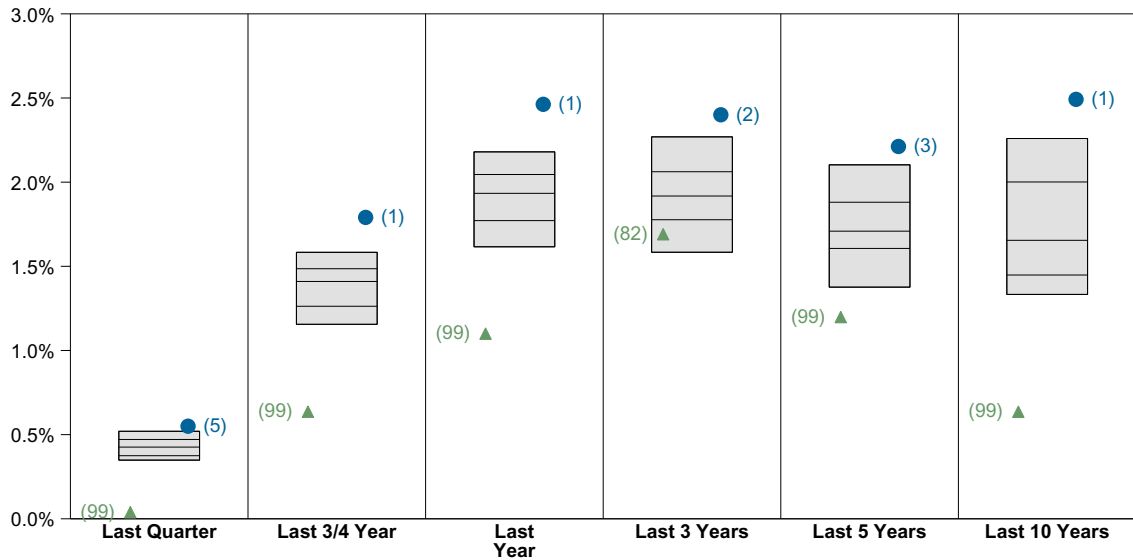
### Investment Philosophy

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

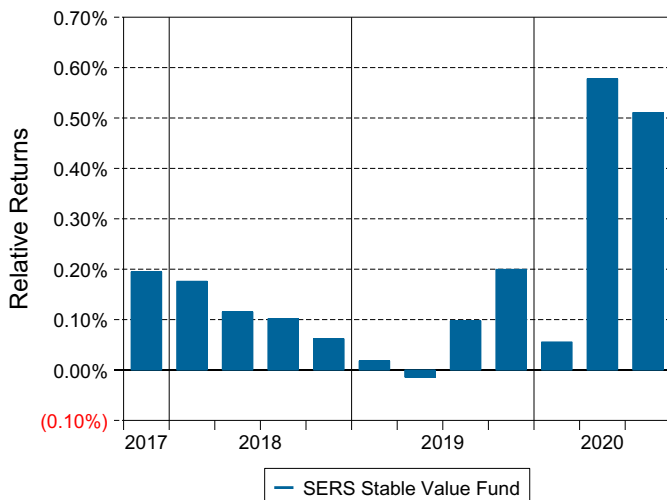
- SERS Stable Value Fund's portfolio posted a 0.55% return for the quarter placing it in the 5 percentile of the Callan Stable Value CT group for the quarter and in the 1 percentile for the last year.
- SERS Stable Value Fund's portfolio outperformed the 3-month Treasury Bill by 0.51% for the quarter and outperformed the 3-month Treasury Bill for the year by 1.36%.

