

September 30, 2019

Pennsylvania SERS 457(b)



**Investment Measurement Service
Quarterly Review**

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U.S. EQUITY

U.S. equity markets posted mixed results amid a market that saw 30-year Treasury yields hit historic lows and the most meaningful, albeit short-lived, factor rotation among equities since the Global Financial Crisis (GFC). Large cap (+1.4%) and mid cap stocks (+0.5%) posted modest gains for the quarter while small caps declined (Russell 2000: -2.4%). Ongoing U.S.-China trade tension, earnings and interest rate uncertainty, and the global political landscape continued to drive investor uncertainty.

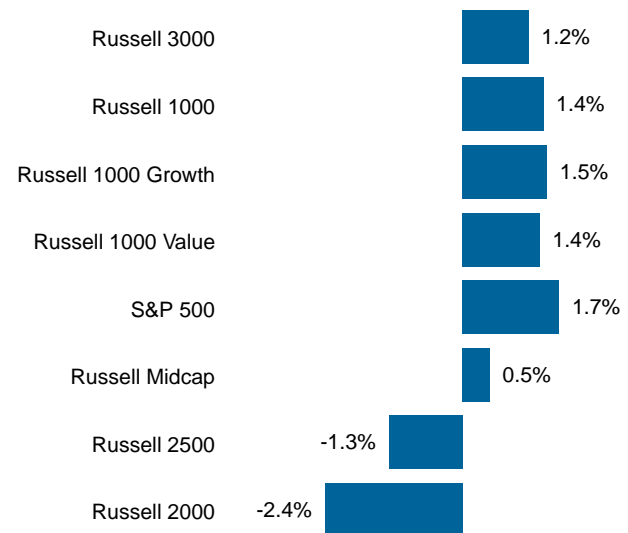
Large Cap U.S. Equity (S&P 500: +1.7%; Russell 1000: +1.4%)

- Top sectors were in defensive areas including Utilities (+9.3%), Real Estate (+7.7%), and Consumer Staples (+6.1%) in response to investors' continued flight to quality.
- Energy, hurt by falling oil prices, fell 6.3%; Health Care lagged (-2.2%) amid discussions around price transparency and pricing reform by U.S. presidential candidates.
- Cyclical sector exposure has been volatile given uncertainty around the trade deal (and continued sideways movement of markets) along with slowed global growth.
- Up to September, momentum stocks (which have shifted to include many of the market's least volatile stocks) outperformed as investors shunned the cheapest quintile of value (and more volatile) stocks. This trend sharply reversed in early September as the 10-year Treasury yield rose from 1.46% to 1.73% and momentum stocks fell precipitously while value stocks traded up over the course of two days. The magnitude of the reversal gave a boost to value stocks across market capitalizations for the quarter.

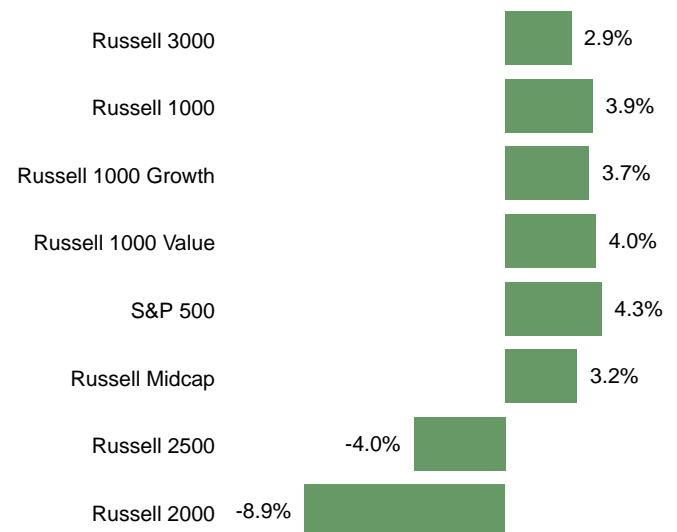
Growth vs. Value (Russell 1000 Value: +1.4%, Russell 1000 Growth: +1.5%; Russell 2000 Value: -0.6%, Russell 2000 Growth: -4.2%)

- While value continues to trail growth year-to-date, it gained ground during September's factor reversal, finishing the quarter essentially in line with growth within large caps.
- Within small cap, value benefited as investors favored the cheapest 20% of small caps while the most expensive quintile within the Russell 2000 declined double digits.

U.S. Equity: Quarterly Returns

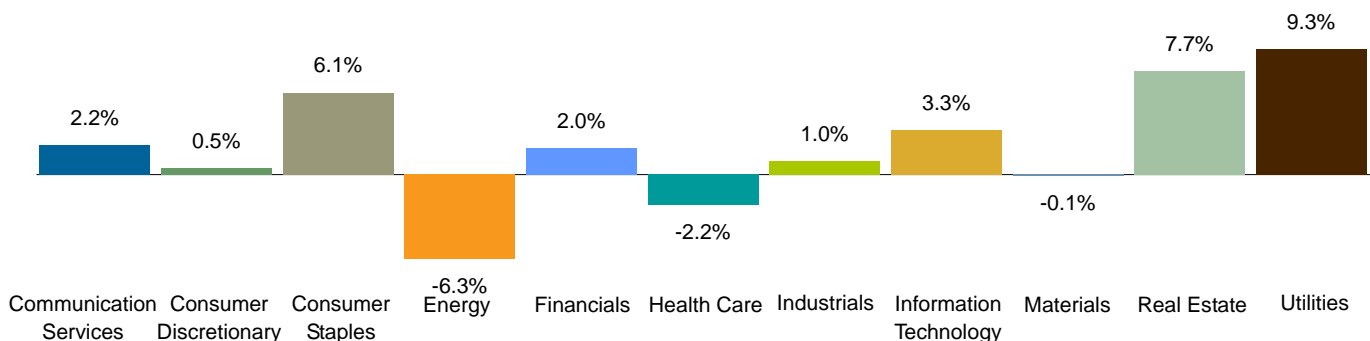


U.S. Equity: One-Year Returns



Sources: FTSE Russell, Standard & Poor's

S&P Sector Returns, Quarter Ended September 30, 2019



Source: Standard & Poor's

NON-U.S./GLOBAL EQUITY

Global equity markets turned negative in the third quarter. After more modest positive results in the second quarter, fears over continued trade war impacts, a no-deal Brexit, and a potential global slowdown impacted investor behavior. Given this backdrop, more defensive areas of the market outperformed.

Global/Non-U.S. Developed (MSCI EAFE: -1.1%; MSCI World ex USA: -0.9%; MSCI ACWI ex USA: -1.8%; MSCI Hong Kong: -11.9%; MSCI Japan: +3.1%)

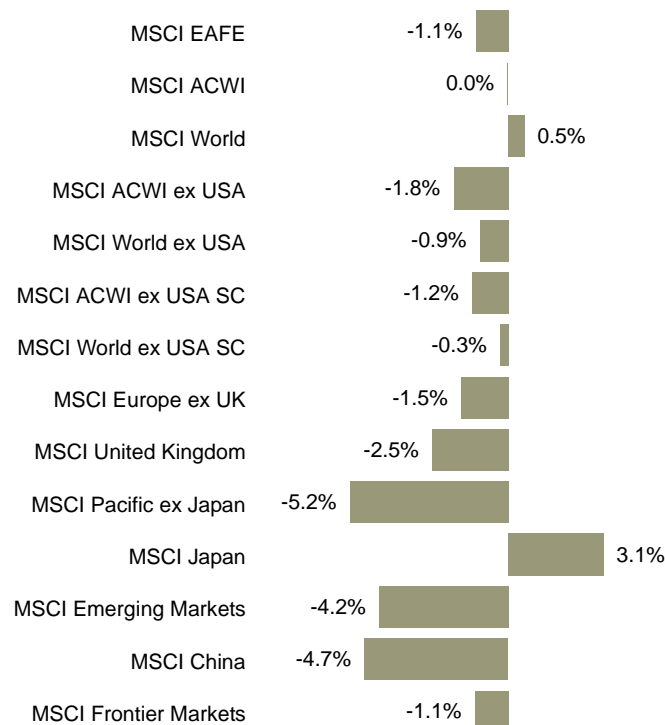
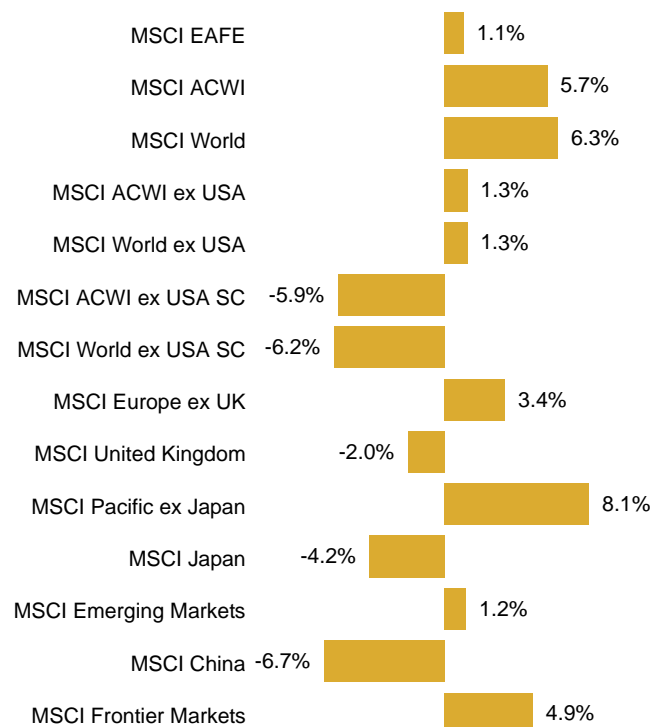
- Boris Johnson's attempted suspension of Parliament and no-deal Brexit proclamations weighed on U.K. stocks (-2.5%).
- Germany (-4.0%) experienced recession fears; industrial production dropped 1.5% in June from the prior month, while the estimate was -0.5%.
- Hong Kong protests proved to be a headwind as the market fell -11.9% over the three-month period.
- Japan was one of the few bright spots within developed markets as low short-term interest rates remain unchanged and a resolution to the Japan/South Korea trade war looked more promising.
- Cyclical sectors trailed as investors were positioned defensively; Energy (-6.5%) had the worst performance.
- For the quarter, factor performance reflected cautious investor behavior as quality and low volatility did well. However, the month of September saw a brief recovery in value across all markets as trade talks improved and central banks eased.

Emerging Markets (MSCI Emerging Markets Index: -4.2%)

- Emerging markets fared worst among global markets; uncertainty weighed heavily on these volatile countries.
- Though most emerging market countries fell during the quarter, Turkey (+11.7%) had strong results as its central bank cut rates two times in less than two months.
- Factor performance in emerging markets favored quality and price momentum as investors moved toward safe assets.

Non-U.S. Small Cap (MSCI World ex USA Small Cap: -0.3%; MSCI EM Small Cap: -4.6%; MSCI ACWI ex USA Small Cap: -1.2%)

- Small cap marginally outperformed large cap, both in developed and all country ex-U.S. markets; despite overall defensive posturing, idiosyncratic businesses pushed past global market issues.
- Japan (+4.0%) helped drive developed returns as small cap companies also benefited from low rates and resolved trade tensions; Hong Kong (-7.6%) detracted as local businesses were hurt by the protests.

Global Equity: Quarterly Returns**Global Equity: One-Year Returns**

Source: MSCI

FIXED INCOME

The Federal Open Market Committee (FOMC) cut short-term interest rates by 25 basis points twice in the third quarter amid an economic backdrop that has been supported by strong consumer spending and a solid labor market, but challenged by weakening manufacturing data and business investment. The Fed chair stated that the FOMC would act as “appropriate to sustain the expansion,” and the European Central Bank and other central banks around the world also moved in the direction of easing monetary policy. Yields fell in the U.S. and abroad given global growth headwinds fueled by mounting trade tensions as well as geopolitical uncertainty.

U.S. Fixed Income (Bloomberg Barclays US Aggregate Bond Index: +2.3%)

- Treasuries returned 2.4% as rates fell across the yield curve.
- While the widely monitored 2- and 10-year key rates remained positive, the spread between the 3-month and 10-year key rates remained inverted.
- Long Treasuries soared (+7.9%) as 30-year yields fell roughly 40 bps.
- Nominal Treasuries outperformed TIPS as inflation expectations continued to fall; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of June 30. The 10-year real yield dipped briefly into negative territory in early September.

Investment Grade Corporates (Bloomberg Barclays Corporate: +3.1%)

- Investment grade corporate credit spreads were range-bound, but their yield advantage was enough to generate positive excess returns versus like-duration Treasuries.
- Issuance in the corporate bond market was \$320 billion in the quarter, \$50 billion higher than a year ago; demand remained solid. BBB-rated corporates (+3.1%) modestly outperformed A-rated or higher corporates (+3.0%).

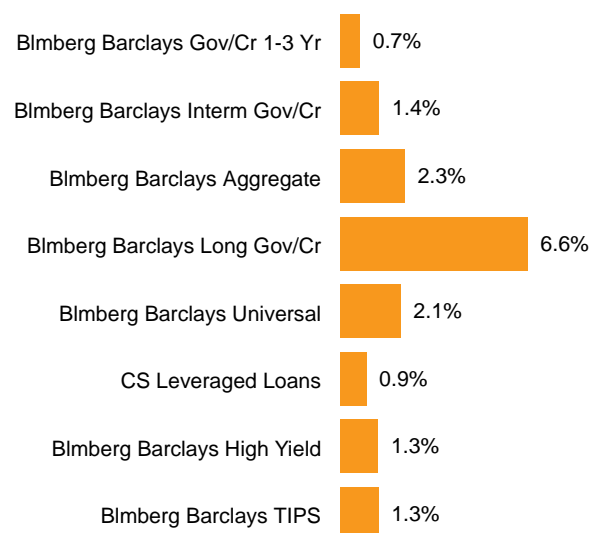
High Yield (Bloomberg Barclays Corporate High Yield: +1.3%)

- BB-rated corporates (+2.0%) outperformed CCC-rated corporates (-1.8%). BB- and B-rated spreads narrowed slightly, but the rally in rates helped drive outperformance as a result of higher quality bonds' greater sensitivity to interest rate movements.
- CCC-rated bond spreads widened significantly, representing some concern about deteriorating quality at the lower-end of the spectrum.

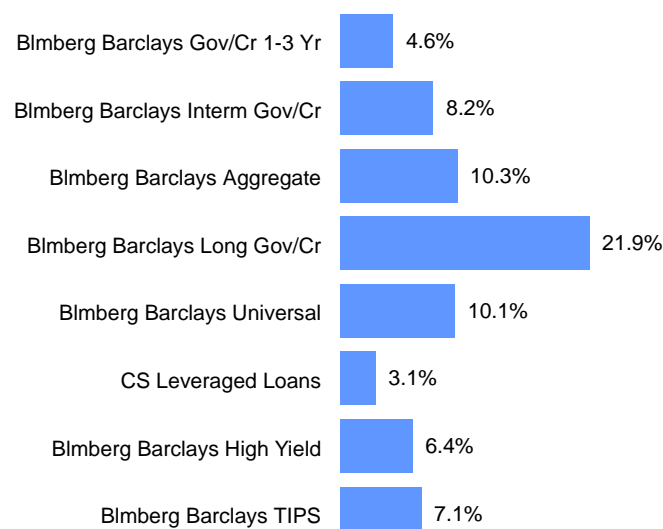
Leveraged Loans (CS Leveraged Loans: +0.9%)

- Bank loans, which have floating rate coupons, underperformed high yield bonds as rates rallied and investors worried about deteriorating credit quality.
- CLO issuance continued to exceed expectations, providing positive technical support to the leveraged loan market.

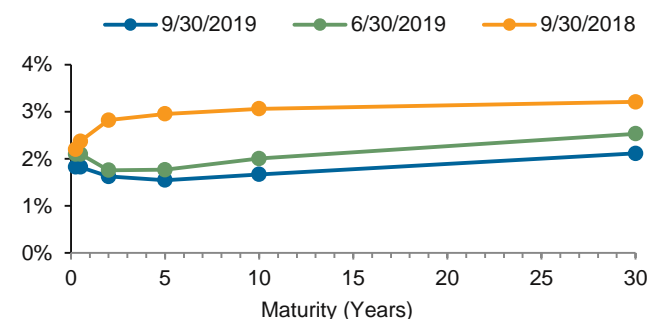
U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: One-Year Returns



U.S. Treasury Yield Curves



Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

NON-U.S. FIXED INCOME

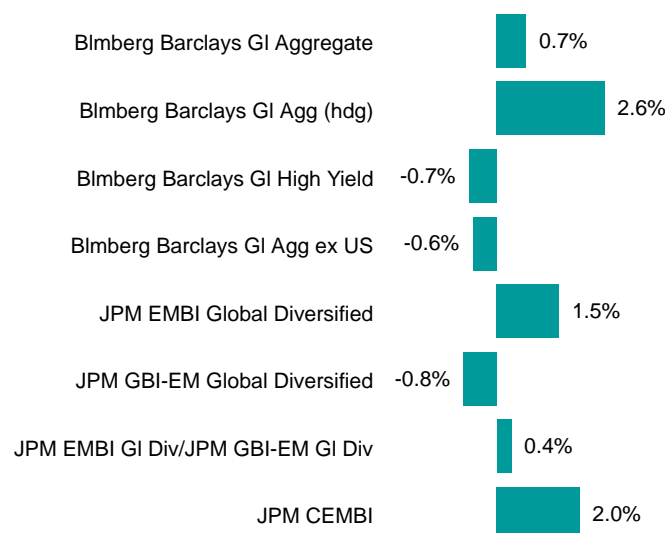
Global Fixed Income (Bloomberg Barclays Global Aggregate (unhedged): +0.7%; (hedged): +2.6%)

- Developed market sovereign bond yields rallied, pushing European sovereigns further into negative territory as the ECB reduced its deposit rate and announced a new bond purchasing stimulus program.
- Negative yielding debt totals nearly \$17 trillion, a record high.
- The U.S. dollar was up 3.4% versus a basket of trade partner currencies and up 4.3% vs the beleaguered euro.

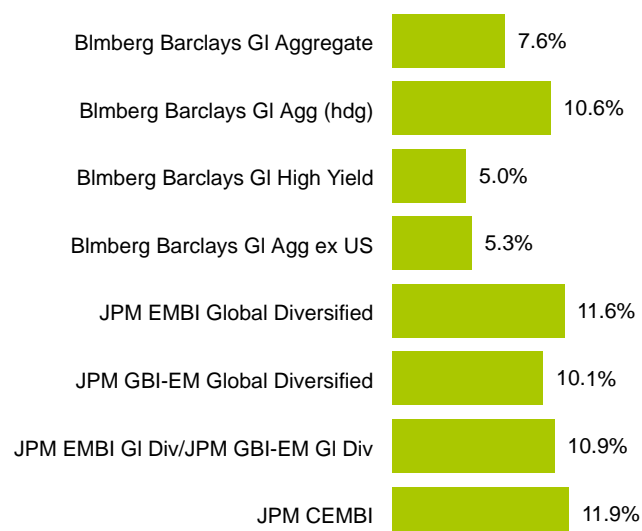
US\$ EMD (JPM EMBI Global Diversified: +1.5%), **Local Currency EMD** (JPM GBI-EM Global Diversified: -0.8%)

- Broadly, emerging market currencies depreciated versus the U.S. dollar, hampering local currency returns.
- Within the dollar-denominated benchmark, Argentina (-42%) and Venezuela (-51%) were among the few to post negative returns. Conversely, returns in the local debt benchmark were more mixed with Turkey (+19%) and Argentina (-60%) being outliers.

Global Fixed Income: Quarterly Returns

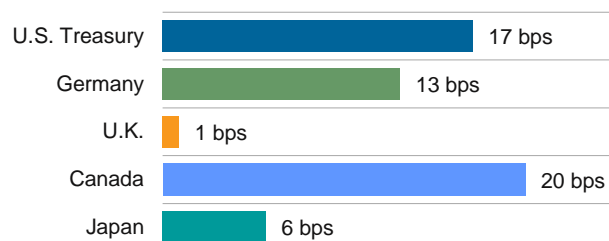


Global Fixed Income: One-Year Returns



Change in 10-Year Global Government Bond Yields

2Q19 to 3Q19



Sources: Bloomberg, Bloomberg Barclays, JP Morgan

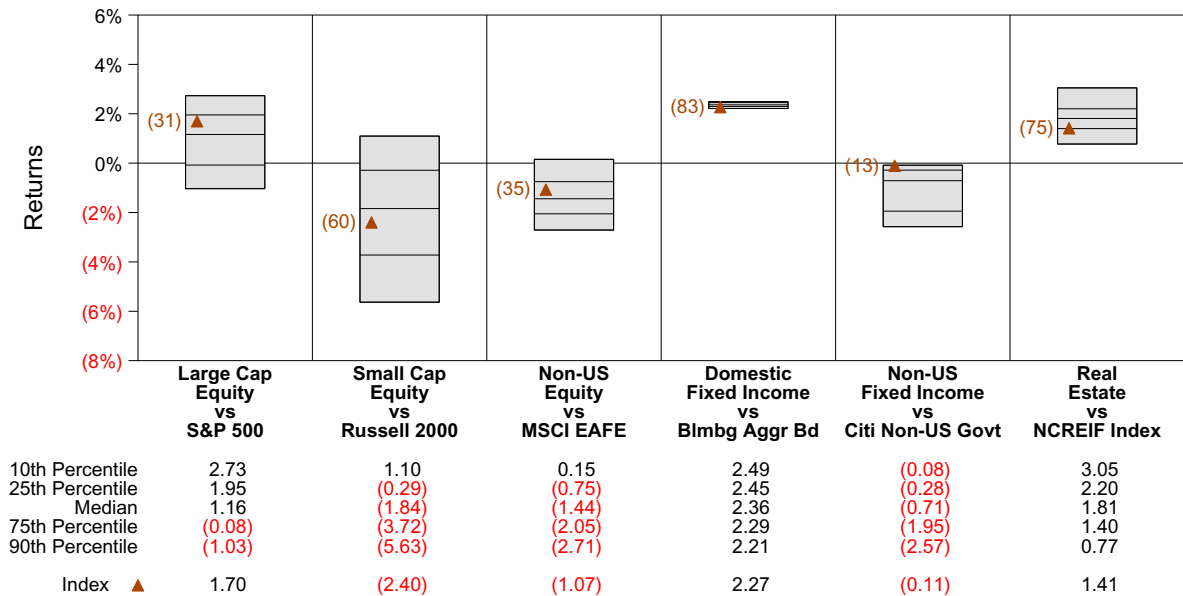
Market Overview

Active Management vs Index Returns

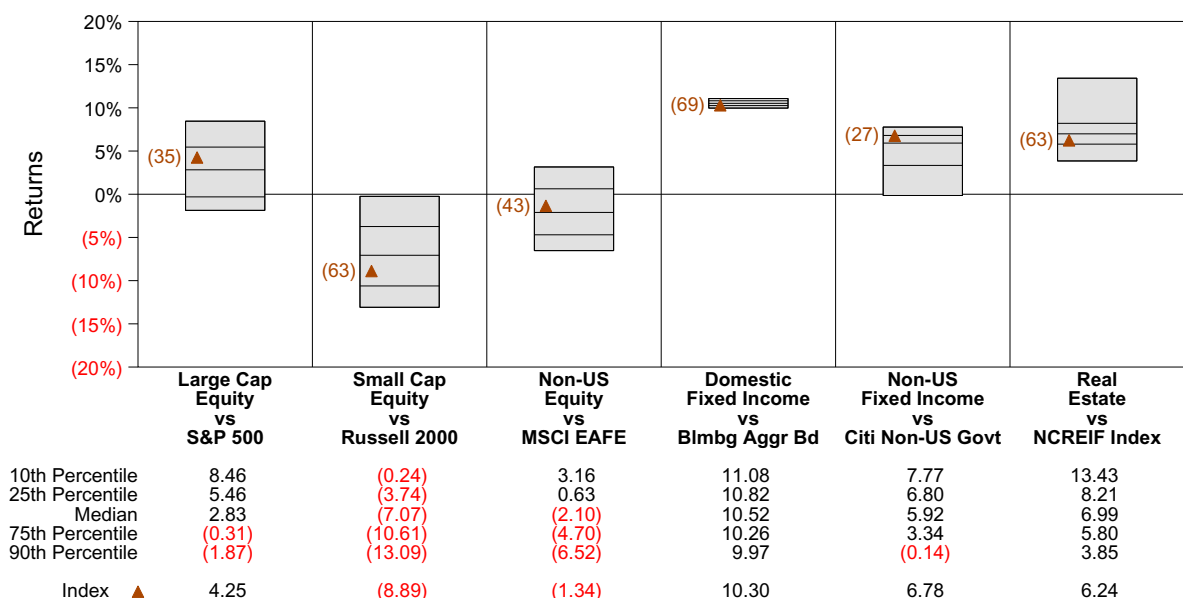
Market Overview

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, 2019



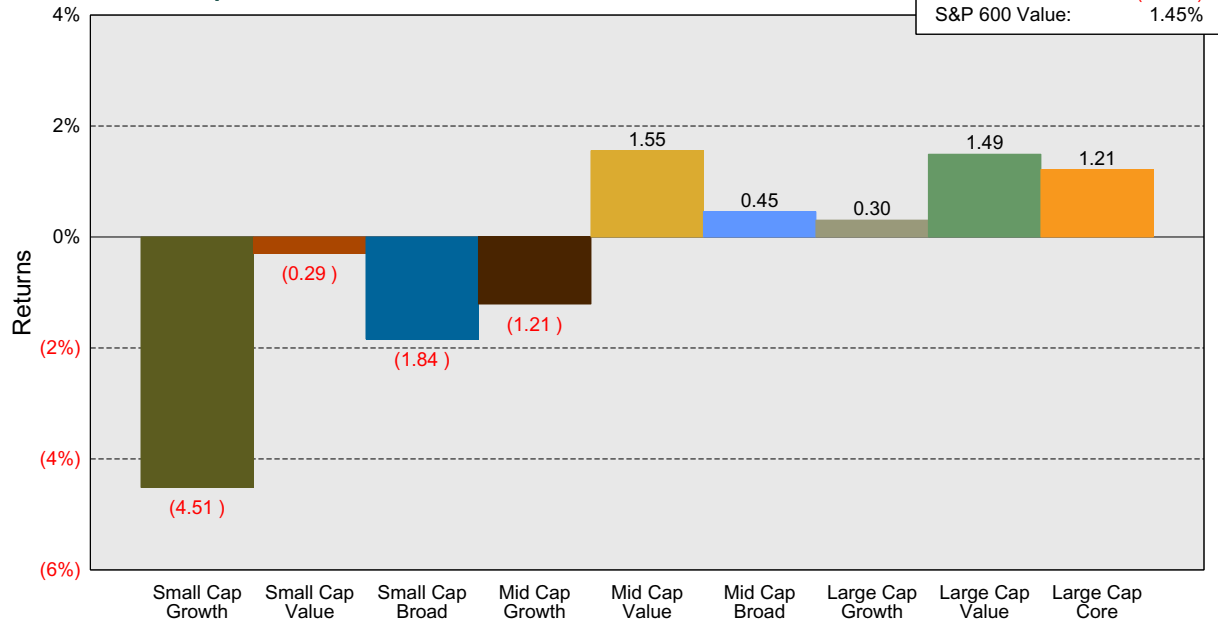
Range of Separate Account Manager Returns by Asset Class One Year Ended September 30, 2019



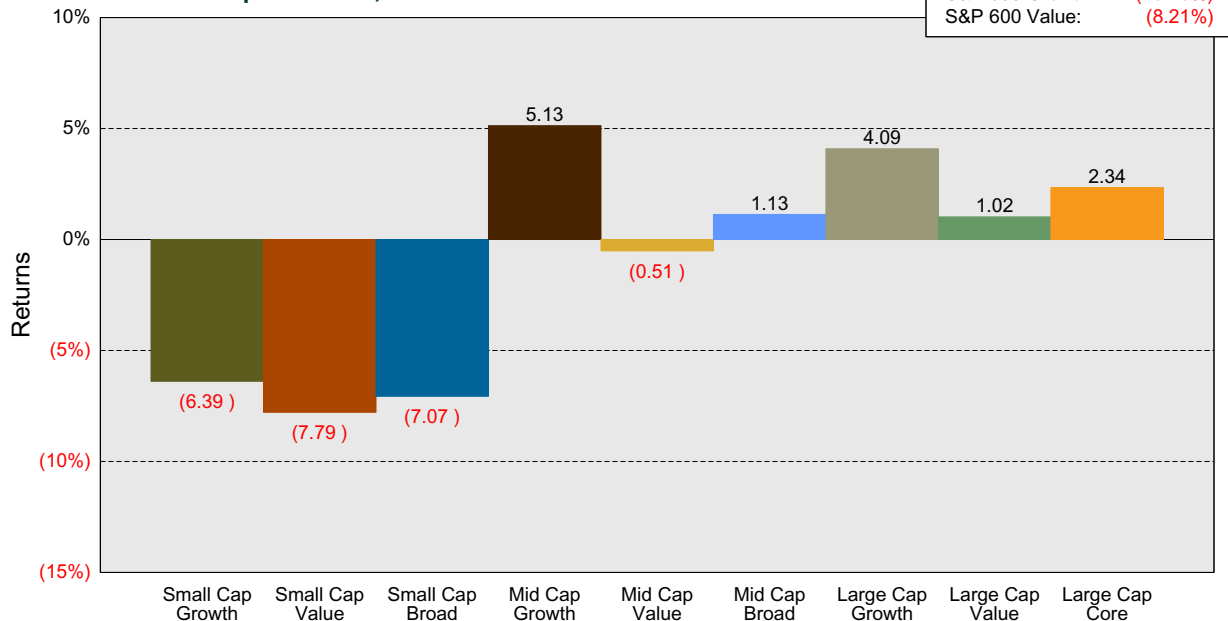
Domestic Equity Active Management Overview

The S&P 500 Index returned 1.7% in the third quarter, bringing its YTD result to an impressive 20.6%. Third quarter returns were mixed across sectors. The winners were Real Estate (+7.7%) and Utilities (+9.3%), both benefiting from lower interest rates. Returns for both sectors are approaching 30% on a YTD basis. Energy, hurt by falling oil prices, lost 6.3% and is up only 6.0% for the year. Health Care was another poor performer, down 2.2% and up 5.6% YTD. From a style perspective, value mounted a comeback late in the quarter, but over the full quarter returns across styles were similar (R1000: 1.4%; R1000G: 1.5%; R1000V: 1.4%). Small caps underperformed (R2000: -2.4% vs R1000: +1.4%) and, notably, small cap value outperformed small cap growth by a significant margin (R2000V: -0.6% vs R2000G: -4.2%).

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



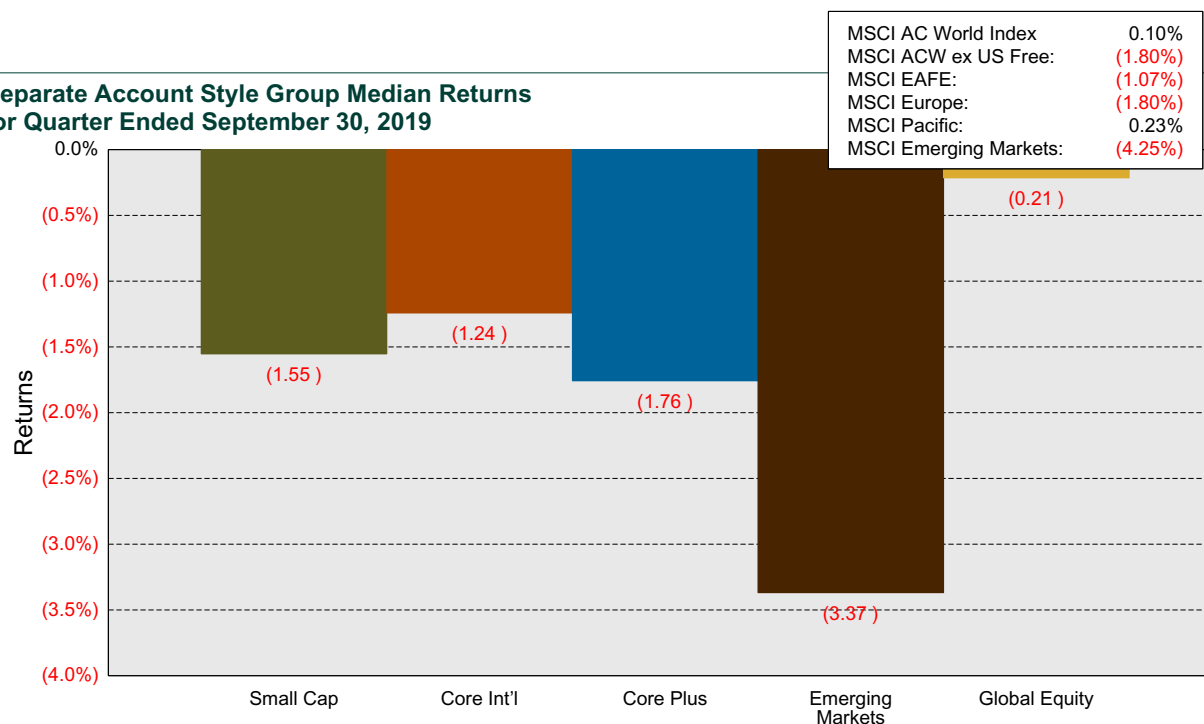
Separate Account Style Group Median Returns for One Year Ended September 30, 2019



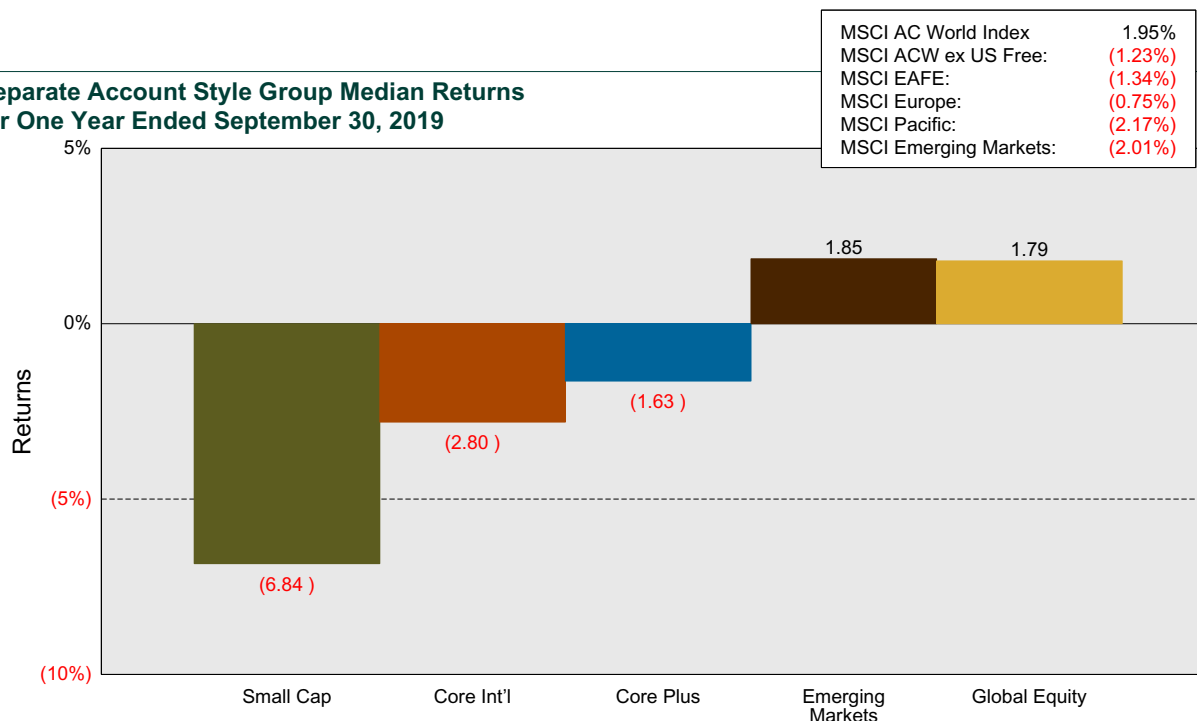
International Equity Active Management Overview

International markets lagged the U.S. on the back of broad-based strength in the U.S. dollar. The MSCI ACWI ex USA Index fell 1.8%, with emerging markets (MSCI EM: -4.2%) underperforming developed (MSCI EAFE: -1.1%). The U.K. sank 2.5% due solely to performance of its currency, which lost just over 3% versus the U.S. dollar on Brexit-related woes. Japan (+3.1%) was one of the few countries to post a positive return, and the yen was also essentially flat vs the U.S. dollar. Brazil, India, and China were off roughly 5%, and Russia posted a more modest 1.4% loss. Political uncertainty in Argentina caused its market to lose half its value in August (-47%); that said, Argentina just entered the EM Index in May 2019 and accounts for a very small slice (less than 1%). Value underperformed growth in both developed and emerging markets and remains far behind on a YTD basis. From a sector standpoint, Technology (MSCI ACWI ex USA Technology: +2.2%) was up the most while Materials (-6.5%) and Energy (-4.6%) performed the worst.

