



# Investment Performance Analysis

## Ohio Retirement Study Council

Period Ended: December 31, 2016



## INDEX GLOSSARY

**S&P 500:** The **S&P 500 Index (Cap Wtd)** is a commonly recognized, market-capitalization weighted index of 500 widely held equity securities designed to measure broad US equity performance.

**R 3000:** The **Russell 3000 Index** is a market-capitalization weighted index of 3,000 widely held equity securities designed to measure performance of the entire U.S. stock market.

**Wilshire 5000:** The **Wilshire 5000 Index** is a market-capitalization weighted index of more than 6,700 widely held equity securities designed to measure performance of the entire U.S. stock market.

**MSCI ACW Ex US:** The **MSCI ACW (All Country World) Ex US Index** is designed to measure equity market performance in global developed and emerging markets, excluding the US. The 22 underlying developed countries are: *Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.* The 23 emerging market countries are: *Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, Qatar, South Africa, Taiwan, Thailand, Turkey, and United Arab Emirates.*

**MSCI ACW Ex US Investable Mkt:** The **MSCI ACW Ex US Investable Mkt Index** is designed to measure equity performance across 22 of 23 Developed Markets (DM) countries (excluding the United States) and 23 Emerging Markets (EM) countries. With 6,085 constituents, the index covers approximately 99% of the global equity opportunity set outside the US.

**MSCI EAFE:** The **MSCI EAFE (Europe, Australasia, Far East) Index** is designed to measure equity market performance of 21 developed countries, excluding the US & Canada: *Australia, Austria, Belgium, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.*

**MSCI World Ex US:** The **MSCI World Index Ex US Index** is designed to measure the equity market performance of developed markets. The MSCI World Index consists of the following 22 developed market country indexes: *Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.*

**MSCI Emerging Markets:** The **MSCI Emerging Markets Index** is designed to measure equity market performance of emerging markets. The MSCI Emerging Markets Index consists of the following 23 emerging market country indexes: *Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey\* and United Arab Emirates.*

**Bloomberg US Agg Bond:** The **Bloomberg US Aggregate Bond Index** covers the US dollar-denominated, investment-grade, fixed-rate, taxable bond market of SEC-registered securities: US Treasury and agency bonds, domestic corporate debt, and mortgage-backed securities.

**Bloomberg US Universal:** The **Bloomberg US Universal Index** covers US dollar-denominated, taxable bonds that are rated either investment grade or high-yield.

**Bloomberg US Trsy:** **The Bloomberg US Treasury Index** measures US dollar-denominated, fixed-rate, nominal debt issued by the US Treasury.

**Bloomberg US Trsy: US TIPS:** The **Bloomberg US Treasury: US TIPS Index** is an unmanaged index that consists of inflation-protected securities issued by the U.S. Treasury.

**Bloomberg Mortgage:** The **Bloomberg US Mortgage Backed Securities (MBS) Index** tracks agency mortgage backed pass-through securities (both fixed-rate and hybrid ARM) guaranteed by Ginnie Mae (GNMA), Fannie Mae (FNMA), and Freddie Mac (FHLMC).

**Bloomberg CMBS:** The **U.S. Bloomberg CMBS Investment Grade Index** measures the market of conduit and fusion CMBS deals with a minimum current deal size of \$300mn.

**Bloomberg US High Yield:** The **Bloomberg US Corporate High Yield Bond Index** measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below.

**Bloomberg Global High Yield:** The **Bloomberg Global High-Yield Index** provides a broad-based measure of the global high-yield fixed income markets.

**CS High Yield Dev Countries Only:** The **Credit Suisse High Yield Dev Countries Only Index** tracks the performance of noninvestment-grade corporate bonds from developed countries.

**CS Leveraged Loan:** The **Credit Suisse Leveraged Loan Index** is an index designed to mirror the investable universe of the \$US-denominated leveraged loan market.

**JPMorgan GBI-EM Gbl Dvf'd:** The **JPMorgan GBI-EM Global Diversified Total Return Index (Unhedged)** is a global emerging markets index that consists of regularly traded, liquid fixed-rate, domestic currency government bonds.

**JPMorgan Emerging Markets Bond Global:** The **JPMorgan Emerging Markets Bond Global Index** is a global emerging markets index that consists of regularly traded, liquid fixed-rate, US dollar-denominated government bonds.

**NCREIF ODCE:** The **NCREIF ODCE (Open End Diversified Core) Index** is an index of investment returns reporting on both a historical and current basis the results of 16 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NCREIF ODCE Index is capitalization-weighted and performance is time-weighted.

**NCREIF Property:** The **NCREIF Property Index** prepared by the National Council of Real Estate Investment Fiduciaries is a quarterly time series composite return measure for over 6,000 individual commercial real estate properties acquired in the private market for investment purposes. Total performance represents returns from appreciation and income, and includes multi-family, office, retail, and industrial properties.

**HFRI FOF Composite:** The **HFRI FOF (Fund of Funds) Composite Index** is an equal-weighted index that contains over 400 constituent hedge fund of funds, both domestic and offshore.

**Burgiss All Private Equity:** The **Burgiss All Private Equity Benchmark** is a composite of nearly 1400 private equity funds derived from the holdings of over 200 institutional investors.

**Alerian MLP:** The **Alerian MLP Index** is a market-capitalization weighted index of the 50 most prominent energy Master Limited Partnerships.

**S&P Goldman Sachs Commodity:** The **S&P Goldman Sachs Commodity Index** is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities. Components are weighted by their respective world production quantities.



**Fourth Quarter Economic Environment**

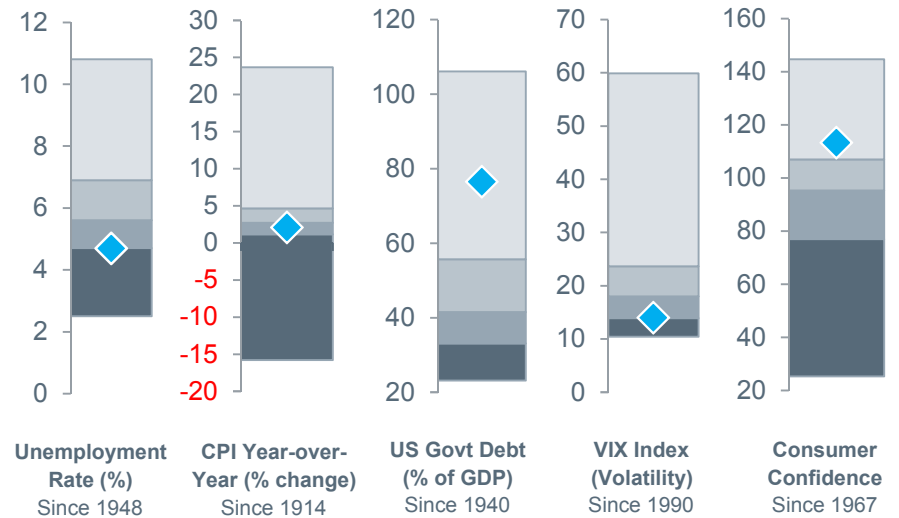
**Key Economic Indicators**

The surprising result of the United States presidential election produced an initial market shock, as US equity futures traded off nearly 5% during the night of November 8th. By morning however, the volatility and uncertainty gave way to renewed optimism for risk assets as markets contemplated the policy objectives and corresponding economic impact of the Trump administration's agenda. The bullish sentiment in the US cleared the path for the Federal Reserve Open Market Committee to raise the benchmark federal funds rate by 25 basis points during its December meeting. The move was widely anticipated, as economic data supported the Fed tightening at this point in the economic cycle. On November 30, 2016, OPEC announced a deal to cut oil production by 1.2 million barrels per day, the first cut since 2008, which drove the price of oil up nearly 10% on the day of the announcement. In Europe, the European Central Bank announced a moderation in the pace of asset purchases from €80 billion per month to €60 billion, but also extended the duration of the purchase program.

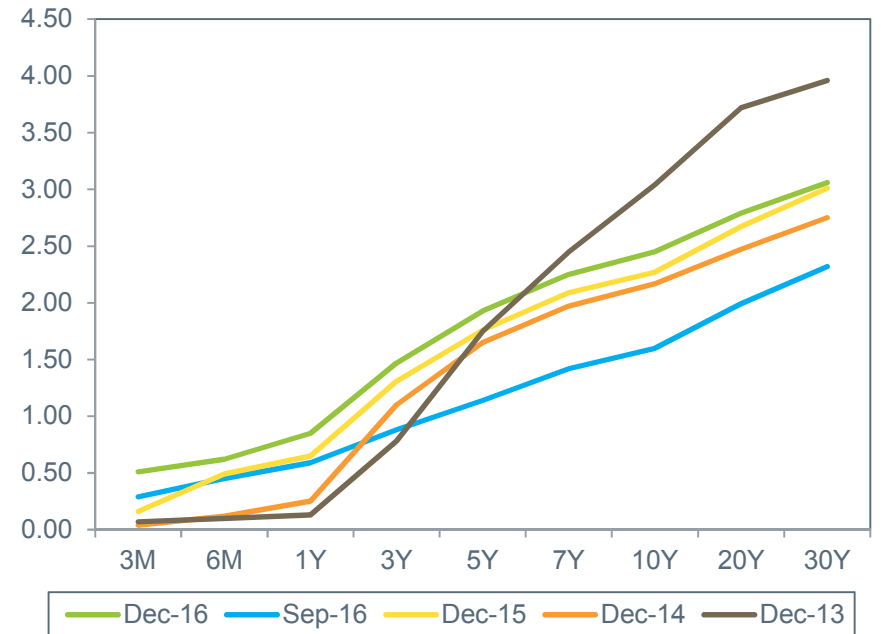
Economic Indicators	Dec-16	Sep-16	Dec-15	Dec-13	20 Yr
Federal Funds Rate (%)	0.55 ▲	0.29	0.20	0.07	2.35
Breakeven Infl. - 1 Yr (%)	1.27 ▲	0.95	0.85	1.50	N/A
Breakeven Infl. - 10 Yr (%)	1.97 ▲	1.61	1.58	2.23	N/A
CPI YoY (Headline) (%)	2.1 ▲	1.5	0.7	1.5	2.2
Unemployment Rate (%)	4.7 ▼	4.9	5.0	6.7	6.0
Real GDP YoY (%)	1.9 ▲	1.7	1.9	2.7	2.3
PMI - Manufacturing	54.50 ▲	51.70	47.90	56.00	52.20
USD Total Wtd Idx	95.76 ▲	90.01	94.25	76.15	86.86
WTI Crude Oil per Barrel (\$)	53.7 ▲	48.2	37.0	98.4	56.0
Gold Spot per Oz (\$)	1,152.3 ▼	1,315.8	1,061.4	1,205.7	784.3

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	3.82	11.96	11.96	14.66	6.95
Russell 2000	8.83	21.31	21.31	14.46	7.07
MSCI EAFE (Net)	-0.71	1.00	1.00	6.53	0.75
MSCI EAFE SC (Net)	-2.86	2.18	2.18	10.56	2.95
MSCI Emg Mkts (Net)	-4.16	11.19	11.19	1.28	1.84
Bloomberg US Agg Bond	-2.98	2.65	2.65	2.23	4.34
BofA ML 3 Mo US T-Bill	0.08	0.33	0.33	0.12	0.80
NCREIF ODCE (Gross)	2.11	8.77	8.77	12.21	5.82
Wilshire US REIT	-2.28	7.24	7.24	12.02	4.80
HFRI FOF Comp	0.88	0.53	0.53	3.42	1.31
Bloomberg Cmddy (TR)	2.66	11.74	11.74	-8.96	-5.58

**Key Economic Indicators**



**Treasury Yield Curve (%)**



Treasury data courtesy of the US Department of the Treasury. Economic data courtesy of Bloomberg Professional Service. Breakeven Inflation does not have 20 years of history; therefore, its 20-year average is shown as N/A.