### Performance vs Callan Stable Value CT (Institutional Net)

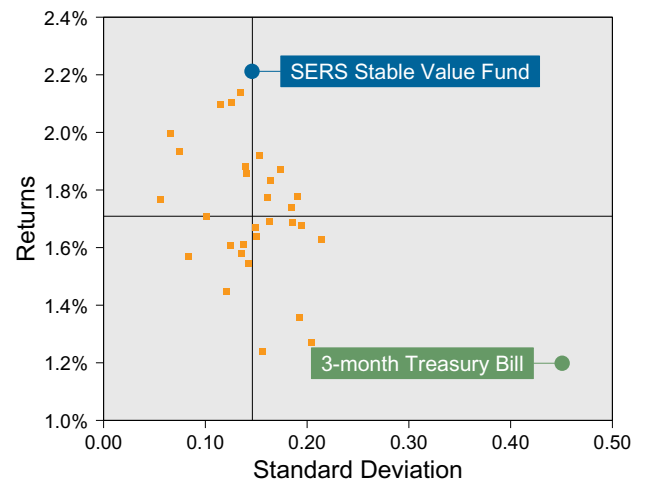


10th Percentile	0.52	1.58	2.18	2.27	2.10	2.26
25th Percentile	0.47	1.49	2.05	2.06	1.88	2.00
Median	0.43	1.41	1.93	1.92	1.71	1.65
75th Percentile	0.37	1.26	1.77	1.78	1.61	1.45
90th Percentile	0.35	1.16	1.62	1.58	1.38	1.33
<b>SERS Stable Value Fund</b>	● 0.55	1.79	2.46	2.40	2.21	2.49
3-month Treasury Bill	▲ 0.04	0.64	1.10	1.69	1.20	0.64

### Relative Return vs 3-month Treasury Bill



### Callan Stable Value CT (Institutional Net) Annualized Five Year Risk vs Return

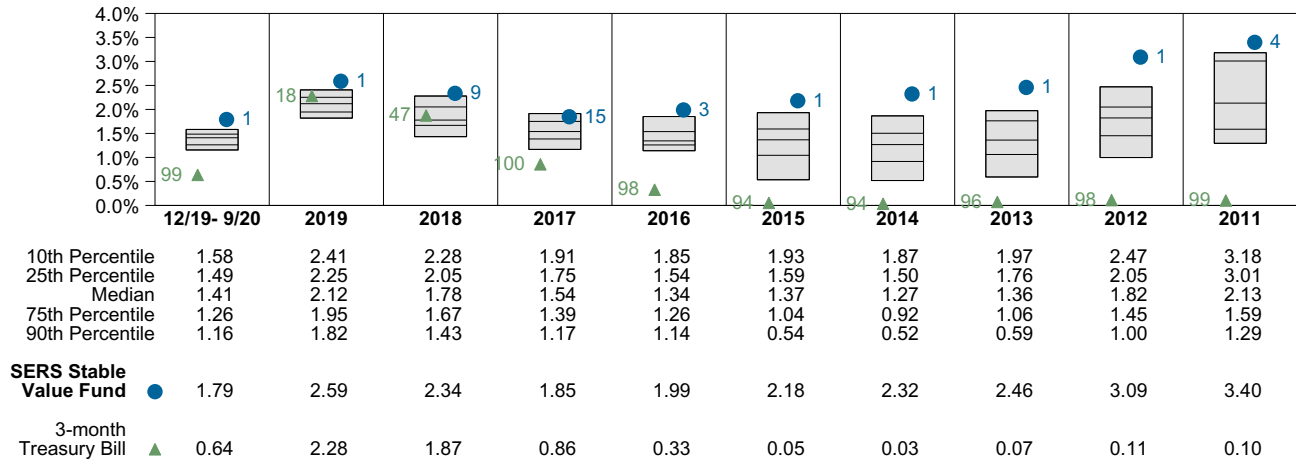


# SERS Stable Value Fund Return Analysis Summary

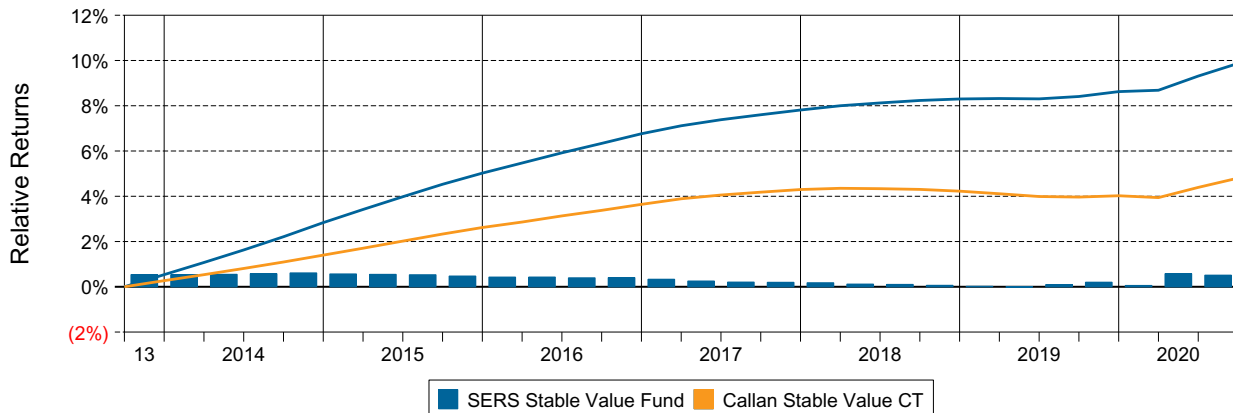
## Return Analysis

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.