**Separate Account Style Group Median Returns
for Quarter Ended September 30, 2019**



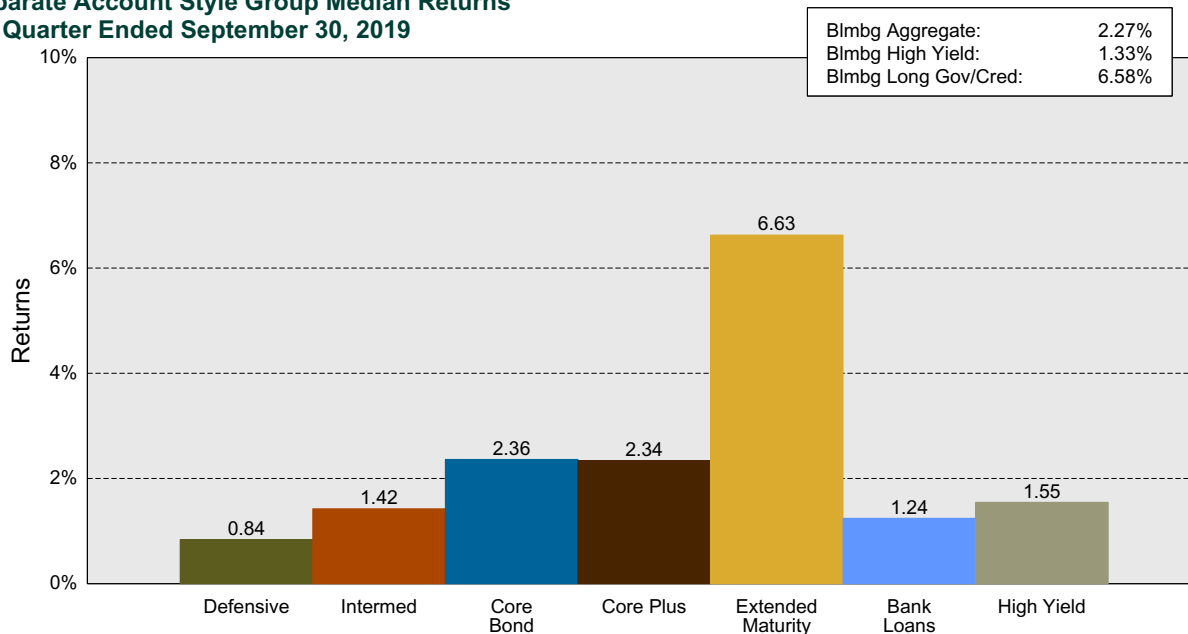
**Separate Account Style Group Median Returns
for One Year Ended September 30, 2019**



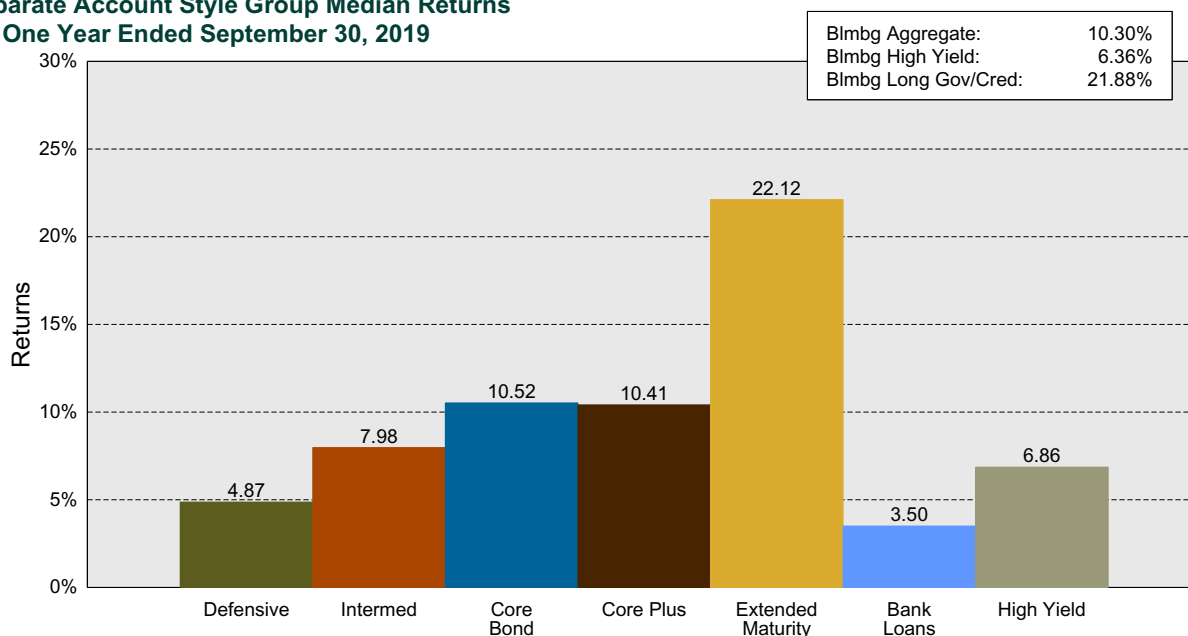
Domestic Fixed Income Active Management Overview

Ten-year U.S. Treasury yields were volatile in the third quarter, especially in September, hitting a 2019 low of 1.40% on Sept. 4, soaring to 1.90% mid-month and closing the quarter at 1.68%, down 32 bps from June 30. U.S. Treasuries thus posted strong results (Bloomberg Barclays US Treasury Index: +2.4%). Long U.S. Treasuries soared (Bloomberg Barclays Long US Treasury Index: +7.9%; +19.8% YTD) in the falling rate environment. The Bloomberg Barclays Aggregate rose 2.3%, bringing its YTD result to an impressive +8.5%. High yield was up just over 1% (+11.4% YTD) but, notably, lower quality significantly underperformed (CCC: -1.8% vs BB: +2.0%, and +5.6% vs +12.8% YTD) representing some concern about deteriorating quality at the lower end of the spectrum. TIPS (Bloomberg Barclays TIPS: +1.3%) underperformed as inflation expectations waned; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of 6/30/19. The 10-year real yield dipped briefly into negative territory in early September.

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



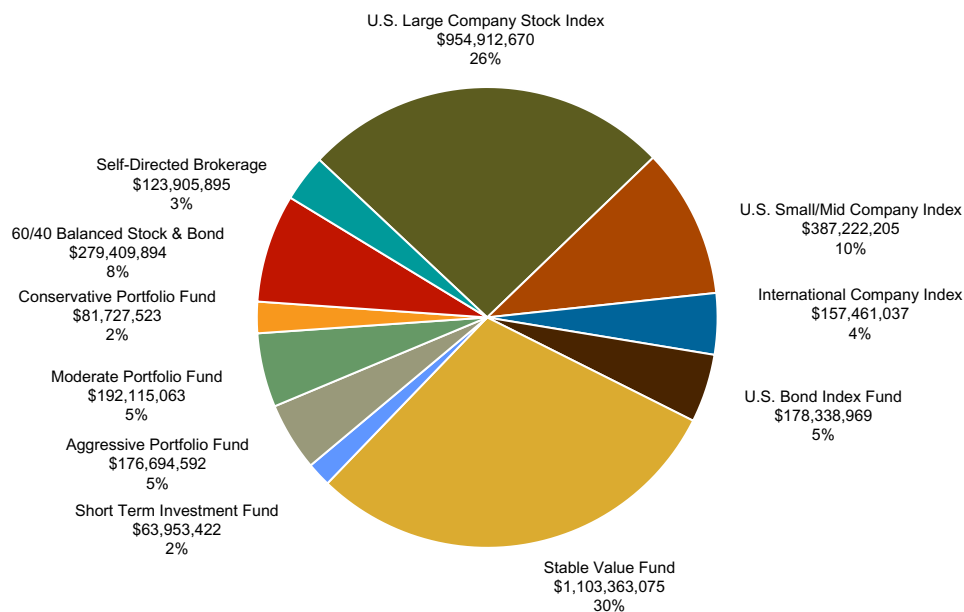
Separate Account Style Group Median Returns for One Year Ended September 30, 2019



Changes in Investment Fund Balances Period Ended September 30, 2019

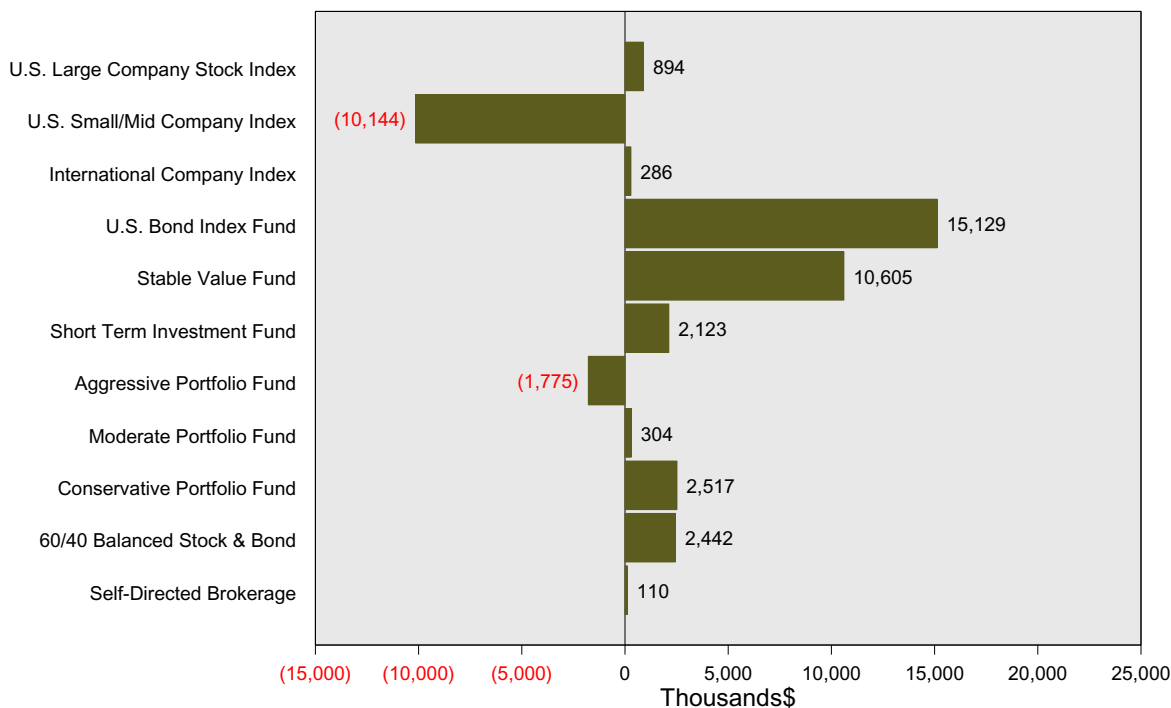
Allocation Across Investment Options

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



Changes in Fund Values

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



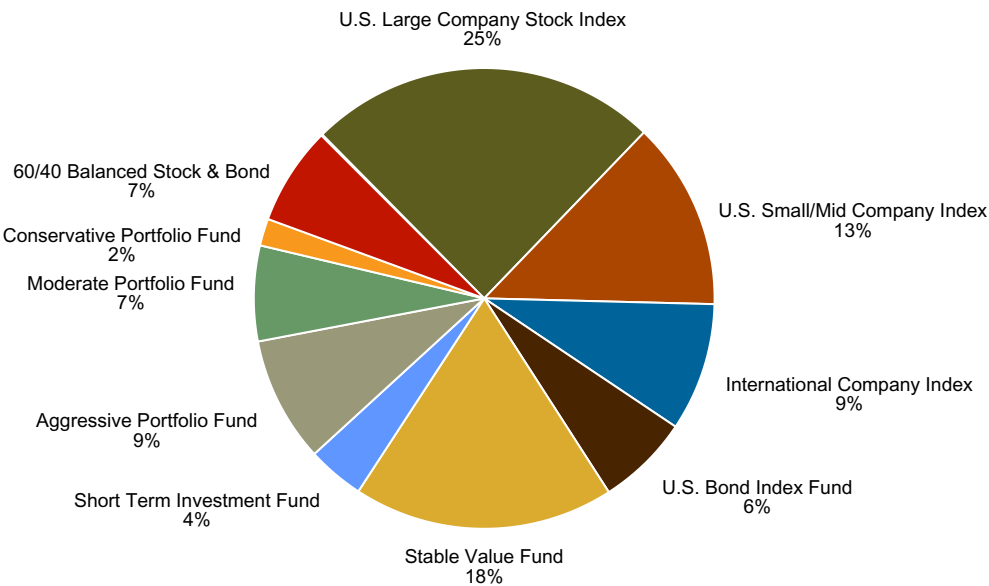
Pennsylvania SERS

Summary of Contributions

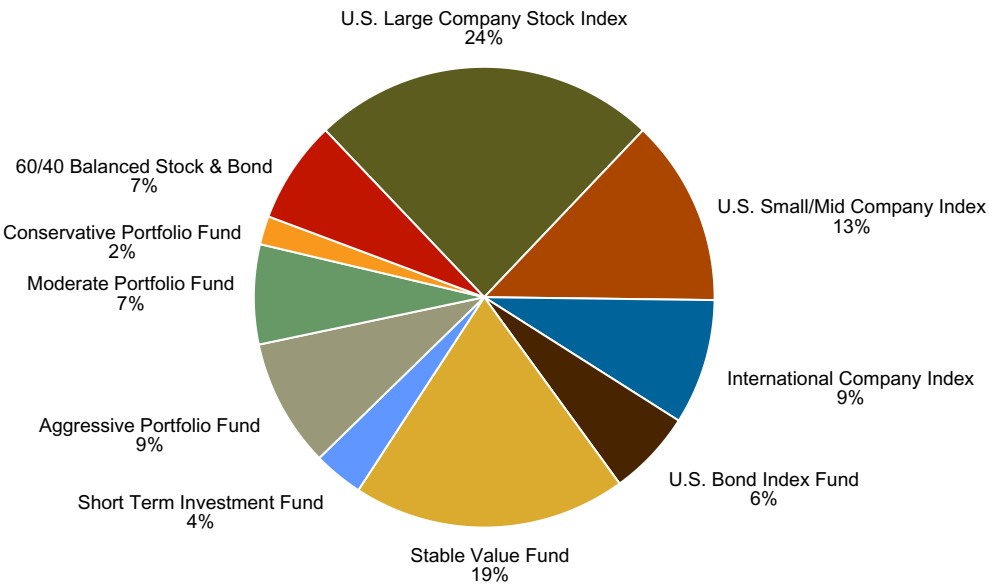
Contributions

The charts below illustrates the contributions for the fund for the current quarter and for the last year.

Contributions ended September 30, 2019

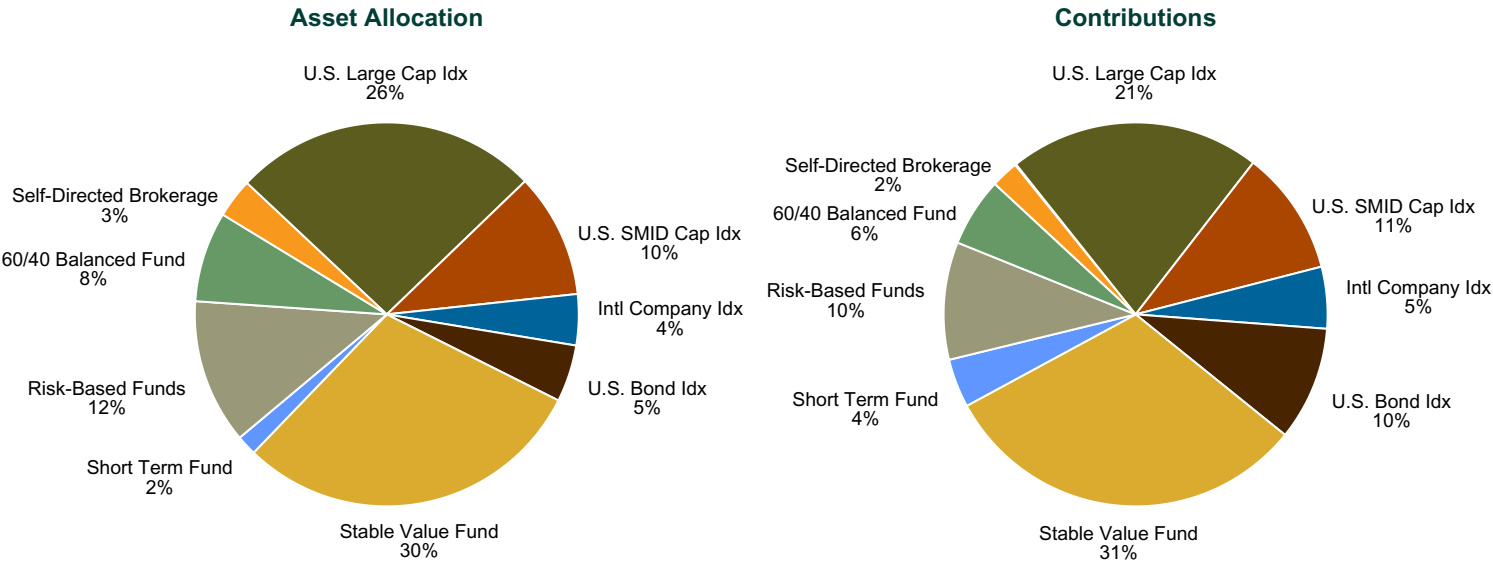


Contributions for One Year ended September 30, 2019

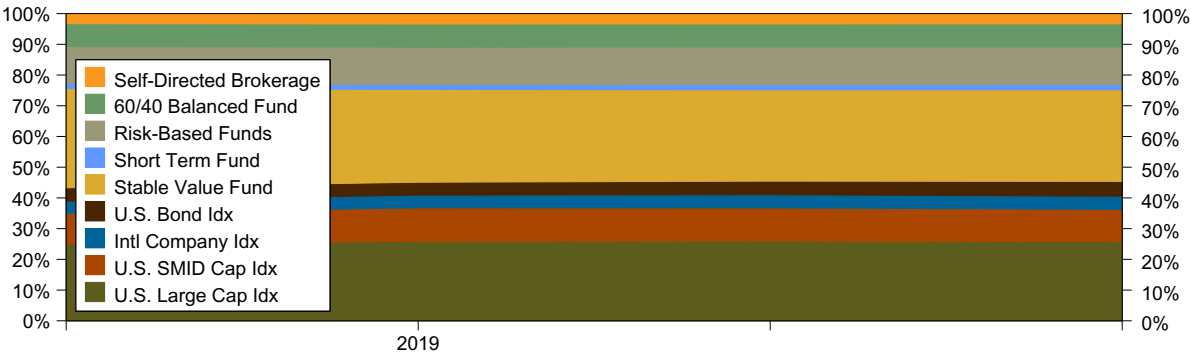


Asset Allocation

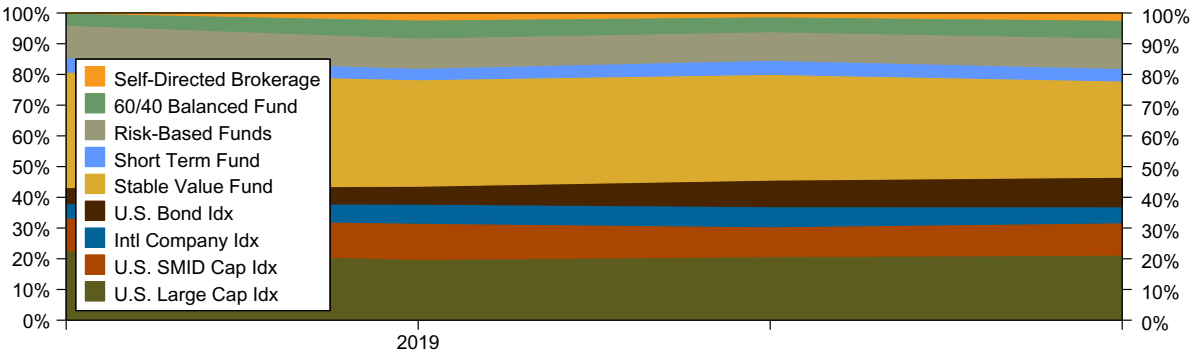
The charts below illustrate the historical asset allocation of the fund as well as the historical allocations of contributions to the fund. The pie charts on the top show the most recent allocations of both assets and contributions which include exchanges and transfers within the plan. The middle chart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



Historical Asset Allocation



Historical Allocation of Contributions



Investment Fund Balances

The table below compares the fund's investment fund balances as of September 30, 2019 with that of June 30, 2019. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

Asset Distribution Across Investment Funds

	September 30, 2019		Net New Inv.	Inv. Return	June 30, 2019	
	Market Value \$(000)	% of Total Weight			Market Value \$(000)	% of Total Weight
SERS Risk-Based Funds	\$729,947	19.73%	\$(6,501)	\$9,989	\$726,459	19.76%
SERS 60/40 Stock & Bond Fund	279,410	7.55%	(2,780)	5,222	276,968	7.53%
SERS Conservative Portfolio Fund	81,728	2.21%	1,438	1,079	79,210	2.15%
SERS Moderate Portfolio Fund	192,115	5.19%	(1,916)	2,220	191,811	5.22%
SERS Aggressive Portfolio Fund	176,695	4.78%	(3,243)	1,467	178,470	4.85%
SERS U.S. Equity	\$1,342,135	36.28%	\$(18,741)	\$9,491	\$1,351,385	36.76%
SERS U.S. Large Company Index	954,913	25.81%	(14,806)	15,700	954,019	25.95%
SERS U.S. SMID Company Index	387,222	10.47%	(3,935)	(6,209)	397,366	10.81%
SERS International Equity						
SERS Intl Company Idx Fund	157,461	4.26%	2,003	(1,717)	157,175	4.27%
SERS Fixed Income	\$1,345,655	36.38%	\$17,030	\$10,827	\$1,317,799	35.84%
SERS Short Term Investment Fund	63,953	1.73%	1,782	340	61,831	1.68%
SERS Stable Value Fund	1,103,363	29.83%	3,796	6,810	1,092,758	29.72%
SERS U.S. Bond Index Fund	178,339	4.82%	11,452	3,676	163,210	4.44%
Self-Directed Brokerage						
Self-Directed Brokerage Account	123,906	3.35%	1,132	(1,022)	123,796	3.37%
SERS 457(b) Total Fund	\$3,699,104	100.0%	\$(5,077)	\$27,567	\$3,676,613	100.0%

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Net Performance					
Risk-Based Funds					
SERS 60/40 Stock & Bond Fund	1.92%	7.16%	9.35%	7.99%	9.08%
60% S&P 500/ 40% Aggregate Bond	1.93%	7.09%	9.33%	7.97%	9.10%
Callan Dom Balanced MFs	1.41%	4.34%	8.27%	6.70%	8.45%
SERS Conservative Portfolio Fund	1.38%	6.49%	5.27%	4.61%	4.95%
Conservative Portfolio Custom Index(3)	1.37%	6.38%	5.19%	4.53%	4.90%
Callan MA Tgt All Cons MF	1.15%	5.40%	4.64%	3.92%	4.57%
SERS Moderate Portfolio Fund	1.22%	5.64%	8.10%	6.75%	7.98%
Moderate Portfolio Custom Index(2)	1.21%	5.48%	8.01%	6.65%	7.93%
Callan MA Tgt All Mod MF	0.96%	4.34%	6.58%	5.31%	6.70%
SERS Aggressive Portfolio Fund	0.88%	3.80%	9.72%	7.78%	9.70%
Aggressive Portfolio Custom Index(1)	0.86%	3.61%	9.61%	7.65%	9.61%
Callan MA Tgt All AgGr MF	0.06%	0.31%	8.99%	6.69%	9.13%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019

	Last 10 Years	Last 15 Years	Last 20 Years
Net Performance			
Risk-Based Funds			
SERS 60/40 Stock & Bond Fund	9.65%	-	-
60% S&P 500/ 40% Aggregate Bond	9.62%	7.39%	6.20%
Callan Dom Balanced MFs	8.75%	6.70%	5.50%
SERS Conservative Portfolio Fund	5.48%	5.16%	-
Conservative Portfolio Custom Index(3)	5.42%	5.11%	5.04%
Callan MA Tgt All Cons MF	5.69%	4.89%	5.01%
SERS Moderate Portfolio Fund	8.45%	7.02%	-
Moderate Portfolio Custom Index(2)	8.35%	6.96%	6.06%
Callan MA Tgt All Mod MF	7.44%	6.17%	5.64%
SERS Aggressive Portfolio Fund	9.87%	7.76%	-
Aggressive Portfolio Custom Index(1)	9.74%	7.65%	6.13%
Callan MA Tgt All AgGr MF	9.27%	6.95%	6.03%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Net Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	1.70%	4.26%	13.39%	10.85%	13.26%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.26%
Callan Lg Cap Broad MF	0.76%	2.27%	12.67%	9.74%	12.54%
SERSU.S. SMID Company Idx Fund	(1.53%)	(3.62%)	10.07%	8.57%	11.72%
Dow Jones US Completion	(1.64%)	(3.95%)	9.84%	8.36%	11.50%
Callan SMID Broad MFs	(1.77%)	(4.42%)	10.81%	8.51%	10.97%
International Equity					
SERS International Company Idx Fund	(1.03%)	(0.83%)	6.77%	3.68%	6.44%
MSCI EAFE	(1.07%)	(1.34%)	6.48%	3.27%	6.12%
Callan Intl Eq Dev Mkt MF	(1.33%)	(2.48%)	5.99%	3.08%	6.02%
Domestic Fixed Income					
SERS Short Term Investment Fund	0.59%	2.43%	1.73%	1.16%	0.88%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Cash Database(1)	0.64%	2.79%	1.89%	1.41%	1.16%
SERS Stable Value Fund	0.60%	2.37%	2.14%	2.14%	2.23%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Stable Value	0.64%	2.50%	2.21%	2.11%	1.98%
SERS U.S. Bond Index Fund	2.25%	10.28%	2.89%	3.33%	2.65%
Blmbg Aggregate	2.27%	10.30%	2.92%	3.38%	2.72%
Callan Core Bond MFs	2.25%	10.14%	3.12%	3.36%	2.73%

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Net Performance			
Domestic Equity			
SERS U.S. Large Company Idx Fund	13.26%	9.05%	6.38%
S&P 500 Index	13.24%	9.01%	6.33%
Callan Lg Cap Broad MF	12.43%	8.83%	6.37%
SERS U.S. SMID Company Idx Fund	12.51%	9.65%	8.39%
Dow Jones US Completion	12.31%	9.45%	8.06%
Callan SMID Broad MFs	12.13%	9.31%	8.88%
International Equity			
SERS International Company Idx Fund	5.22%	5.58%	3.66%
MSCI EAFE	4.90%	5.29%	3.72%
Callan Intl Eq Dev Mkt MF	4.94%	5.47%	4.37%
Domestic Fixed Income			
SERS Short Term Investment Fund	0.69%	1.56%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Cash Database(1)	1.02%	1.87%	2.36%
SERS Stable Value Fund	2.63%	3.31%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Stable Value	2.24%	2.92%	3.67%
SERS U.S. Bond Index Fund	3.68%	4.15%	4.96%
Bimbg Aggregate	3.75%	4.21%	5.01%
Callan Core Bond MFs	4.01%	4.46%	5.07%

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

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

Investment Fund Returns

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

	12/2018- 9/2019	2018	2017	2016	2015
Net Performance					
Risk-Based Funds					
SERS 60/40 Stock & Bond Fund	15.76%	(2.19%)	14.25%	8.16%	1.20%
60% S&P 500/ 40% Aggregate Bond	15.72%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	14.85%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	10.08%	(1.58%)	8.37%	4.35%	0.48%
Conservative Portfolio Custom Index(3)	10.00%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	10.04%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	14.47%	(4.07%)	14.46%	7.00%	0.55%
Moderate Portfolio Custom Index(2)	14.32%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	12.74%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	16.42%	(5.66%)	18.29%	8.49%	0.45%
Aggressive Portfolio Custom Index(1)	16.24%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	15.67%	(8.91%)	20.65%	7.67%	(1.42%)

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

Investment Fund Returns

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

	12/2018- 9/2019	2018	2017	2016	2015
Net Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	20.55%	(4.39%)	21.84%	11.98%	1.40%
S&P 500 Index	20.55%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.76%	(4.54%)	23.56%	8.43%	1.50%
SERSU.S. SMID Company Idx Fund	17.77%	(9.34%)	18.19%	16.05%	(3.32%)
Dow Jones US Completion	17.54%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	18.99%	(8.69%)	17.14%	13.80%	(2.80%)
International Equity					
SERS International Company Idx Fund	13.38%	(13.39%)	25.53%	1.71%	(0.43%)
MSCI EAFE	12.80%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	12.29%	(15.06%)	26.64%	0.39%	(0.73%)
Domestic Fixed Income					
SERS Short Term Investment Fund	1.82%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.19%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	1.73%	2.34%	1.85%	1.99%	2.18%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	1.88%	2.24%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	8.49%	0.01%	3.51%	2.57%	0.47%
Blmbg Aggregate	8.52%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	8.80%	(0.35%)	3.71%	3.03%	0.10%

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Risk-Based Funds					
SERS 60/40 Stock & Bond Fund	1.92%	7.18%	9.37%	8.00%	9.10%
60% S&P 500/ 40% Aggregate Bond	1.93%	7.09%	9.33%	7.97%	9.10%
Callan Dom Balanced MFs	1.41%	4.34%	8.27%	6.70%	8.45%
SERS Conservative Portfolio Fund	1.38%	6.51%	5.29%	4.63%	4.96%
Conservative Portfolio Custom Index(3)	1.37%	6.38%	5.19%	4.53%	4.90%
Callan MA Tgt All Cons MF	1.15%	5.40%	4.64%	3.92%	4.57%
SERS Moderate Portfolio Fund	1.22%	5.66%	8.11%	6.76%	8.00%
Moderate Portfolio Custom Index(2)	1.21%	5.48%	8.01%	6.65%	7.93%
Callan MA Tgt All Mod MF	0.96%	4.34%	6.58%	5.31%	6.70%
SERS Aggressive Portfolio Fund	0.88%	3.81%	9.73%	7.80%	9.71%
Aggressive Portfolio Custom Index(1)	0.86%	3.61%	9.61%	7.65%	9.61%
Callan MA Tgt All AgGr MF	0.06%	0.31%	8.99%	6.69%	9.13%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Gross Performance			
Risk-Based Funds			
SERS 60/40 Stock & Bond Fund	9.66%	-	-
60% S&P 500/ 40% Aggregate Bond	9.62%	7.39%	6.20%
Callan Dom Balanced MFs	8.75%	6.70%	5.50%
SERS Conservative Portfolio Fund	5.49%	5.18%	-
Conservative Portfolio Custom Index(3)	5.42%	5.11%	5.04%
Callan MA Tgt All Cons MF	5.69%	4.89%	5.01%
SERS Moderate Portfolio Fund	8.46%	7.04%	-
Moderate Portfolio Custom Index(2)	8.35%	6.96%	6.06%
Callan MA Tgt All Mod MF	7.44%	6.17%	5.64%
SERS Aggressive Portfolio Fund	9.89%	7.77%	-
Aggressive Portfolio Custom Index(1)	9.74%	7.65%	6.13%
Callan MA Tgt All AgGr MF	9.27%	6.95%	6.03%