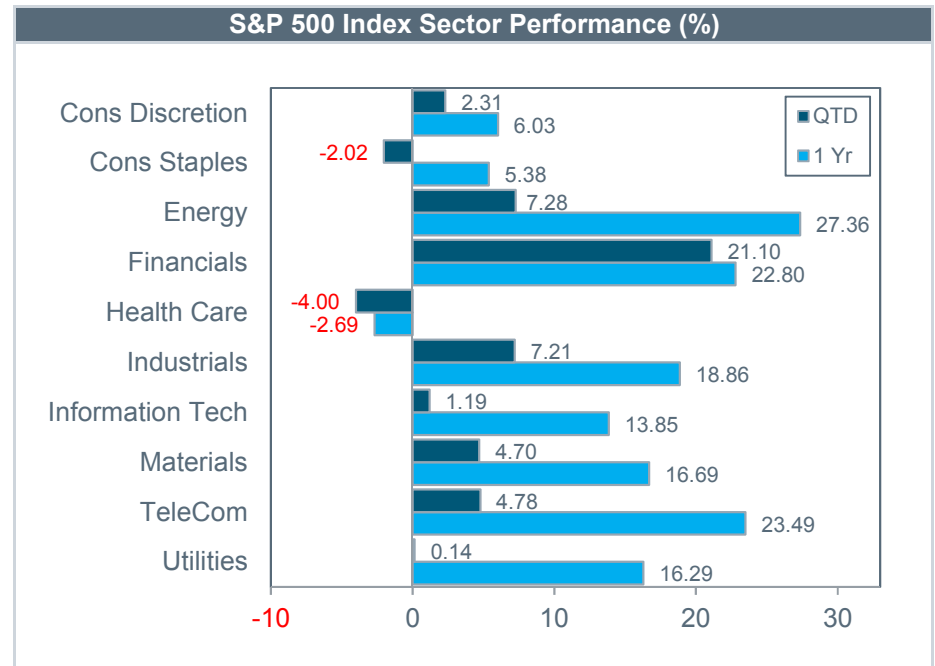
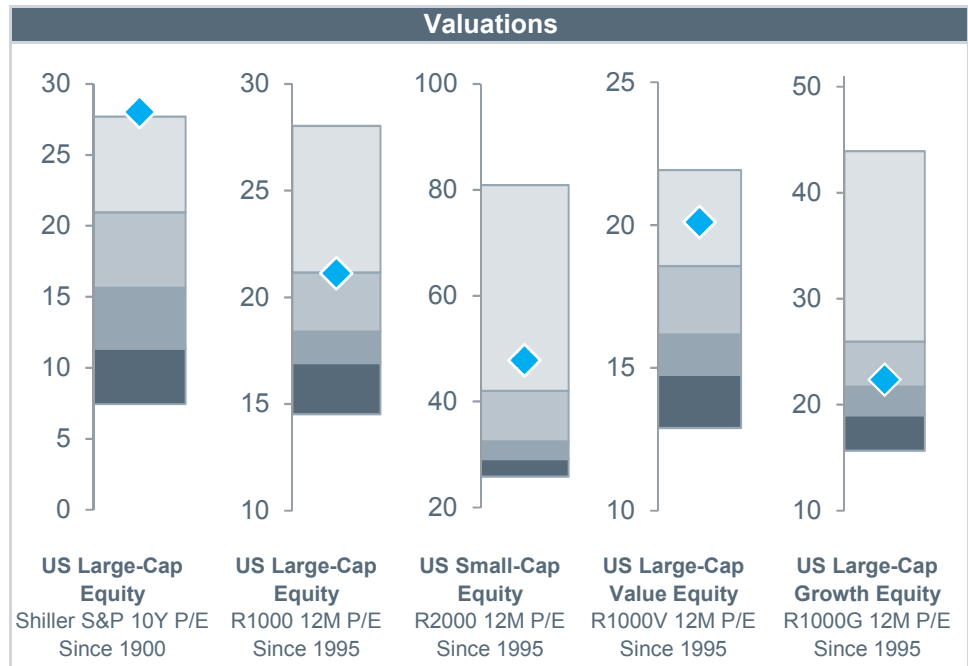
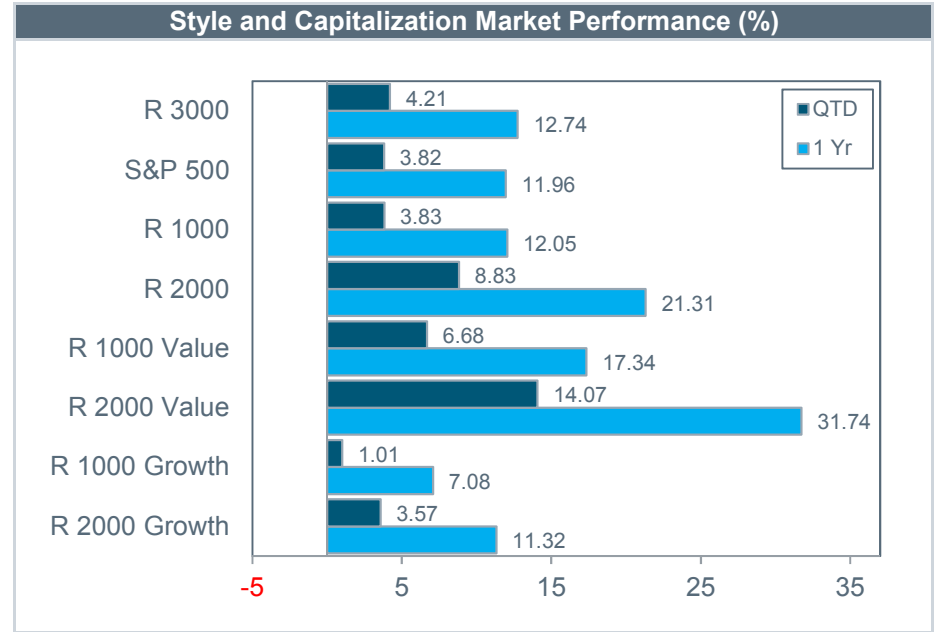


### Fourth Quarter Review

**Broad Market**  
 US equity markets started the fourth quarter with a slight decline, fueled largely by uncertainty surrounding the presidential election. However, results swiftly shifted post-election, and all major US equity indices finished the quarter and year in positive territory, with the Russell 3000 Index returning 4.2% and 12.7%, respectively.

**Market Cap**  
 While all major indices finished the quarter in positive territory, small cap led the way with the Russell 2000 returning 21.3% compared with 12.1% for the Russell 1000.

**Style and Sector**  
 Value stocks outperformed growth across all market caps in 2016. Post-election, several sectors finished the year with a strong rally including: Consumer Discretionary (14.5%), Energy (28.0%), Financials (20.4%), and Producer Durables (18.2%).



Valuation data courtesy of Bloomberg Professional Service and Robert J. Shiller, Irrational Exuberance, Second Edition. P/E metrics shown represent the 5th through 95th percentiles to minimize the effect of outliers.

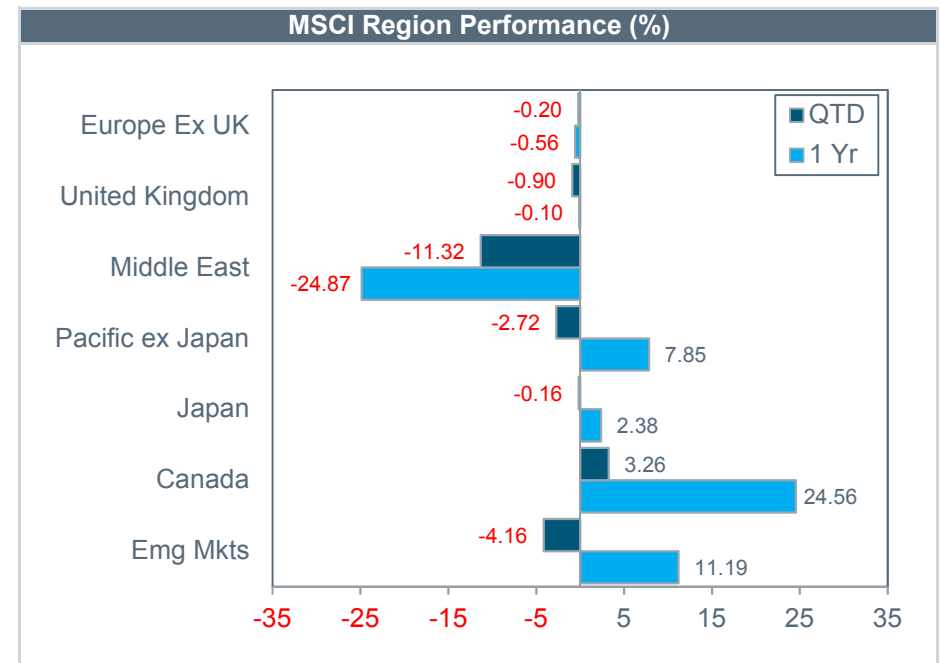
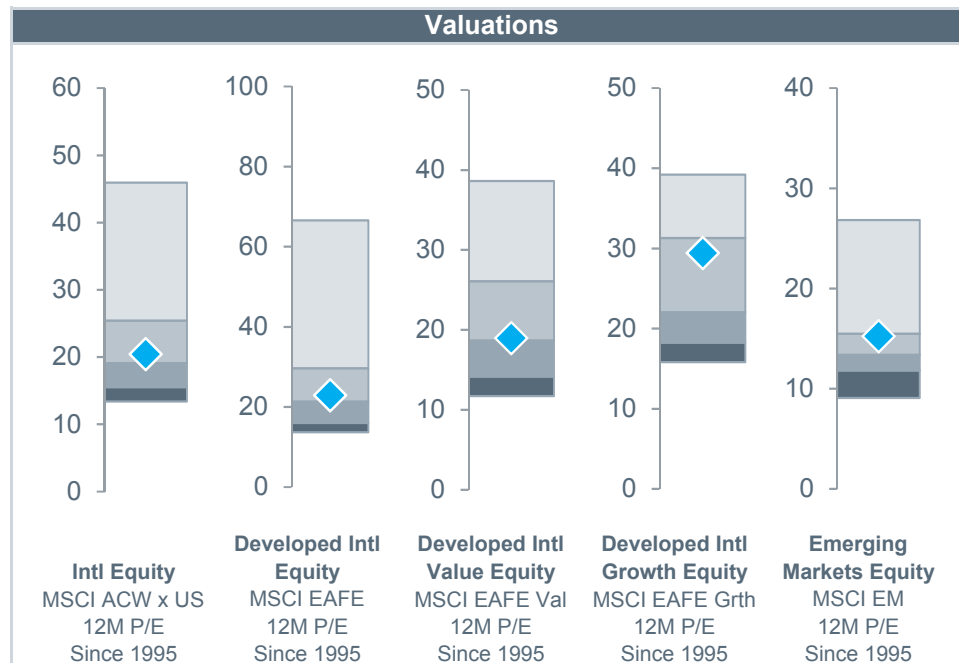
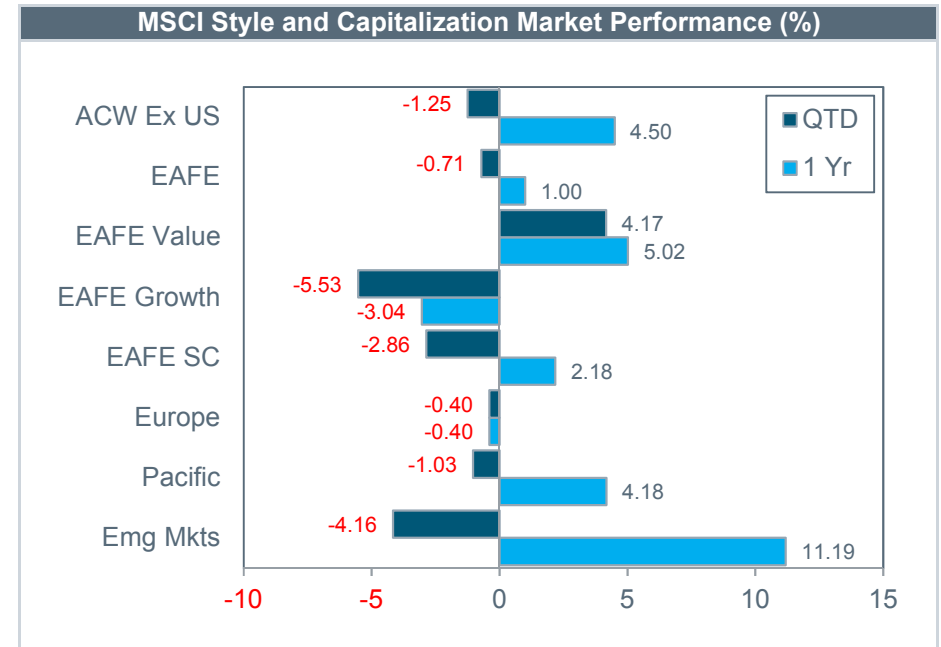


### Fourth Quarter Review

**Developed Markets**  
 Developed international markets ended the quarter slightly negative, but were positive for the year. Cyclical sectors, such as financials and energy, provided positive contributions for the quarter. By country, there were few bright spots, with only a few European countries posting positive returns in Q4.

**Emerging Markets**  
 Emerging Markets underperformed developed markets by a significant margin for the quarter. Year-end returns remained strong, but lagged US equities. Poor performance in emerging markets this quarter stemmed from fears that stimulus programs in the US could lead to higher bond yields and a stronger dollar, which may draw significant capital to the currency.

**Market Cap & Style**  
 Value stocks outperformed growth stocks for both the quarter and year while small-cap lagged large-cap for the quarter, but outperformed for the year.



Valuation data courtesy of Bloomberg Professional Service.  
 P/E metrics shown represent the 5th through 95th percentiles to minimize the effect of outliers.  
 All returns are shown net of foreign taxes on dividends.



**Fourth Quarter Review**

**Broad Market**

Recent and anticipated interest rate hikes negatively affected bond market returns for the quarter. The Bloomberg Barclays US Aggregate Bond Index ended the year with a return of 2.7% after returning -3.0% during Q4. Long duration government bonds, which are particularly sensitive to interest rate movements, returned -11.5% for the quarter and ended the year with a return of 1.4% as measured by the Bloomberg Barclays Long US Government Index.

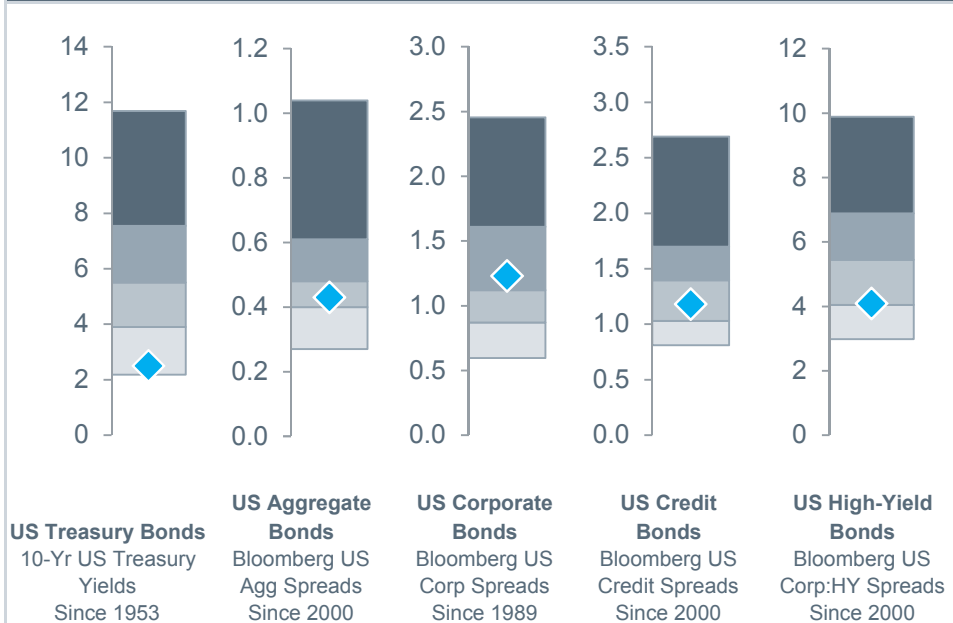
**Credit Market**

Investment grade and high yield credit spreads compressed during the quarter as investors' increased their appetite for credit. The BofAML US High Yield Index returned 17.5% for the quarter – its best return since 2009.