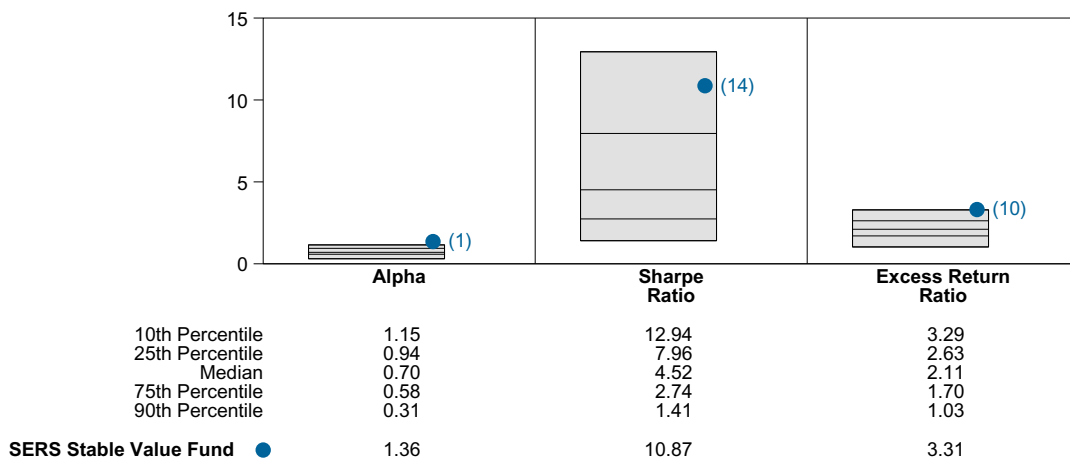
### Performance vs Callan Stable Value CT (Institutional Net)



### Cumulative and Quarterly Relative Return vs 3-month Treasury Bill



### Risk Adjusted Return Measures vs 3-month Treasury Bill Rankings Against Callan Stable Value CT (Institutional Net) Seven Years Ended September 30, 2020