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	1.70%	4.27%	13.41%	10.86%	13.27%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.26%
Callan Lg Cap Broad MF	0.76%	2.27%	12.67%	9.74%	12.54%
SERS U.S. SMID Company Idx Fund	(1.52%)	(3.60%)	10.09%	8.59%	11.74%
Dow Jones US Completion	(1.64%)	(3.95%)	9.84%	8.36%	11.50%
Callan SMID Broad MFs	(1.77%)	(4.42%)	10.81%	8.51%	10.97%
International Equity					
International Company Stock Idx Fund	(1.03%)	(0.81%)	6.79%	3.70%	6.46%
MSCI EAFE	(1.07%)	(1.34%)	6.48%	3.27%	6.12%
Callan Intl Eq Dev Mkt MF	(1.33%)	(2.48%)	5.99%	3.08%	6.02%
Domestic Fixed Income					
SERS Short Term Investment Fund	0.59%	2.43%	1.73%	1.16%	0.88%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Cash Database(1)	0.64%	2.79%	1.89%	1.41%	1.16%
SERS Stable Value Fund	0.68%	2.62%	2.37%	2.41%	2.52%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Stable Value	0.64%	2.50%	2.21%	2.11%	1.98%
SERS U.S. Bond Index Fund	2.25%	10.29%	2.91%	3.35%	2.67%
Bmbg Aggregate	2.27%	10.30%	2.92%	3.38%	2.72%
Callan Core Bond MFs	2.25%	10.14%	3.12%	3.36%	2.73%

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

Investment Fund Returns

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

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Gross Performance			
Domestic Equity			
SERS U.S. Large Company Idx Fund	13.27%	9.06%	6.39%
S&P 500 Index	13.24%	9.01%	6.33%
Callan Lg Cap Broad MF	12.43%	8.83%	6.37%
SERS U.S. SMID Company Idx Fund	12.53%	9.67%	8.41%
Dow Jones US Completion	12.31%	9.45%	8.06%
Callan SMID Broad MFs	12.13%	9.31%	8.88%
International Equity			
International Company Stock Idx Fund	5.24%	5.60%	3.68%
MSCI EAFE	4.90%	5.29%	3.72%
Callan Intl Eq Dev Mkt MF	4.94%	5.47%	4.37%
Domestic Fixed Income			
SERS Short Term Investment Fund	0.69%	1.56%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Cash Database(1)	1.02%	1.87%	2.36%
SERS Stable Value Fund	2.93%	3.59%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Stable Value	2.24%	2.92%	3.67%
SERS U.S. Bond Index Fund	3.70%	4.17%	4.98%
Bimbg Aggregate	3.75%	4.21%	5.01%
Callan Core Bond MFs	4.01%	4.46%	5.07%

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

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

Investment Fund Returns

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

	12/2018- 9/2019	2018	2017	2016	2015
Gross Performance					
Risk-Based Funds					
SERS 60/40 Stock & Bond Fund	15.77%	(2.18%)	14.27%	8.18%	1.21%
60% S&P 500/ 40% Aggregate Bond	15.72%	(2.26%)	14.26%	8.21%	1.20%
Callan Dom Balanced MFs	14.85%	(4.56%)	14.32%	7.30%	(0.54%)
SERS Conservative Portfolio Fund	10.09%	(1.57%)	8.39%	4.36%	0.50%
Conservative Portfolio Custom Index(3)	10.00%	(1.72%)	8.31%	4.28%	0.44%
Callan MA Tgt All Cons MF	10.04%	(3.34%)	8.82%	5.48%	(1.12%)
SERS Moderate Portfolio Fund	14.48%	(4.06%)	14.48%	7.02%	0.56%
Moderate Portfolio Custom Index(2)	14.32%	(4.21%)	14.40%	6.92%	0.47%
Callan MA Tgt All Mod MF	12.74%	(5.06%)	13.20%	6.59%	(1.38%)
SERS Aggressive Portfolio Fund	16.43%	(5.65%)	18.31%	8.51%	0.46%
Aggressive Portfolio Custom Index(1)	16.24%	(5.82%)	18.19%	8.33%	0.34%
Callan MA Tgt All AgGr MF	15.67%	(8.91%)	20.65%	7.67%	(1.42%)

(1) Consists of: 48% S&P 500, 20% MSCI EAFE, 20% Bloomberg Agg., and 12% Dow Jones U.S. Market Completion Index

(2) Consists of: 40% Bloomberg Agg., 36% S&P 500, 15% MSCI EAFE, and 9% Dow Jones U.S. Market Completion Index

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

Investment Fund Returns

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

	12/2018- 9/2019	2018	2017	2016	2015
Gross Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	20.57%	(4.38%)	21.85%	11.99%	1.41%
S&P 500 Index	20.55%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.76%	(4.54%)	23.56%	8.43%	1.50%
SERS U.S. SMID Company Idx Fund	17.78%	(9.32%)	18.21%	16.08%	(3.30%)
Dow Jones US Completion	17.54%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	18.99%	(8.69%)	17.14%	13.80%	(2.80%)
International Equity					
International Company Stock Idx Fund	13.40%	(13.37%)	25.55%	1.73%	(0.41%)
MSCI EAFE	12.80%	(13.79%)	25.03%	1.00%	(0.81%)
Callan Intl Eq Dev Mkt MF	12.29%	(15.06%)	26.64%	0.39%	(0.73%)
Domestic Fixed Income					
SERS Short Term Investment Fund	1.82%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.19%	2.00%	1.19%	0.95%	0.40%
SERS Stable Value Fund	1.97%	2.41%	2.16%	2.31%	2.51%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Stable Value	1.88%	2.24%	1.97%	1.89%	1.77%
SERS U.S. Bond Index Fund	8.50%	0.03%	3.53%	2.59%	0.49%
Blmbg Aggregate	8.52%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	8.80%	(0.35%)	3.71%	3.03%	0.10%

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

Pennsylvania SERS
Investment Manager Performance Monitoring Summary Report
September 30, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
Gross of Fee Performance									
Risk-Based Funds									
SERS 60/40 Stock & Bond Fund	1.9 26	7.2 22	9.4 21	8.0 10	9.1 25	9.7 16			0.01 98
Callan Dom Balanced MFs									
60% S&P 500/ 40% Aggregate Bond	1.9 26	7.1 23	9.3 22	8.0 10	9.1 25	9.6 17			
SERS Conservative Portfolio Fund	1.4 26	6.5 27	5.3 28	4.6 22	5.0 38	5.5 59			0.01 100
Callan MA Tgt All Cons MF									
Conservative Portfolio Custom Index	1.4 26	6.4 28	5.2 32	4.5 25	4.9 41	5.4 61			
SERS Moderate Portfolio Fund	1.2 37	5.7 28	8.1 20	6.8 17	8.0 23	8.5 25			0.02 100
Callan MA Tgt All Mod MF									
Moderate Portfolio Custom Index	1.2 38	5.5 31	8.0 21	6.7 19	7.9 25	8.3 28			
SERS Aggressive Portfolio Fund	0.9 16	3.8 9	9.7 29	7.8 15	9.7 32	9.9 24			0.02 100
Callan MA Tgt All AgGr MF									
Aggressive Portfolio Custom Index	0.9 17	3.6 10	9.6 33	7.7 16	9.6 34	9.7 29			
Domestic Equity									
SERS U.S. Large Company Index	1.7 24	4.3 29	13.4 43	10.9 38	13.3 36	13.3 35			0.01 99
Callan Lg Cap Broad MF									
S&P 500 Index	1.7 24	4.3 29	13.4 44	10.8 38	13.3 37	13.2 36			
SERS U.S. Small/Mid Company Index	-1.5 49	-3.6 44	10.1 55	8.6 50	11.7 36	12.5 41			0.02 100
Callan SMID Broad MFs									
Dow Jones US Completion	-1.6 49	-4.0 46	9.8 58	8.4 51	11.5 41	12.3 44			
International Equity									
SERS International Company Idx Fund	-1.0 36	-0.8 32	6.8 28	3.7 35	6.5 30	5.2 43			0.02 99
Callan Intl Eq Dev Mkt MF									
MSCI EAFE	-1.1 37	-1.3 37	6.5 34	3.3 43	6.1 46	4.9 57			
Domestic Fixed Income									
SERS Short Term Investment Fund	0.6 78	2.4 88	1.7 80	1.2 85	0.9 86	0.7 86			0.00 100
Callan Cash Database									
3-month Treasury Bill	0.6 91	2.4 94	1.5 94	1.0 97	0.7 97	0.5 97			
Comments: Callan Cash Database includes STIF, enhanced cash, and money market funds.									

Returns:
■ above median
■ third quartile
■ fourth quartile

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

Risk Quadrant:


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

Pennsylvania SERS
Investment Manager Performance Monitoring Summary Report
September 30, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
SERS Stable Value Fund Callan Stable Value 3-month Treasury Bill	0.7 11	2.6 30	2.4 15	2.4 1	2.5 1	2.9 1			
SERS U.S. Bond Index Fund Callan Core Bond MFs Blmbg Aggregate	2.3 49	10.3 43	2.9 70	3.3 52	2.7 58	3.7 86			0.02 96
	2.3 44	10.3 43	2.9 70	3.4 47	2.7 51	3.7 83			

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

SERS 60/40 Stock & Bond Fund Period Ended September 30, 2019

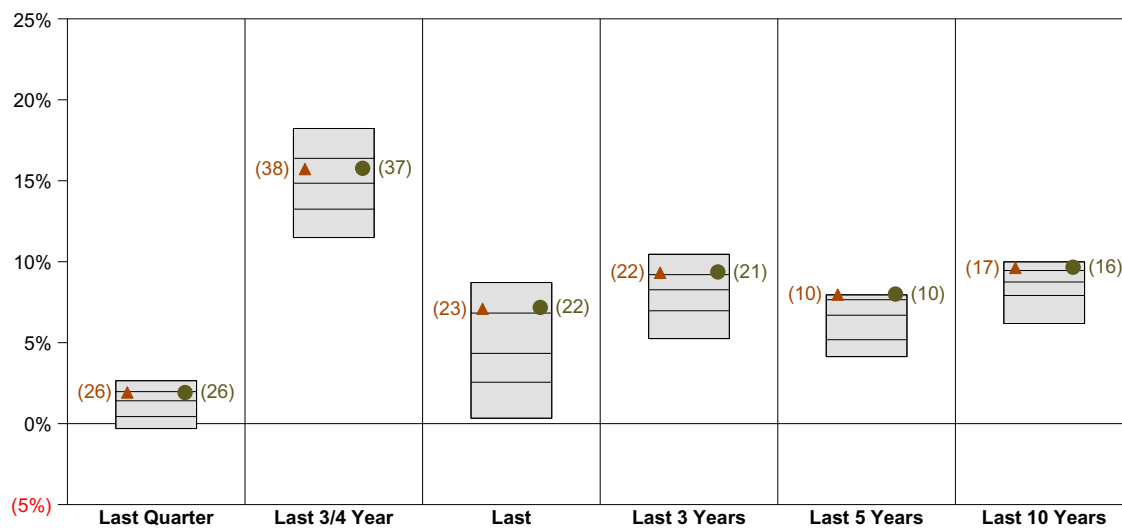
Investment Philosophy

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

Quarterly Summary and Highlights

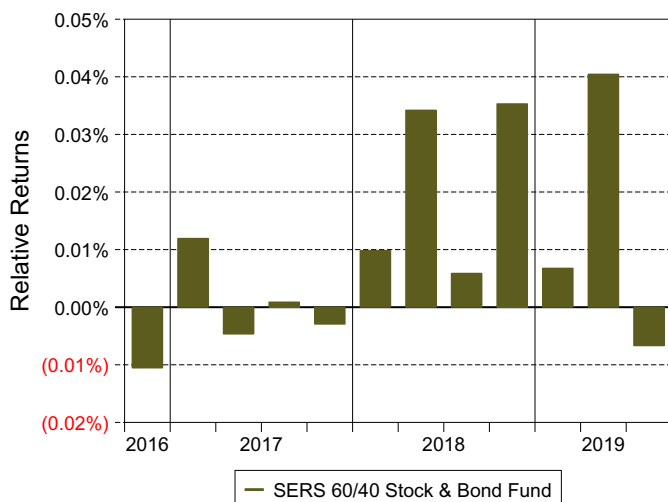
- SERS 60/40 Stock & Bond Fund's portfolio posted a 1.92% return for the quarter placing it in the 26 percentile of the Callan Domestic Balanced Mutual Funds group for the quarter and in the 22 percentile for the last year.
- SERS 60/40 Stock & Bond Fund's portfolio underperformed the 60% S&P 500/ 40% Aggregate Bond by 0.01% for the quarter and outperformed the 60% S&P 500/ 40% Aggregate Bond for the year by 0.08%.

Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)

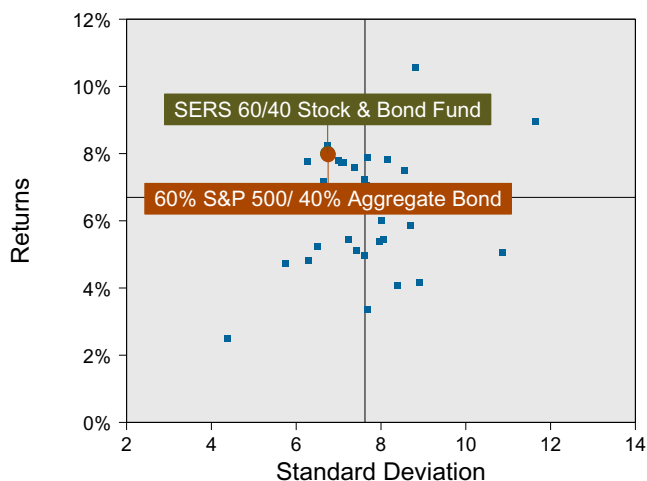


10th Percentile	2.65	18.23	8.72	10.46	7.95	9.99
25th Percentile	1.98	16.38	6.83	9.20	7.65	9.46
Median	1.41	14.85	4.34	8.27	6.70	8.75
75th Percentile	0.44	13.25	2.56	6.97	5.18	7.91
90th Percentile	(0.30)	11.49	0.33	5.25	4.14	6.18
SERS 60/40 Stock & Bond Fund	● 1.92	15.77	7.18	9.37	8.00	9.66
60% S&P 500/ 40% Aggregate Bond	▲ 1.93	15.72	7.09	9.33	7.97	9.62

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



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

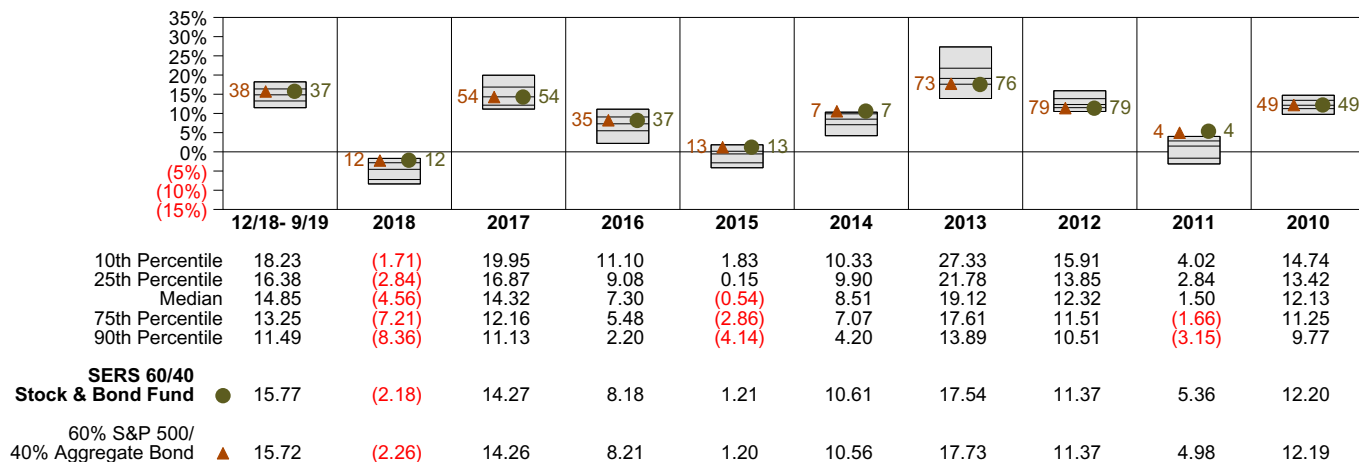


SERS 60/40 Stock & Bond Fund Return Analysis Summary

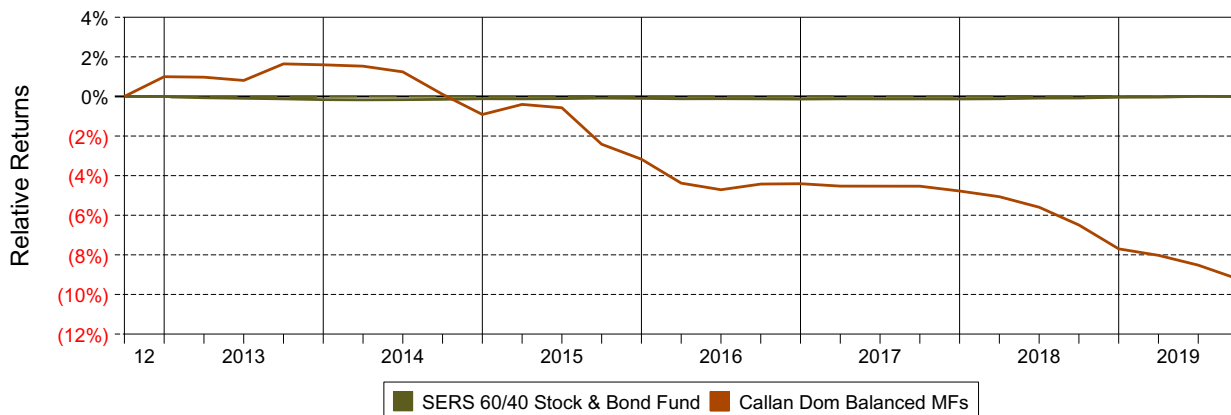
Return Analysis

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

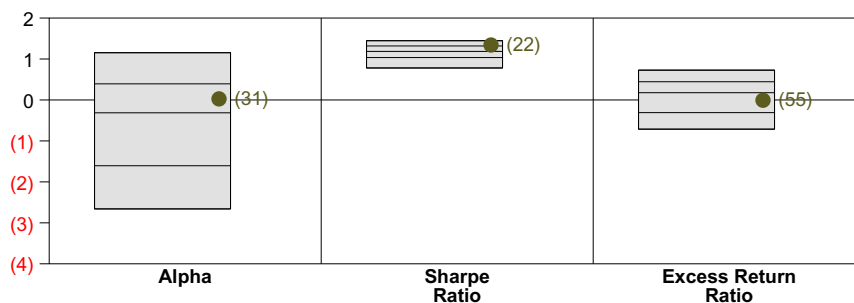
Performance vs Callan Domestic Balanced Mutual Funds (Institutional Net)



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



Risk Adjusted Return Measures vs 60% S&P 500/ 40% Aggregate Bond Rankings Against Callan Domestic Balanced Mutual Funds (Institutional Net) Seven Years Ended September 30, 2019



SERS Conservative Portfolio Fund Period Ended September 30, 2019

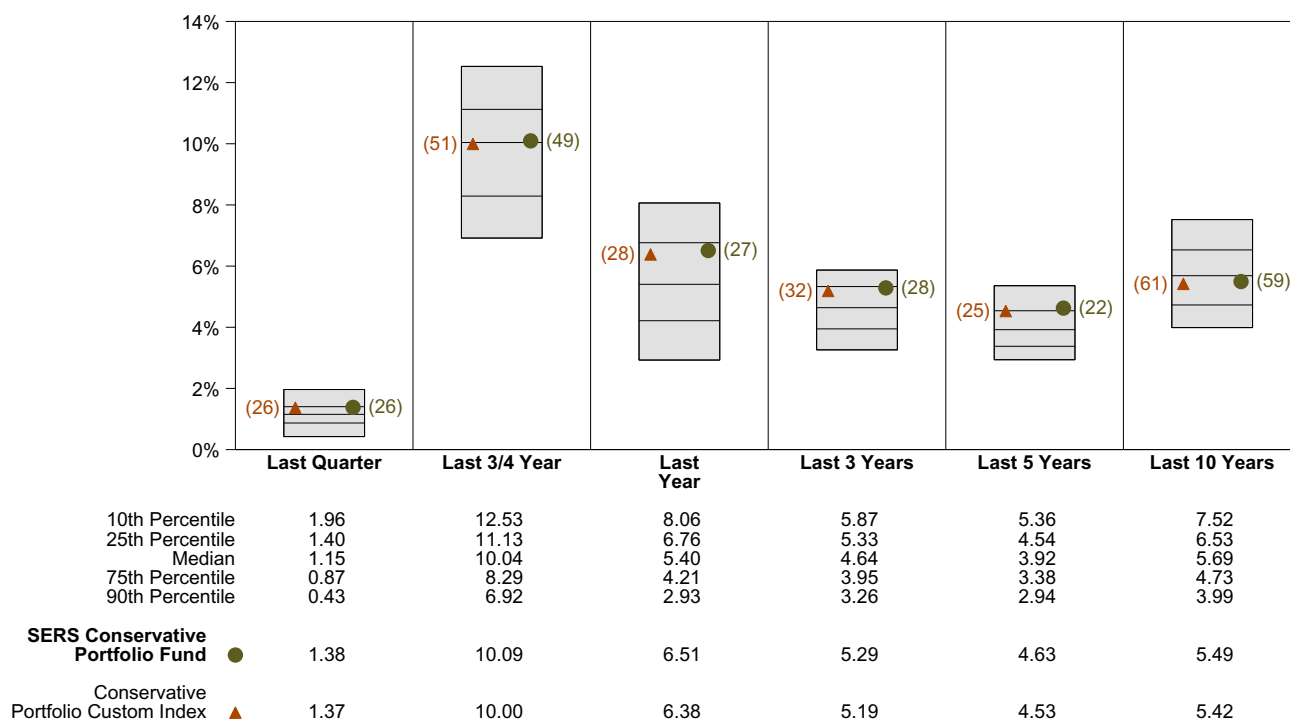
Investment Philosophy

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

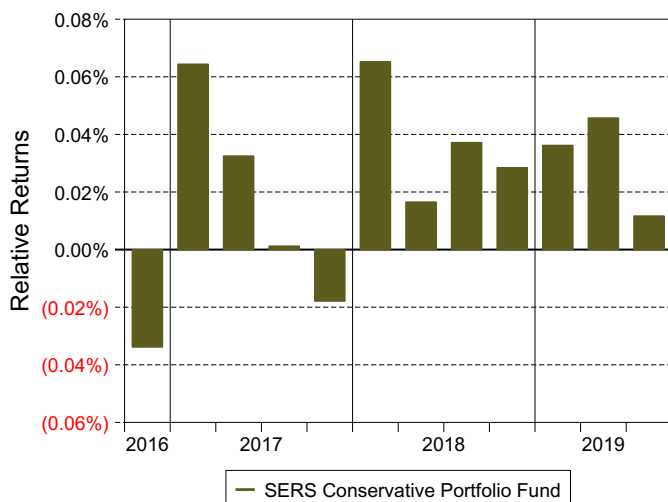
Quarterly Summary and Highlights

- SERS Conservative Portfolio Fund's portfolio posted a 1.38% return for the quarter placing it in the 26 percentile of the Callan Mixed-Asset Target Alloc Cons MFs group for the quarter and in the 27 percentile for the last year.
- SERS Conservative Portfolio Fund's portfolio outperformed the Conservative Portfolio Custom Index by 0.01% for the quarter and outperformed the Conservative Portfolio Custom Index for the year by 0.13%.

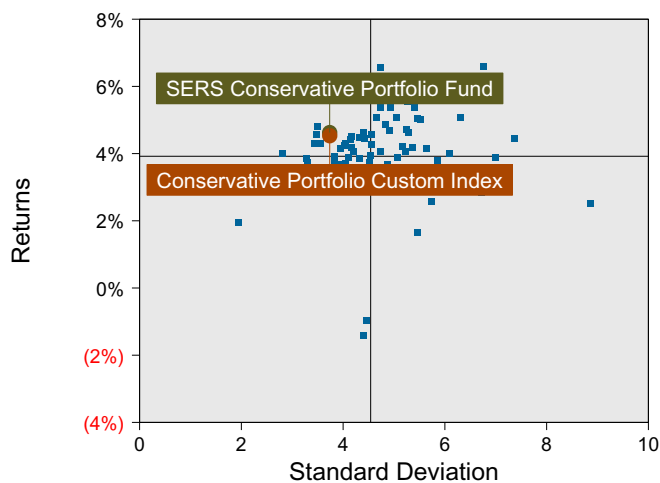
Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)



Relative Returns vs Conservative Portfolio Custom Index



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

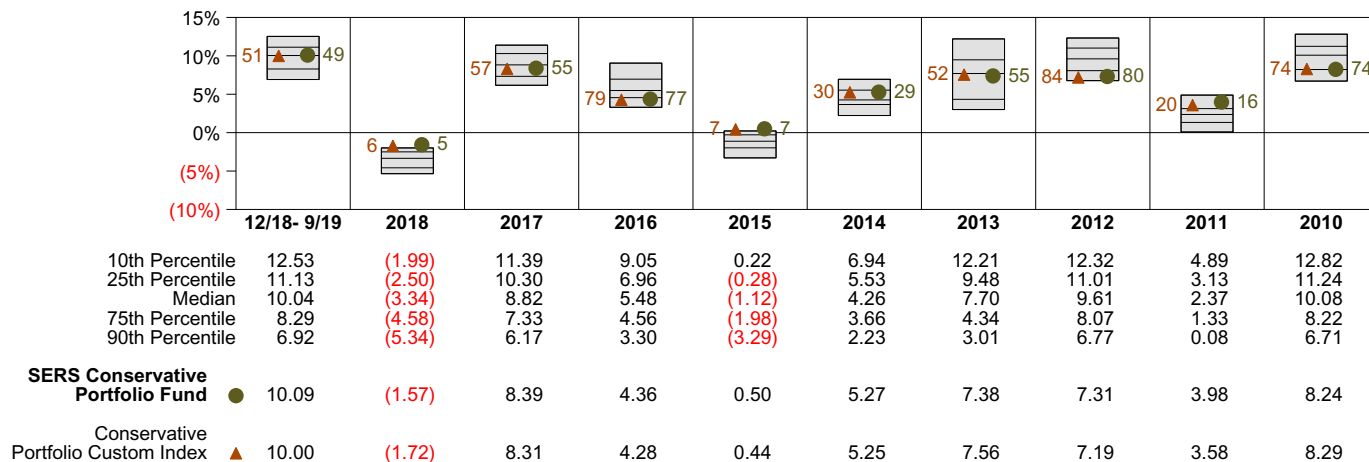


SERS Conservative Portfolio Fund Return Analysis Summary

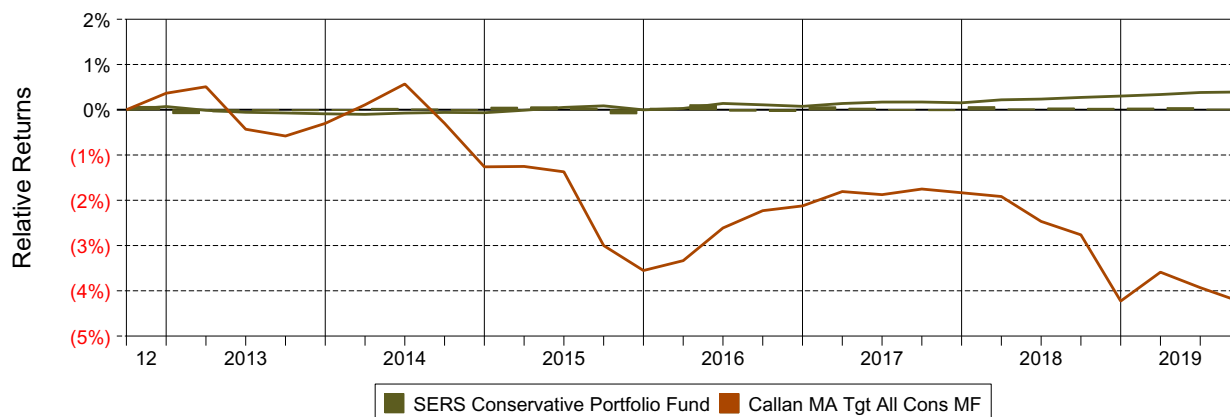
Return Analysis

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

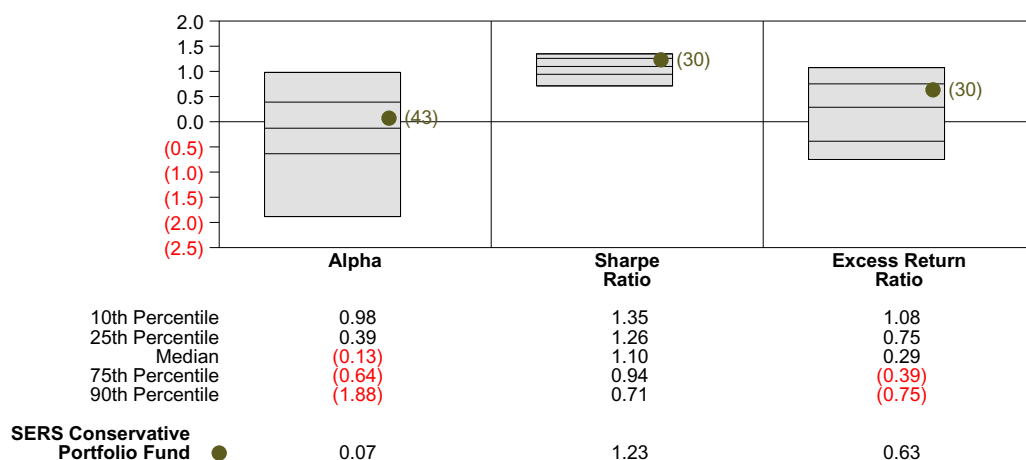
Performance vs Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net)



Cumulative and Quarterly Relative Return vs Conservative Portfolio Custom Index



Risk Adjusted Return Measures vs Conservative Portfolio Custom Index Rankings Against Callan Mixed-Asset Target Alloc Cons MFs (Institutional Net) Seven Years Ended September 30, 2019



SERS Moderate Portfolio Fund Period Ended September 30, 2019

Investment Philosophy

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

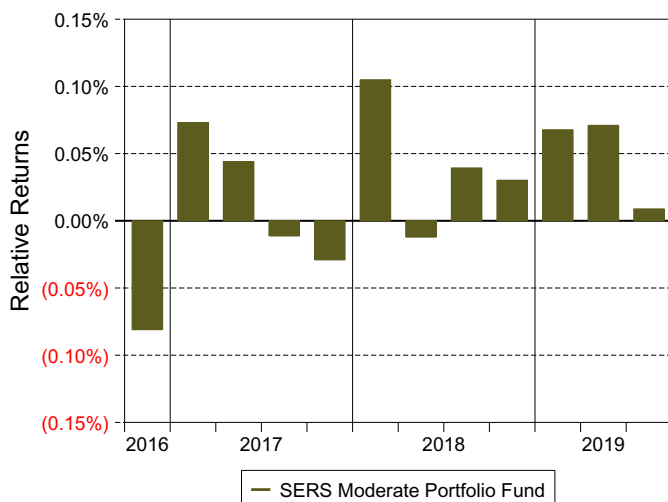
Quarterly Summary and Highlights

- SERS Moderate Portfolio Fund's portfolio posted a 1.22% return for the quarter placing it in the 37 percentile of the Callan Mixed-Asset Target Alloc Mod MF group for the quarter and in the 28 percentile for the last year.
- SERS Moderate Portfolio Fund's portfolio outperformed the Moderate Portfolio Custom Index by 0.01% for the quarter and outperformed the Moderate Portfolio Custom Index for the year by 0.18%.