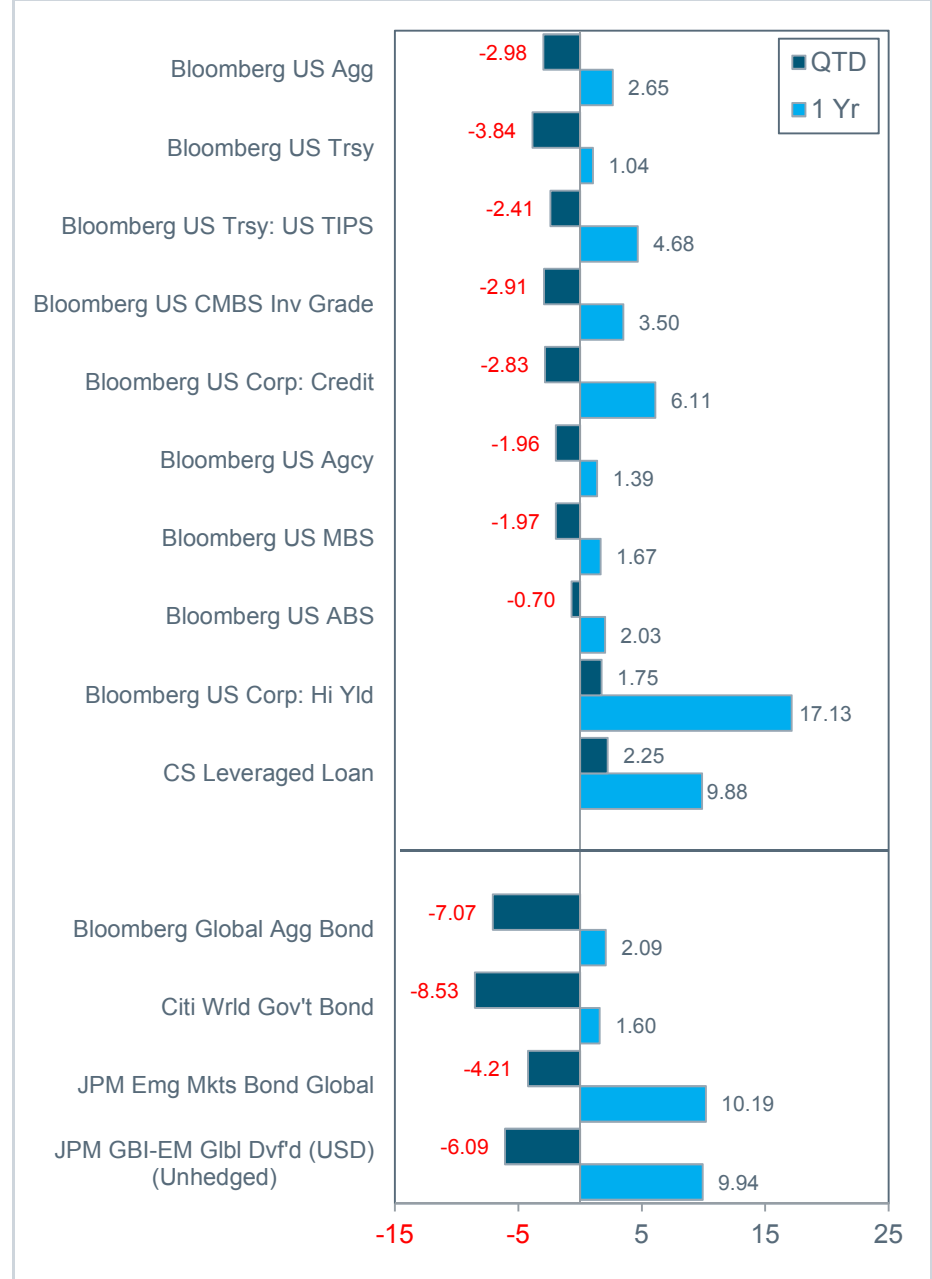
**International**

Foreign debt from both developed and emerging markets declined significantly during the quarter as the US dollar strengthened. The sharpest decline occurred immediately following the US presidential election.

**Valuations**



**Fixed Income Performance (%)**



Valuation data courtesy of Bloomberg Professional Service. Valuations shown represent the 5th through 95th percentiles to minimize the effect of outliers.

**Fourth Quarter Review - Absolute Return**

**General Market - Hedge Funds**

The fourth quarter wrapped up a mixed year for the hedge fund industry. Individual hedged equity managers had another difficult quarter from an alpha perspective, with early reports indicating the second worst quarter of alpha generation since 2010, in part due to sector rotations out of technology, consumer, and health care following the November elections. Poor performance from short books was a main detractor for many managers that delivered disappointing alpha and absolute returns. The best performing strategies for the year continued to be in the distressed/restructuring space.

**General Market - Global Tactical Asset Allocation (GTAA)**

Most GTAA managers underperformed an undiversified and static 60/40 portfolio of US large cap equity and US fixed income. Managers that focus on lower-volatility and low correlation alpha provided the strongest performance for the quarter, as long dollar, short US duration, and credit positions were rewarded in a welcome break from a challenging year for these managers.

**Fourth Quarter Review - Real Assets**

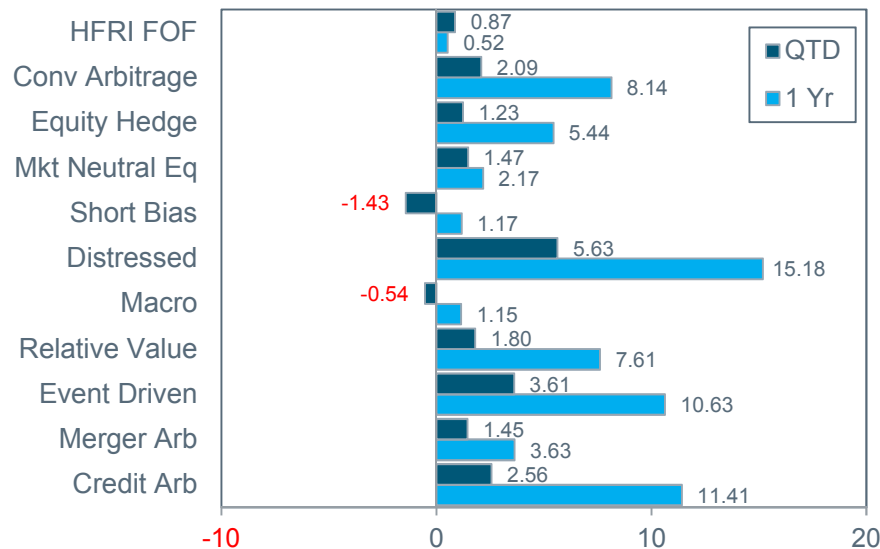
**General Market - Diversified Inflation Strategies (DIS)**

While most managers ended the year in positive territory, the fourth quarter proved challenging due to macroeconomic events. Managers with larger energy commodity exposure and natural resource equity exposure led the group during both the quarter and year. Managers with larger infrastructure and REIT allocations posted negative performance during the quarter as these asset classes initially appeared correlated with increased bond yields. Those that structurally allocate to TIPS at the expense of REITs, infrastructure, and natural resource equity ended the quarter at the approximate midpoint of the group.

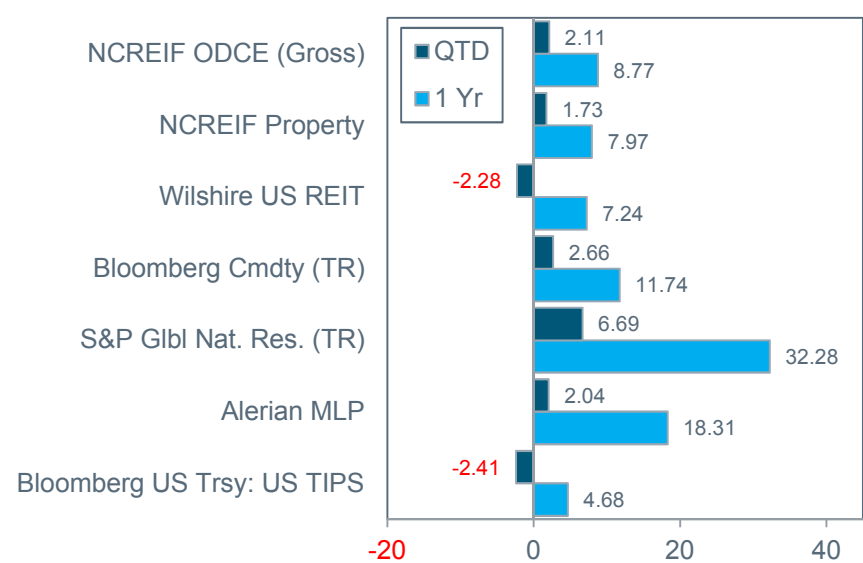
**General Market - Real Estate**

Investors responded to recent US political events and interest rate increases by selling off REITs, as evidenced by the -3.5% return in the FTSE/NAREIT US Real Estate Index during the quarter. The NCREIF-ODCE Index returned 2.1% for the quarter based on preliminary results, with a nearly equal share of returns deriving from income and appreciation.

**HFRI Hedge Fund Performance (%)**



**Real Asset Performance (%)**





Annual Asset Class Performance

As of December 31, 2016

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Best	25.91	61.34	33.16	34.00	35.97	39.38	8.44	78.51	28.60	22.49	20.00	38.82	31.78	15.02	21.31
	16.56	55.81	31.45	26.19	32.18	16.23	5.24	58.21	26.85	15.99	18.23	32.39	19.31	9.59	17.13
	14.84	47.25	25.55	21.39	26.34	15.97	2.06	46.78	22.04	13.56	17.59	29.30	13.69	4.23	11.96
	10.27	38.59	20.25	21.36	19.31	11.63	-2.35	31.78	18.88	9.24	17.32	22.78	12.50	1.38	11.74
	5.54	36.18	18.33	13.82	18.37	11.17	-10.01	28.60	16.83	7.84	16.35	13.94	5.97	0.55	11.19
	3.58	28.96	13.06	13.54	16.32	10.25	-21.37	27.17	16.36	4.98	16.00	8.96	4.89	0.05	8.77
	1.78	28.68	11.14	7.49	15.79	6.97	-26.16	26.46	15.12	2.11	15.81	7.44	3.64	-0.27	7.24
	1.02	23.93	10.88	5.34	11.86	6.60	-33.79	18.91	15.06	0.10	10.94	1.86	3.37	-0.31	6.67
	-1.37	11.61	9.15	4.91	10.39	5.49	-35.65	11.47	10.16	-4.18	8.78	0.07	2.45	-1.44	4.68
	-6.17	9.28	8.56	4.55	4.85	5.00	-37.00	11.41	7.75	-5.72	6.98	-2.02	0.04	-3.30	2.65
	-7.83	8.39	8.46	3.07	4.34	1.87	-39.20	5.93	6.54	-12.14	4.79	-2.60	-2.19	-4.41	2.18
	-15.94	5.88	6.86	2.84	2.72	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.30	-4.47	1.00
	-20.48	4.11	4.34	2.74	2.07	-1.57	-47.01	0.21	5.70	-15.94	0.11	-8.83	-4.95	-14.92	0.52
Worst	-22.10	1.15	1.33	2.43	0.49	-17.55	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-24.66	0.33
	S&P 500 - US Large Cap	R 2000 - US Small Cap	MSCI EAFE (Net) - Int'l Dev.	MSCI EAFE SC (Net) - Int'l SC	MSCI EM (Net) - Int'l Emg Mkts	Bloomberg US Agg Bond - FI	Bloomberg US Corp: Hi Yield - FI	Bloomberg US Trsy: US TIPS - FI	Bloomberg US Gov/Credit: Lng - FI	NCREIF ODCE (Gross) - Real Estate	Wilshire US REIT - REITs	HFRI FOF Comp Index - ARS	Bloomberg Cmdty (TR) - Commod.	BofA ML 3 Mo T-Bill - Cash Equiv	

NCREIF ODCE (Gross) performance is reported quarterly; performance is shown N/A in interim-quarter months.

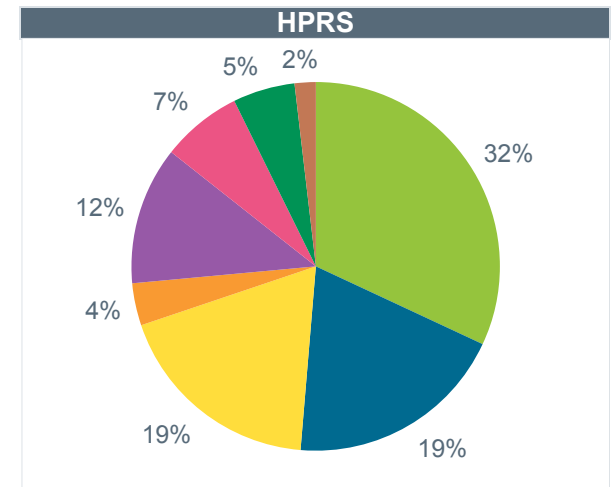
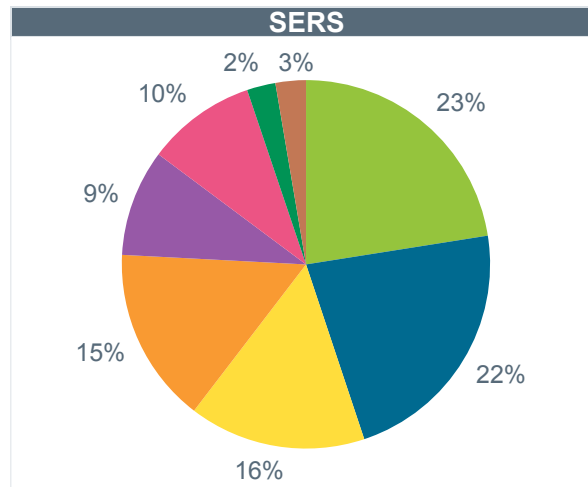
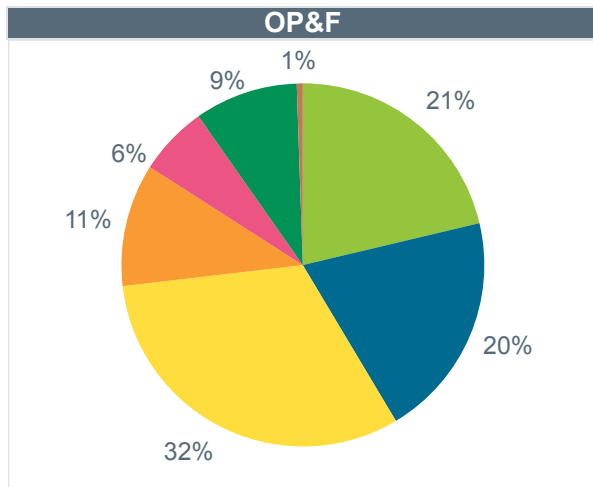
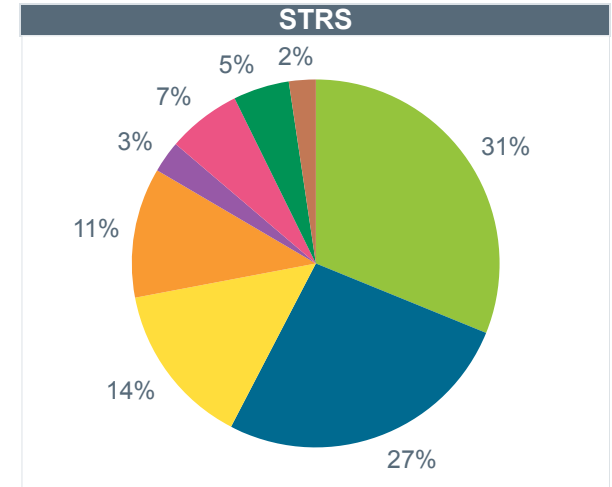
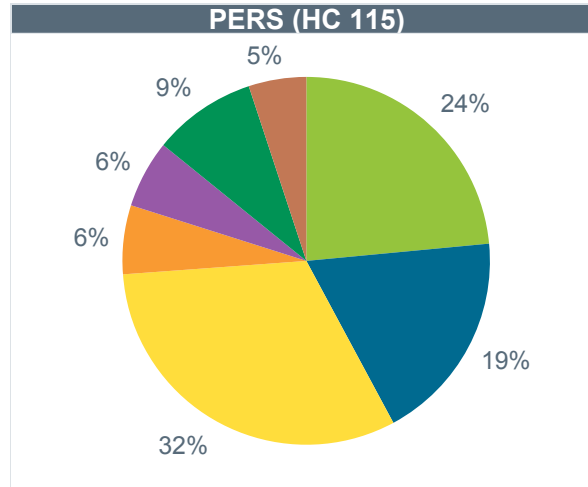
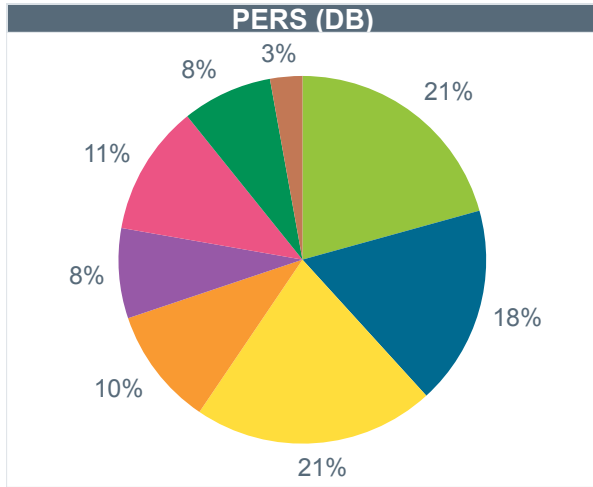