# SERS U.S. Bond Index Fund

## Period Ended September 30, 2020

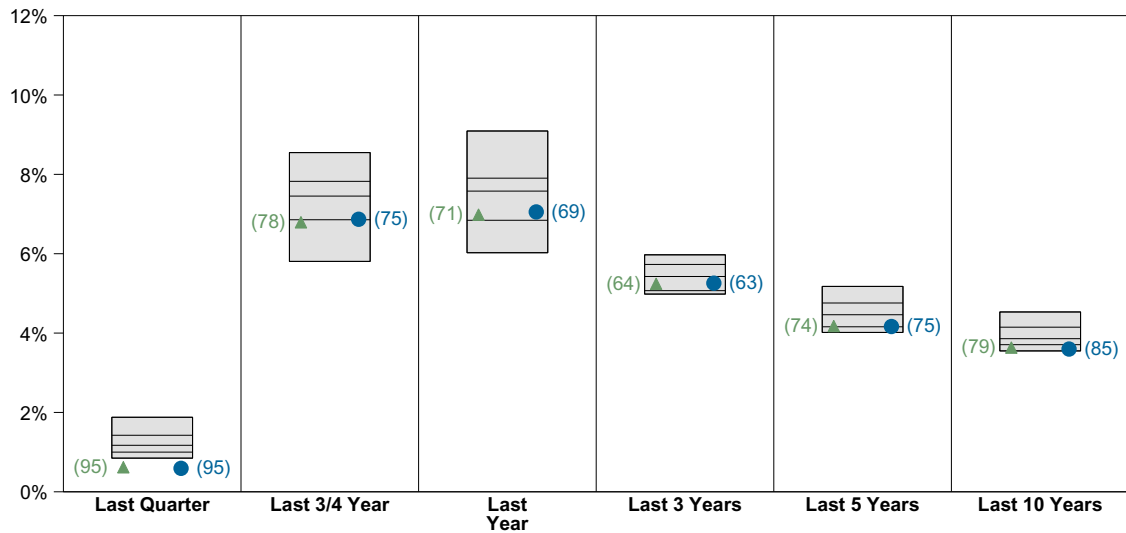
### Investment Philosophy

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

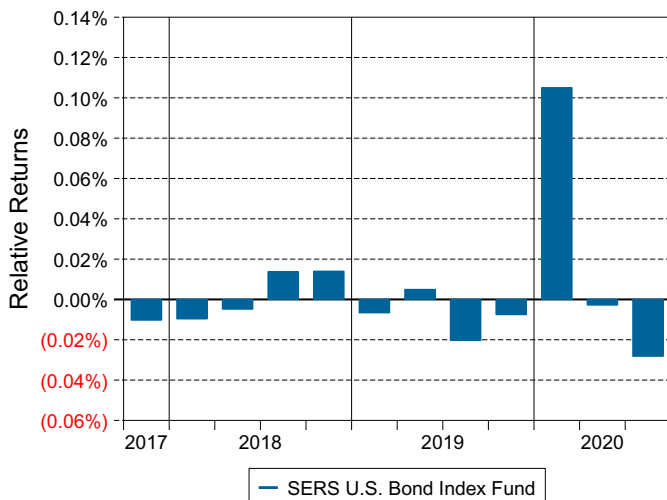
- SERS U.S. Bond Index Fund's portfolio posted a 0.59% return for the quarter placing it in the 95 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 69 percentile for the last year.
- SERS U.S. Bond Index Fund's portfolio underperformed the Blmbg Aggregate by 0.03% for the quarter and outperformed the Blmbg Aggregate for the year by 0.07%.

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

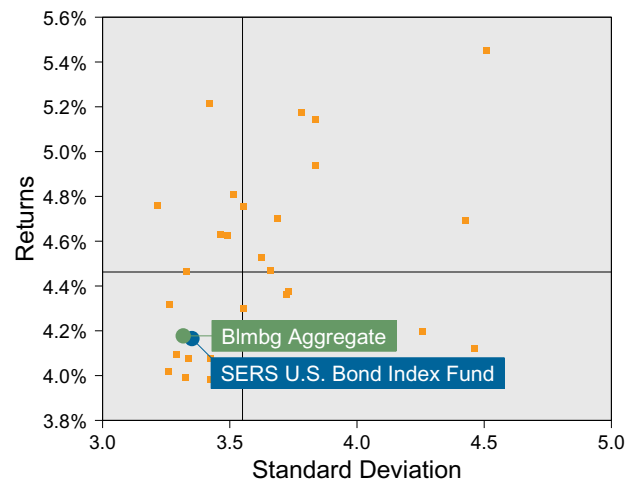


10th Percentile	1.88	8.55	9.09	5.97	5.18	4.53
25th Percentile	1.42	7.82	7.90	5.73	4.76	4.15
Median	1.17	7.45	7.58	5.43	4.46	3.86
75th Percentile	1.00	6.86	6.84	5.07	4.16	3.71
90th Percentile	0.85	5.81	6.02	4.98	4.02	3.55
<b>SERS U.S. Bond Index Fund</b> ●	0.59	6.87	7.05	5.26	4.17	3.60
Blmbg Aggregate ▲	0.62	6.79	6.98	5.24	4.18	3.64