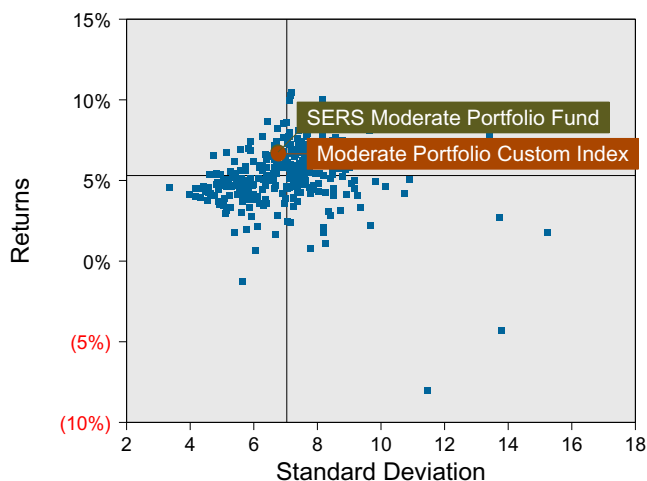
Performance vs Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)



Relative Returns vs Moderate Portfolio Custom Index



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

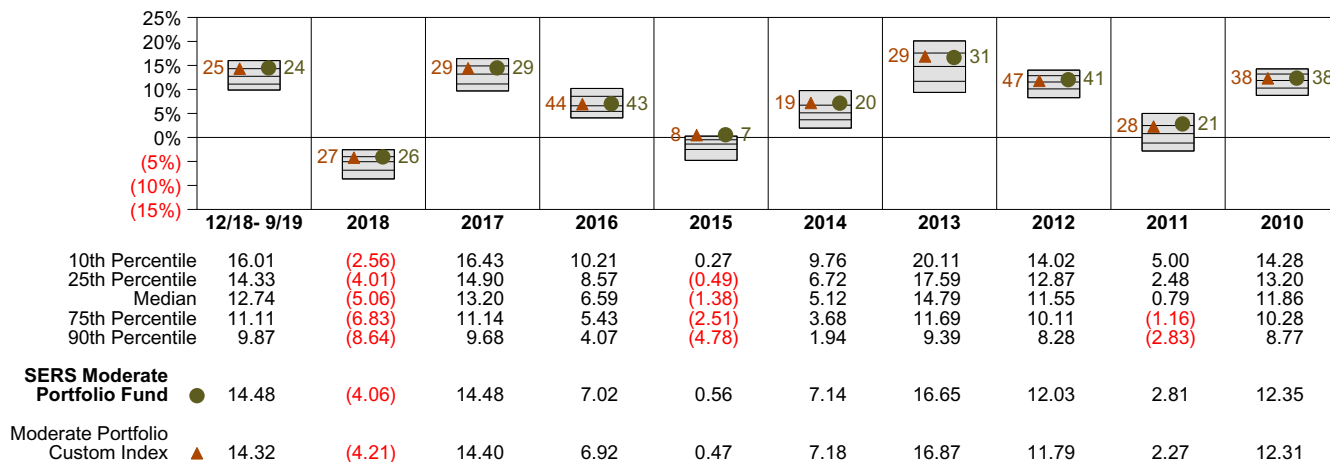


SERS Moderate Portfolio Fund Return Analysis Summary

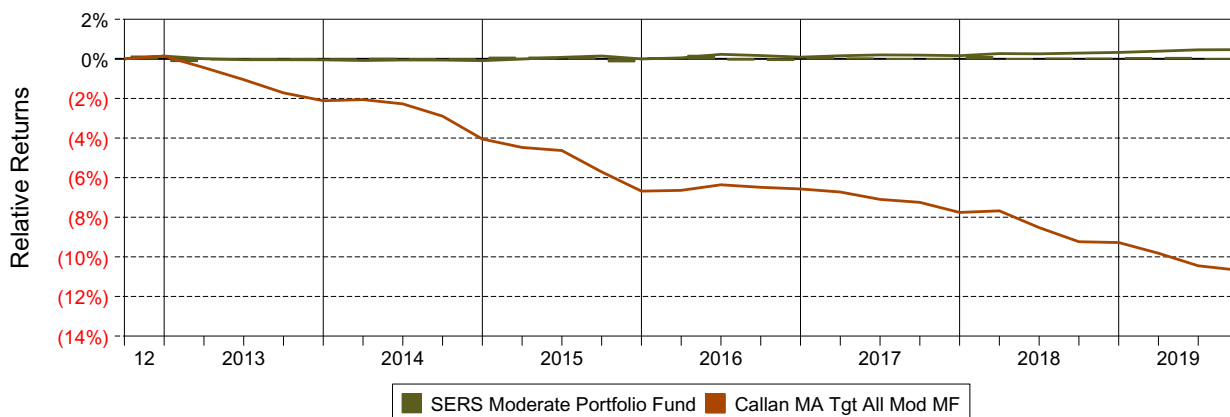
Return Analysis

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

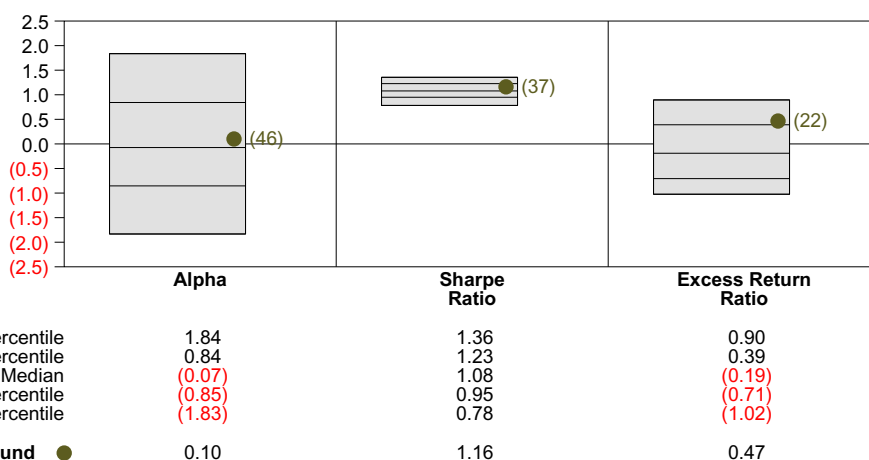
Performance vs Callan Mixed-Asset Target Alloc Mod MF (Institutional Net)



Cumulative and Quarterly Relative Return vs Moderate Portfolio Custom Index



Risk Adjusted Return Measures vs Moderate Portfolio Custom Index Rankings Against Callan Mixed-Asset Target Alloc Mod MF (Institutional Net) Seven Years Ended September 30, 2019



SERS Aggressive Portfolio Fund Period Ended September 30, 2019

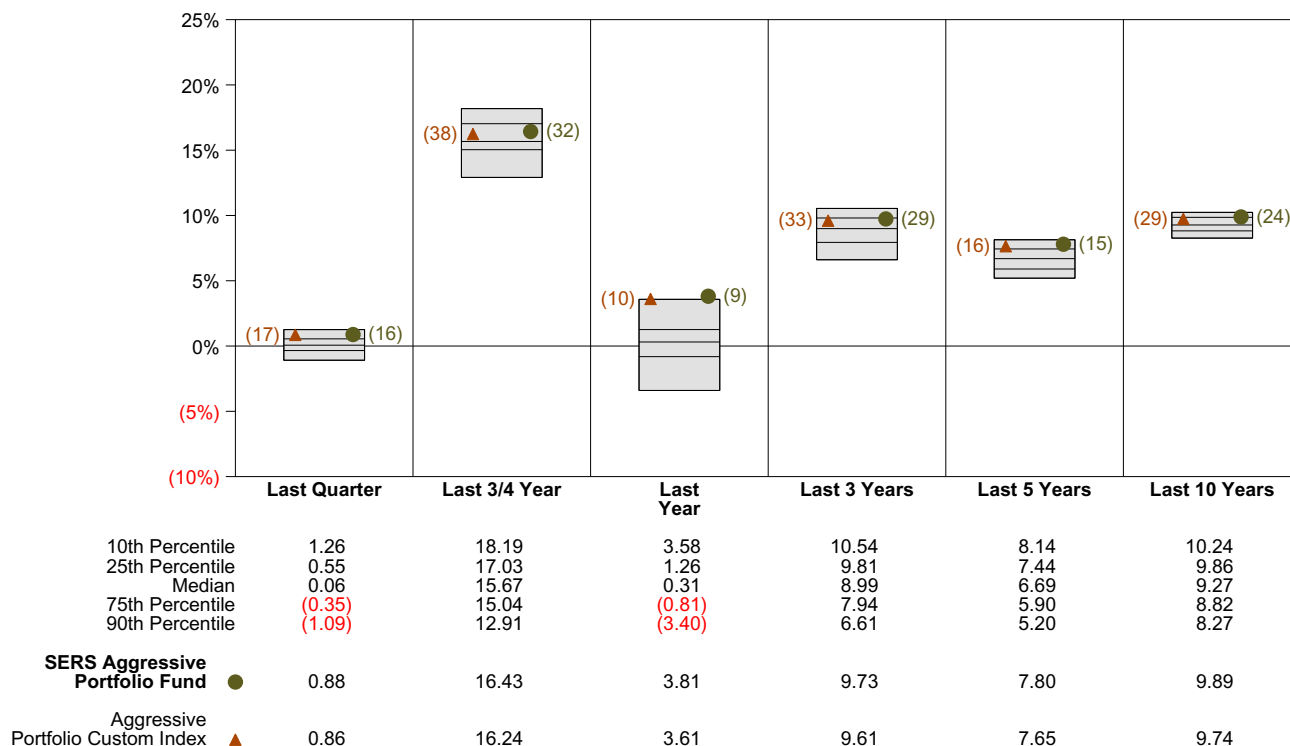
Investment Philosophy

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

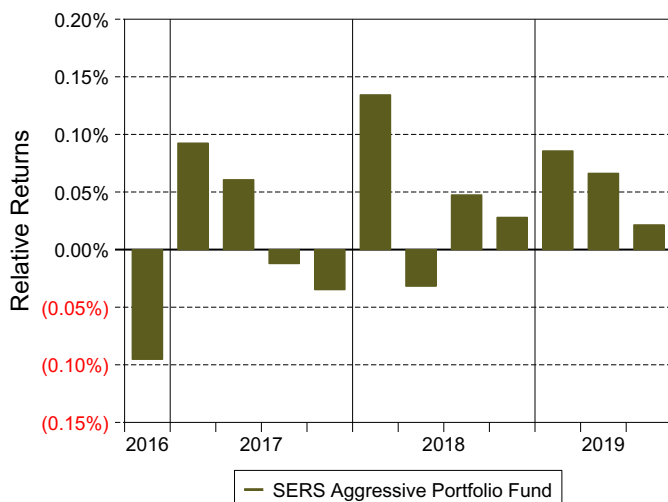
Quarterly Summary and Highlights

- SERS Aggressive Portfolio Fund's portfolio posted a 0.88% return for the quarter placing it in the 16 percentile of the Callan Mix-Asst Tgt Alloc Aggr Grwth MF group for the quarter and in the 9 percentile for the last year.
- SERS Aggressive Portfolio Fund's portfolio outperformed the Aggressive Portfolio Custom Index by 0.02% for the quarter and outperformed the Aggressive Portfolio Custom Index for the year by 0.20%.

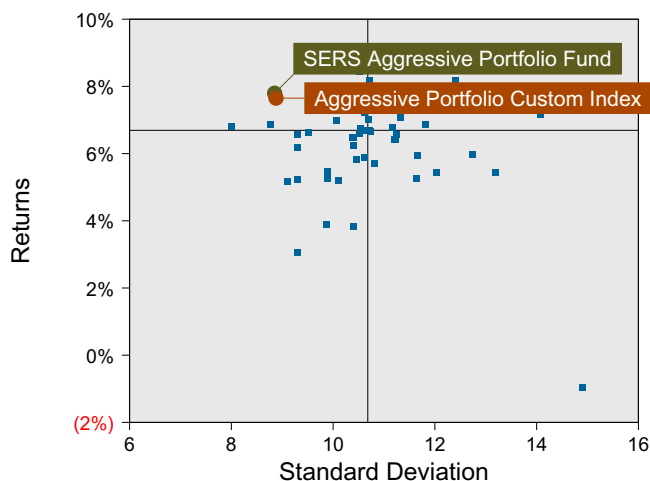
Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



Relative Returns vs Aggressive Portfolio Custom Index



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

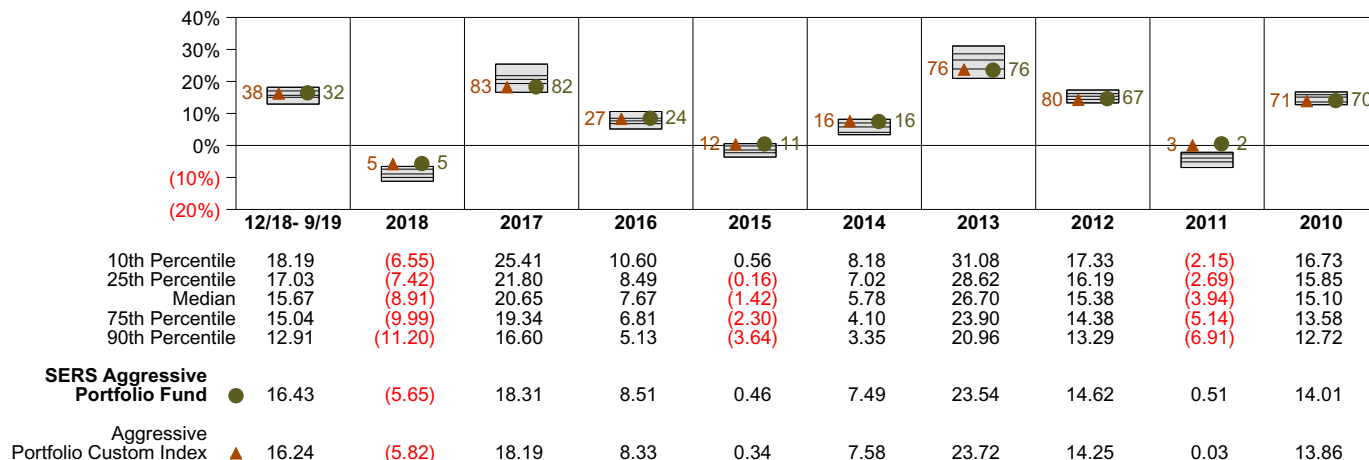


SERS Aggressive Portfolio Fund Return Analysis Summary

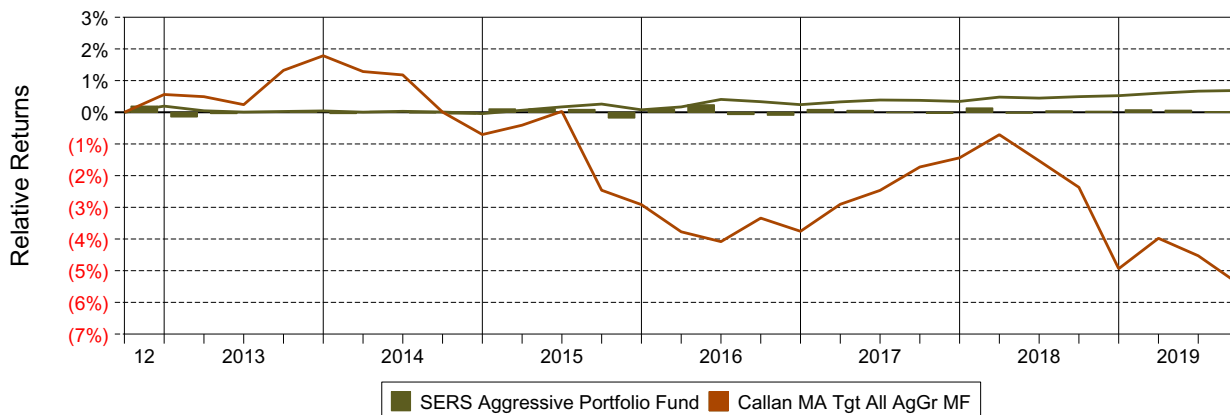
Return Analysis

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

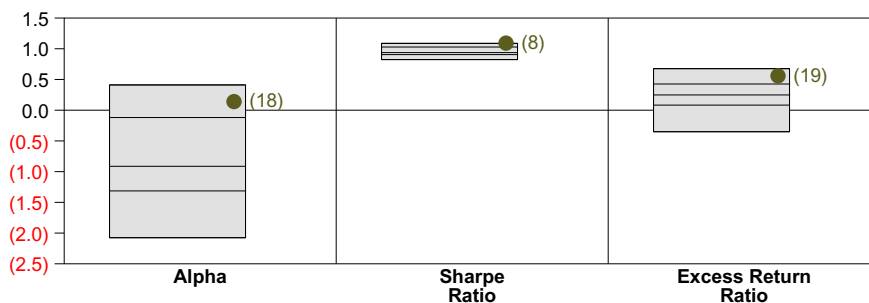
Performance vs Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net)



Cumulative and Quarterly Relative Return vs Aggressive Portfolio Custom Index



Risk Adjusted Return Measures vs Aggressive Portfolio Custom Index Rankings Against Callan Mix-Asst Tgt Alloc Aggr Grwth MF (Institutional Net) Seven Years Ended September 30, 2019



10th Percentile	0.41	1.09	0.68
25th Percentile	(0.12)	1.03	0.43
Median	(0.91)	0.94	0.25
75th Percentile	(1.31)	0.90	0.08
90th Percentile	(2.08)	0.82	(0.35)
SERS Aggressive Portfolio Fund	0.14	1.09	0.56

SERS U.S. Large Company Index Fund

Period Ended September 30, 2019

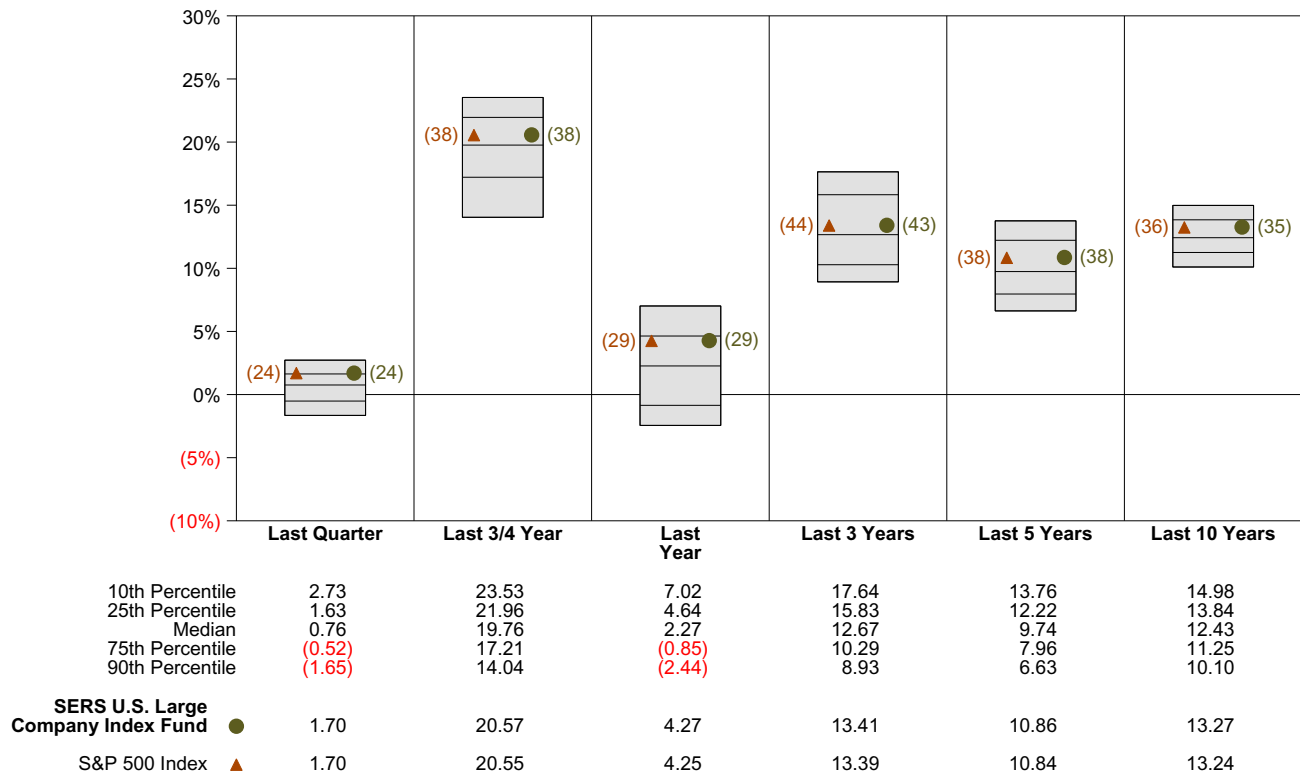
Investment Philosophy

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

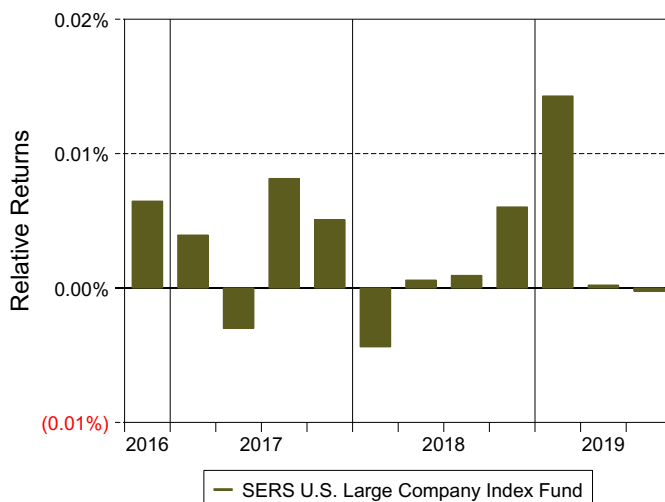
Quarterly Summary and Highlights

- SERS U.S. Large Company Index Fund's portfolio posted a 1.70% return for the quarter placing it in the 24 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 29 percentile for the last year.
- SERS U.S. Large Company Index Fund's portfolio underperformed the S&P 500 Index by 0.00% for the quarter and outperformed the S&P 500 Index for the year by 0.02%.

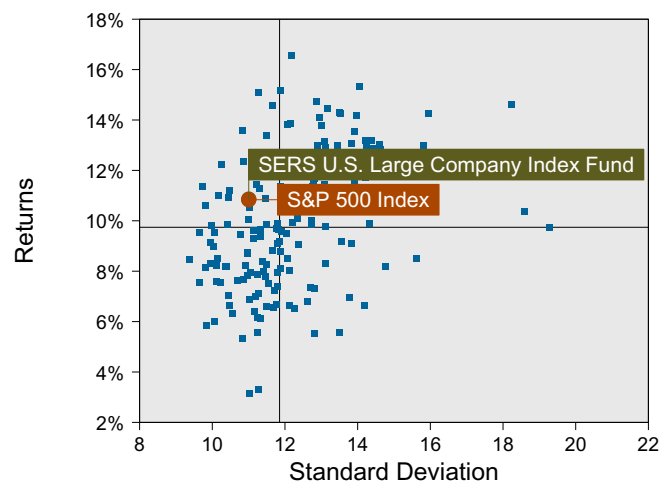
Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



Relative Return vs S&P 500 Index



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



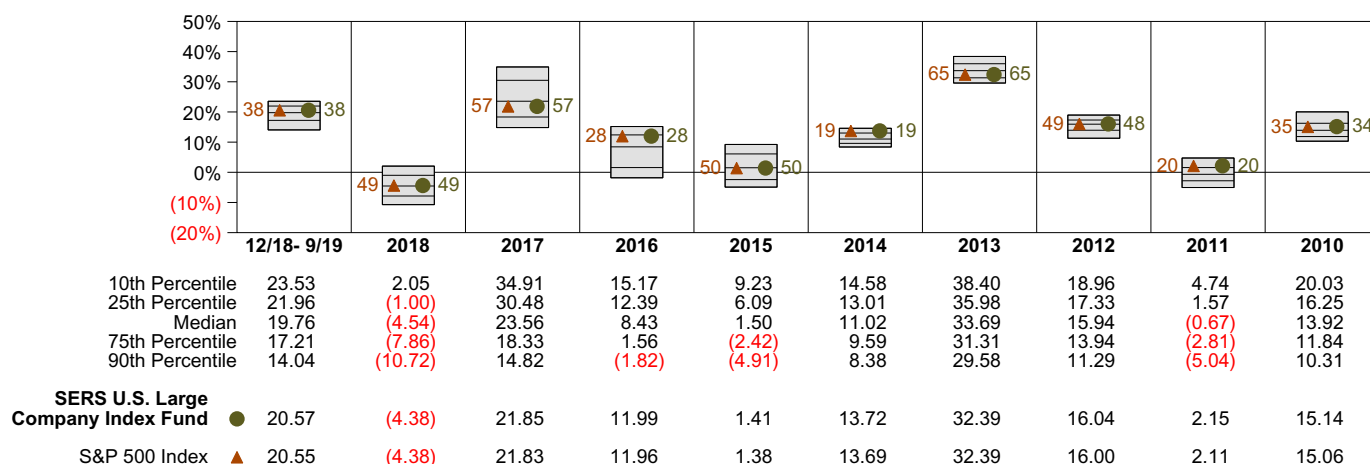
SERS U.S. Large Company Index Fund

Return Analysis Summary

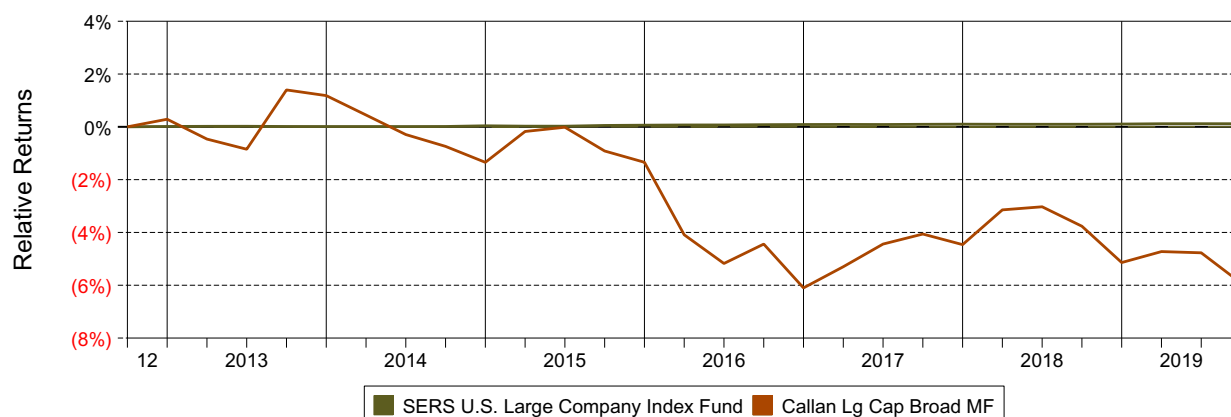
Return Analysis

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)



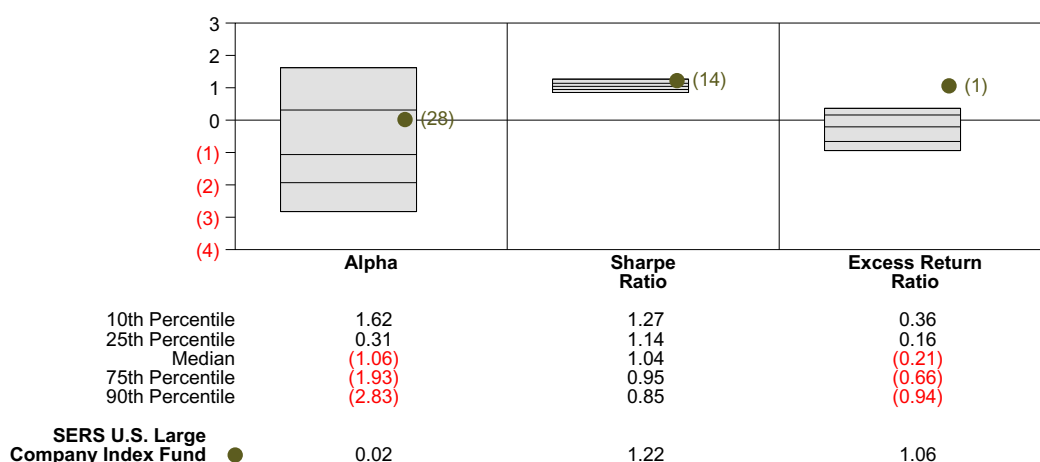
Cumulative and Quarterly Relative Return vs S&P 500 Index



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, 2019

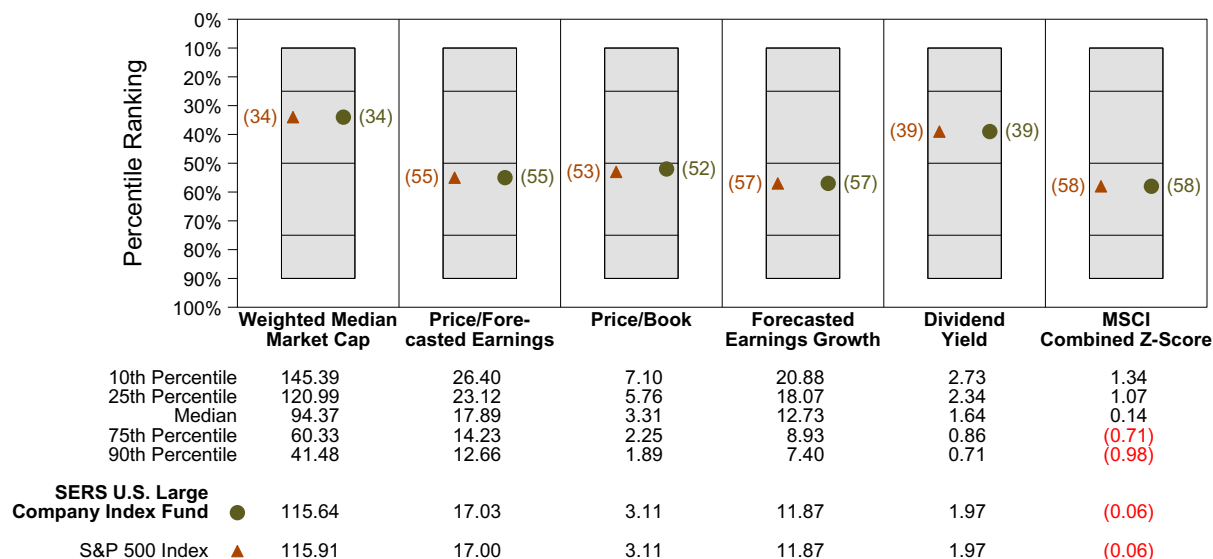


SERS U.S. Large Company Index Fund Equity Characteristics Analysis Summary

Portfolio Characteristics

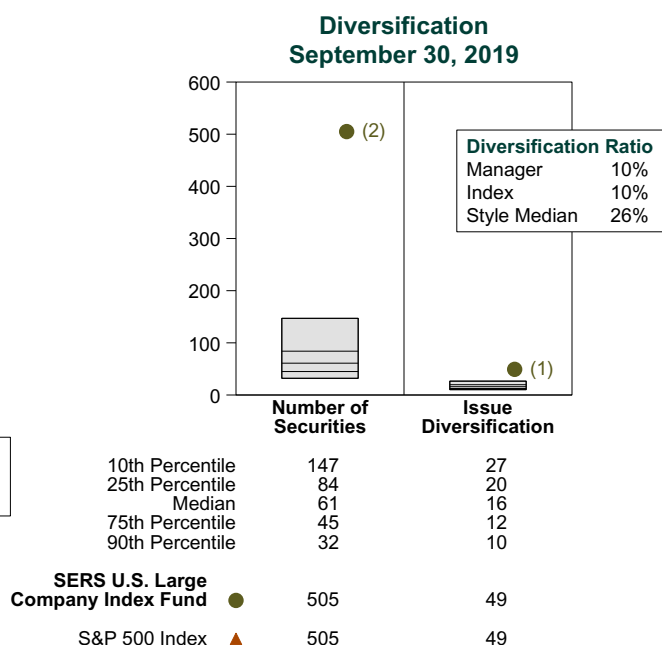
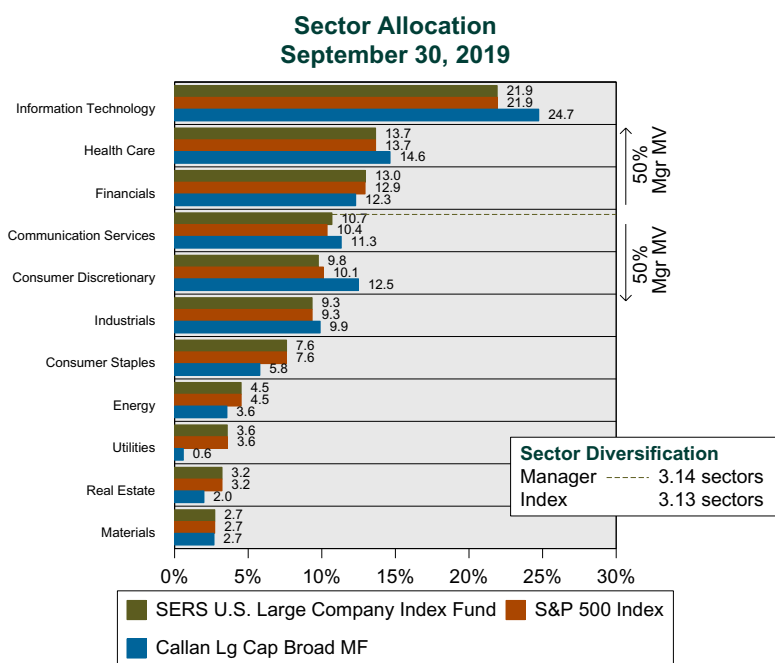
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

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



Sector Weights

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



SERS U.S. Large Company Index Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	\$40,998,662	4.3%	4.14%	1061.55	25.67	1.47%	14.15%
Apple Inc	Information Technology	\$36,746,237	3.8%	13.60%	1012.16	17.60	1.38%	9.68%
Amazon.Com	Consumer Discretionary	\$27,845,767	2.9%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	\$16,543,798	1.7%	(7.73)%	428.41	20.49	0.00%	20.05%
Berkshire Hathaway Inc Del Cl B New	Financials	\$15,736,013	1.6%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	\$14,552,045	1.5%	6.01%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	\$14,240,640	1.5%	12.78%	423.41	22.55	0.00%	12.56%
Alphabet Inc Cl A	Communication Services	\$14,126,809	1.5%	12.78%	365.77	22.61	0.00%	12.56%
Johnson & Johnson	Health Care	\$13,194,155	1.4%	(6.42)%	341.46	14.39	2.94%	6.54%
Procter & Gamble Co	Consumer Staples	\$12,014,854	1.3%	14.17%	311.28	25.22	2.40%	7.09%

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
Kla-Tencor Corp	Information Technology	\$995,721	0.1%	35.67%	25.27	16.19	1.88%	14.57%
Western Digital Corp	Information Technology	\$670,084	0.1%	25.43%	17.73	15.41	3.35%	(13.80)%
Target Corp	Consumer Discretionary	\$2,113,246	0.2%	24.39%	54.62	16.58	2.47%	9.35%
Lam Research Corp	Information Technology	\$1,300,345	0.1%	23.65%	33.47	15.66	1.99%	(0.06)%
Newell Brands Inc	Consumer Discretionary	\$277,818	0.0%	23.10%	7.93	11.87	4.91%	(14.00)%
D.R. Horton	Consumer Discretionary	\$692,003	0.1%	22.60%	19.49	11.47	1.14%	13.00%
Hunt (J.B.) Transport	Industrials	\$371,369	0.0%	21.36%	11.81	18.66	0.94%	8.91%
Kellogg Co	Consumer Staples	\$614,404	0.1%	21.21%	21.92	16.14	3.54%	0.75%
Sherwin-Williams Co	Materials	\$1,742,364	0.2%	20.24%	50.73	23.52	0.82%	14.30%
Kroger Co	Consumer Staples	\$805,450	0.1%	19.61%	20.67	11.31	2.48%	5.20%