Asset Allocation & Performance											
	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>PERS (DB)</b>	<b>77,183,301</b>	<b>4.22</b>	<b>8.56</b>	<b>5.40</b>	<b>9.03</b>	<b>8.48</b>	<b>5.27</b>	<b>0.58</b>	<b>7.25</b>	<b>14.65</b>	<b>14.78</b>
PERS (DB) Total Fund Benchmark		4.44	8.64	4.84	8.71	7.89	4.94	0.25	5.81	14.24	15.35
Difference		-0.22	-0.08	0.56	0.32	0.59	0.33	0.33	1.44	0.41	-0.57
Rank		64	20	27	30	28	44	36	32	59	7
<b>PERS (HC 115)</b>	<b>11,843,241</b>	<b>2.92</b>	<b>7.67</b>	<b>3.59</b>	<b>7.13</b>	<b>6.91</b>	<b>4.68</b>	<b>-2.11</b>	<b>5.46</b>	<b>11.54</b>	<b>13.85</b>
PERS (HC 115) Total Fund Benchmark		3.07	7.75	3.53	6.88	6.59	4.69	-1.93	5.01	10.70	13.54
Difference		-0.15	-0.08	0.06	0.25	0.32	-0.01	-0.18	0.45	0.84	0.31
Rank		89	59	95	85	90	79	97	75	79	26
<b>STRS</b>	<b>71,661,176</b>	<b>6.04</b>	<b>8.18</b>	<b>6.16</b>	<b>9.80</b>	<b>9.06</b>	<b>5.47</b>	<b>2.46</b>	<b>7.95</b>	<b>17.39</b>	<b>13.60</b>
STRS Total Fund Benchmark		5.70	8.00	5.94	9.85	9.04	5.51	1.70	8.26	18.09	13.93
Difference		0.34	0.18	0.22	-0.05	0.02	-0.04	0.76	-0.31	-0.70	-0.33
Rank		7	36	2	10	11	39	6	19	27	41
<b>OP&amp;F</b>	<b>14,485,210</b>	<b>6.75</b>	<b>11.52</b>	<b>6.25</b>	<b>10.09</b>	<b>9.78</b>	<b>6.31</b>	<b>0.65</b>	<b>6.87</b>	<b>16.83</b>	<b>15.41</b>
OP&F Total Fund Benchmark		5.04	11.44	5.22	8.94	8.50	5.27	-2.18	6.87	14.61	14.94
Difference		1.71	0.08	1.03	1.15	1.28	1.04	2.83	0.00	2.22	0.47
Rank		2	1	1	3	1	1	33	39	33	2
<b>SERS</b>	<b>12,785,492</b>	<b>4.88</b>	<b>8.08</b>	<b>5.95</b>	<b>9.72</b>	<b>8.63</b>	<b>5.11</b>	<b>2.93</b>	<b>6.92</b>	<b>16.86</b>	<b>14.42</b>
SERS Total Fund Benchmark		4.15	6.65	4.90	8.62	7.58	4.84	1.48	6.66	15.34	13.56
Difference		0.73	1.43	1.05	1.10	1.05	0.27	1.45	0.26	1.52	0.86
Rank		43	39	8	12	22	59	1	35	32	12
<b>HPRS</b>	<b>825,505</b>	<b>5.44</b>	<b>7.31</b>	<b>4.67</b>	<b>8.86</b>	<b>7.78</b>	<b>4.85</b>	<b>0.15</b>	<b>6.73</b>	<b>19.59</b>	<b>11.45</b>
HPRS Total Fund Benchmark		4.59	7.30	4.79	8.73	8.27	5.56	0.19	7.03	16.79	13.07
Difference		0.85	0.01	-0.12	0.13	-0.49	-0.71	-0.04	-0.30	2.80	-1.62
Rank		21	68	52	33	59	70	53	46	11	88
<i>All Public Plans &gt; \$1B-Total Fund Median</i>		4.63	7.84	4.69	8.31	7.91	5.23	0.20	6.59	15.61	13.20

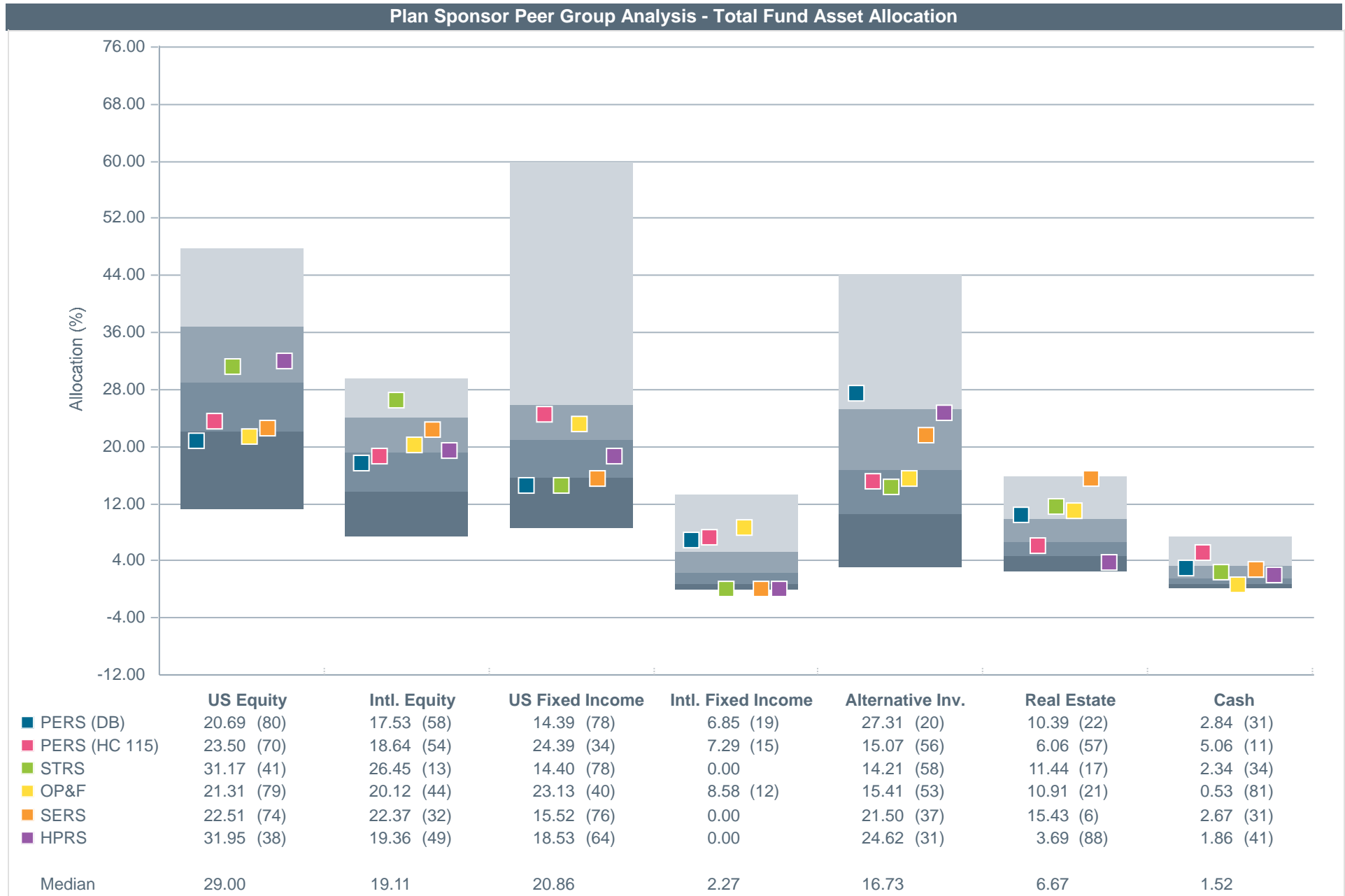
Performance shown is gross of fees but is net of embedded fees on externally managed real estate and alternative investments. Ranks are shown against All Public Plans >\$1B-Total Fund.

Asset Allocation & Performance - Net of Fees											
	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>PERS (DB)</b>	<b>77,183,301</b>	<b>4.12</b>	<b>8.31</b>	<b>5.14</b>	<b>8.77</b>	<b>8.25</b>	<b>5.11</b>	<b>0.33</b>	<b>6.96</b>	<b>14.38</b>	<b>14.54</b>
PERS (DB) Total Fund Benchmark		4.44	8.64	4.84	8.71	7.89	4.94	0.25	5.81	14.24	15.35
Difference		-0.32	-0.33	0.30	0.06	0.36	0.17	0.08	1.15	0.14	-0.81
<b>PERS (HC 115)</b>	<b>11,843,241</b>	<b>2.86</b>	<b>7.55</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-2.23</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) Total Fund Benchmark		3.07	7.75	N/A	N/A	N/A	N/A	-1.93	N/A	N/A	N/A
Difference		-0.21	-0.20	N/A	N/A	N/A	N/A	-0.30	N/A	N/A	N/A
<b>STRS</b>	<b>71,661,176</b>	<b>5.97</b>	<b>8.03</b>	<b>6.03</b>	<b>9.66</b>	<b>8.93</b>	<b>5.35</b>	<b>2.33</b>	<b>7.82</b>	<b>17.25</b>	<b>13.47</b>
STRS Total Fund Benchmark		5.70	8.00	5.94	9.85	9.04	5.51	1.70	8.26	18.09	13.93
Difference		0.27	0.03	0.09	-0.19	-0.11	-0.16	0.63	-0.44	-0.84	-0.46
<b>OP&amp;F</b>	<b>14,485,210</b>	<b>6.48</b>	<b>10.90</b>	<b>5.65</b>	<b>9.56</b>	<b>9.29</b>	<b>5.89</b>	<b>0.07</b>	<b>6.27</b>	<b>16.40</b>	<b>14.98</b>
OP&F Total Fund Benchmark		5.04	11.44	5.22	8.94	8.50	5.27	-2.18	6.87	14.61	14.94
Difference		1.44	-0.54	0.43	0.62	0.79	0.62	2.25	-0.60	1.79	0.04
<b>SERS</b>	<b>12,785,492</b>	<b>4.52</b>	<b>7.37</b>	<b>5.28</b>	<b>9.00</b>	<b>7.89</b>	<b>4.41</b>	<b>2.31</b>	<b>6.25</b>	<b>16.09</b>	<b>13.55</b>
SERS Total Fund Benchmark		4.15	6.65	4.90	8.62	7.58	4.84	1.48	6.66	15.34	13.56
Difference		0.37	0.72	0.38	0.38	0.31	-0.43	0.83	-0.41	0.75	-0.01
<b>HPRS</b>	<b>825,505</b>	<b>5.28</b>	<b>6.92</b>	<b>4.21</b>	<b>8.46</b>	<b>7.40</b>	<b>4.51</b>	<b>-0.43</b>	<b>6.30</b>	<b>19.35</b>	<b>11.13</b>
HPRS Total Fund Benchmark		4.59	7.30	4.79	8.73	8.27	5.56	0.19	7.03	16.79	13.07
Difference		0.69	-0.38	-0.58	-0.27	-0.87	-1.05	-0.62	-0.73	2.56	-1.94

Performance shown is net of all investment management costs.