### Relative Return vs Blmbg Aggregate



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

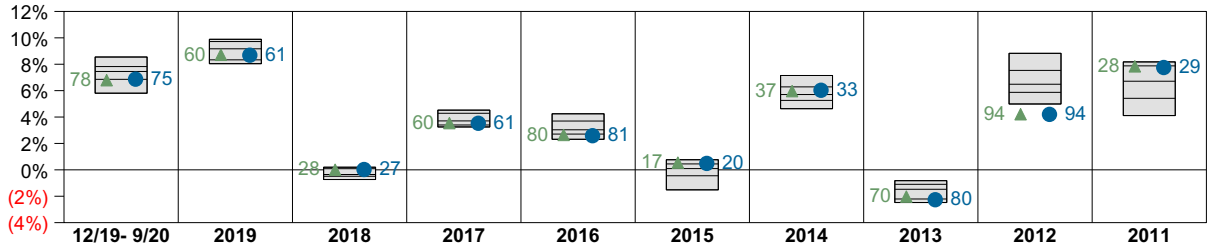


# SERS U.S. Bond Index Fund Return Analysis Summary

## Return Analysis

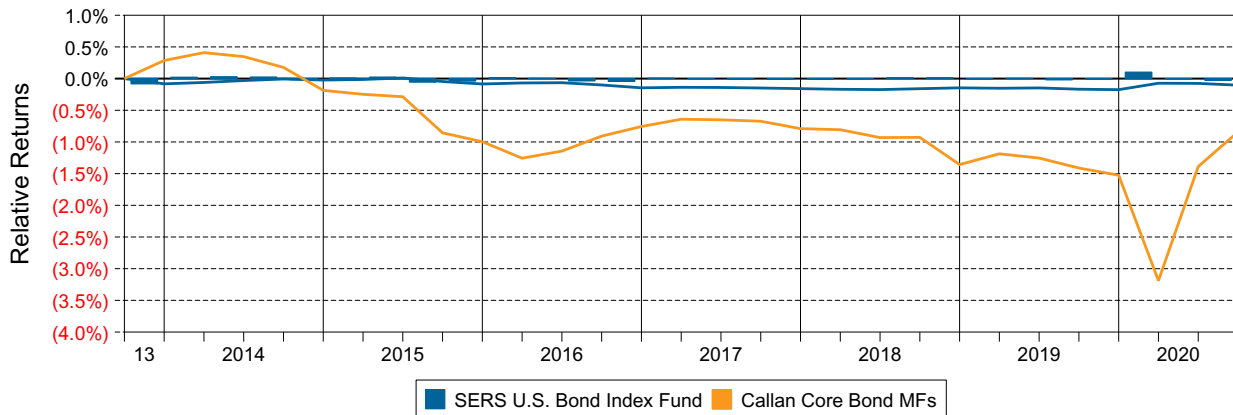
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

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

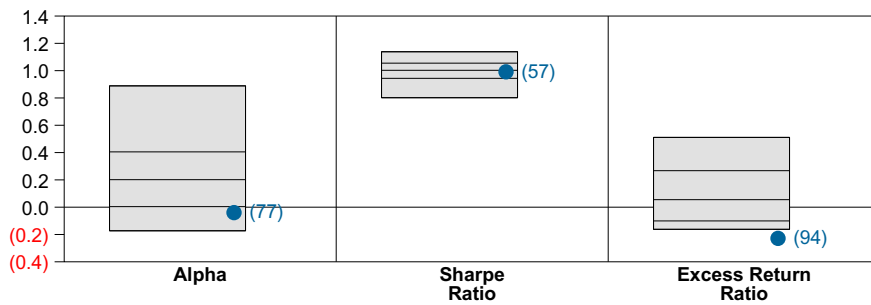


	12/19- 9/20	2019	2018	2017	2016	2015	2014	2013	2012	2011
<b>SERS U.S. Bond Index Fund</b>	6.87	8.69	0.02	3.53	2.59	0.49	6.03	(2.26)	4.20	7.75
<b>Blmbg Aggregate</b>	6.79	8.72	0.01	3.54	2.65	0.55	5.97	(2.02)	4.21	7.84

### 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 September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
<b>SERS U.S. Bond Index Fund</b>	(0.04)	0.99	(0.23)