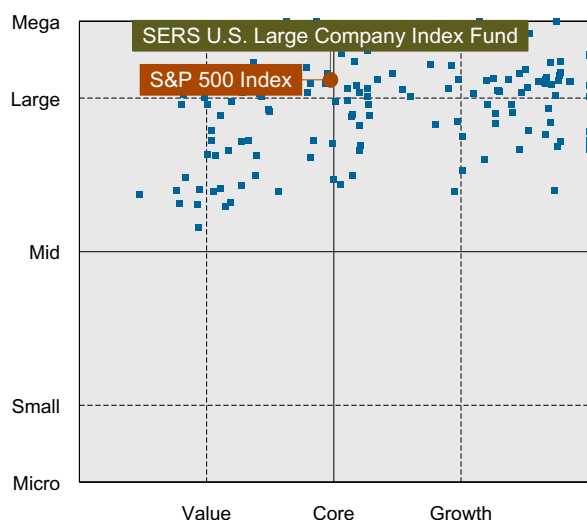
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nektar Therapeutics	Health Care	\$120,201	0.0%	(48.81)%	3.19	(7.00)	0.00%	-
Dxc Technology Co	Information Technology	\$304,193	0.0%	(46.15)%	7.73	3.77	2.85%	6.69%
Concho Res Inc	Energy	\$527,210	0.1%	(34.08)%	13.65	14.98	0.74%	12.03%
Align Technology Inc	Health Care	\$506,048	0.1%	(33.90)%	14.45	29.80	0.00%	19.50%
Abiomed Inc	Health Care	\$305,767	0.0%	(31.71)%	8.07	34.28	0.00%	24.20%
Ulta Salon Cosmetics & Frag I	Consumer Discretionary	\$566,289	0.1%	(27.74)%	14.75	19.46	0.00%	10.22%
Netflix Inc	Communication Services	\$4,524,070	0.5%	(27.14)%	117.17	52.93	0.00%	47.60%
Macys Inc	Consumer Discretionary	\$188,804	0.0%	(25.98)%	4.80	5.79	9.72%	(14.79)%
Alexion Pharmaceuticals Inc	Health Care	\$845,724	0.1%	(25.23)%	21.96	9.13	0.00%	17.18%
L Brands Inc	Consumer Discretionary	\$170,801	0.0%	(23.78)%	5.41	7.98	6.13%	6.10%

Historical Holdings Based Style Analysis SERS U.S. Large Company Index Fund For Three Years Ended September 30, 2019

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

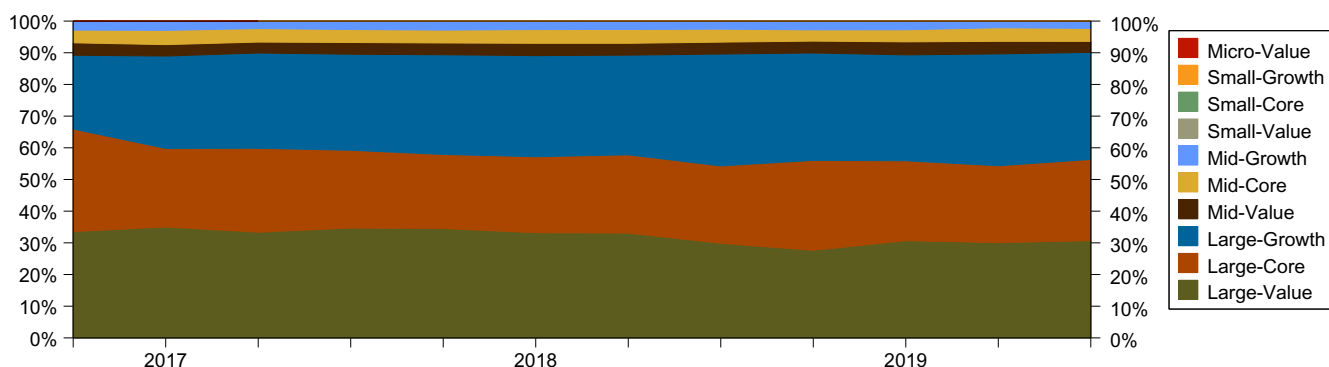
Average Style Map vs Callan Lg Cap Broad MF Holdings for Three Years Ended September 30, 2019



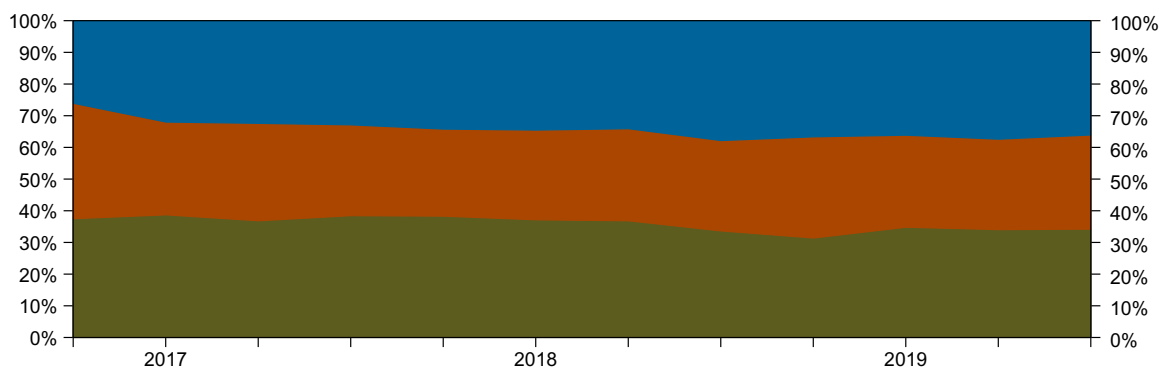
Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2019

	32.2% (105)	25.7% (93)	31.6% (86)	89.5% (284)
Large	32.1% (105)	25.7% (93)	31.7% (87)	89.5% (285)
Mid	3.8% (83)	4.1% (83)	2.6% (49)	10.5% (215)
	3.8% (83)	4.1% (83)	2.6% (49)	10.4% (215)
Small	0.0% (2)	0.0% (0)	0.0% (1)	0.0% (3)
	0.0% (2)	0.0% (0)	0.0% (1)	0.1% (3)
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	36.0% (190)	29.8% (176)	34.2% (136)	100.0% (502)
	35.9% (190)	29.8% (176)	34.2% (137)	100.0% (503)
	Value	Core	Growth	Total

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



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



SERS U.S. SMID Company Idx Fund Period Ended September 30, 2019

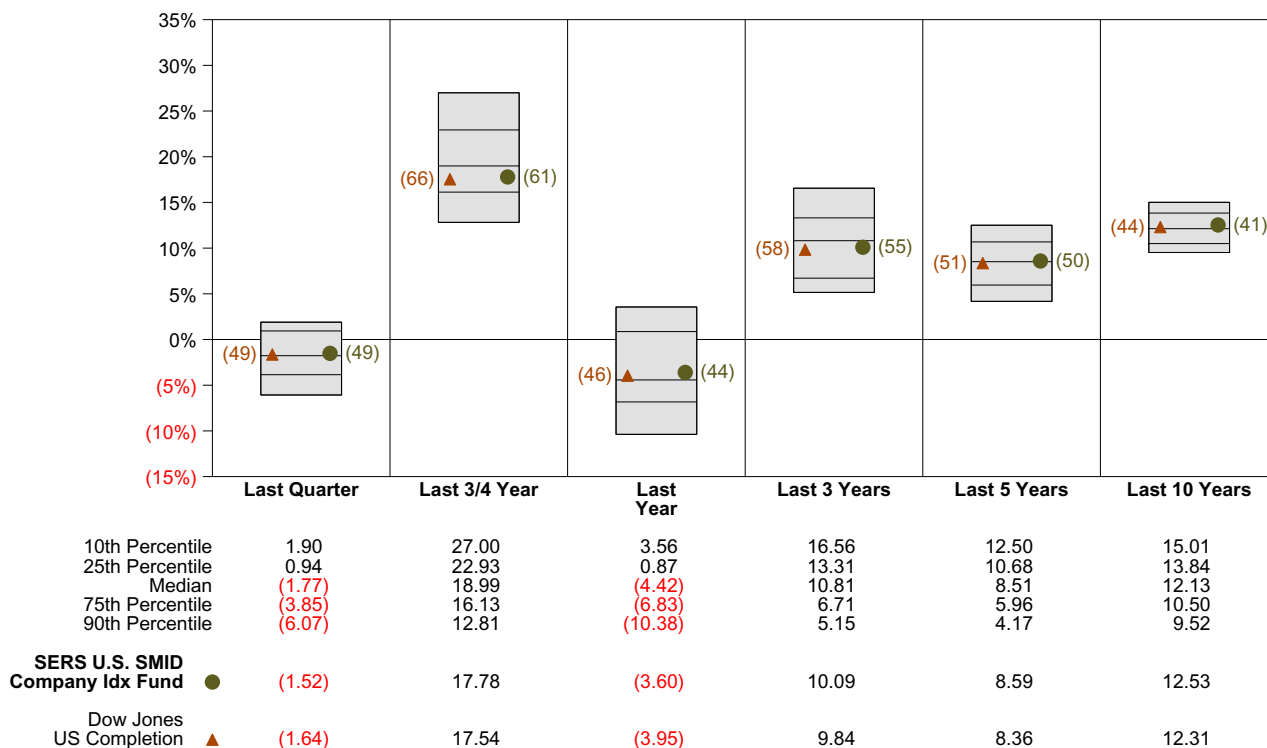
Investment Philosophy

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

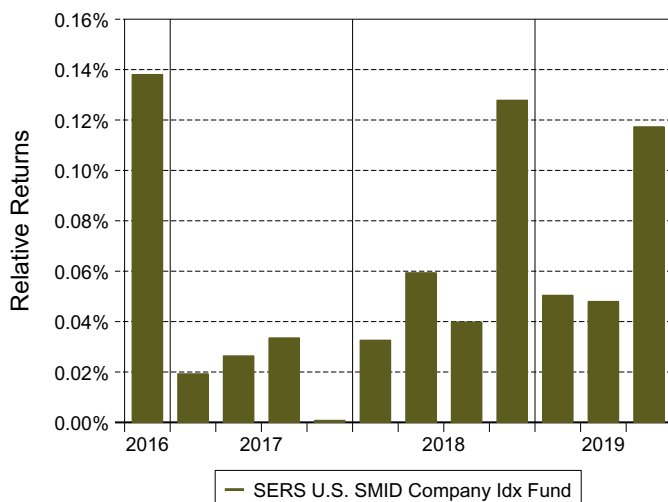
Quarterly Summary and Highlights

- SERS U.S. SMID Company Idx Fund's portfolio posted a (1.52)% return for the quarter placing it in the 49 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 44 percentile for the last year.
- SERS U.S. SMID Company Idx Fund's portfolio outperformed the Dow Jones US Completion by 0.12% for the quarter and outperformed the Dow Jones US Completion for the year by 0.35%.

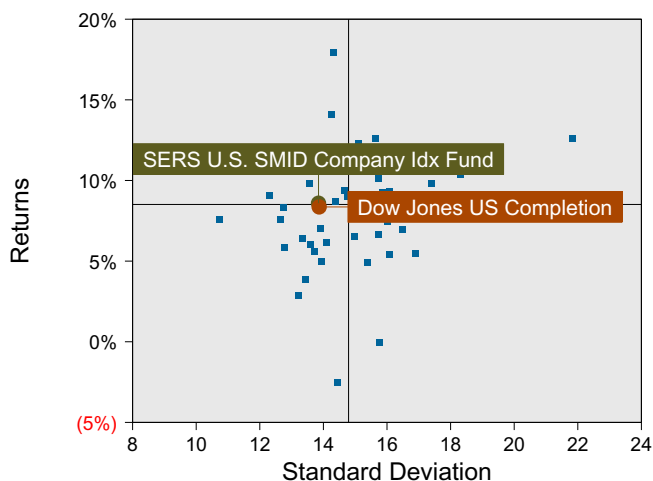
Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



Relative Return vs Dow Jones US Completion



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

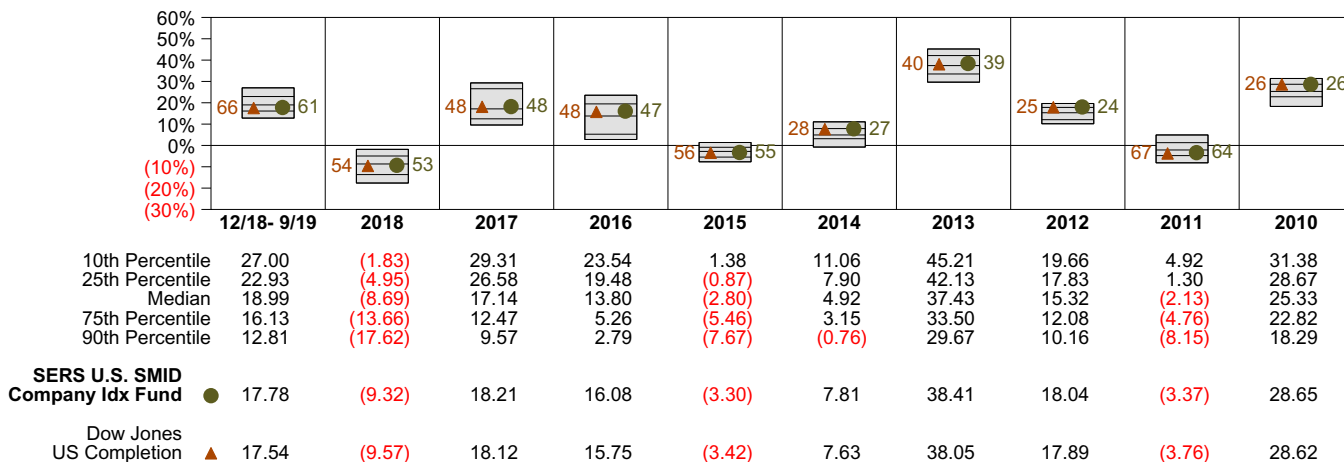


SERS U.S. SMID Company Idx Fund Return Analysis Summary

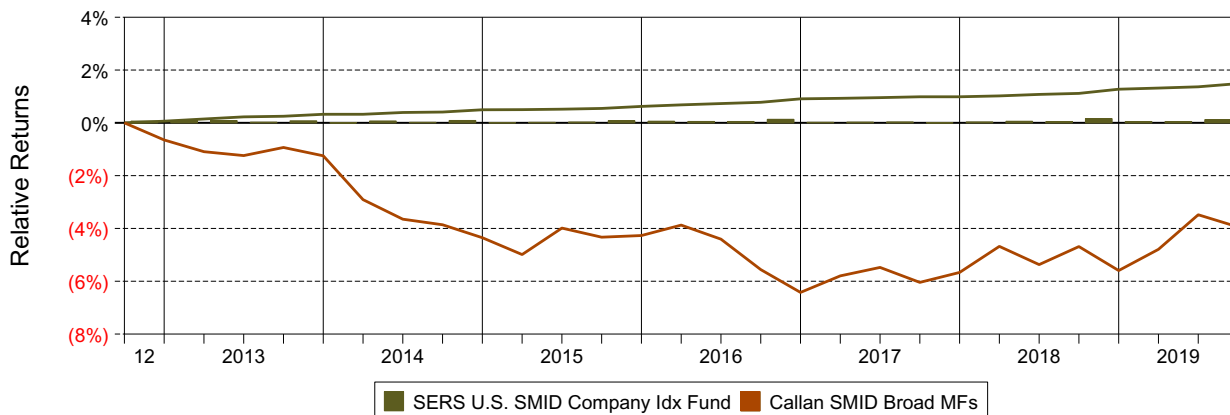
Return Analysis

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

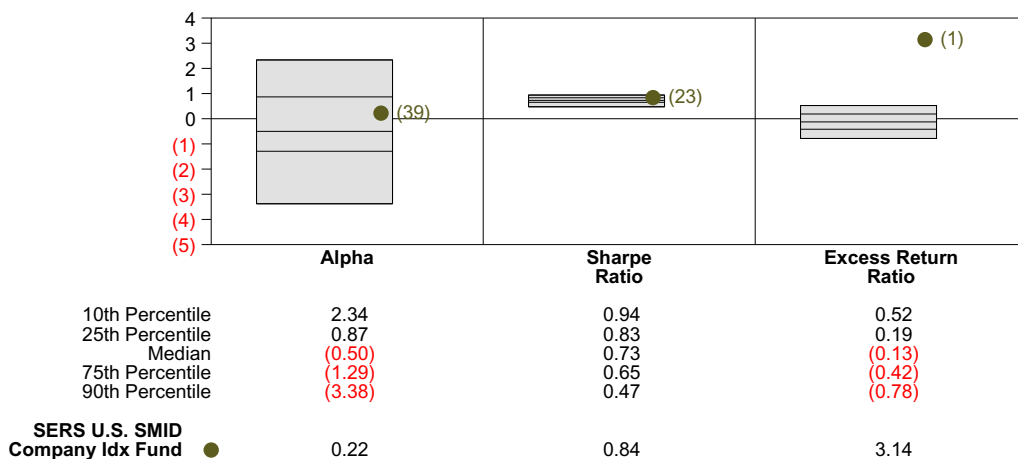
Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



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, 2019

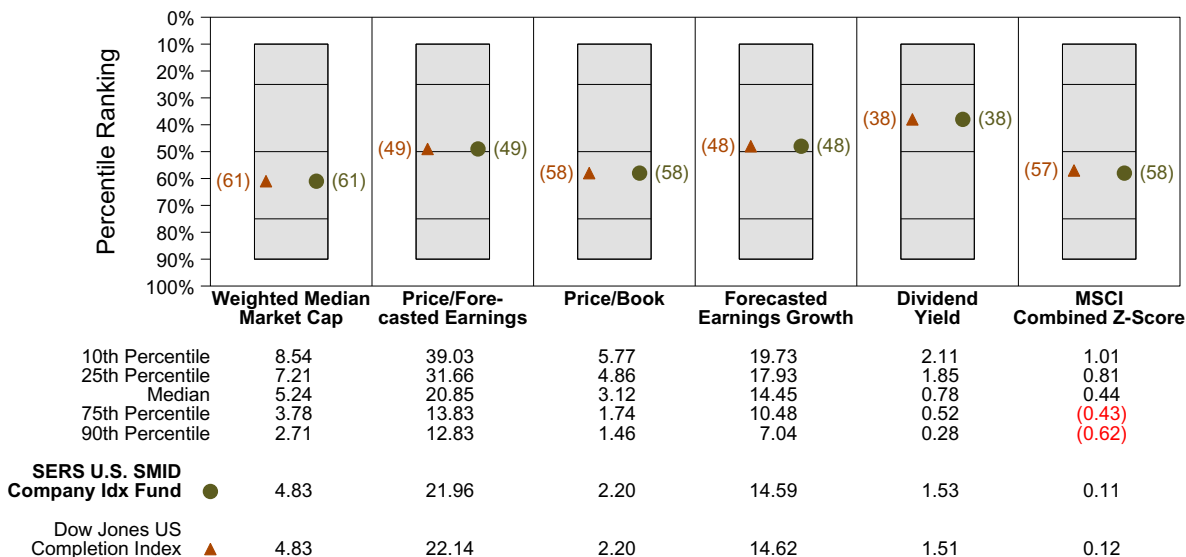


SERS U.S. SMID Company Idx Fund Equity Characteristics Analysis Summary

Portfolio Characteristics

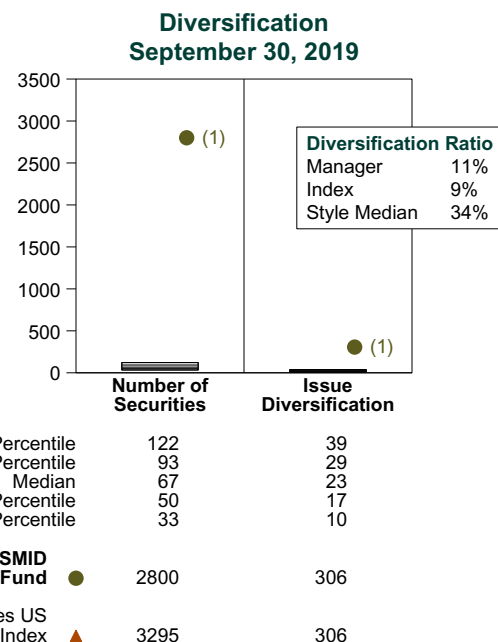
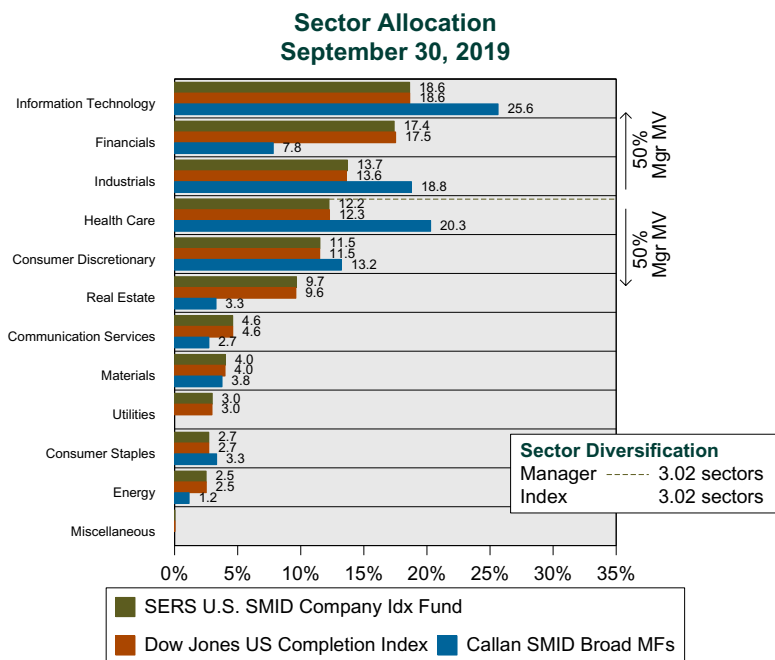
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings Rankings Against Callan Small/MidCap Broad Mutual Funds as of September 30, 2019



Sector Weights

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



SERS U.S. SMID Company Idx Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Servicenow Inc	Information Technology	\$3,752,156	1.0%	(7.55)%	47.60	63.08	0.00%	33.35%
Tesla Mtrs Inc	Consumer Discretionary	\$2,686,029	0.7%	7.79%	43.15	115.30	0.00%	-
Blackstone Group Inc Com Cl A	Financials	\$2,545,621	0.7%	11.02%	32.30	16.98	5.43%	19.43%
Workday Inc Cl A	Information Technology	\$2,172,585	0.6%	(17.33)%	27.87	83.11	0.00%	28.30%
Costar Group Inc	Industrials	\$1,710,776	0.4%	7.06%	21.68	51.20	0.00%	41.67%
Lululemon Athletica Inc	Consumer Discretionary	\$1,696,526	0.4%	6.84%	23.71	36.14	0.00%	19.25%
Square Inc Cl A	Information Technology	\$1,675,133	0.4%	(14.59)%	21.23	60.68	0.00%	48.60%
Veeva Sys Inc Cl A Com	Health Care	\$1,565,611	0.4%	(5.81)%	20.09	65.73	0.00%	19.00%
Las Vegas Sands Corp	Consumer Discretionary	\$1,549,816	0.4%	(0.98)%	44.46	17.46	5.33%	2.50%
Palo Alto Networks Inc	Information Technology	\$1,543,419	0.4%	0.03%	19.77	38.70	0.00%	16.75%

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
Durect Corp	Health Care	\$31,957	0.0%	182.21%	0.35	(14.60)	0.00%	-
Cim Coml Tr Corp	Financials	\$1,135	0.0%	177.09%	0.23	0.71	1.48%	159.32%
Impac Mtg Hldgs Inc	Financials	\$10,520	0.0%	153.87%	0.17	35.77	0.00%	(40.54)%
Hovnanian Enterprises Inc Cl A New	Consumer Discretionary	\$10,009	0.0%	153.29%	0.10	11.48	0.00%	(32.61)%
Stage Stores Inc	Consumer Discretionary	\$4,344	0.0%	144.16%	0.05	(0.68)	10.64%	-
Xpel Inc	Consumer Staples	\$11,555	0.0%	118.15%	0.33	24.95	0.00%	-
Atlanticus Hldgs Corp	Financials	\$10,922	0.0%	106.17%	0.13	3.51	0.00%	-
Nextcure	Health Care	\$16,965	0.0%	105.94%	0.70	(15.93)	0.00%	-
Seachange Intl Inc	Information Technology	\$14,077	0.0%	101.40%	0.11	20.87	0.00%	(23.59)%
Dova Pharmaceuticals Inc	Health Care	\$36,967	0.0%	98.23%	0.81	(14.41)	0.00%	-

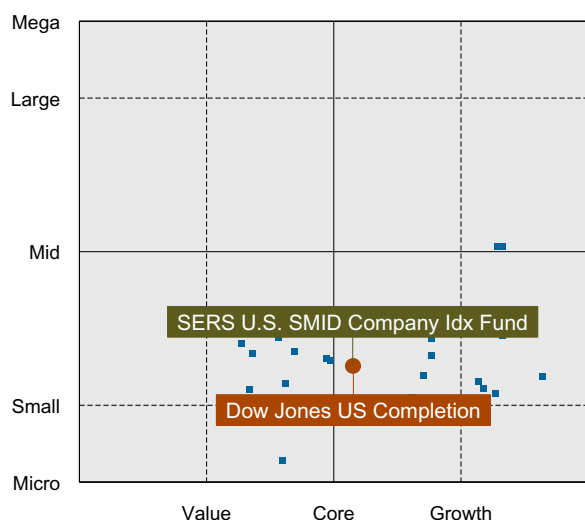
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Genocea Biosciences Inc	Health Care	\$986	0.0%	(90.75)%	0.08	(1.55)	0.00%	-
Tocagen Inc	Health Care	\$1,080	0.0%	(90.09)%	0.02	(0.34)	0.00%	-
Advaxis Inc	Health Care	\$67	0.0%	(87.27)%	0.01	(0.16)	0.00%	-
Waitr Hldgs Inc	Consumer Discretionary	\$5,971	0.0%	(79.57)%	0.10	(1.44)	0.00%	(0.46)%
Mcdermott Intl Inc	Energy	\$29,527	0.0%	(79.09)%	0.37	2.20	0.00%	(5.26)%
Synlogic Inc	Health Care	\$2,860	0.0%	(74.84)%	0.07	(1.21)	0.00%	-
Mallinckrodt	Health Care	\$16,555	0.0%	(73.75)%	0.20	0.31	0.00%	(9.60)%
Clovis Oncology Inc	Health Care	\$17,317	0.0%	(73.57)%	0.21	(0.63)	0.00%	33.70%
Bloom Energy Corp Com Cl A	Industrials	\$6,285	0.0%	(73.51)%	0.23	(13.49)	0.00%	25.00%
Chaparral Energy Inc Com Cl A	Energy	\$3,313	0.0%	(71.55)%	0.06	(6.91)	0.00%	-

Historical Holdings Based Style Analysis SERS U.S. SMID Company Idx Fund For Three Years Ended September 30, 2019

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

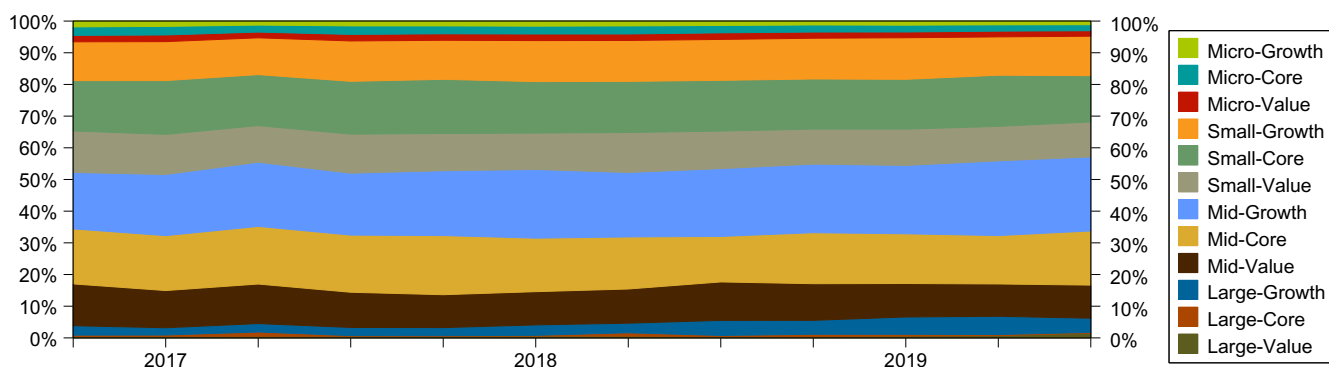
**Average Style Map vs Callan SMID Broad MFs
Holdings for Three Years Ended September 30, 2019**



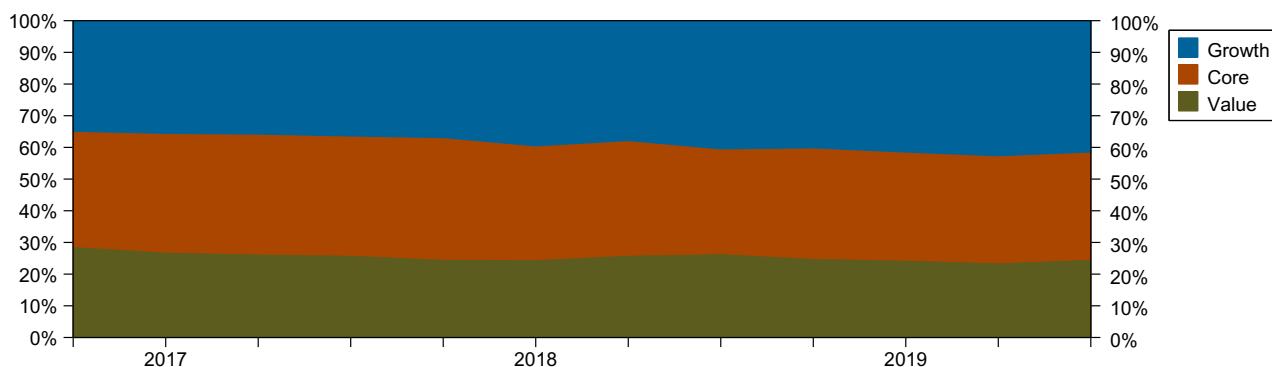
**Average Style Exposure Matrix
Holdings for Three Years Ended September 30, 2019**

	0.6% (2)	0.5% (3)	3.7% (8)	4.8% (13)
Large	0.6% (2)	0.4% (2)	3.6% (8)	4.7% (12)
Mid	11.3% (94)	16.8% (136)	20.9% (153)	49.0% (383)
Small	11.8% (327)	16.1% (481)	12.5% (376)	40.5% (1184)
Micro	2.0% (435)	2.4% (652)	1.4% (267)	5.8% (1354)
	1.9% (523)	2.5% (869)	1.4% (304)	5.8% (1696)
Total	25.6% (858)	35.8% (1272)	38.6% (804)	100.0% (2934)
	25.5% (947)	35.9% (1492)	38.6% (843)	100.0% (3282)
	Value	Core	Growth	Total

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



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



SERS International Company Index Fund

Period Ended September 30, 2019

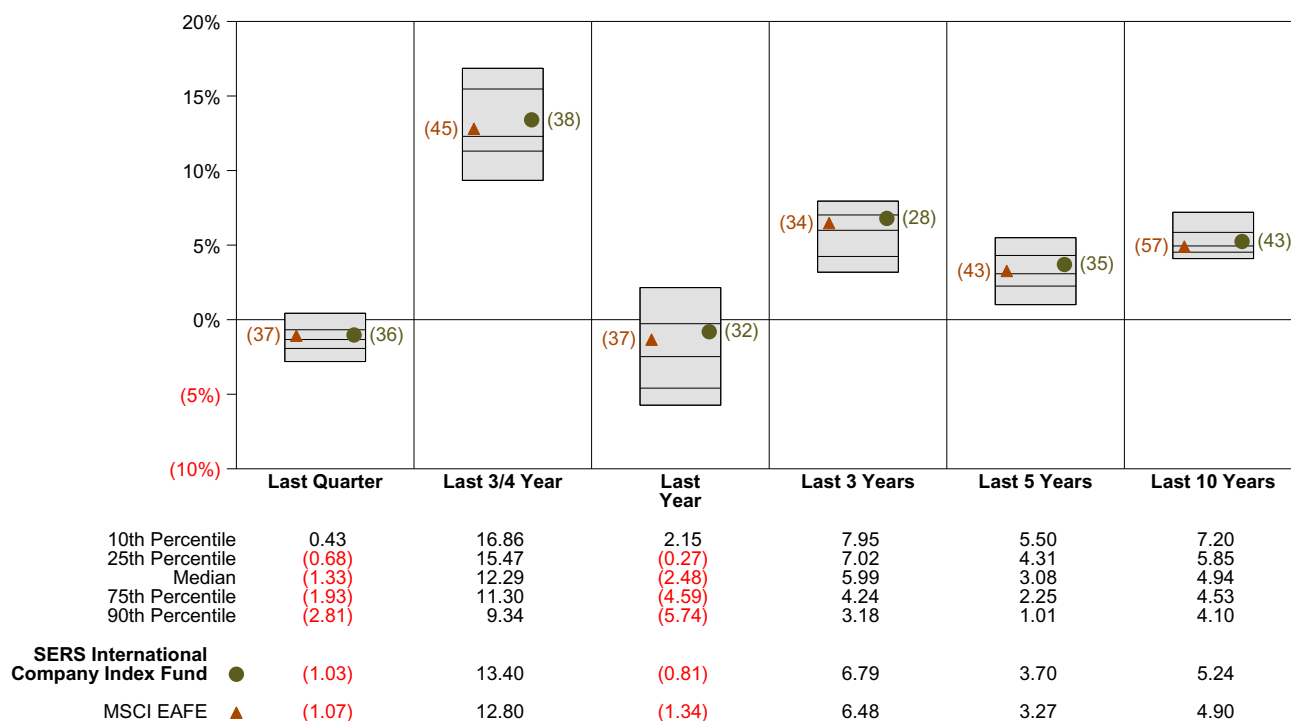
Investment Philosophy

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

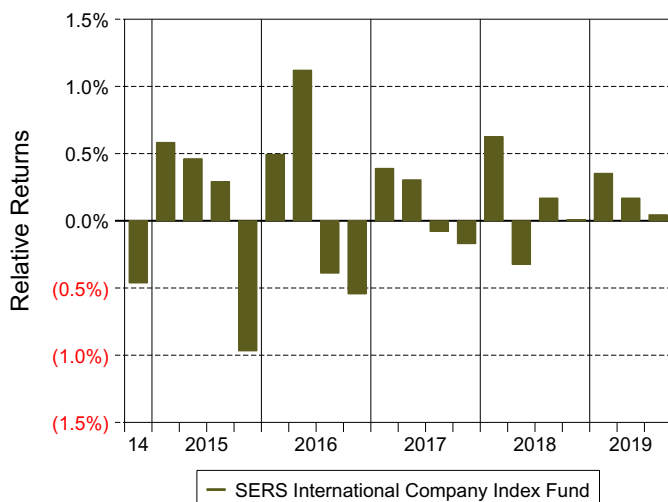
Quarterly Summary and Highlights

- SERS International Company Index Fund's portfolio posted a (1.03)% return for the quarter placing it in the 36 percentile of the Callan Intl Eq Developed Mkts MFs group for the quarter and in the 32 percentile for the last year.
- SERS International Company Index Fund's portfolio outperformed the MSCI EAFE by 0.04% for the quarter and outperformed the MSCI EAFE for the year by 0.53%.