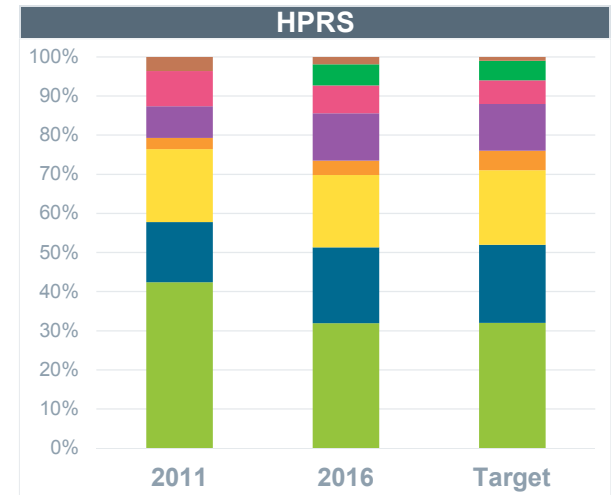
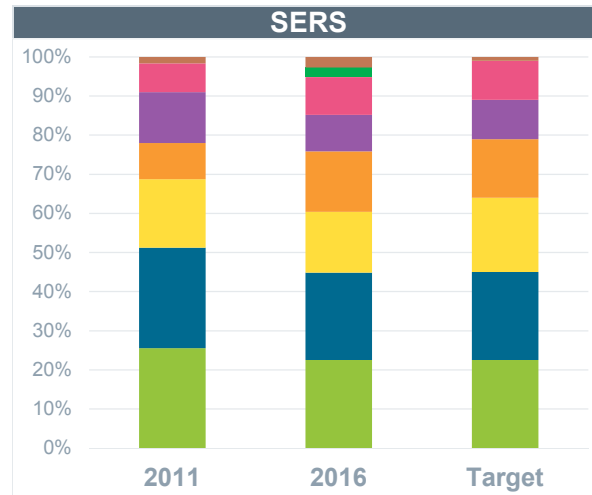
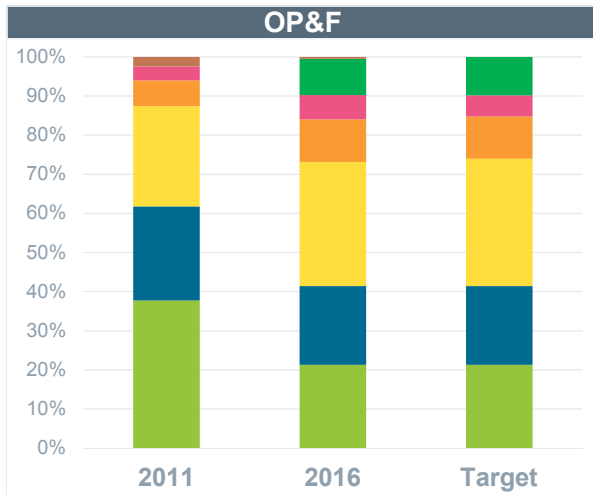
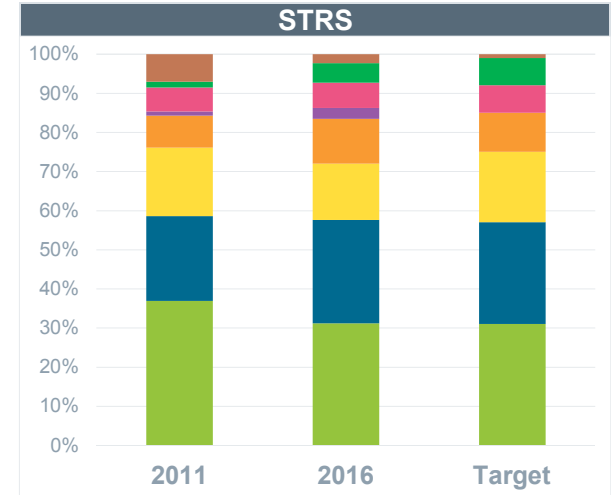
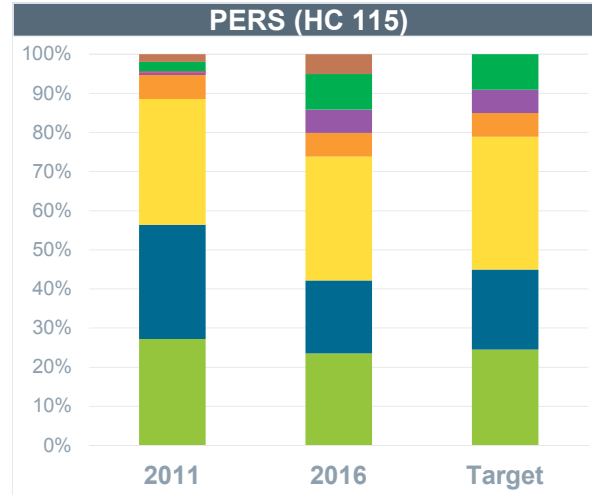
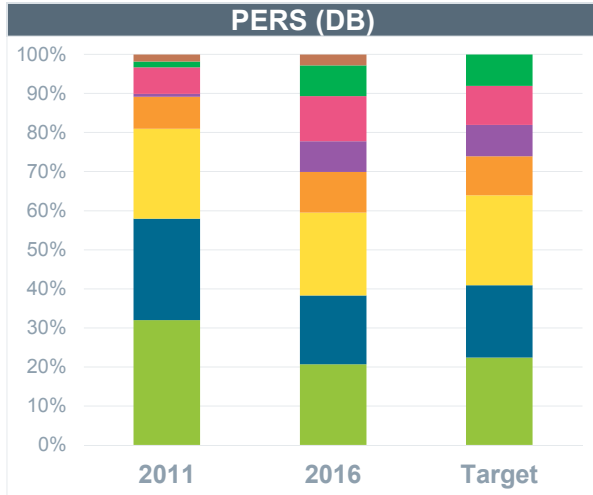


Allocations shown may not sum up to 100% exactly due to rounding. Cash Equivalents for PERS (DB) and PERS (HC 115) consists of cash, rebalancing, and additional annuity.



Allocations shown may not add up to 100% due to rounding. US Fixed Income may include allocations to Intl. Fixed Income not explicitly broken out by the plans. Parentheses contain percentile ranks. Cash Equivalents for PERS (DB) consists of cash, rebalancing, and additional annuity. Cash Equivalents for PERS (HC 115) consists of cash and rebalancing.



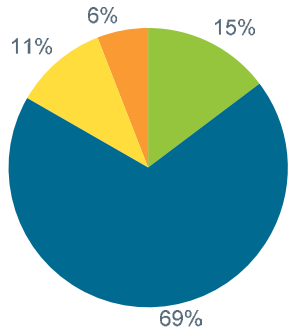


- US Equity
- International Equity
- Fixed Income
- Real Estate
- Hedge Funds
- Private Equity
- Other Alternatives
- Cash Equivalents

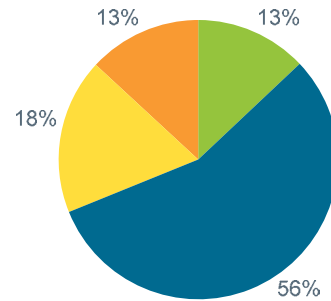
Summary

- **Alpha:** Aims to continually provide a return in excess of the portfolio benchmark return for a given level of risk and are intended to provide diversification (primarily with the Capital Appreciation and Capital Preservation components).  
(Includes: Hedge Funds, Global Tactical Asset Allocation (GTAA), and Risk Parity)
- **Capital Appreciation:** Seeks high level of capital gains through increased risk-return trade-off.  
(Includes: Public & Private Equities, High Yield, Emerging Markets Debt, MLPs, Timber, Non-Core Real Estate, Opportunistic Investments, and Securitized Debt)
- **Capital Preservation:** Conservative strategy designed to avoid risk of loss of principal.  
(Includes: Core Fixed Income and Cash Equivalents)
- **Inflation:** Provide returns that will keep pace with normal inflationary movements in the long-term market. Designed not to lose value in an inflationary environment.  
(Includes: TIPS, Commodities, Real Return, Floating Rate Debt, REITs, and Core Real Estate)

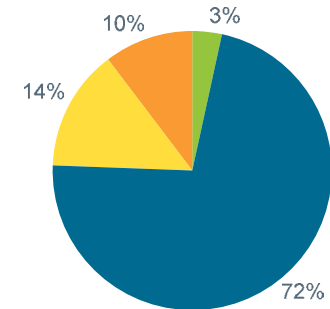
PERS (DB)



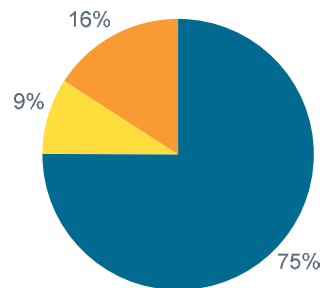
PERS (HC 115)



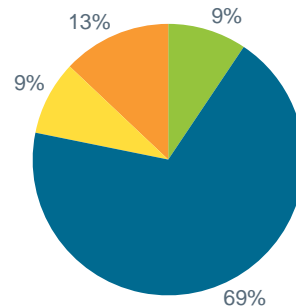
STRS



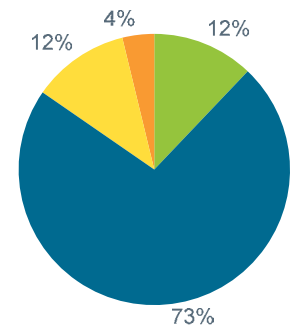
OP&F



SERS



HPRS



Asset Allocation by Thematic Category percentages are provided by the Plans. Allocations are based on dedicated composite allocations and not underlying investment manager exposures; as such, thematic allocations are approximations. OP&F does not have any dedicated exposure to Alpha strategies, but does have alpha exposure embedded within other asset class buckets. Allocations shown may not sum up to exactly 100% due to rounding. Please see the Glossary for additional information regarding thematic descriptions.

Summary

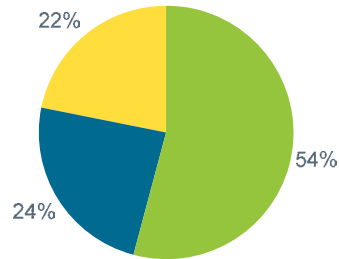
**RVK Liquidity Rating** - A qualitative method developed and calculated by RVK for determining the relative amount of liquidity in a portfolio.

**Liquid Investments:** Publicly traded assets, largely exchanged traded with significant trading volume for the overall asset classes. Takes a relatively small discount or time required to raise cash, but generally expected to clear at quoted bid prices within several trading days.

**Less Liquid Investments:** Smaller trading volume, non-exchange traded, or vehicle-based liquidity constraints. Moderate to significant discount to raise cash, expected to see fewer purchase-oriented bids, or time required to receive cash is significantly greater than several trading days.

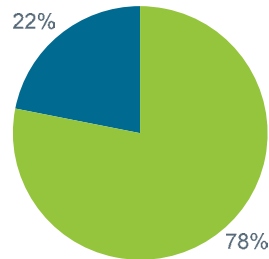
**Not Liquid Investments:** Private appraisal-based transactions, vehicle-based liquidity constraints, or privately held assets. Extreme discount to raise cash or 6-12+ months required to receive cash.

PERS (DB)



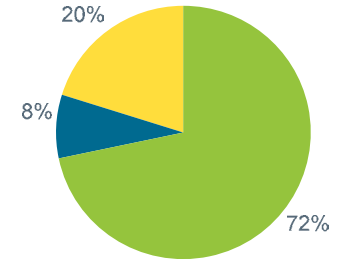
PERS (DB) Liquidity Rating 63

PERS (HC 115)