# SERS U.S. Bond Index Fund

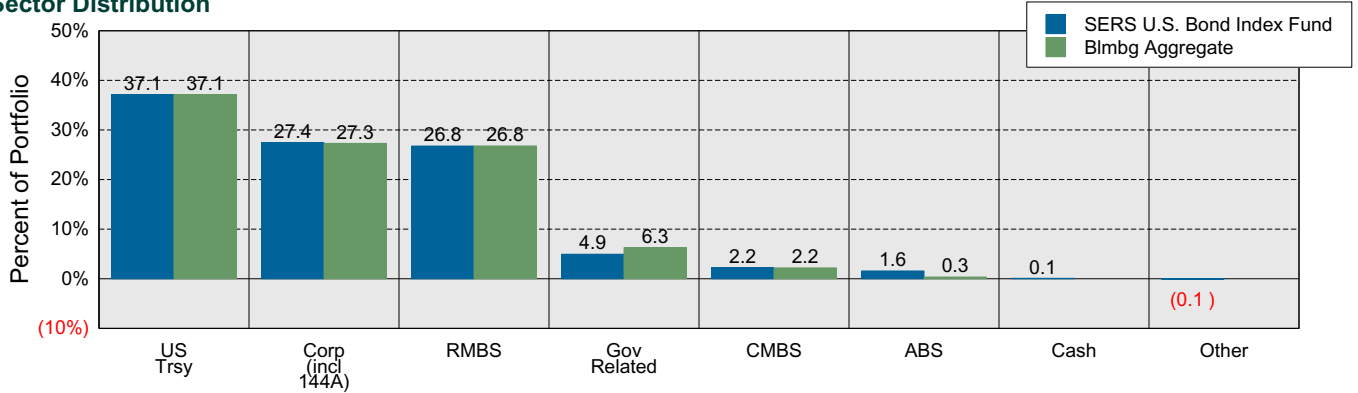
## Portfolio Characteristics Summary

### As of September 30, 2020

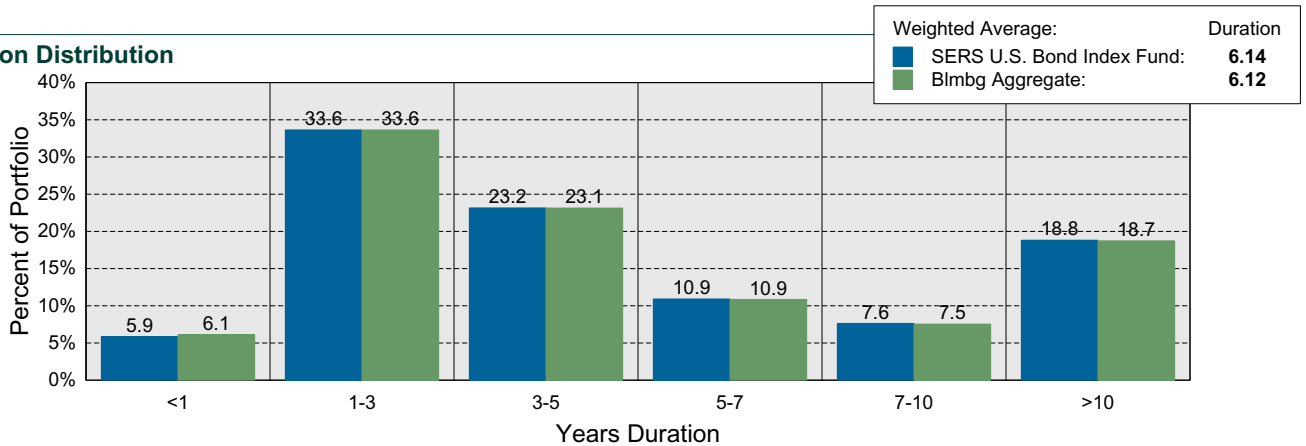
#### Portfolio Structure Comparison

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.