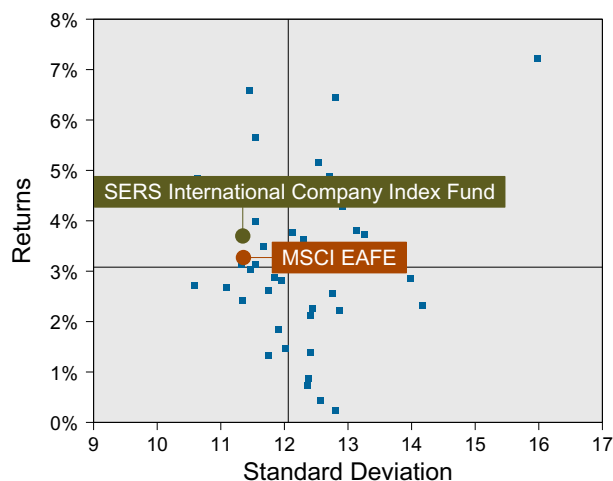
Performance vs Callan Intl Eq Developed Mkts MFs (Institutional Net)



Relative Return vs MSCI EAFE



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

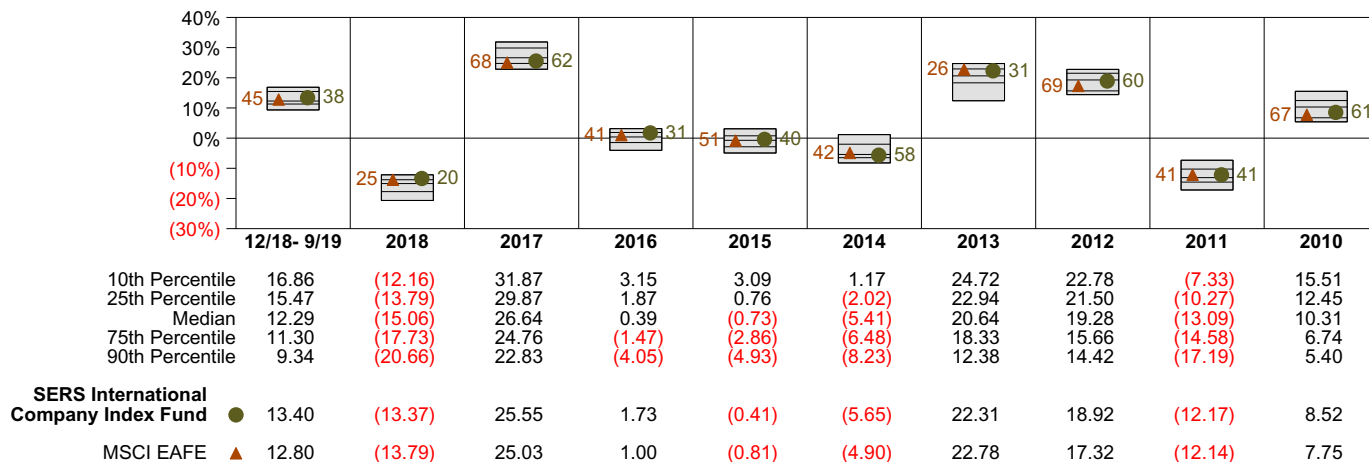


SERS International Company Index Fund Return Analysis Summary

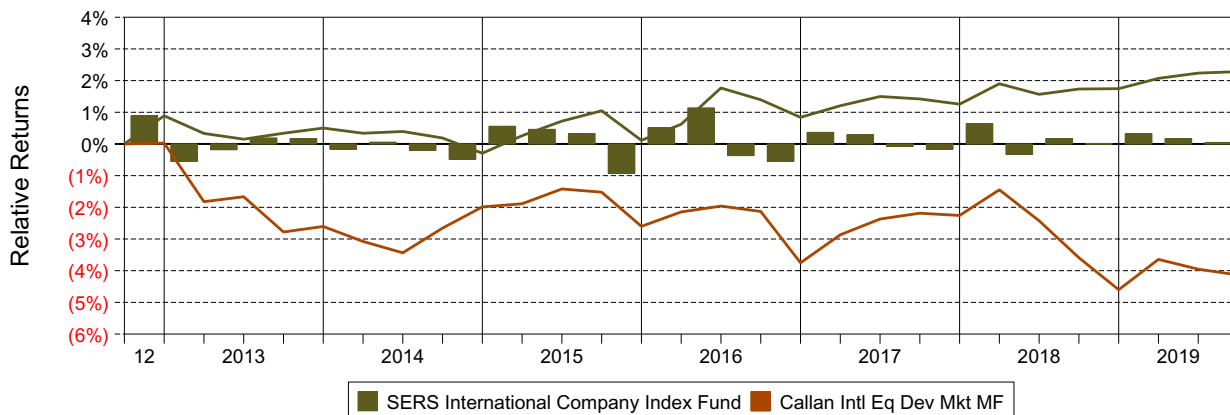
Return Analysis

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

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

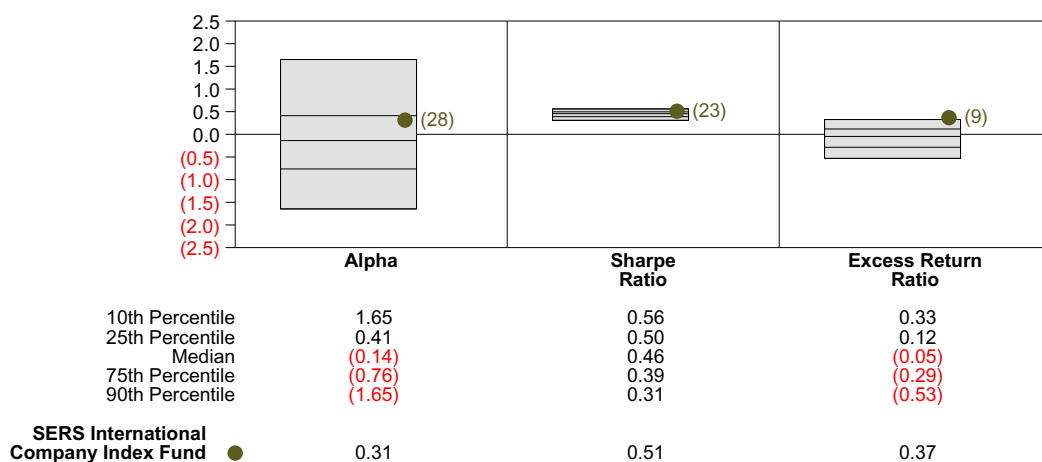


Cumulative and Quarterly Relative Return vs MSCI EAFE



Risk Adjusted Return Measures vs MSCI EAFE

Rankings Against Callan Intl Eq Developed Mkts MFs (Institutional Net) Seven Years Ended September 30, 2019



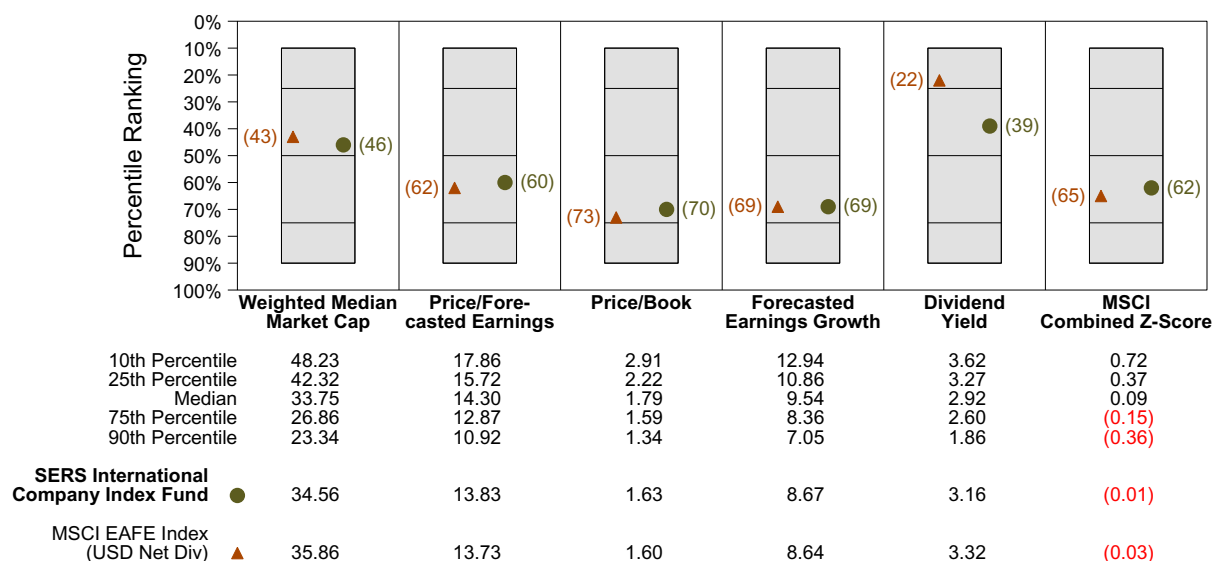
SERS International Company Index Fund

Equity Characteristics Analysis Summary

Portfolio Characteristics

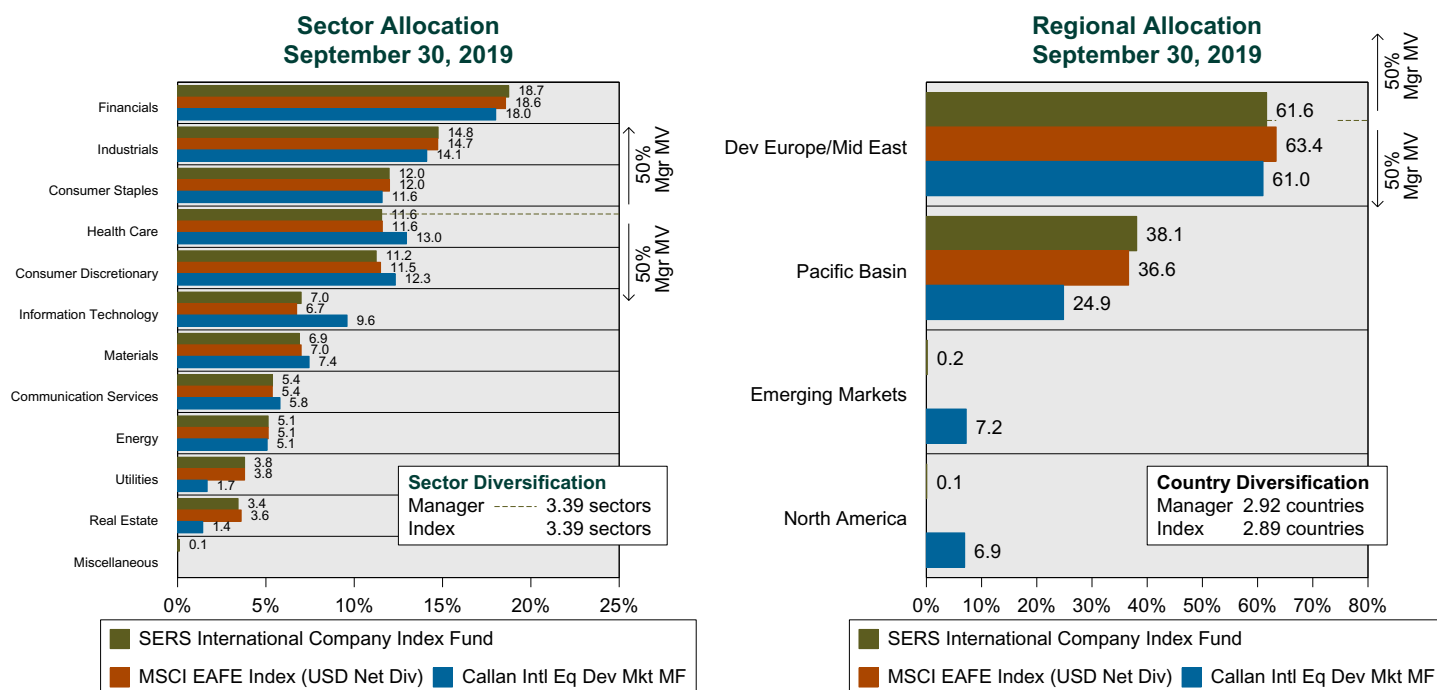
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

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



Sector Weights

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



Country Allocation

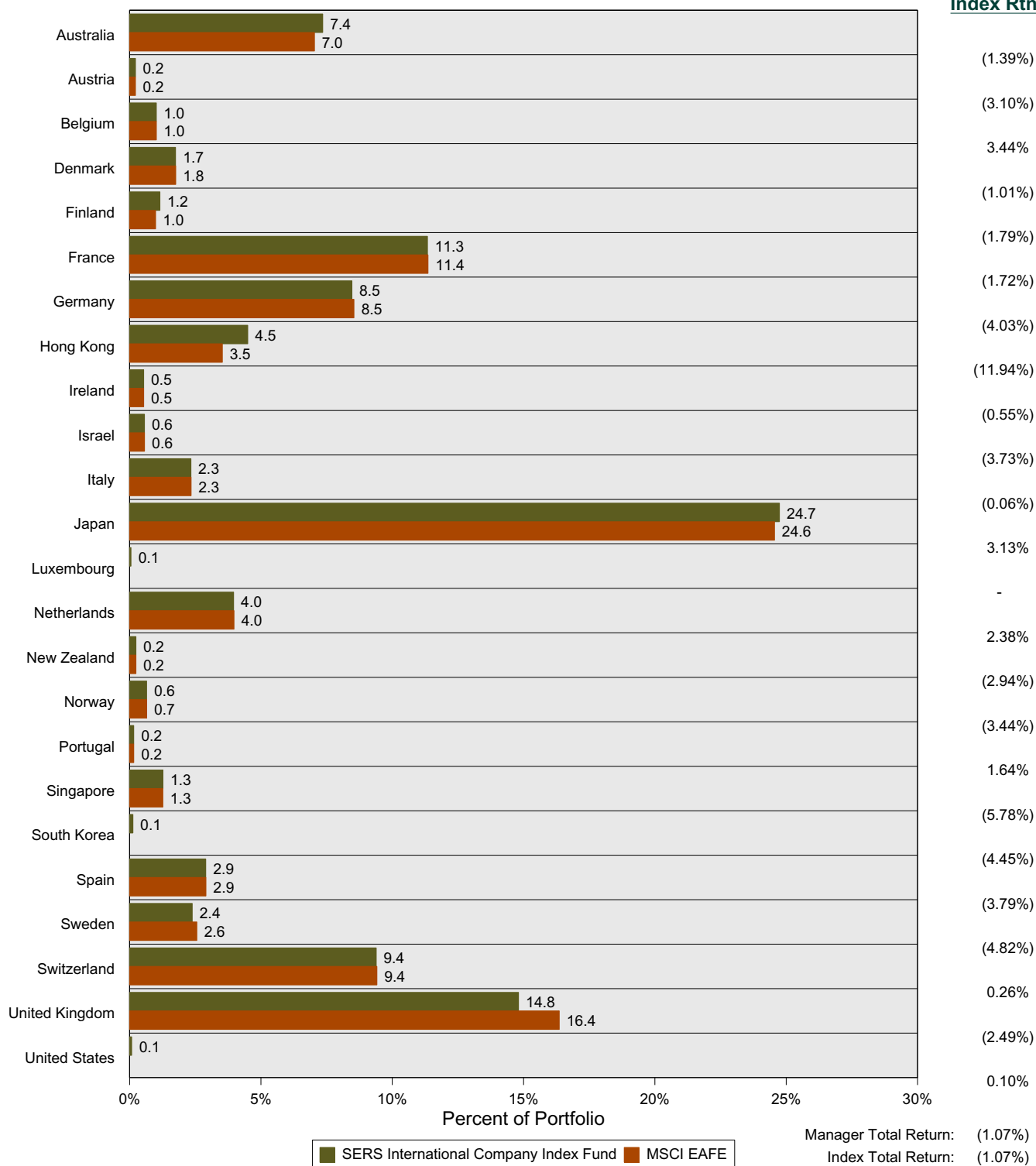
SERS International Company Index Fund VS MSCI EAFE Index (USD Net Div)

Country Allocation

The chart below contrasts the portfolio's country allocation with that of the index as of September 30, 2019. This chart is useful because large deviations in country allocation relative to the index are often good predictors of tracking error in the subsequent quarter. To the extent that the portfolio allocation is similar to the index, the portfolio should experience more "index-like" performance. In order to illustrate the performance effect on the portfolio and index of these country allocations, the individual index country returns are also shown.

Country Weights as of September 30, 2019

Index Rtns



SERS International Company Index Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nestle S A Shs Nom New	Consumer Staples	\$3,786,436	2.4%	4.76%	323.16	23.06	2.26%	8.73%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	\$2,329,283	1.5%	3.40%	204.64	14.87	2.86%	6.00%
Novartis	Health Care	\$2,122,127	1.3%	(5.14)%	219.34	15.65	3.29%	6.66%
Hsbc Holdings (Gb)	Financials	\$1,772,789	1.1%	(6.65)%	155.94	10.62	6.37%	1.52%
Toyota Motor Corp	Consumer Discretionary	\$1,760,039	1.1%	7.57%	217.87	8.93	3.05%	12.29%
Bp Plc Shs	Energy	\$1,471,692	0.9%	(7.45)%	129.88	11.30	6.24%	10.50%
Royal Dutch Shell A Shs	Energy	\$1,455,309	0.9%	(8.77)%	124.44	10.71	6.21%	12.32%
Total Sa Act	Energy	\$1,434,154	0.9%	(5.68)%	139.22	9.81	5.30%	11.57%
Astrazeneca Plc Ord	Health Care	\$1,335,613	0.8%	10.32%	117.38	21.68	2.96%	15.70%
Sap Se Shs	Information Technology	\$1,315,357	0.8%	(14.09)%	144.78	20.86	1.39%	12.70%

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
Banco Espirito Santo E Comer Ord	Financials	\$7	0.0%	100.00%	0.00	-	0.00%	-
Advantest Corp Ord	Information Technology	\$101,004	0.1%	60.63%	8.82	23.08	1.93%	(21.81)%
Casino Guichard Perrach Et C Act	Consumer Staples	\$29,677	0.0%	39.74%	5.18	14.07	7.12%	12.28%
Tokyo Electron	Information Technology	\$342,055	0.2%	36.85%	31.44	18.45	3.69%	(8.70)%
Nippon Paint Hldgs Co Ltd Shs	Materials	\$86,577	0.1%	33.79%	16.89	37.51	0.80%	10.40%
Renesas Electronics Corp Shs	Information Technology	\$55,697	0.0%	33.33%	11.07	23.81	0.00%	15.00%
So-Net M3	Health Care	\$121,989	0.1%	31.73%	16.34	67.26	0.27%	13.29%
Lend Lease Corp Ltd Ord	Real Estate	\$77,116	0.0%	30.83%	6.69	13.29	2.68%	5.33%
London Stk Exchange Grp Plc Ord	Financials	\$323,010	0.2%	29.36%	31.50	33.47	0.87%	12.10%
Bandai Namco Hldgs Inc Shs	Consumer Discretionary	\$142,396	0.1%	28.70%	13.82	21.22	2.15%	8.10%

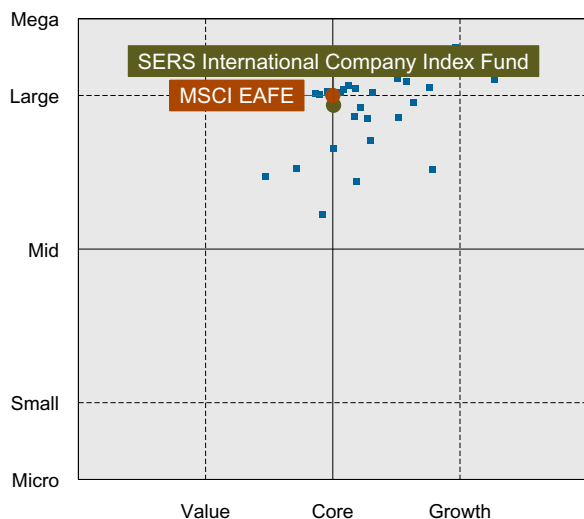
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Yangzijiang Shipbu	Industrials	\$19,471	0.0%	(38.61)%	2.76	6.09	5.21%	(6.28)%
Cimic Group Ltd	Industrials	\$24,648	0.0%	(31.70)%	6.88	12.19	4.99%	(5.97)%
Ipsen Shs	Health Care	\$40,594	0.0%	(30.51)%	7.96	11.77	1.15%	10.94%
Evraz Plc	Materials	\$33,185	0.0%	(28.00)%	8.37	5.75	17.63%	153.22%
Konica Minolta Inc Shs	Information Technology	\$37,101	0.0%	(27.16)%	3.50	9.76	3.99%	0.60%
Teva Pharmaceutical Inds Ltd ADR	Health Care	\$86,554	0.1%	(25.46)%	7.52	(1.98)	0.00%	(7.60)%
Kerry Properties Ltd Ord	Real Estate	\$22,735	0.0%	(25.45)%	4.49	6.30	5.59%	12.79%
Yamato Holdings Co Ltd Ord	Industrials	\$53,356	0.0%	(25.35)%	6.19	16.48	1.72%	8.16%
Pacific Ports	Industrials	\$28,242	0.0%	(24.67)%	6.06	10.83	4.78%	1.52%
Imerys Ord	Materials	\$16,115	0.0%	(24.27)%	3.20	8.58	5.83%	3.00%

Historical Holdings Based Style Analysis SERS International Company Index Fund For Three Years Ended September 30, 2019

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

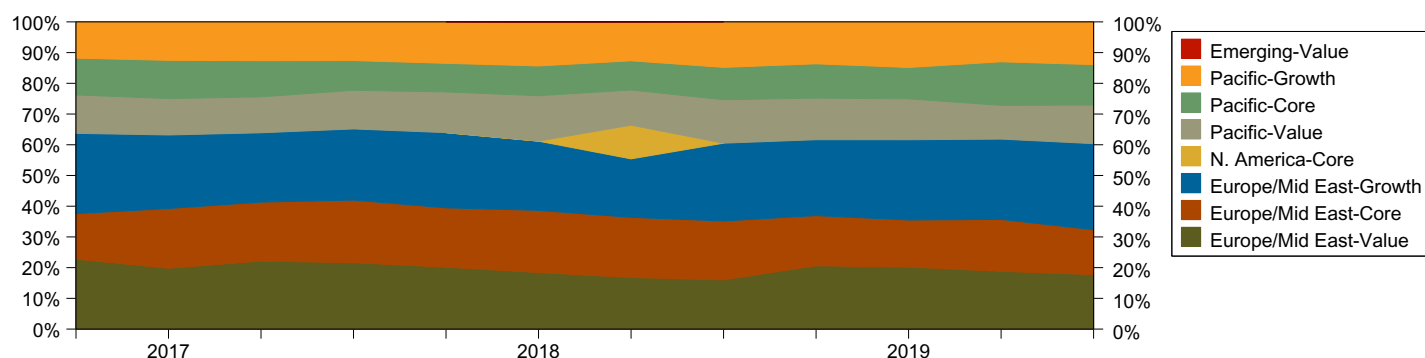
Average Style Map vs Callan Intl Eq Dev Mkt MF Holdings for Three Years Ended September 30, 2019



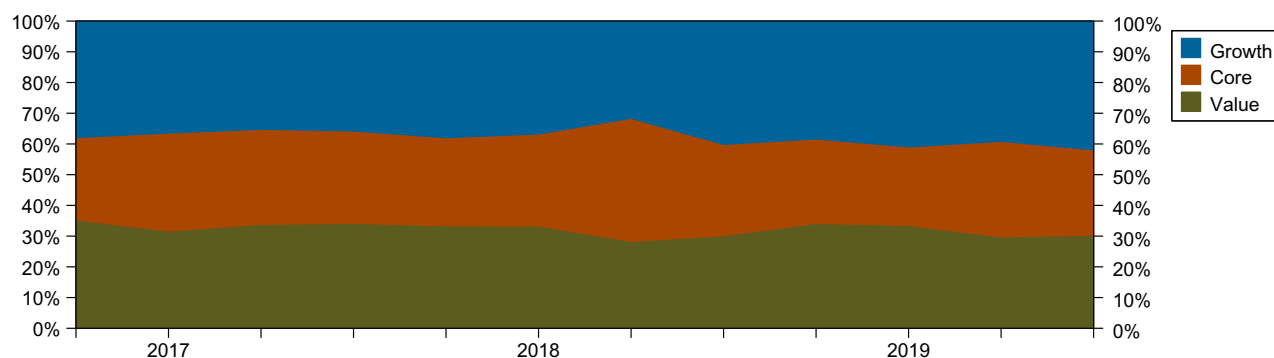
Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2019

Europe/ Mid East	19.6% (128)	17.9% (128)	24.3% (179)	61.9% (435)
	19.9% (134)	18.2% (130)	24.8% (189)	62.9% (453)
N. America	0.0% (0)	0.9% (0)	0.0% (0)	0.9% (0)
	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Pacific	12.7% (144)	11.1% (151)	13.3% (174)	37.2% (469)
	13.0% (145)	11.0% (150)	13.1% (175)	37.1% (470)
Emerging	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total	32.3% (272)	30.0% (279)	37.7% (353)	100.0% (904)
	33.0% (279)	29.1% (280)	37.9% (364)	100.0% (923)
	Value	Core	Growth	Total

SERS International Company Index Fund Historical Region/Style Exposures



SERS International Company Index Fund Historical Style Only Exposures



SERS Short Term Investment Fund Period Ended September 30, 2019

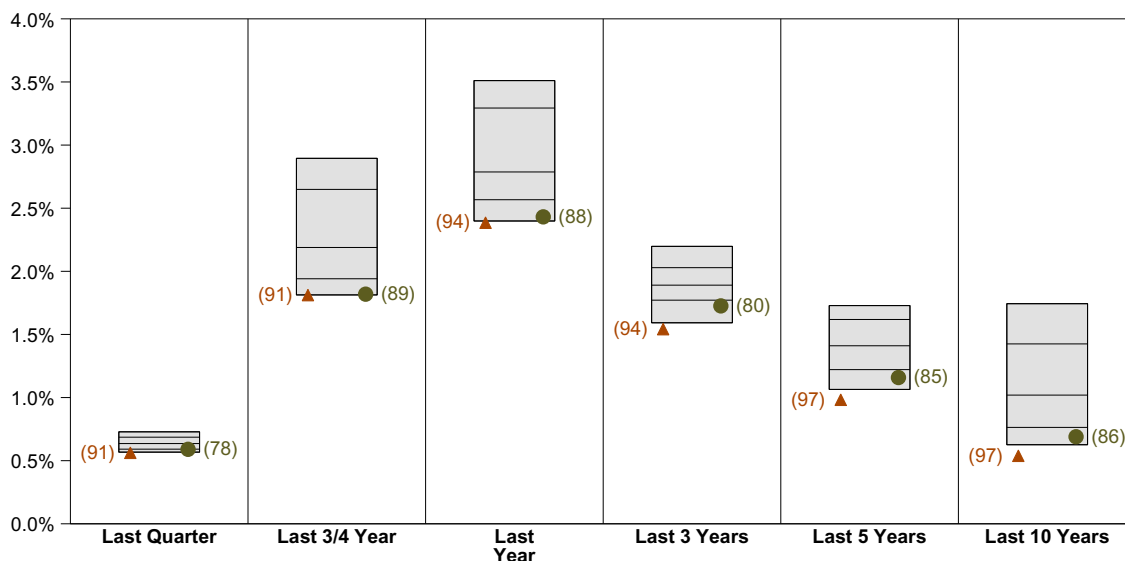
Investment Philosophy

The Short Term Investment Fund seeks to achieve the highest current income consistent with maintaining liquidity and safety of principal. This fund is managed by the Pennsylvania State Treasurer. It is compared against the Callan Cash database: a group that contains STIF, enhanced cash, and money market funds.

Quarterly Summary and Highlights

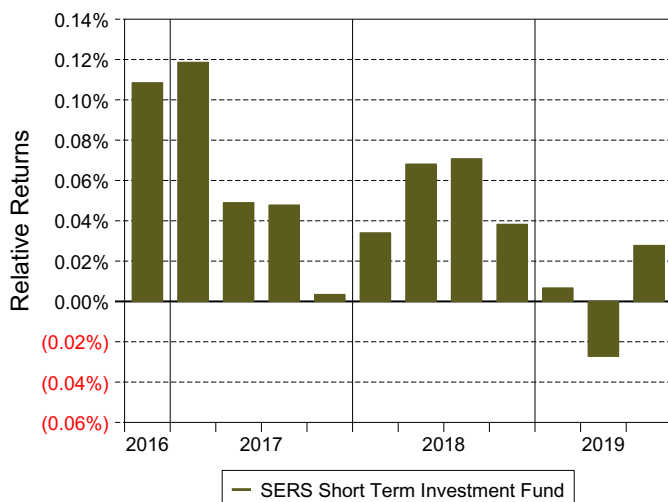
- SERS Short Term Investment Fund's portfolio posted a 0.59% return for the quarter placing it in the 78 percentile of the Callan Cash Database group for the quarter and in the 88 percentile for the last year.
- SERS Short Term Investment Fund's portfolio outperformed the 3-month Treasury Bill by 0.03% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.05%.