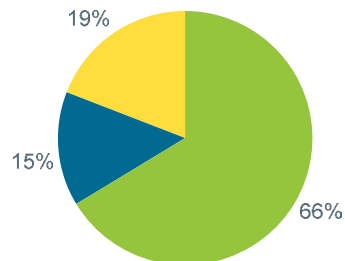
PERS (HC 115) Liquidity Rating 84

STRS



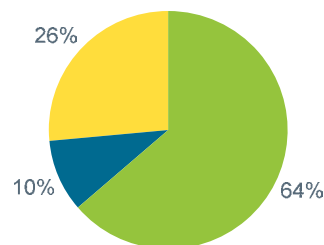
STRS Liquidity Rating 71

OP&F



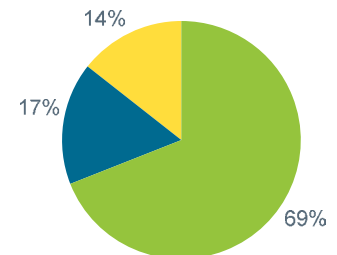
OP&F Liquidity Rating 70

SERS



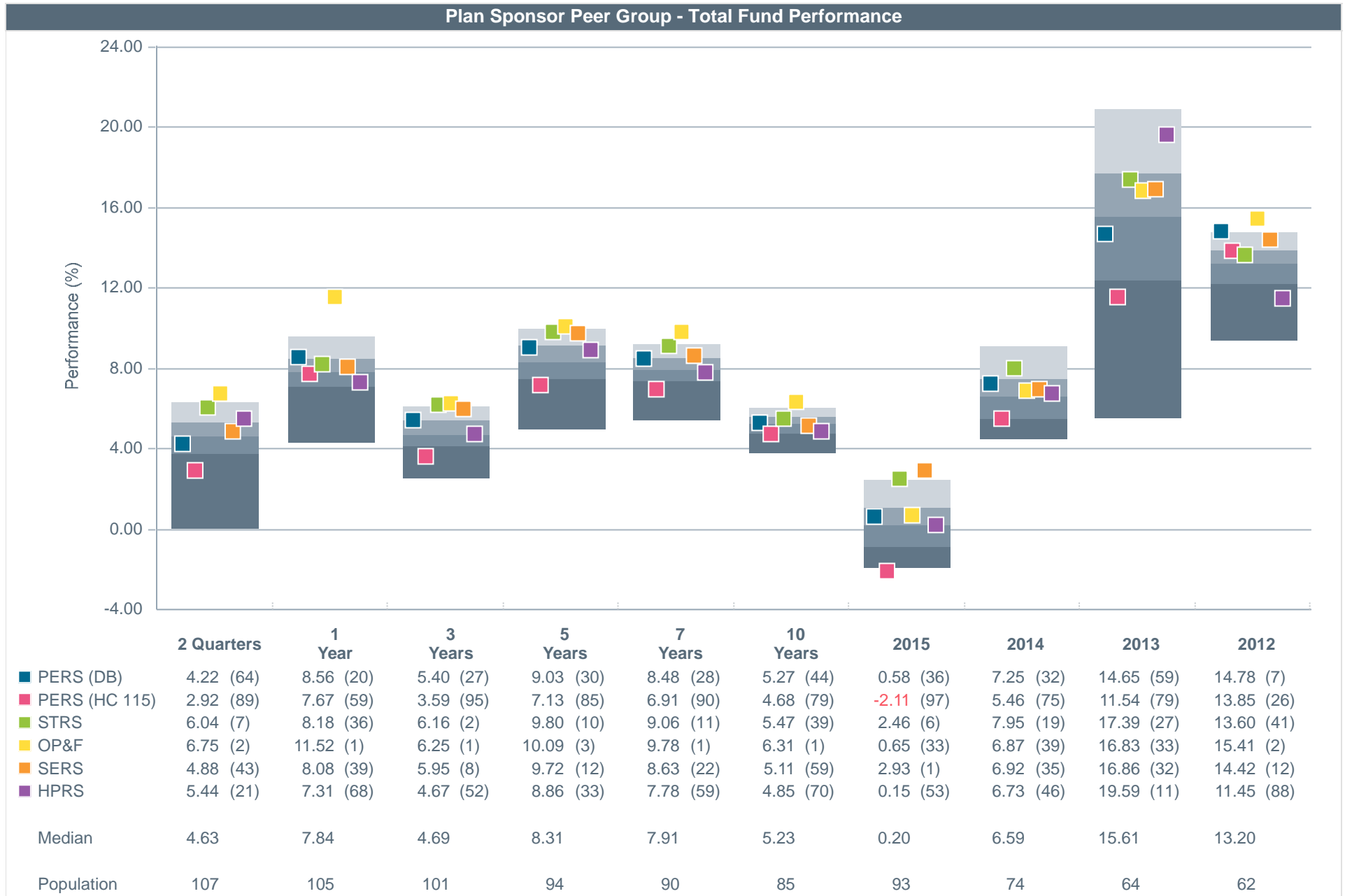
SERS Liquidity Rating 63

HPRS



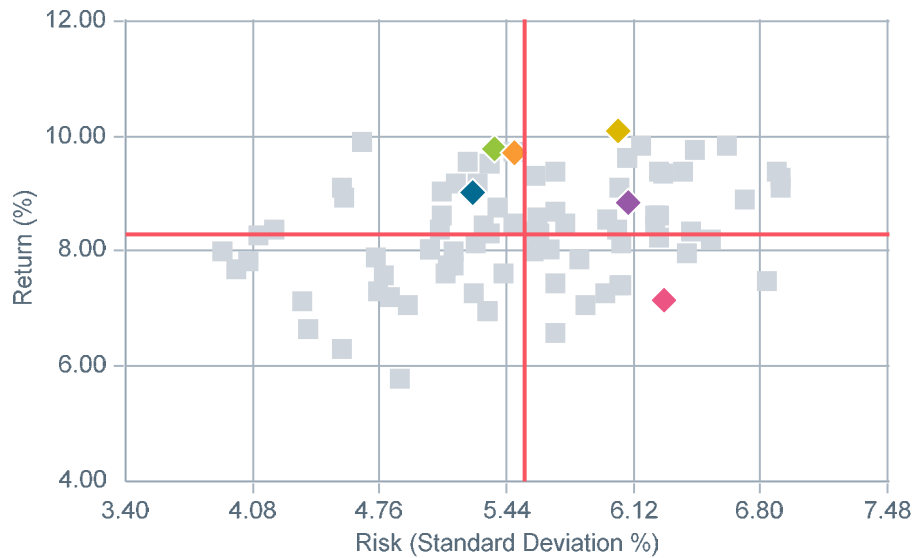
HPRS Liquidity Rating 68

Asset Allocation by Liquidity percentages are provided by the Plans. Allocations are based on dedicated composite allocations and not underlying investment manager exposures; as such, liquidity allocations are approximations. Allocations shown may not sum up to exactly 100% due to rounding. The RVK Liquidity Rating is calculated by RVK using beginning of quarter investment weights applied to each corresponding asset class liquidity rating. Please see the glossary for additional information regarding liquidity and custom index descriptions.



Performance shown is gross of fees. Parentheses contain percentile ranks.

Plan Sponsor Peer Group Scattergram - 5 Years

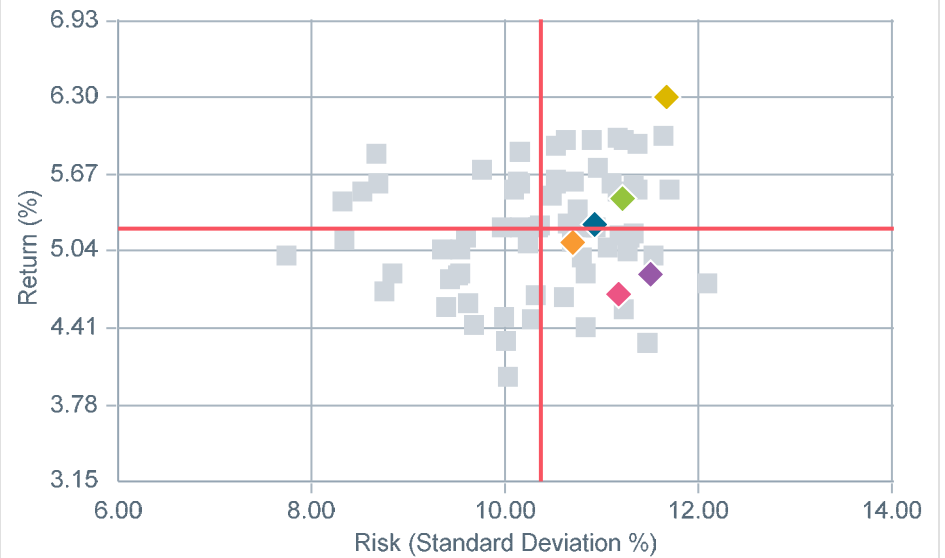


	Return	Standard Deviation
◆ PERS (DB)	9.03	5.25
◆ PERS (HC 115)	7.13	6.29
◆ STRS	9.80	5.37
◆ OP&F	10.09	6.04
◆ SERS	9.72	5.48
◆ HPRS	8.86	6.10
— Median	8.31	5.54

Sharpe Ratio - 5 Year

PERS (DB)	1.67
PERS (HC 115)	1.12
STRS	1.76
OP&F	1.62
SERS	1.72
HPRS	1.42
<i>All Public Plans &gt; \$1B-Total Fund Median</i>	1.45

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	5.27	10.93
◆ PERS (HC 115)	4.68	11.17
◆ STRS	5.47	11.22
◆ OP&F	6.31	11.68
◆ SERS	5.11	10.70
◆ HPRS	4.85	11.51
— Median	5.23	10.38

Sharpe Ratio - 10 Year

PERS (DB)	0.45
PERS (HC 115)	0.39
STRS	0.46
OP&F	0.51
SERS	0.44
HPRS	0.40
<i>All Public Plans &gt; \$1B-Total Fund Median</i>	0.47

Performance shown is gross of fees.



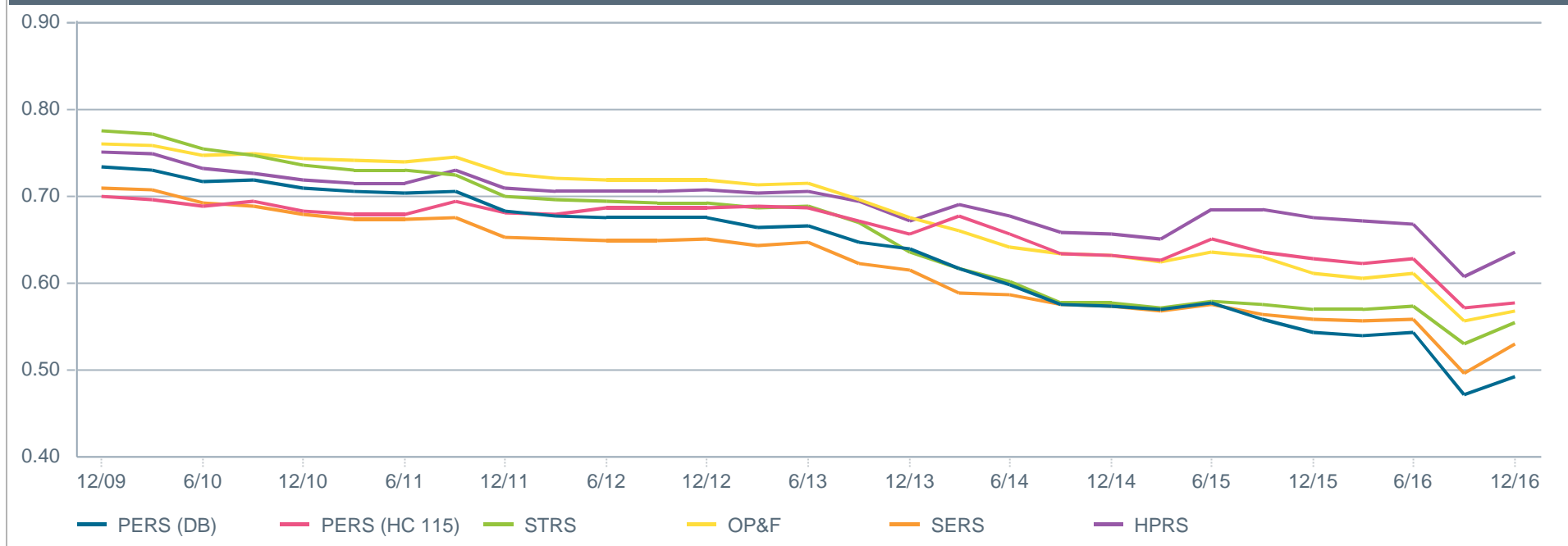
Summary

Beta is a measure of the sensitivity of a portfolio to the movements of the U.S. equity market as represented by the S&P 500 Index (Cap Wtd). Beta measures a portfolio's non-diversifiable or systematic risk. As an example, a Beta of 0.70 indicates that a portfolio captures roughly 70% of the S&P 500 Index return. If the S&P 500 Index returns 10%, the portfolio would be expected to return 7%.

Equity Beta

	3 Years	5 Years	7 Years	10 Years
PERS (DB)	0.49	0.49	0.57	0.65
PERS (HC 115)	0.62	0.58	0.63	0.65
STRS	0.61	0.55	0.58	0.67
OP&F	0.62	0.57	0.63	0.69
SERS	0.50	0.53	0.56	0.63
HPRS	0.62	0.64	0.65	0.69
S&P 500 Index (Cap Wtd)	1.00	1.00	1.00	1.00

5 Year Rolling Equity Beta



Performance shown is gross of fees and is calculated using quarterly periodicity.

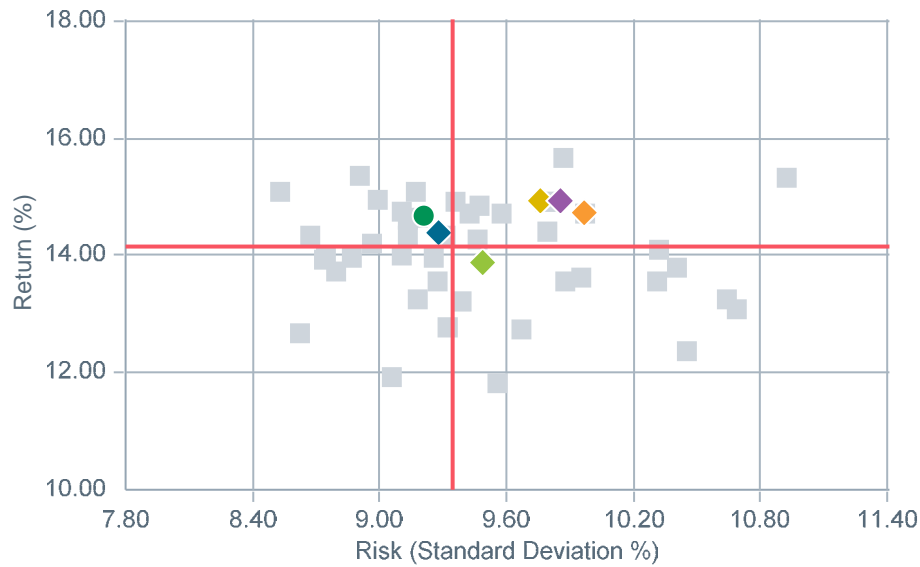
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>US Equity</b>										
<b>PERS (DB)</b>	<b>8.46</b>	<b>12.09</b>	<b>7.89</b>	<b>14.41</b>	<b>12.73</b>	<b>6.88</b>	<b>0.68</b>	<b>11.29</b>	<b>33.86</b>	<b>16.58</b>
Russell 3000 Index	8.79	12.74	8.43	14.67	12.92	7.07	0.48	12.56	33.55	16.42
Difference	-0.33	-0.65	-0.54	-0.26	-0.19	-0.19	0.20	-1.27	0.31	0.16
Rank	60	65	49	39	57	61	27	52	52	49
<b>PERS (HC 115)</b>	<b>8.46</b>	<b>12.09</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.68</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Russell 3000 Index	8.79	12.74	N/A	N/A	N/A	N/A	0.48	N/A	N/A	N/A
Difference	-0.33	-0.65	N/A	N/A	N/A	N/A	0.20	N/A	N/A	N/A
Rank	60	65	N/A	N/A	N/A	N/A	27	N/A	N/A	N/A
<b>STRS</b>	<b>9.14</b>	<b>11.32</b>	<b>7.83</b>	<b>13.87</b>	<b>12.40</b>	<b>6.56</b>	<b>0.83</b>	<b>11.70</b>	<b>32.14</b>	<b>15.56</b>
Russell 3000 Index	8.79	12.74	8.43	14.67	12.92	7.07	0.48	12.56	33.55	16.42
Difference	0.35	-1.42	-0.60	-0.80	-0.52	-0.51	0.35	-0.86	-1.41	-0.86
Rank	41	80	53	64	67	71	25	43	81	69
<b>OP&amp;F</b>	<b>11.41</b>	<b>15.60</b>	<b>8.99</b>	<b>14.93</b>	<b>13.86</b>	<b>7.99</b>	<b>0.66</b>	<b>11.27</b>	<b>35.53</b>	<b>14.28</b>
Wilshire 5000 Index	9.03	13.37	8.75	14.71	12.96	7.15	0.67	12.71	33.07	16.06
Difference	2.38	2.23	0.24	0.22	0.90	0.84	-0.01	-1.44	2.46	-1.78
Rank	7	9	13	19	9	9	28	52	18	96
<b>SERS</b>	<b>7.76</b>	<b>11.27</b>	<b>7.73</b>	<b>14.73</b>	<b>13.06</b>	<b>6.95</b>	<b>1.24</b>	<b>10.99</b>	<b>35.76</b>	<b>17.09</b>
Russell 3000 Index	8.79	12.74	8.43	14.67	12.92	7.07	0.48	12.56	33.55	16.42
Difference	-1.03	-1.47	-0.70	0.06	0.14	-0.12	0.76	-1.57	2.21	0.67
Rank	78	81	57	28	37	57	19	59	12	23
<b>HPRS</b>	<b>10.36</b>	<b>13.73</b>	<b>8.45</b>	<b>14.94</b>	<b>13.33</b>	<b>7.51</b>	<b>0.18</b>	<b>11.97</b>	<b>35.56</b>	<b>16.01</b>
Russell 3000 Index	8.79	12.74	8.43	14.67	12.92	7.07	0.48	12.56	33.55	16.42
Difference	1.57	0.99	0.02	0.27	0.41	0.44	-0.30	-0.59	2.01	-0.41
Rank	15	25	27	18	19	17	45	33	17	62
<i>All Public Plans &gt; \$1B-US Equity Segment Median</i>	<i>8.74</i>	<i>12.87</i>	<i>7.86</i>	<i>14.16</i>	<i>12.88</i>	<i>7.12</i>	<i>-0.10</i>	<i>11.41</i>	<i>34.33</i>	<i>16.53</i>

Performance shown is gross of fees. Ranks are shown against All Public Plans >\$1B-US Equity Segment.