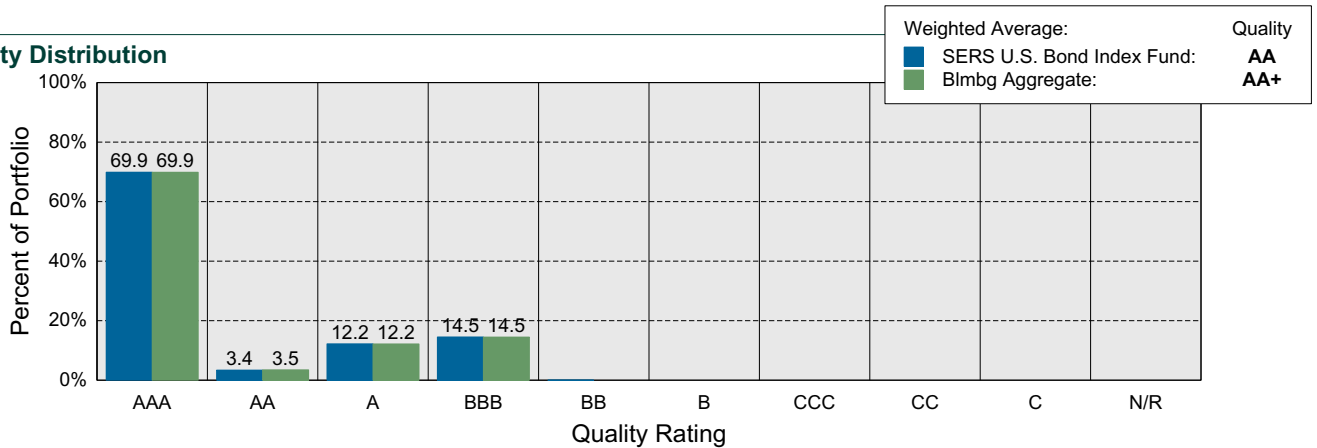
#### Sector Distribution



#### Duration Distribution



#### Quality Distribution





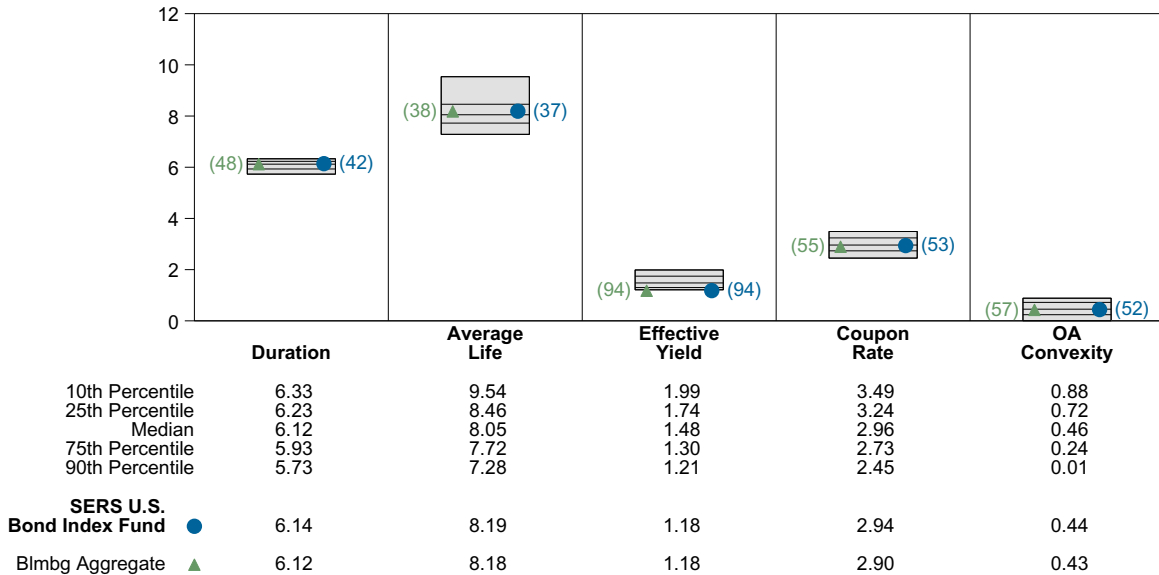
# SERS U.S. Bond Index Fund

## Bond Characteristics Analysis Summary

### Portfolio Characteristics

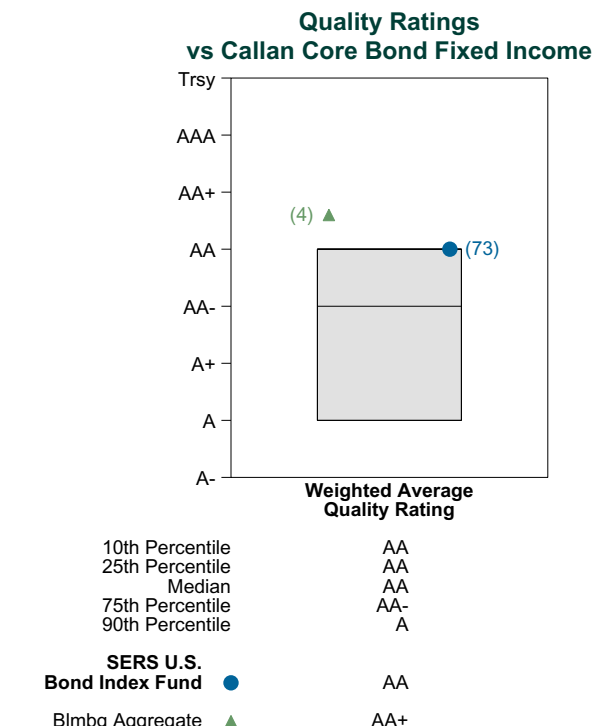
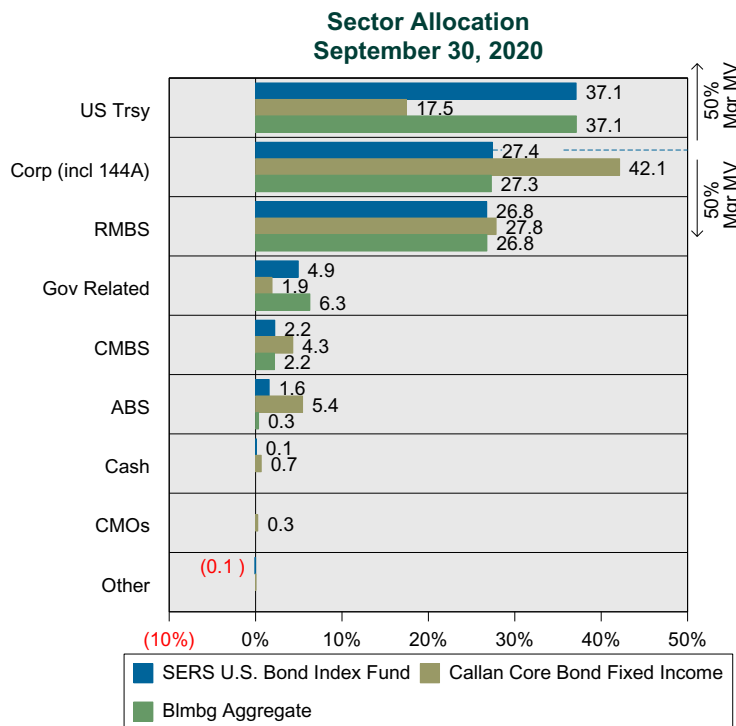
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Fixed Income Portfolio Characteristics Rankings Against Callan Core Bond Fixed Income as of September 30, 2020