Performance vs Callan Cash Database (Gross)

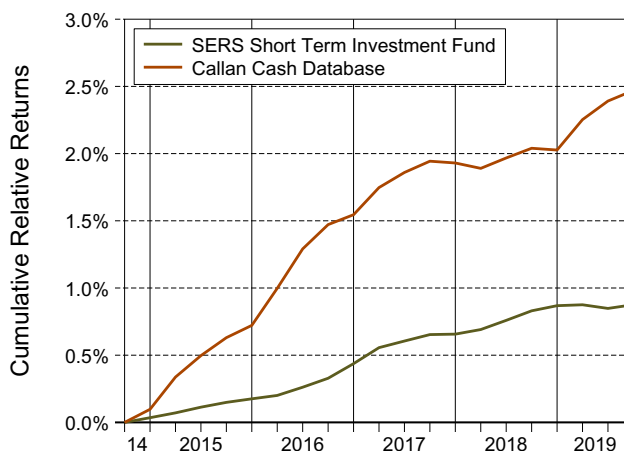


10th Percentile	0.73	2.90	3.51	2.20	1.73	1.74
25th Percentile	0.69	2.65	3.29	2.03	1.62	1.42
Median	0.64	2.19	2.79	1.89	1.41	1.02
75th Percentile	0.59	1.94	2.57	1.77	1.22	0.76
90th Percentile	0.57	1.81	2.40	1.59	1.06	0.63
SERS Short Term Investment Fund	● 0.59	1.82	2.43	1.73	1.16	0.69
3-month Treasury Bill	▲ 0.56	1.81	2.39	1.54	0.98	0.54

Relative Return vs 3-month Treasury Bill



Cumulative Returns vs 3-month Treasury Bill



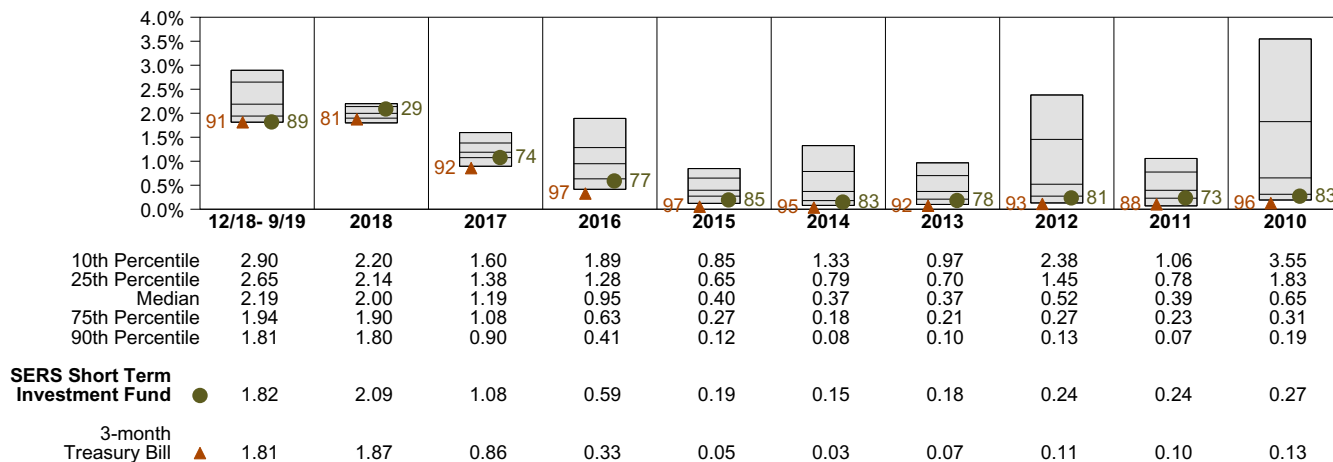
SERS Short Term Investment Fund Return Analysis Summary

Return Analysis

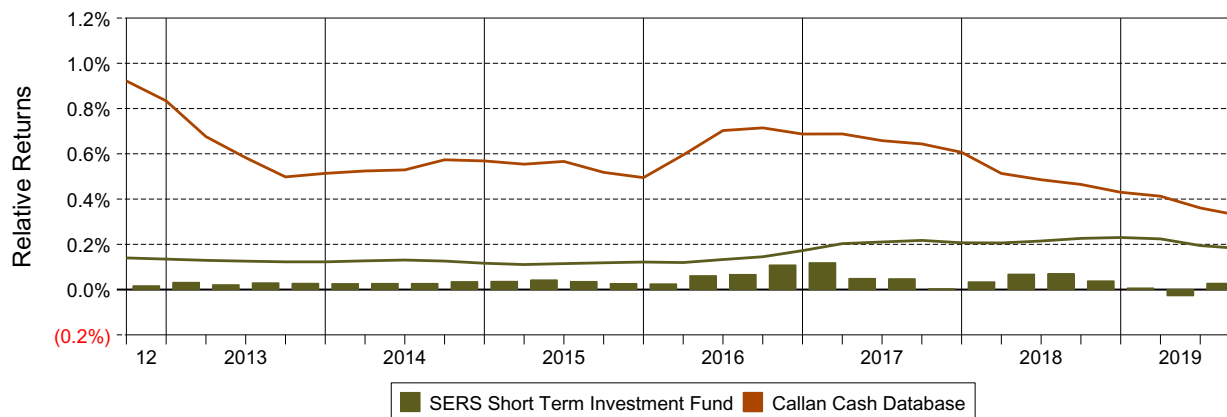
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and 12 quarter rolling manager returns versus the appropriate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

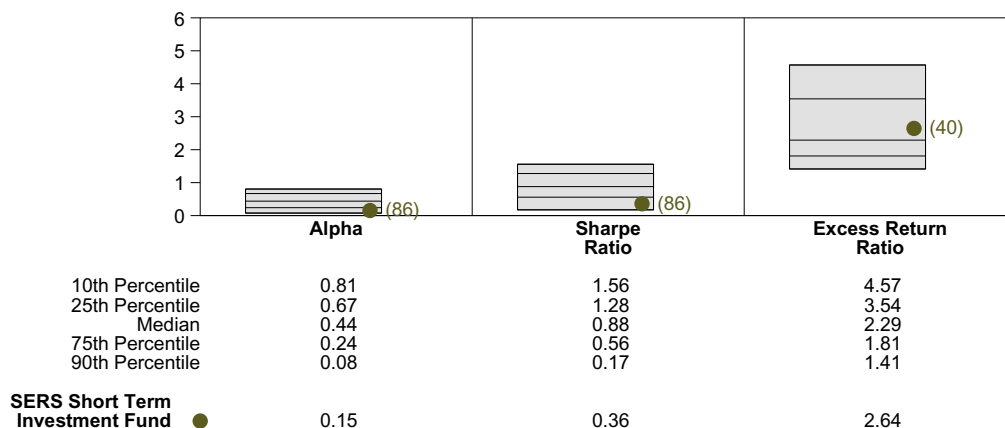
Performance vs Callan Cash Database (Gross)



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, 2019



SERS Stable Value Fund Period Ended September 30, 2019

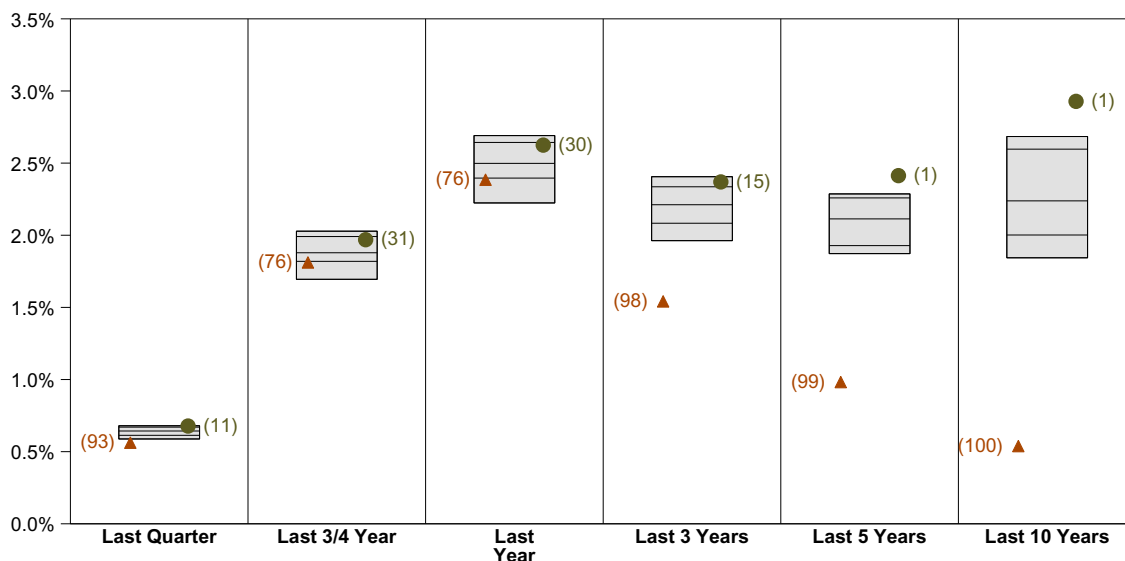
Investment Philosophy

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

Quarterly Summary and Highlights

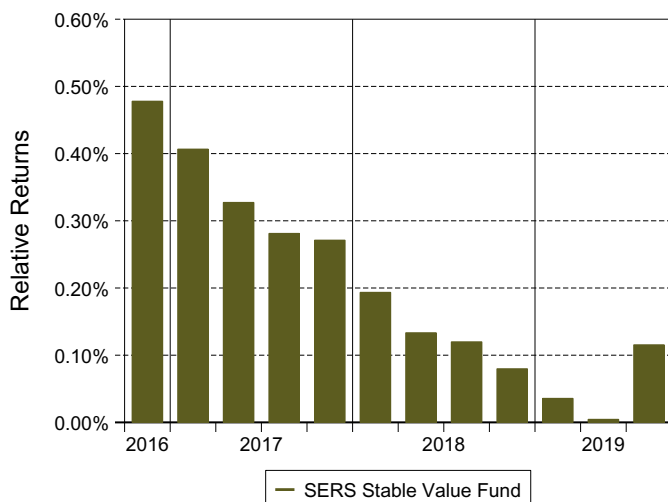
- SERS Stable Value Fund's portfolio posted a 0.68% return for the quarter placing it in the 11 percentile of the Callan Stable Value group for the quarter and in the 30 percentile for the last year.
- SERS Stable Value Fund's portfolio outperformed the 3-month Treasury Bill by 0.12% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.24%.

Performance vs Callan Stable Value (Gross)

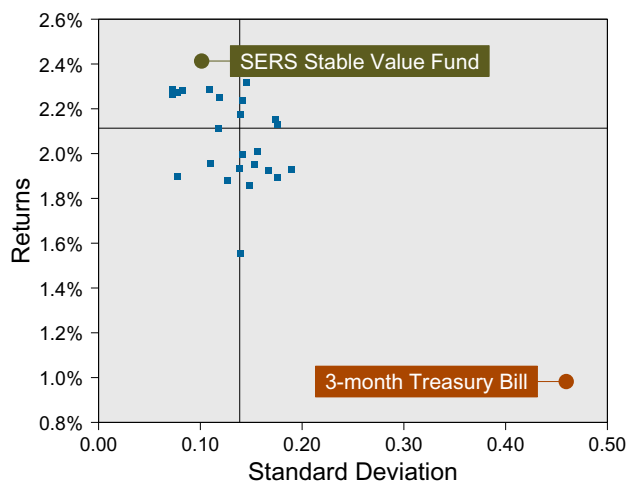


10th Percentile	0.68	2.03	2.69	2.41	2.29	2.68
25th Percentile	0.67	1.99	2.64	2.34	2.26	2.60
Median	0.64	1.88	2.50	2.21	2.11	2.24
75th Percentile	0.61	1.82	2.40	2.08	1.93	2.00
90th Percentile	0.59	1.69	2.22	1.96	1.87	1.84
SERS Stable Value Fund	0.68	1.97	2.62	2.37	2.41	2.93
3-month Treasury Bill	0.56	1.81	2.39	1.54	0.98	0.54

Relative Return vs 3-month Treasury Bill



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

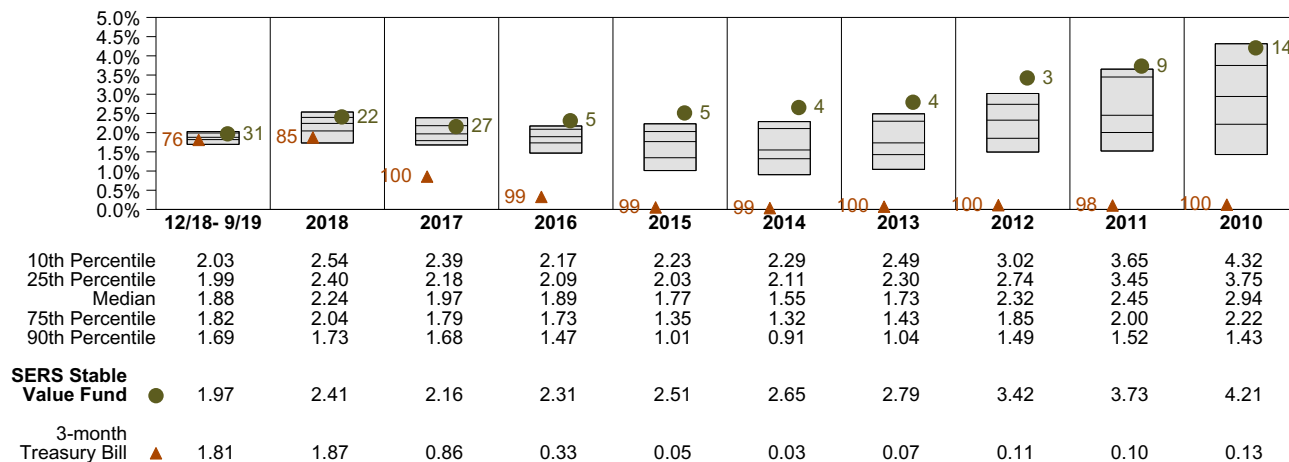


SERS Stable Value Fund Return Analysis Summary

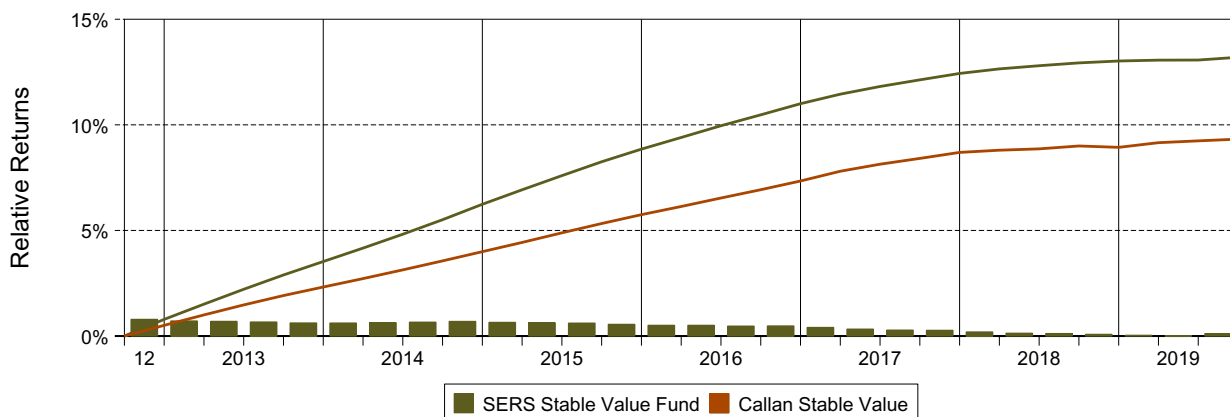
Return Analysis

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

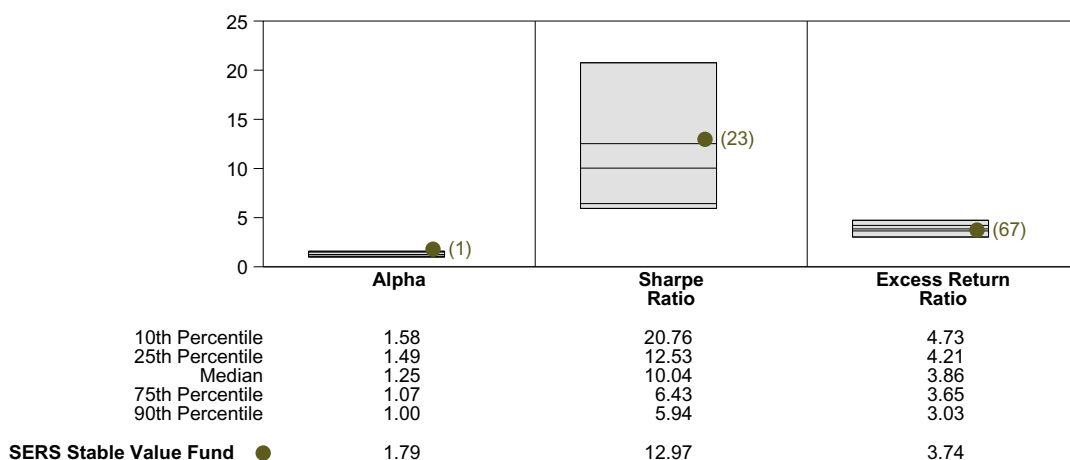
Performance vs Callan Stable Value (Gross)



Cumulative and Quarterly Relative Return vs 3-month Treasury Bill



Risk Adjusted Return Measures vs 3-month Treasury Bill Rankings Against Callan Stable Value (Gross) Seven Years Ended September 30, 2019



SERS U.S. Bond Index Fund

Period Ended September 30, 2019

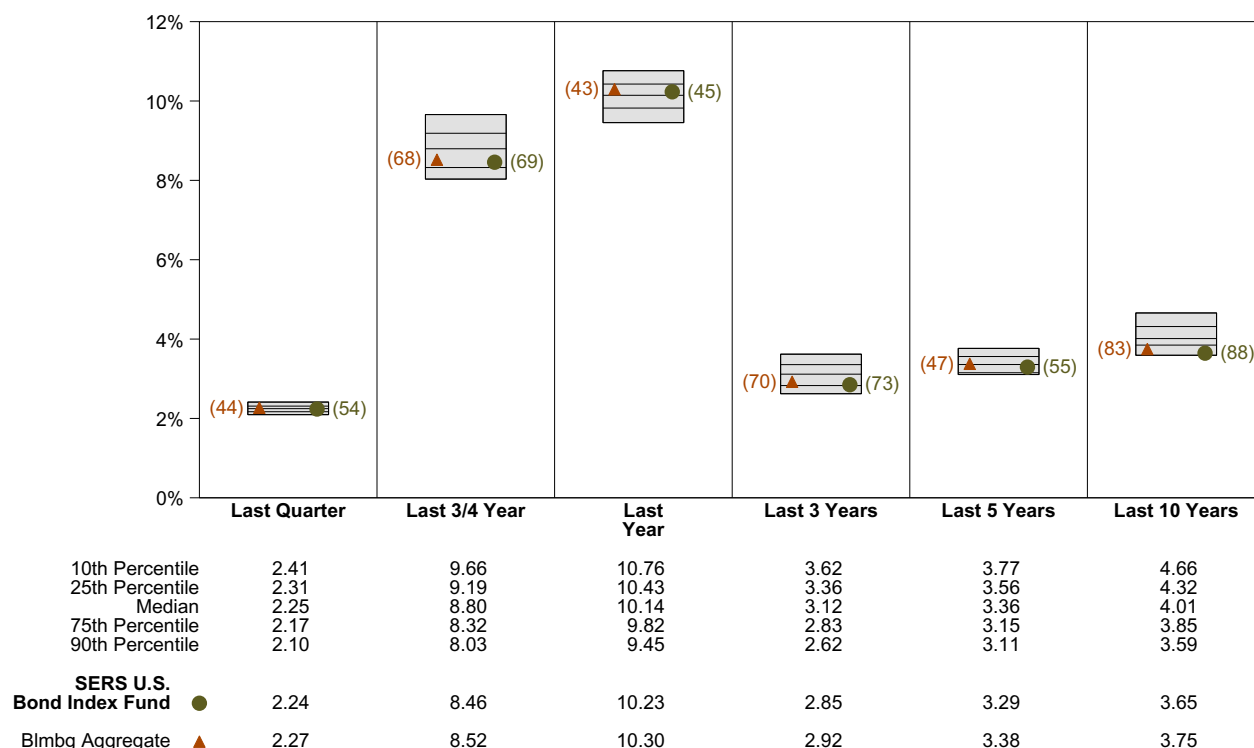
Investment Philosophy

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

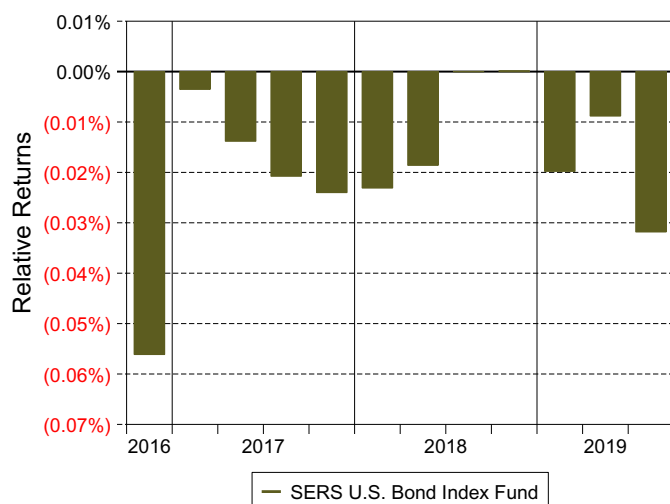
Quarterly Summary and Highlights

- SERS U.S. Bond Index Fund's portfolio posted a 2.24% return for the quarter placing it in the 54 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 45 percentile for the last year.
- SERS U.S. Bond Index Fund's portfolio underperformed the Blmbg Aggregate by 0.03% for the quarter and underperformed the Blmbg Aggregate for the year by 0.06%.

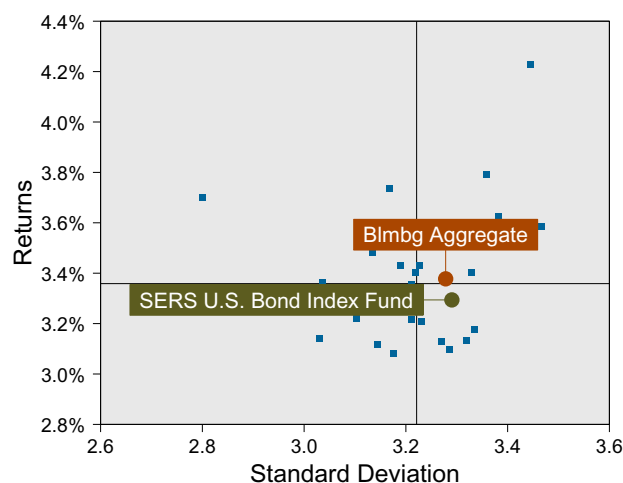
Performance vs Callan Core Bond Mutual Funds (Institutional Net)



Relative Return vs Blmbg Aggregate



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

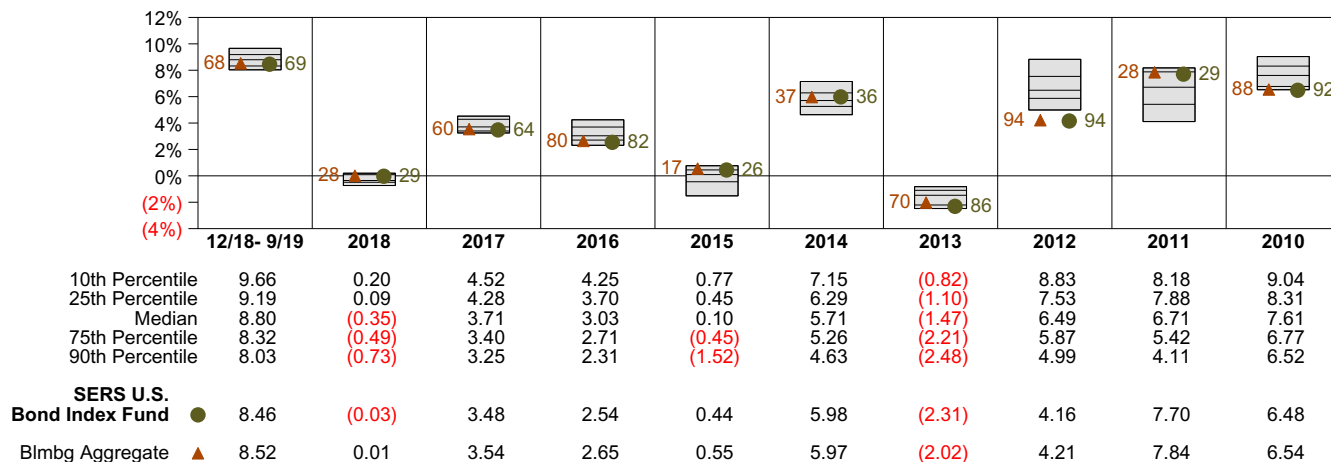


SERS U.S. Bond Index Fund Return Analysis Summary

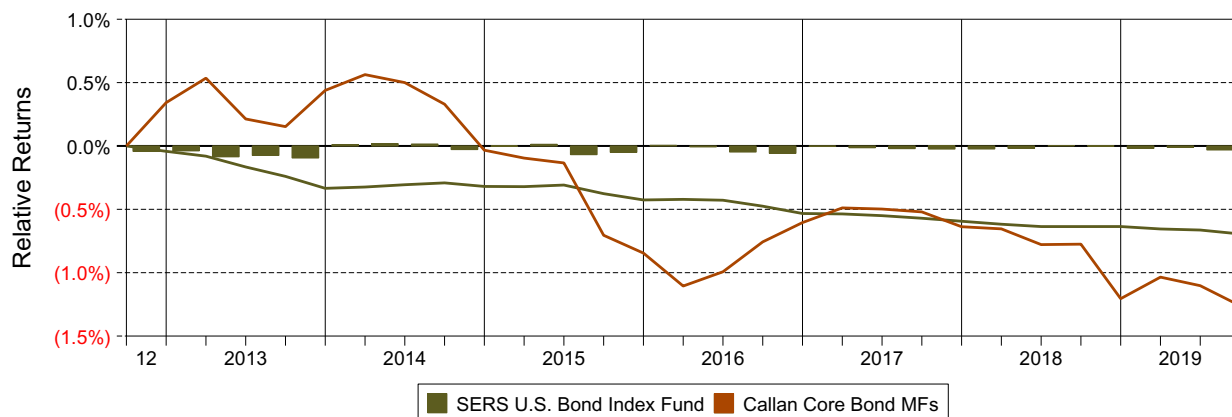
Return Analysis

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.

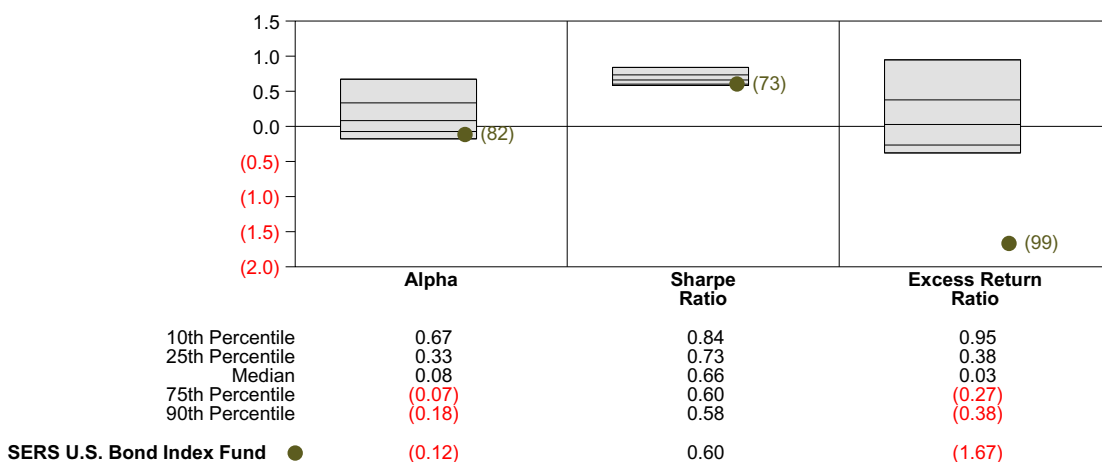
Performance vs Callan Core Bond Mutual Funds (Institutional Net)



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, 2019



SERS U.S. Bond Index Fund

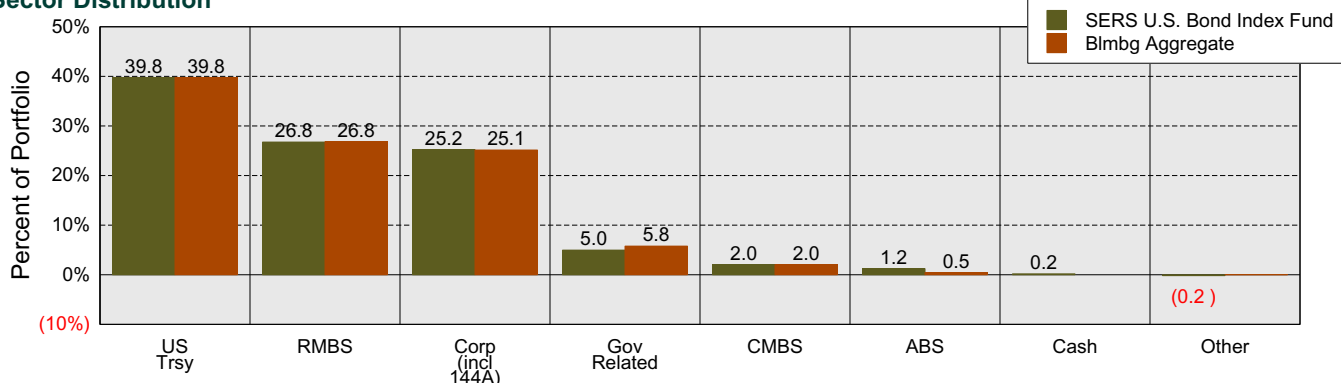
Portfolio Characteristics Summary

As of September 30, 2019

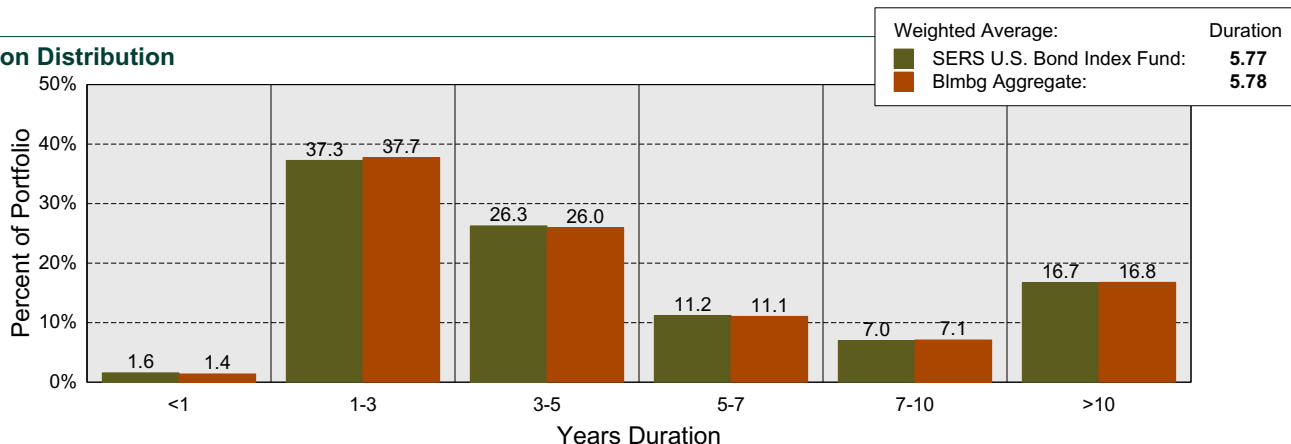
Portfolio Structure Comparison

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

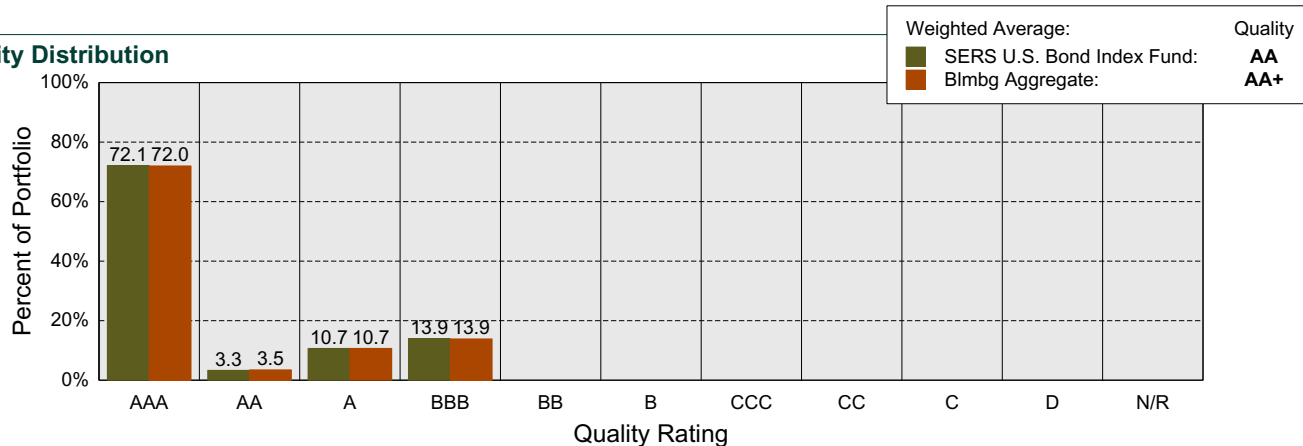
Sector Distribution



Duration Distribution



Quality Distribution



SERS U.S. Bond Index Fund

Bond Characteristics Analysis Summary

Portfolio Characteristics

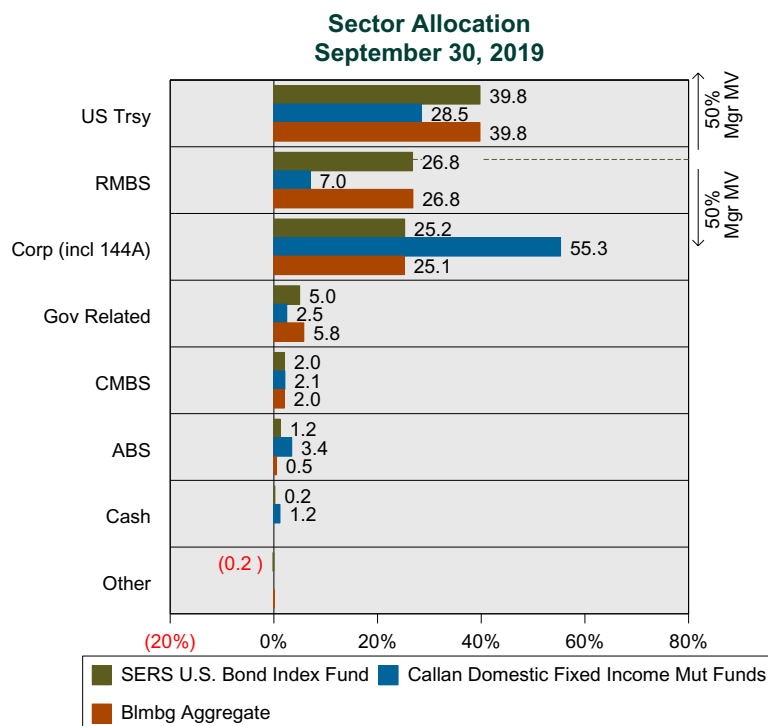
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

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

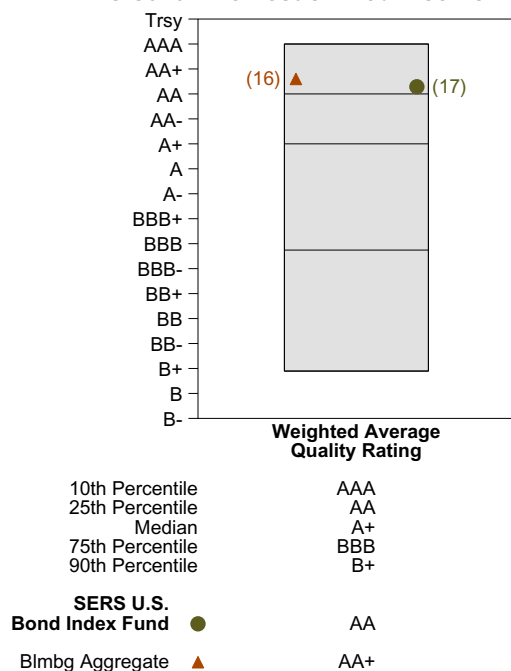


Sector Allocation and Quality Ratings

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



Quality Ratings vs Callan Domestic Fixed Income Mut Funds



Equity Market Indicators

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

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

Fixed Income Market Indicators

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

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

International Equity Market Indicators

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

Callan Databases

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

Equity Funds

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

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

Fixed Income Funds

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

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

Balanced Funds

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

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

Risk/Reward Statistics

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

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

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

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

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

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

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

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

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

Risk/Reward Statistics

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

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

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

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

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

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

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

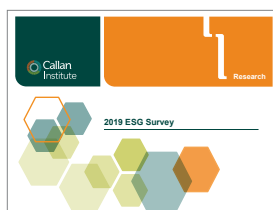
Note: Alpha, Total Risk, and Residual Risk are annualized.