Risk & Return - US Equity

All Public Plans > \$1B-US Equity Segment

Plan Sponsor Peer Group Scattergram - 5 Years

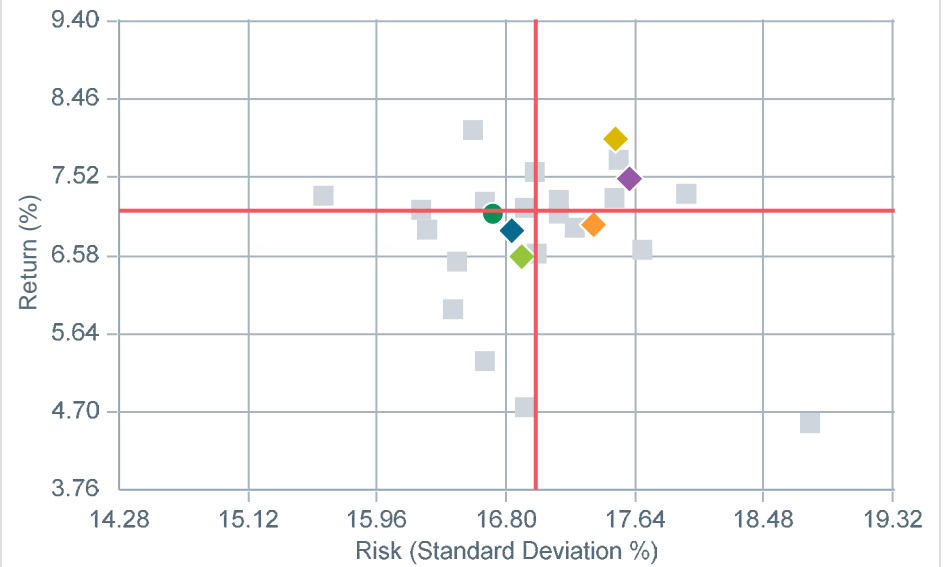


	Return	Standard Deviation
◆ PERS (DB)	14.41	9.28
◆ PERS (HC 115)	N/A	N/A
◆ STRS	13.87	9.49
◆ OP&F	14.93	9.76
◆ SERS	14.73	9.97
◆ HPRS	14.94	9.85
● Russell 3000 Index	14.67	9.22
— Median	14.16	9.35

Sharpe Ratio - 5 Years

PERS (DB)	1.51
PERS (HC 115)	N/A
STRS	1.42
OP&F	1.49
SERS	1.44
HPRS	1.47
Russell 3000 Index	1.54
All Public Plans > \$1B-US Equity Segment Median	1.47

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	6.88	16.84
◆ PERS (HC 115)	N/A	N/A
◆ STRS	6.56	16.90
◆ OP&F	7.99	17.52
◆ SERS	6.95	17.37
◆ HPRS	7.51	17.61
● Russell 3000 Index	7.07	16.73
— Median	7.12	17.00

Sharpe Ratio - 10 Years

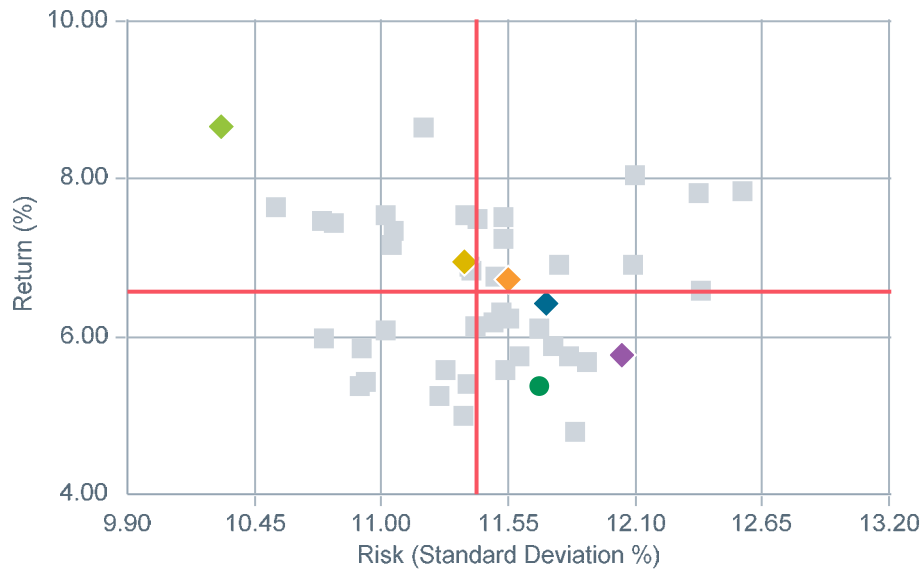
PERS (DB)	0.43
PERS (HC 115)	N/A
STRS	0.41
OP&F	0.48
SERS	0.43
HPRS	0.46
Russell 3000 Index	0.45
All Public Plans > \$1B-US Equity Segment Median	0.44

Performance shown is gross of fees.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>International Equity</b>										
<b>PERS (DB)</b>	<b>4.74</b>	<b>5.72</b>	<b>-0.01</b>	<b>6.43</b>	<b>4.14</b>	<b>1.69</b>	<b>-4.01</b>	<b>-1.48</b>	<b>15.61</b>	<b>18.15</b>
PERS (DB) International Equity Custom Benchmark	5.22	5.54	-1.44	4.84	2.74	0.83	-6.09	-3.42	12.92	17.18
Difference	-0.48	0.18	1.43	1.59	1.40	0.86	2.08	1.94	2.69	0.97
Rank	46	22	25	52	67	61	79	27	81	71
<b>PERS (HC 115)</b>	<b>4.74</b>	<b>5.72</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-4.01</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) International Equity Custom Benchmark	5.22	5.54	N/A	N/A	N/A	N/A	-6.09	N/A	N/A	N/A
Difference	-0.48	0.18	N/A	N/A	N/A	N/A	2.08	N/A	N/A	N/A
Rank	97	99	N/A	N/A	N/A	N/A	96	N/A	N/A	N/A
<b>STRS</b>	<b>8.43</b>	<b>7.09</b>	<b>2.70</b>	<b>8.66</b>	<b>5.78</b>	<b>2.99</b>	<b>0.30</b>	<b>0.83</b>	<b>19.23</b>	<b>17.32</b>
STRS International Equity Custom Benchmark	8.78	6.39	1.21	7.35	4.53	2.04	-2.78	0.24	17.63	16.93
Difference	-0.35	0.70	1.49	1.31	1.25	0.95	3.08	0.59	1.60	0.39
Rank	1	12	3	6	15	15	12	6	35	81
<b>OP&amp;F</b>	<b>5.38</b>	<b>2.75</b>	<b>-1.25</b>	<b>6.95</b>	<b>5.05</b>	<b>2.58</b>	<b>-0.77</b>	<b>-5.58</b>	<b>21.01</b>	<b>20.08</b>
MSCI ACW Ex US IM Index (USD) (Net)	5.37	4.41	-1.44	5.35	3.28	1.22	-4.60	-3.89	15.82	17.04
Difference	0.01	-1.66	0.19	1.60	1.77	1.36	3.83	-1.67	5.19	3.04
Rank	26	74	79	40	25	24	26	99	17	22
<b>SERS</b>	<b>5.92</b>	<b>5.81</b>	<b>-0.31</b>	<b>6.73</b>	<b>4.58</b>	<b>2.16</b>	<b>-2.37</b>	<b>-4.10</b>	<b>17.29</b>	<b>19.16</b>
SERS International Equity Custom Benchmark	5.57	4.50	-1.78	5.44	3.30	1.22	-5.66	-3.87	17.15	17.39
Difference	0.35	1.31	1.47	1.29	1.28	0.94	3.29	-0.23	0.14	1.77
Rank	16	22	39	49	47	36	51	88	70	34
<b>HPRS</b>	<b>3.37</b>	<b>1.69</b>	<b>-1.99</b>	<b>5.76</b>	<b>3.34</b>	<b>1.26</b>	<b>-2.91</b>	<b>-4.65</b>	<b>19.05</b>	<b>18.06</b>
MSCI ACW Ex US Index (USD) (Net)	5.57	4.50	-1.78	5.00	2.93	0.96	-5.66	-3.87	15.29	16.83
Difference	-2.20	-2.81	-0.21	0.76	0.41	0.30	2.75	-0.78	3.76	1.23
Rank	77	81	99	71	89	83	58	93	36	72
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	<i>4.65</i>	<i>3.92</i>	<i>-0.49</i>	<i>6.57</i>	<i>4.42</i>	<i>1.82</i>	<i>-2.36</i>	<i>-2.94</i>	<i>17.97</i>	<i>18.87</i>

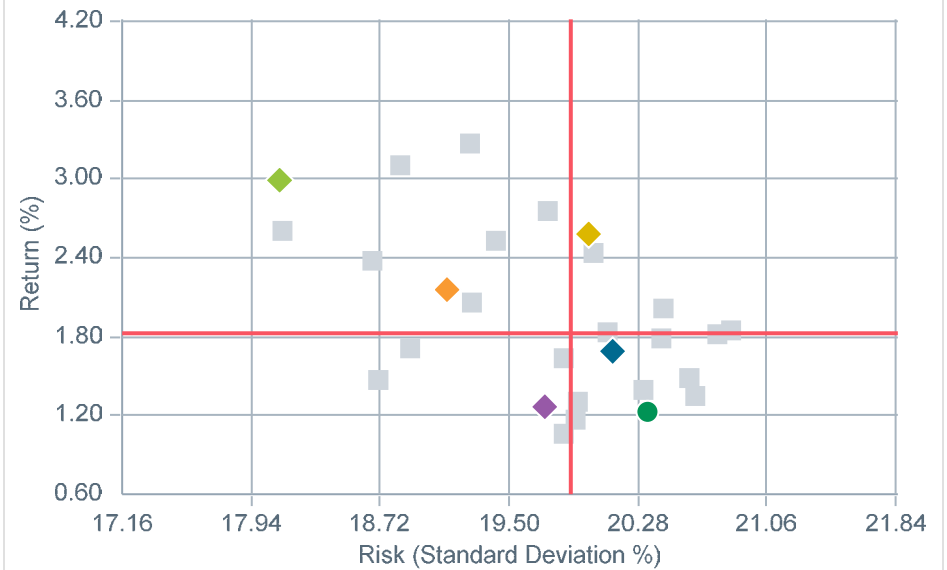
Performance shown is gross of fees. Ranks are shown against All Public Plans >\$1B-Intl. Equity Segment.

**Plan Sponsor Peer Group Scattergram - 5 Years**



	Return	Standard Deviation
◆ PERS (DB)	6.43	11.71
◆ PERS (HC 115)	N/A	N/A
◆ STRS	8.66	10.31
◆ OP&F	6.95	11.36
◆ SERS	6.73	11.55
◆ HPRS	5.76	12.04
● MSCI ACW Ex US IMI (Net)	5.35	11.69
— Median	6.57	11.41

**Plan Sponsor Peer Group Scattergram - 10 Years**



	Return	Standard Deviation
◆ PERS (DB)	1.69	20.12
◆ PERS (HC 115)	N/A	N/A
◆ STRS	2.99	18.11
◆ OP&F	2.58	19.98
◆ SERS	2.16	19.12
◆ HPRS	1.26	19.72
● MSCI ACW Ex US IMI (Net)	1.22	20.34
— Median	1.82	19.87

**Sharpe Ratio - 5 Years**

PERS (DB)	0.59
PERS (HC 115)	N/A
STRS	0.85
OP&F	0.64
SERS	0.62
HPRS	0.52
MSCI ACW Ex US IMI (Net)	0.50
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	<i>0.59</i>

**Sharpe Ratio - 10 Years**

PERS (DB)	0.15
PERS (HC 115)	N/A
STRS	0.21
OP&F	0.19
SERS	0.17
HPRS	0.12
MSCI ACW Ex US IMI (Net)	0.12
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	<i>0.15</i>

Performance shown is gross of fees.