### 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

**[2020 ESG Survey](#)** | Callan’s eighth annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

**[Coping with COVID-19: How Work Is Evolving for Investment Managers—2nd Edition](#)** | Following up on our June publication, Callan again surveyed investment managers regarding how their firms were responding to the COVID-19 pandemic, focusing on office closures and reopenings, work-from-home approaches, business travel, and meetings. Respondents reflected a variety of firms by location, employee size, ownership structure, and assets under management.

**[Private Equity Fees and Terms Study](#)** | To help institutional investors better evaluate private equity funds, Callan conducted an extensive analysis of the fees and terms for private equity partnerships. Using that data, we created this study to help investors evaluate a partnership’s terms compared to its peers.

**[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.

### Blog Highlights

**[How Investors Can Address Climate Risk in Real Estate](#)** | Climate risk, which refers to the hazards associated with climate change, can significantly threaten real estate portfolios. Institutional investors and real estate investment managers must evaluate the increasing significance of climate risk given the material financial impact that climate change can have on real estate portfolios.

**[Fine-Tuning Implementation of the CARES Act](#)** | Drafting the CARES Act was expedited, which means there is a limited congressional record to clarify provisions. The IRS has issued two notices and a FAQ to clarify how defined contribution (DC) plan sponsors should implement the provisions, touching on required notices, tax reporting, and recordkeeping.

**[DOL Proposes Tightened Proxy Voting Guidelines](#)** | The department’s new proposal dovetails with SEC guidance finalized in 2020 and would create a refined set of circumstances in which plan fiduciaries may engage in proxy voting.

### Quarterly Periodicals

**[Private Equity Trends, 2Q20](#)** | A high-level summary of private equity activity in the quarter through all the investment stages

**[Active vs. Passive Charts, 2Q20](#)** | A comparison of active managers alongside relevant benchmarks over the long term

**[Market Pulse Flipbook, 2Q20](#)** | A quarterly market reference guide covering trends in the U.S. economy, developments for institutional investors, and the latest data on the capital markets

**[Capital Market Review, 2Q20](#)** | 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, 2Q20](#)** | Commentary on developments for hedge funds and multi-asset class (MAC) strategies

**[Real Assets Reporter, 2Q20](#)** | In this quarter’s edition, Barbara Bernard and Sally Haskins discuss how new risk-retention rules affect the CMBS market. In addition, it includes analysis of the performance of real estate and other real assets in 2Q20.



## 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:

### 2021 National Conference

June 21-23, 2021

San Francisco | Palace Hotel

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

## Education

Founded in 1994, the "Callan College" offers educational sessions for industry professionals involved in the investment decision-making process.

### Introduction to Investments—Virtual

This program familiarizes institutional investor trustees and staff and asset management advisers with basic investment theory, terminology, and practices. It is held over three days with virtual modules of 2.5-3 hours. This course is designed for individuals with less than two years of experience with asset-management oversight and/or support responsibilities. Tuition is \$950 per person and includes instruction and digital materials.

**Please look for our updated schedule for 2021 in November**

Additional information including registration can be found at: [www.callan.com/cc-introduction-virtual/](http://www.callan.com/cc-introduction-virtual/)

### Introduction to Investments—In Person

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.

Additional information including dates and registration can be found at: [www.callan.com/callan-college-intro-2/](http://www.callan.com/callan-college-intro-2/)



"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