Research and Educational Programs

The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit www.callan.com/library to see all of our publications, and www.callan.com/blog to view our blog “Perspectives.” For more information contact Barb Gerraty at 415-274-3093 / institute@callan.com.

New Research from Callan’s Experts

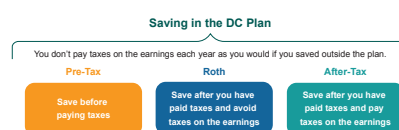
DTS Offers Some Key Advantages for Evaluating Fixed Income Portfolios | This paper describes duration times spread (DTS), which measures systematic credit-spread risk exposure. DTS estimates the return of any bond, by percentage, if its spread were to change from the current level, all else equal. DTS offers several advantages for monitoring risk in credit portfolios over other methods.



2019 ESG Survey | Callan’s seventh annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

Callan’s DC Index in Detail | A video about the Callan DC Index™: why we started it, what it measures, and how it can benefit defined contribution plan sponsors.

DC Plan Hacks: Tips for an Efficient Design | Defined contribution



plan sponsors should regularly evaluate their plans to make sure they serve the organization's

benefits philosophy. When evaluating changes, the sponsor should consider its demographics, cost of benefits, vendor capabilities, impact on nondiscrimination testing, communication capabilities, and legal requirements.

2019 June Workshop Summary: In the Age of Illiquidity | For many nonprofits and defined benefit plans, the shift to higher-returning but less liquid asset classes has myriad implications. This summary discusses how consultants, institutional investors, and investment managers can work together to identify solutions tailored to each plan.

The Keys to Unlocking Private Equity Portfolio Assessment

Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities. Closed-end private equity vehicles are assessed using ratio analyses and internal rate of return (IRR) measures. Using performance metrics, private equity portfolios can be evaluated at the partnership level, at the vintage year level, and then at the total portfolio level.

Survivorship Bias and the Walking Dead | Survivorship bias, the predisposition to evaluate a data set by focusing on the “survivors” rather than also examining the record of non-survivors, is important to understand for hedge fund peer groups, which tend to have a relatively large number of constituents that disappear. Using a proprietary approach, Callan is able to adjust peer group comparisons for survivorship bias. This better-informed perspective enables a more honest assessment in considering performance relative to other opportunities.

Quarterly Periodicals

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

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

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

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

Events

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

Please mark your calendar and look forward to upcoming invitations.

2020 National Conference

Celebrating the 40th anniversary of the Callan Institute
January 27-29, 2020 – San Francisco

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

For more information about events, please contact Barb Gerraty: 415-274-3093 / gerraty@callan.com

The Center for Investment Training Educational Sessions

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

Introduction to Investments

April 21-22, 2020

July 21-22, 2020

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 who have less than two years of experience with asset-management oversight and/or support responsibilities. Tuition for the Introductory “Callan College” session is \$2,350 per person. Tuition includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

Learn more at www.callan.com/events/callan-college-intro

Education: By the Numbers

525

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

50+

Unique pieces of research the Institute generates each year

3,700

Total attendees of the “Callan College” since 1994

1980

Year the Callan Institute was founded



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

Greg Allen, CEO and Chief Research Officer

Confidential – For Callan Client Use Only

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

Manager Name	Actual	Target
Mr. A. Smith	85	90
Ms. B. Jones	92	88
Mr. C. Brown	78	82
Ms. D. White	88	92
Mr. E. Black	82	85
Ms. F. Green	95	90
Mr. G. Grey	80	85
Ms. H. Blue	88	92
Mr. I. Yellow	75	80
Ms. J. Purple	90	88
Mr. K. Pink	85	90
Ms. L. Orange	82	85
Mr. M. Silver	95	90
Ms. N. Gold	88	92
Mr. O. Bronze	78	82
Ms. P. Copper	85	88
Mr. Q. Iron	80	85
Ms. R. Steel	92	90
Mr. S. Aluminum	88	92
Ms. T. Titanium	85	90
Mr. U. Carbon	75	80
Ms. V. Silicon	82	85
Mr. W. Germanium	90	88
Ms. X. Gallium	88	92
Mr. Y. Indium	85	90
Ms. Z. Tin	82	85
Mr. AA. Lead	78	82
Ms. AB. Bismuth	85	88
Mr. AC. Antimony	80	85
Ms. AD. Arsenic	92	90
Mr. AE. Selenium	88	92
Ms. AF. Tellurium	85	90
Mr. AG. Polonium	75	80
Ms. AH. Astatine	82	85
Mr. AI. Francium	90	88
Ms. AJ. Radium	88	92
Mr. AK. Actinium	85	90
Ms. AL. Thorium	82	85
Mr. AM. Protactinium	78	82
Ms. AN. Uranium	85	88
Mr. AO. Neptunium	80	85
Ms. AP. Plutonium	92	90
Mr. AQ. Americium	88	92
Ms. AR. Curium	85	90
Mr. AS. Berkelium	82	85
Ms. AT. Californium	78	82
Mr. AU. Einsteinium	85	88
Ms. AV. Fermium	80	85
Mr. AW. Mendelevium	90	88
Ms. AX. Nobelium	88	92
Mr. AY. Lawrencium	85	90
Ms. AZ. Rutherfordium	82	85
Mr. BA. Dubnium	78	82
Ms. BB. Seaborgium	85	88
Mr. BC. Bohrium	80	85
Ms. BD. Hassium	92	90
Mr. BE. Meitnerium	88	92
Ms. BF. Darmstadtium	85	90
Mr. BG. Roentgenium	82	85
Ms. BH. Copernicium	78	82
Mr. BI. Nihonium	85	88
Ms. BJ. Flerovium	80	85
Mr. BK. Moscovium	90	88
Ms. BL. Tennessine	88	92
Mr. BM. Oganesson	85	90

Manager Name	
Manager A	85
Manager B	78
Manager C	92
Manager D	65
Manager E	88
Manager F	72
Manager G	95
Manager H	60
Manager I	82
Manager J	75
Manager K	90
Manager L	68
Manager M	85
Manager N	70
Manager O	93
Manager P	62
Manager Q	80
Manager R	73
Manager S	91
Manager T	67
Manager U	83
Manager V	76
Manager W	94
Manager X	63
Manager Y	81
Manager Z	74
Manager AA	96
Manager AB	61
Manager AC	84
Manager AD	71
Manager AE	97
Manager AF	64
Manager AG	86
Manager AH	77
Manager AI	99
Manager AJ	66
Manager AK	87
Manager AL	79
Manager AM	98
Manager AN	69
Manager AO	89
Manager AP	72
Manager AQ	90
Manager AR	65
Manager AS	82
Manager AT	75
Manager AU	93
Manager AV	62
Manager AW	80
Manager AX	73
Manager AY	91
Manager AZ	67
Manager BA	83
Manager BB	76
Manager BC	94
Manager BD	63
Manager BE	81
Manager BF	74
Manager BG	96
Manager BH	61
Manager BI	84
Manager BJ	71
Manager BK	97
Manager BL	64
Manager BM	86
Manager BN	77
Manager BO	99
Manager BP	66
Manager BQ	87
Manager BR	79
Manager BS	98
Manager BT	69
Manager BU	89
Manager BV	72
Manager BW	90
Manager BX	65
Manager BY	82
Manager BZ	75
Manager CA	93
Manager CB	62
Manager CC	80
Manager CD	73
Manager CE	91
Manager CF	67
Manager CG	83
Manager CH	76
Manager CI	94
Manager CJ	63
Manager CK	81
Manager CL	74
Manager CM	96
Manager CN	61
Manager CO	84
Manager CP	71
Manager CQ	97
Manager CR	64
Manager CS	86
Manager CT	77
Manager CU	99
Manager CV	66
Manager CW	87
Manager CX	79
Manager CY	98
Manager CZ	69
Manager DA	89
Manager DB	72
Manager DC	90
Manager DD	65
Manager DE	82
Manager DF	75
Manager DG	93
Manager DH	62
Manager DI	80
Manager DJ	73
Manager DK	91
Manager DL	67
Manager DM	83
Manager DN	76
Manager DO	94
Manager DP	63
Manager DQ	81
Manager DR	74
Manager DS	96
Manager DT	61
Manager DU	84
Manager DV	71
Manager DW	97
Manager DX	64
Manager DY	86
Manager DZ	77
Manager EA	99
Manager EB	66
Manager EC	87
Manager ED	79
Manager EE	98
Manager EF	69
Manager EG	89
Manager EH	72
Manager EI	90
Manager EJ	65
Manager EK	82
Manager EL	75
Manager EM	93
Manager EN	62
Manager EO	80
Manager EP	73
Manager EQ	91
Manager ER	67
Manager ES	83
Manager ET	76
Manager EU	94
Manager EV	63
Manager EW	81
Manager EX	74
Manager EY	96
Manager EZ	61
Manager FA	84
Manager FB	71
Manager FC	97
Manager FD	64
Manager FE	86
Manager FF	77
Manager FG	99
Manager FH	66
Manager FI	87
Manager FJ	79
Manager FK	98
Manager FL	69
Manager FO	89
Manager FP	72
Manager FQ	90
Manager FR	65
Manager FS	82
Manager FT	75
Manager FU	93
Manager FV	62
Manager FW	80
Manager FX	73
Manager FY	91
Manager FZ	67
Manager GA	83
Manager GB	76
Manager GC	94
Manager GD	63
Manager GE	81
Manager GF	74
Manager GG	96
Manager GH	61
Manager GI	84
Manager GJ	71
Manager GK	97
Manager GL	64
Manager GM	86
Manager GN	77
Manager GO	99
Manager GP	66
Manager GQ	87
Manager GR	79
Manager GS	98
Manager GT	69
Manager GU	89
Manager GV	72
Manager GW	90
Manager GX	65
Manager GY	82
Manager GZ	75
Manager HA	93
Manager HB	62
Manager HC	80
Manager HD	73
Manager HE	91
Manager HF	67
Manager HG	83
Manager HH	76
Manager HI	94
Manager HJ	63
Manager HK	81
Manager HL	74
Manager HM	96
Manager HN	61
Manager HO	84
Manager HP	71
Manager HQ	97
Manager HR	64
Manager HS	86
Manager HT	77
Manager HU	99
Manager HV	66
Manager HW	87
Manager HX	79
Manager HY	98
Manager HZ	69
Manager IA	89
Manager IB	72
Manager IC	90
Manager ID	65
Manager IE	82
Manager IF	75
Manager IG	93
Manager IH	62
Manager II	80
Manager IJ	73
Manager IK	91
Manager IL	67
Manager IM	83
Manager IN	76
Manager IO	94
Manager IP	63
Manager IQ	81
Manager IR	74
Manager IS	96
Manager IT	61
Manager IU	84
Manager IV	71
Manager IW	97
Manager IX	64
Manager IY	86
Manager IZ	77
Manager JA	99
Manager JB	66
Manager JC	87
Manager JD	79
Manager JE	98
Manager JF	69
Manager JG	89
Manager JH	72
Manager JI	90
Manager JJ	65
Manager JK	82
Manager JL	75
Manager JM	93
Manager JN	62
Manager JO	80
Manager JP	73
Manager JQ	91
Manager JR	67
Manager JS	83
Manager JT	76
Manager JU	94
Manager JV	63
Manager JW	81
Manager JX	74
Manager JY	96
Manager JZ	61
Manager KA	84
Manager KB	71
Manager KC	97
Manager KD	64
Manager KE	86
Manager KF	77
Manager KG	99
Manager KH	66
Manager KI	87
Manager KJ	79
Manager KK	98
Manager KL	69
Manager KO	89
Manager KP	72
Manager KQ	90
Manager KR	65
Manager KS	82
Manager KT	75
Manager KU	93
Manager KV	62
Manager KW	80
Manager KX	73
Manager KY	91
Manager KZ	67
Manager LA	83
Manager LB	76
Manager LC	94
Manager LD	63
Manager LE	81
Manager LF	74
Manager LG	96
Manager LH	61
Manager LI	84
Manager LJ	71
Manager LK	97
Manager LL	64
Manager LM	86
Manager LN	77
Manager LO	99
Manager LP	66
Manager LQ	87
Manager LR	79
Manager LS	98
Manager LT	69
Manager LU	89
Manager LV	72
Manager LW	90
Manager LX	65
Manager LY	82
Manager LZ	75
Manager MA	93
Manager MB	62
Manager MC	80
Manager MD	73
Manager ME	91
Manager MF	67
Manager MG	83
Manager MH	76
Manager MI	94
Manager MJ	63
Manager MK	81
Manager ML	74
Manager MM	96
Manager MN	61
Manager MO	84
Manager MP	71
Manager MQ	97
Manager MR	64
Manager MS	86
Manager MT	77
Manager MU	99
Manager MV	66
Manager MW	87
Manager MX	79
Manager MY	98
Manager MZ	69
Manager NA	89
Manager NB	72
Manager NC	90
Manager ND	65
Manager NE	82
Manager NF	75
Manager NG	93
Manager NH	62
Manager NI	80
Manager NJ	73
Manager NK	91
Manager NL	67
Manager NM	83
Manager NN	76
Manager NO	94
Manager NP	63
Manager NQ	81
Manager NR	74
Manager NS	96
Manager NT	61
Manager NU	84
Manager NV	71
Manager NW	97
Manager NX	64
Manager NY	86
Manager NZ	77
Manager OA	99
Manager OB	66
Manager OC	87
Manager OD	79
Manager OE	98
Manager OF	69
Manager OG	89
Manager OH	72
Manager OI	90
Manager OJ	65
Manager OK	82
Manager OL	75
Manager OM	93
Manager ON	62
Manager OO	80
Manager OP	73
Manager OQ	91
Manager OR	67
Manager OS	83
Manager OT	76
Manager OU	94
Manager OV	63
Manager OW	81
Manager OX	74
Manager OY	96
Manager OZ	61
Manager PA	84
Manager PB	71
Manager PC	97
Manager PD	64
Manager PE	86
Manager PF	77
Manager PG	99
Manager PH	66
Manager PI	87
Manager PJ	79
Manager PK	98
Manager PL	69
Manager PO	89
Manager PP	72
Manager PQ	90
Manager PR	65
Manager PS	82
Manager PT	75
Manager PU	93
Manager PV	62
Manager PW	80
Manager PX	73
Manager PY	91
Manager PZ	67
Manager QA	83
Manager QB	76
Manager QC	94
Manager QD	63
Manager QE	81
Manager QF	74
Manager QG	96
Manager QH	61
Manager QI	84
Manager QJ	71
Manager QK	97
Manager QL	64
Manager QM	86
Manager QN	77
Manager QO	99
Manager QP	66
Manager QQ	87
Manager QR	79
Manager QS	98
Manager QT	69
Manager QU	89
Manager QV	72
Manager QW	90
Manager QX	65
Manager QY	82
Manager QZ	75
Manager RA	93
Manager RB	62
Manager RC	80
Manager RD	73
Manager RE	91
Manager RF	67
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Manager RH	76
Manager RI	94
Manager RJ	63
Manager RK	81
Manager RL	74
Manager RM	96
Manager RN	61
Manager RO	84
Manager RP	71
Manager RQ	97
Manager RR	64
Manager RS	86
Manager RT	77
Manager RU	99
Manager RV	66
Manager RW	87
Manager RX	79
Manager RY	98
Manager RZ	69
Manager SA	89
Manager SB	72
Manager SC	90
Manager SD	65
Manager SE	82
Manager SF	75
Manager SG	93
Manager SH	62
Manager SI	80
Manager SJ	73
Manager SK	91
Manager SL	67
Manager SM	83
Manager SN	76
Manager SO	94
Manager SP	63
Manager SQ	81
Manager SR	74
Manager SS	96
Manager ST	61
Manager SU	84
Manager SV	71
Manager SW	97
Manager SX	64
Manager SY	86
Manager SZ	77
Manager TA	99
Manager TB	66
Manager TC	87
Manager TD	79
Manager TE	98
Manager TF	69
Manager TG	89
Manager TH	72
Manager TI	90
Manager TJ	65
Manager TK	82
Manager TL	75
Manager TM	93
Manager TN	62
Manager TO	80
Manager TP	73
Manager TQ	91
Manager TR	67
Manager TS	83
Manager TT	76
Manager TU	94
Manager TV	63
Manager TW	81
Manager TX	74
Manager TY	96
Manager TZ	61
Manager UA	84
Manager UB	71
Manager UC	97
Manager UD	64
Manager UE	86
Manager UF	77
Manager UG	99
Manager UH	66
Manager UI	87
Manager UJ	79
Manager UK	98
Manager UL	69
Manager UO	89
Manager UP	72
Manager UQ	90
Manager UR	65
Manager US	82
Manager UT	75
Manager UU	93
Manager UV	62
Manager UW	80
Manager UX	73
Manager UY	91
Manager UZ	67
Manager VA	83
Manager VB	76
Manager VC	94
Manager VD	63
Manager VE	81
Manager VF	74
Manager VG	96
Manager VH	61
Manager VI	84
Manager VJ	71
Manager VK	97
Manager VL	64
Manager VM	86
Manager VN	77
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Manager VQ	87
Manager VR	79
Manager VS	98
Manager VT	69
Manager VU	89
Manager VV	72
Manager VW	90
Manager VX	65
Manager VY	82
Manager VZ	75
Manager WA	93
Manager WB	62
Manager WC	80
Manager WD	73
Manager WE	91
Manager WF	67
Manager WG	83
Manager WH	76
Manager WI	94
Manager WJ	63
Manager WK	81
Manager WL	74
Manager WM	96
Manager WN	61
Manager WO	84
Manager WP	71
Manager WQ	97
Manager WR	64
Manager WS	86
Manager WT	77
Manager WU	99
Manager WV	66
Manager WW	87
Manager WX	79
Manager WY	98
Manager WZ	69
Manager XA	89
Manager XB	72
Manager XC	90
Manager XD	65
Manager XE	82
Manager XF	75
Manager XG	93
Manager XH	62
Manager XI	80
Manager XJ	73
Manager XK	91
Manager XL	67
Manager XM	83
Manager XN	76
Manager XO	94
Manager XP	63
Manager XQ	81
Manager XR	74
Manager XS	96
Manager XT	61
Manager XU	84
Manager XV	71
Manager XW	97
Manager XX	64
Manager XY	86
Manager XZ	77
Manager YA	99
Manager YB	66
Manager YC	87
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Manager YT	76
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Manager ZA	84
Manager ZB	71
Manager ZC	97
Manager ZD	64
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Manager ZG	99
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Manager ZI	87
Manager ZJ	79
Manager ZK	98
Manager ZL	69
Manager ZO</	

Manager Name	Actual	Target
John Smith	85	90
Jane Doe	78	82
Michael Brown	92	95
Sarah Johnson	88	90
David Wilson	75	80
Emily Davis	90	92
James Miller	82	85
Alice Taylor	79	82
Robert Lee	87	90
Olivia White	91	93
William Black	84	87
Isabella Green	76	80
Liam Grey	89	91
Mia Blue	83	86
Noah Yellow	77	81
Charlotte Purple	93	95
Benjamin Red	86	89
Amelia Pink	81	84
Ethan Orange	74	78
Sophia Silver	90	92
Lucas Gold	85	88
Ava Bronze	79	82
Henry Platinum	92	94
Madison Diamond	87	90
Sebastian Sapphire	80	83
Layla Ruby	75	79
Julian Emerald	89	91
Skylar Amethyst	84	87
Isaac Topaz	78	81
Natalie Garnet	91	93
Christopher Opal	86	89
Victoria Jade	82	85
Matthew Malachite	76	80
Chloe Peridot	90	92
Christopher Zircon	85	88
Isabella Aquamarine	79	82
Christopher Citrine	92	94
Isabella Moonstone	87	90
Christopher Smoky Quartz	80	83
Isabella Rose Quartz	75	79
Christopher Labradorite	89	91
Skylar Tiger's Eye	84	87
Isaac Onyx	78	81
Natalie Obsidian	91	93
Christopher Amethyst	86	89
Isabella Turquoise	82	85
Christopher Labradorite	76	80
Isabella Malachite	90	92
Christopher Jade	85	88
Isabella Peridot	79	82
Christopher Zircon	92	94
Isabella Smoky Quartz	87	90
Christopher Rose Quartz	80	83
Isabella Labradorite	75	79
Christopher Tiger's Eye	89	91
Isabella Onyx	84	87
Christopher Obsidian	78	81
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Christopher Rose Quartz	76	80
Isabella Labradorite	90	92
Christopher Tiger's Eye	85	88
Isabella Onyx	79	82
Christopher Obsidian	92	94
Isabella Amethyst	87	90
Christopher Turquoise	80	83
Isabella Labradorite	75	79
Christopher Malachite	89	91
Isabella Peridot	84	87
Christopher Zircon	78	81
Isabella Smoky Quartz	91	93
Christopher Rose Quartz	86	89
Isabella Labradorite	82	85
Christopher Tiger's Eye	76	80
Isabella Onyx	90	92
Christopher Obsidian	85	88
Isabella Amethyst	79	82
Christopher Turquoise	92	94
Isabella Labradorite	87	90
Christopher Malachite	80	83
Isabella Peridot	75	79
Christopher Zircon	89	91
Isabella Smoky Quartz	84	87
Christopher Rose Quartz	78	81
Isabella Labradorite	91	93
Christopher Tiger's Eye	86	89
Isabella Onyx	82	85
Christopher Obsidian	76	80
Isabella Amethyst	90	92
Christopher Turquoise	85	88
Isabella Labradorite	79	82
Christopher Malachite	92	94
Isabella Peridot	87	90
Christopher Zircon	80	83
Isabella Smoky Quartz	75	79
Christopher Rose Quartz	89	91
Isabella Labradorite	84	87
Christopher Tiger's Eye	78	81
Isabella Onyx		

Manager Name	Actual	Target
Manager A	85	90
Manager B	78	82
Manager C	92	88
Manager D	88	95
Manager E	75	80
Manager F	82	85
Manager G	90	92
Manager H	72	78
Manager I	85	88
Manager J	88	90
Manager K	78	82
Manager L	92	95
Manager M	85	88
Manager N	75	80
Manager O	82	85
Manager P	90	92
Manager Q	72	78
Manager R	85	88
Manager S	88	90
Manager T	78	82
Manager U	92	95
Manager V	85	88
Manager W	75	80
Manager X	82	85
Manager Y	90	92
Manager Z	72	78
Manager AA	85	88
Manager AB	88	90
Manager AC	78	82
Manager AD	92	95
Manager AE	85	88
Manager AF	75	80
Manager AG	82	85
Manager AH	90	92
Manager AI	72	78
Manager AJ	85	88
Manager AK	88	90
Manager AL	78	82
Manager AM	92	95
Manager AN	85	88
Manager AO	75	80
Manager AP	82	85
Manager AQ	90	92
Manager AR	72	78
Manager AS	85	88
Manager AT	88	90
Manager AU	78	82
Manager AV	92	95
Manager AW	85	88
Manager AX	75	80
Manager AY	82	85
Manager AZ	90	92
Manager BA	72	78
Manager BB	85	88
Manager BC	88	90
Manager BD	78	82
Manager BE	92	95
Manager BF	85	88
Manager BG	75	80
Manager BH	82	85
Manager BI	90	92
Manager BJ	72	78
Manager BK	85	88
Manager BL	88	90
Manager BM	78	82
Manager BN	92	95
Manager BO	85	88
Manager BP	75	80
Manager BQ	82	85
Manager BR	90	92
Manager BS	72	78
Manager BT	85	88
Manager BU	88	90
Manager BV	78	82
Manager BV	92	95
Manager BW	85	88
Manager BX	75	80
Manager BY	82	85
Manager BZ	90	92
Manager CA	72	78
Manager CB	85	88
Manager CC	88	90
Manager CD	78	82
Manager CE	92	95
Manager CF	85	88
Manager CG	75	80
Manager CH	82	85
Manager CI	90	92
Manager CJ	72	78
Manager CK	85	88
Manager CL	88	90
Manager CM	78	82
Manager CN	92	95
Manager CO	85	88
Manager CP	75	80
Manager CQ	82	85
Manager CR	90	92
Manager CS	72	78
Manager CT	85	88
Manager CU	88	90
Manager CV	78	82
Manager CV	92	95
Manager CW	85	88
Manager CX	75	80
Manager CY	82	85
Manager CZ	90	92
Manager DA	72	78
Manager DB	85	88
Manager DC	88	90
Manager DD	78	82
Manager DE	92	95
Manager DF	85	88
Manager DG	75	80
Manager DH	82	85
Manager DI	90	92
Manager DJ	72	78
Manager DK	85	88
Manager DL	88	90
Manager DM	78	82
Manager DN	92	95
Manager DO	85	88
Manager DP	75	80
Manager DQ	82	85
Manager DR	90	92
Manager DS	72	78
Manager DT	85	88
Manager DU	88	90
Manager DV	78	82
Manager DV	92	95
Manager DW	85	88
Manager DX	75	80
Manager DY	82	85
Manager DZ	90	92
Manager EA	72	78
Manager EB	85	88
Manager EC	88	90
Manager ED	78	82
Manager EE	92	95
Manager EF	85	88
Manager EG	75	80
Manager EH	82	85
Manager EI	90	92
Manager EJ	72	78
Manager EK	85	88
Manager EL	88	90
Manager EM	78	82
Manager EN	92	95
Manager EO	85	88
Manager EP	75	80
Manager EQ	82	85
Manager ER	90	92
Manager ES	72	78
Manager ET	85	88
Manager EU	88	90
Manager EV	78	82
Manager EV	92	95
Manager EW	85	88
Manager EX	75	80
Manager EY	82	85
Manager EZ	90	92
Manager FA	72	78
Manager FB	85	88
Manager FC	88	90
Manager FD	78	82
Manager FE	92	95
Manager FF	85	88
Manager FG	75	80
Manager FH	82	85
Manager FI	90	92
Manager FJ	72	78
Manager FK	85	88
Manager FL	88	90
Manager FM	78	82
Manager FN	92	95
Manager FO	85	88
Manager FP	75	80
Manager FQ	82	85
Manager FR	90	92
Manager FS	72	78
Manager FT	85	88
Manager FU	88	90
Manager FV	78	82
Manager FV	92	95
Manager FW	85	88
Manager FX	75	80
Manager FY	82	85
Manager FZ	90	92
Manager GA	72	78
Manager GB	85	88
Manager GC	88	90
Manager GD	78	82
Manager GE	92	95
Manager GF	85	88
Manager GG	75	80
Manager GH	82	85
Manager GI	90	92
Manager GJ	72	78
Manager GK	85	88
Manager GL	88	90
Manager GM	78	82
Manager GN	92	95
Manager GO	85	88
Manager GP	75	80
Manager GQ	82	85
Manager GR	90	92
Manager GS	72	78
Manager GT	85	88
Manager GU	88	90
Manager GV	78	82
Manager GV	92	95
Manager GW	85	88
Manager GX	75	80
Manager GY	82	85
Manager GZ	90	92
Manager HA	72	78
Manager HB	85	88
Manager HC	88	90
Manager HD	78	82
Manager HE	92	95
Manager HF	85	88
Manager HG	75	80
Manager HH	82	85
Manager HI	90	92
Manager HJ	72	78
Manager HK	85	88
Manager HL	88	90
Manager HM	78	82
Manager HN	92	95
Manager HO	85	88
Manager HP	75	80
Manager HQ	82	85
Manager HR	90	92
Manager HS	72	78
Manager HT	85	88
Manager HU	88	90
Manager HV	78	82
Manager HV	92	95
Manager HW	85	88
Manager HX	75	80
Manager HY	82	85
Manager HZ	90	92
Manager IA	72	78
Manager IB	85	88
Manager IC	88	90
Manager ID	78	82
Manager IE	92	95
Manager IF	85	88
Manager IG	75	80
Manager IH	82	85
Manager II	90	92
Manager IJ	72	78
Manager IK	85	88
Manager IL	88	90
Manager IM	78	82
Manager IN	92	95
Manager IO	85	88
Manager IP	75	80
Manager IQ	82	85
Manager IR	90	92
Manager IS	72	78
Manager IT	85	88
Manager IU	88	90
Manager IV	78	82
Manager IV	92	95
Manager IW	85	88
Manager IX	75	80
Manager IY	82	85
Manager IZ	90	92
Manager JA	72	78
Manager JB	85	88
Manager JC	88	90
Manager JD	78	82
Manager JE	92	95
Manager JF	85	88
Manager JG	75	80
Manager JH	82	85
Manager JI	90	92
Manager JJ	72	78
Manager JK	85	88
Manager JL	88	90
Manager JM	78	82
Manager JN	92	95
Manager JO	85	88
Manager JP	75	80
Manager JQ	82	85
Manager JR	90	92
Manager JS	72	78
Manager JT	85	88
Manager JU	88	90
Manager JV	78	82
Manager JV	92	95
Manager JW	85	88
Manager JX	75	80
Manager JY	82	85
Manager JZ	90	92
Manager KA	72	78
Manager KB	85	88
Manager KC	88	90
Manager KD	78	82
Manager KE	92	95
Manager KF	85	88
Manager KG	75	80
Manager KH	82	85
Manager KI	90	92
Manager KJ	72	78
Manager KK	85	88
Manager KL	88	90
Manager KM	78	82
Manager KN	92	95
Manager KO	85	88
Manager KP	75	80
Manager KQ	82	85
Manager KR	90	92
Manager KS	72	78
Manager KT	85	88
Manager KU	88	90
Manager KV	78	82
Manager KV	92	95
Manager KW	85	88
Manager KX	75	80
Manager KY	82	85
Manager KZ	90	92
Manager LA	72	78
Manager LB	85	88
Manager LC	88	90
Manager LD	78	82
Manager LE	92	95
Manager LF	85	88
Manager LG	75	80
Manager LH	82	85
Manager LI	90	92
Manager LJ	72	78
Manager LK	85	88
Manager LL	88	90
Manager LM	78	82
Manager LN	92	95
Manager LO	85	88
Manager LP	75	80
Manager LQ	82	85
Manager LR	90	92
Manager LS	72	78
Manager LT	85	88
Manager LU	88	90
Manager LV	78	82
Manager LV	92	95
Manager LW	85	88
Manager LX	75	80
Manager LY	82	85
Manager LZ	90	92
Manager MA	72	78
Manager MB	85	88
Manager MC	88	90
Manager MD	78	82
Manager ME	92	95
Manager MF	85	88
Manager MG	75	80
Manager MH	82	85
Manager MI	90	92
Manager MJ	72	78
Manager MK	85	88
Manager ML	88	90
Manager MM	78	82
Manager MN	92	95
Manager MO	85	88
Manager MP	75	80
Manager MQ	82	85
Manager MR	90	92
Manager MS	72	78
Manager MT	85	88
Manager MU	88	90
Manager MV	78	82
Manager MV	92	95
Manager MW	85	88
Manager MX	75	80
Manager MY	82	85
Manager MZ	90	92
Manager NA	72	78
Manager NB	85	88
Manager NC	88	90
Manager ND	78	82
Manager NE	92	95
Manager NF	85	88
Manager NG	75	80
Manager NH	82	85
Manager NI	90	92
Manager NJ	72	78
Manager NK	85	88
Manager NL	88	90
Manager NM	78	82
Manager NN	92	95
Manager NO	85	88
Manager NP	75	80
Manager NQ	82	85
Manager NR	90	92
Manager NS	72	78
Manager NT	85	88
Manager NU	88	90
Manager NV	78	82
Manager NV	92	95
Manager NW	85	88
Manager NX	75	80
Manager NY	82	85
Manager NZ	90	92
Manager OA	72	78
Manager OB	85	88
Manager OC	88	90
Manager OD	78	82
Manager OE	92	95
Manager OF	85	88
Manager OG	75	80
Manager OH	82	85
Manager OI	90	92
Manager OJ	72	78
Manager OK	85	88
Manager OL	88	90
Manager OM	78	82
Manager ON	92	95
Manager OO	85	88
Manager OP	75	80
Manager OQ	82	85
Manager OR	90	92
Manager OS	72	78
Manager OT	85	88
Manager OU	88	90
Manager OV	78	82
Manager OV	92	95
Manager OW	85	88
Manager OX	75	80
Manager OY	82	85
Manager OZ	90	92
Manager PA	72	78
Manager PB	85	88
Manager PC	88	90
Manager PD	78	82
Manager PE	92	95
Manager PF	85	88
Manager PG	75	80
Manager PH	82	85
Manager PI	90	92
Manager PJ	72	78
Manager PK	85	88
Manager PL	88	90
Manager PM	78	82
Manager PN	92	95
Manager PO	85	88
Manager PP	75	80
Manager PQ	82	85
Manager PR	90	92
Manager PS	72	78
Manager PT	85	88
Manager PU	88	90
Manager PV	78	82
Manager PV	92	95
Manager PW	85	88
Manager PX	75	80
Manager PY	82	85
Manager PZ	90	92
Manager QA	72	78
Manager QB	85	88
Manager QC	88	90
Manager QD	78	82
Manager QE	92	95
Manager QF	85	88
Manager QG	75	80
Manager QH	82	85
Manager QI	90	92
Manager QJ	72	78
Manager QK	85	88
Manager QL	88	90
Manager QM	78	82
Manager QN	92	95
Manager QO	85	88
Manager QP	75	80
Manager QQ	82	85
Manager QR	90	92
Manager QS	72	78
Manager QT	85	88
Manager QU	88	90
Manager QV	78	82
Manager QV	92	95
Manager QW	85	88
Manager QX	75	80
Manager QY	82	85
Manager QZ	90	92
Manager RA	72	78
Manager RB	85	88
Manager RC	88	90
Manager RD	78	82
Manager RE	92	95
Manager RF	85	88
Manager RG	75	80
Manager RH	82	85