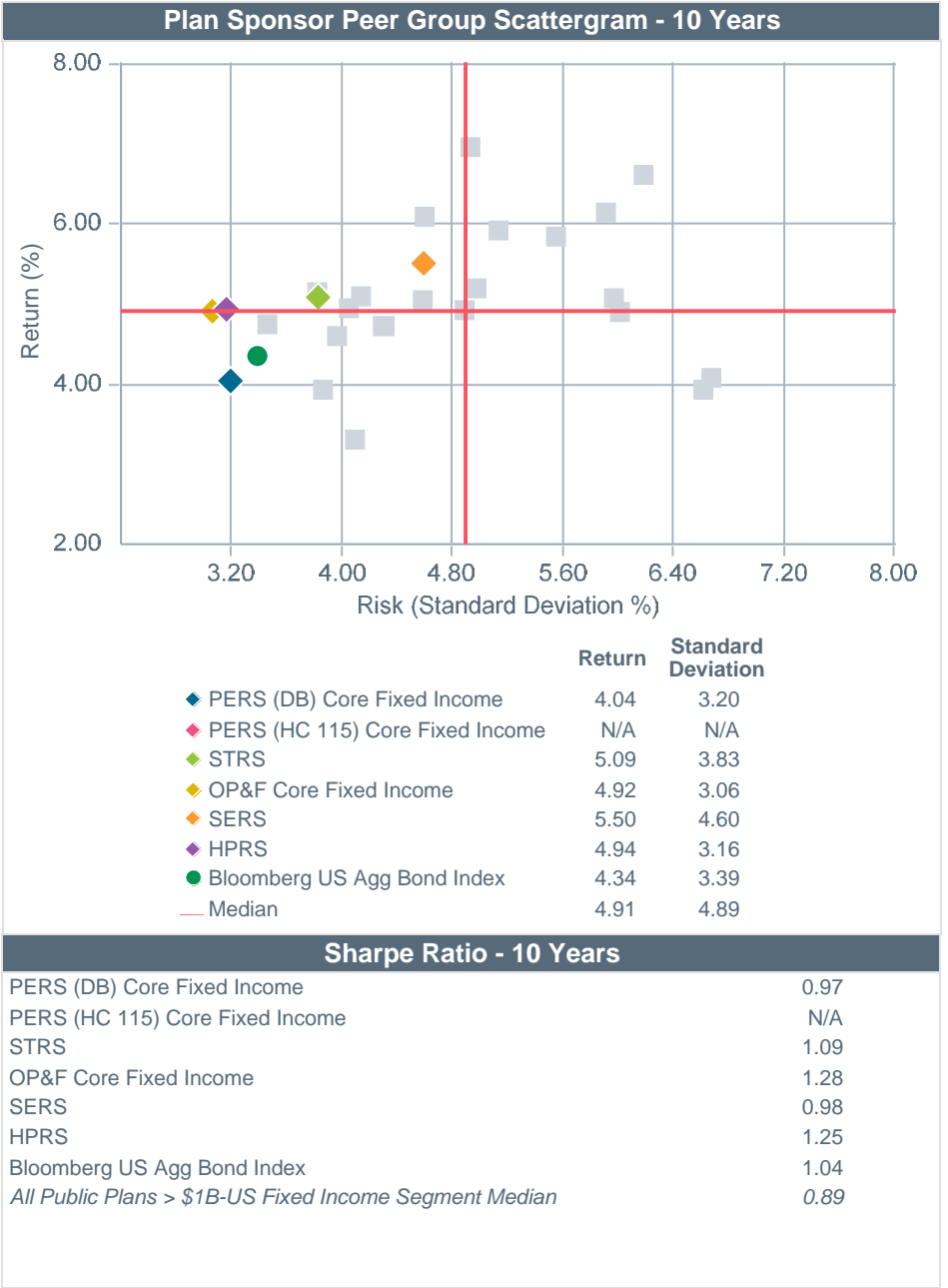


Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Fixed Income</b>										
<b>PERS (DB) Core Fixed Income</b>	<b>-2.26</b>	<b>2.66</b>	<b>3.34</b>	<b>2.77</b>	<b>4.13</b>	<b>4.04</b>	<b>0.96</b>	<b>6.47</b>	<b>-1.04</b>	<b>4.99</b>
PERS (DB) Core Fixed Income Custom Benchmark	-2.53	2.65	3.03	2.23	3.63	4.34	0.55	5.97	-2.02	4.21
Difference	0.27	0.01	0.31	0.54	0.50	-0.30	0.41	0.50	0.98	0.78
Rank	83	88	59	68	74	80	19	40	46	97
<b>PERS (HC 115) Core Fixed Income</b>	<b>-2.26</b>	<b>2.66</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.96</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) Core Fixed Income Benchmark	-2.53	2.65	N/A	N/A	N/A	N/A	0.56	N/A	N/A	N/A
Difference	0.27	0.01	N/A	N/A	N/A	N/A	0.40	N/A	N/A	N/A
Rank	100	100	N/A	N/A	N/A	N/A	23	N/A	N/A	N/A
<b>STRS</b>	<b>-0.82</b>	<b>4.77</b>	<b>3.44</b>	<b>3.06</b>	<b>4.31</b>	<b>5.09</b>	<b>0.60</b>	<b>5.02</b>	<b>-1.02</b>	<b>6.14</b>
Bloomberg US Unv Bond Index	-1.68	3.91	3.28	2.78	4.05	4.57	0.43	5.56	-1.35	5.53
Difference	0.86	0.86	0.16	0.28	0.26	0.52	0.17	-0.54	0.33	0.61
Rank	60	52	57	57	66	36	31	81	46	77
<b>OP&amp;F Core Fixed Income</b>	<b>0.58</b>	<b>4.14</b>	<b>3.29</b>	<b>3.00</b>	<b>4.42</b>	<b>4.92</b>	<b>1.45</b>	<b>4.31</b>	<b>-1.08</b>	<b>6.31</b>
Bloomberg US Agg Bond Index	-2.53	2.65	3.03	2.23	3.63	4.34	0.55	5.97	-2.02	4.21
Difference	3.11	1.49	0.26	0.77	0.79	0.58	0.90	-1.66	0.96	2.10
Rank	24	65	61	58	60	48	9	87	46	74
<b>SERS</b>	<b>-1.08</b>	<b>4.67</b>	<b>3.42</b>	<b>3.78</b>	<b>5.07</b>	<b>5.50</b>	<b>-0.14</b>	<b>5.84</b>	<b>-0.37</b>	<b>9.21</b>
Bloomberg US Agg Bond Index	-2.53	2.65	3.03	2.23	3.63	4.34	0.55	5.97	-2.02	4.21
Difference	1.45	2.02	0.39	1.55	1.44	1.16	-0.69	-0.13	1.65	5.00
Rank	67	54	58	37	38	27	60	60	31	29
<b>HPRS</b>	<b>1.51</b>	<b>6.36</b>	<b>3.61</b>	<b>3.29</b>	<b>4.50</b>	<b>4.94</b>	<b>0.54</b>	<b>4.00</b>	<b>-0.81</b>	<b>6.55</b>
Bloomberg US Agg Bond Index	-2.53	2.65	3.03	2.23	3.63	4.34	0.55	5.97	-2.02	4.21
Difference	4.04	3.71	0.58	1.06	0.87	0.60	-0.01	-1.97	1.21	2.34
Rank	15	30	53	51	58	47	32	91	43	72
<i>All Public Plans &gt; \$1B-US Fixed Income Segment Median</i>	<i>-0.55</i>	<i>4.86</i>	<i>3.72</i>	<i>3.31</i>	<i>4.84</i>	<i>4.91</i>	<i>0.12</i>	<i>6.12</i>	<i>-1.30</i>	<i>7.64</i>

Performance shown is gross of fees. Ranks are shown against All Public Plans >\$1B-US Fixed Income Segment. PERS (DB), PERS (HC), and OP&F performance for Total Fixed Income is unavailable, so Core Fixed Income is shown for illustrative purposes. PERS (DB) and PERS (HC) changed mandates in 2010 and are therefore unable to report 7- and 10-year trailing returns.

Risk & Return - Fixed Income

All Public Plans > \$1B-US Fixed Income Segment



Performance shown is gross of fees.



Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Additional Fixed Income</b>										
<b>PERS (DB) U.S. Treasury</b>	<b>-4.08</b>	<b>0.99</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Bloomberg US Trsy Index	-4.11	1.04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	0.03	-0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (DB) EMD</b>	<b>-0.21</b>	<b>10.94</b>	<b>0.56</b>	<b>2.50</b>	<b>N/A</b>	<b>N/A</b>	<b>-6.82</b>	<b>-1.64</b>	<b>-6.35</b>	<b>18.83</b>
PERS (DB) EMD Custom Benchmark	-2.10	10.18	0.70	2.09	N/A	N/A	-7.12	-0.20	-7.76	17.74
Difference	1.89	0.76	-0.14	0.41	N/A	N/A	0.30	-1.44	1.41	1.09
<b>PERS (DB) High Yield</b>	<b>6.17</b>	<b>14.44</b>	<b>4.57</b>	<b>7.41</b>	<b>N/A</b>	<b>N/A</b>	<b>-2.74</b>	<b>2.73</b>	<b>7.92</b>	<b>15.82</b>
Bloomberg U.S. High Yield Index	7.40	17.13	4.66	7.36	N/A	N/A	-4.47	2.45	7.44	15.81
Difference	-1.23	-2.69	-0.09	0.05	N/A	N/A	1.73	0.28	0.48	0.01
<b>PERS (DB) Floating Rate Debt</b>	<b>1.10</b>	<b>0.86</b>	<b>2.70</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>2.83</b>	<b>4.43</b>	<b>6.69</b>	<b>N/A</b>
CS Lvg'd Loan Index	5.42	9.88	3.76	N/A	N/A	N/A	-0.38	2.06	6.15	N/A
Difference	-4.32	-9.02	-1.06	N/A	N/A	N/A	3.21	2.37	0.54	N/A
<b>PERS (DB) Securitized Debt</b>	<b>-0.97</b>	<b>-0.80</b>	<b>7.09</b>	<b>13.14</b>	<b>N/A</b>	<b>N/A</b>	<b>4.93</b>	<b>17.98</b>	<b>21.25</b>	<b>24.51</b>
Bloomberg CMBS Index + 2%	-1.14	5.87	4.73	5.57	N/A	N/A	2.59	5.76	2.23	11.66
Difference	0.17	-6.67	2.36	7.57	N/A	N/A	2.34	12.22	19.02	12.85
<b>PERS (DB) TIPS</b>	<b>-1.46</b>	<b>4.69</b>	<b>2.27</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-1.43</b>	<b>3.66</b>	<b>N/A</b>	<b>N/A</b>
Bloomberg U.S. TIPS Index	-1.47	4.68	2.26	N/A	N/A	N/A	-1.44	3.64	N/A	N/A
Difference	0.01	0.01	0.01	N/A	N/A	N/A	0.01	0.02	N/A	N/A
<b>PERS (DB) Global High Yield</b>	<b>5.11</b>	<b>13.16</b>	<b>2.79</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-4.03</b>	<b>0.00</b>	<b>7.58</b>	<b>N/A</b>
Bloomberg Global High Yield Index	5.10	14.27	3.60	N/A	N/A	N/A	-2.72	0.01	7.33	N/A
Difference	0.01	-1.11	-0.81	N/A	N/A	N/A	-1.31	-0.01	0.25	N/A
<b>PERS (HC 115) EMD</b>	<b>-0.21</b>	<b>10.94</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-6.82</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) EMD Custom Benchmark	-2.10	10.18	N/A	N/A	N/A	N/A	-7.12	N/A	N/A	N/A
Difference	1.89	0.76	N/A	N/A	N/A	N/A	0.30	N/A	N/A	N/A

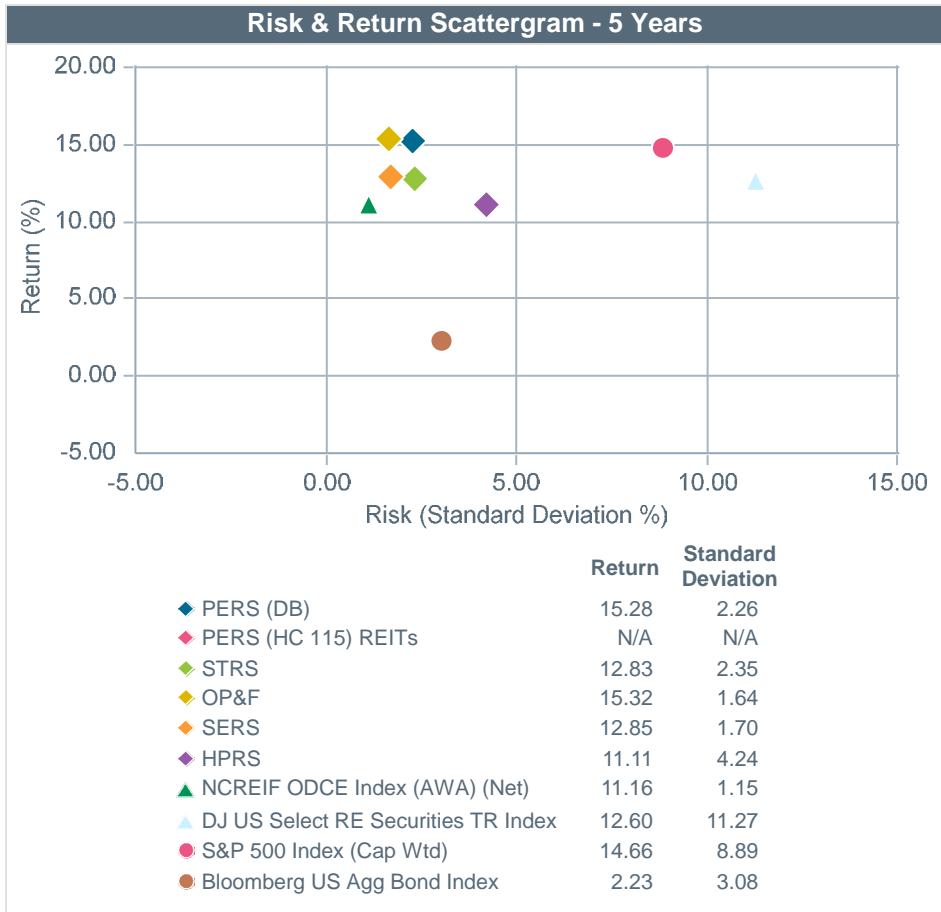
Performance shown is gross of fees.

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Additional Fixed Income</b>										
<b>PERS (HC 115) High Yield</b>	6.17	14.44	N/A	N/A	N/A	N/A	-2.74	N/A	N/A	N/A
Bloomberg U.S. High Yield Index	7.40	17.13	4.66	7.36	N/A	N/A	-4.47	2.45	7.44	15.81
Difference	-1.23	-2.69	N/A	N/A	N/A	N/A	1.73	N/A	N/A	N/A
<b>PERS (HC 115) Floating Rate Debt</b>	1.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CS Lvg'd Loan Index	5.42	9.88	3.76	5.35	5.48	4.33	-0.38	2.06	6.15	9.43
Difference	-4.32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Securitized Debt</b>	-0.97	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bloomberg CMBS Index + 2%	-1.14	5.87	4.73	5.57	N/A	N/A	2.59	5.76	2.23	11.66
Difference	0.17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) TIPS</b>	-1.46	4.69	N/A	N/A	N/A	N/A	-1.43	N/A	N/A	N/A
Bloomberg U.S. Tips Index	-1.47	4.68	N/A	N/A	N/A	N/A	-1.44	N/A	N/A	N/A
Difference	0.01	0.01	N/A	N/A	N/A	N/A	0.01	N/A	N/A	N/A
<b>PERS (HC 115) Global High Yield</b>	5.11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bloomberg Global High Yield Index	5.10	5.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>OP&amp;F Mortgages</b>	4.71	5.63	5.78	5.87	7.21	5.24	3.21	8.56	6.72	5.28
Bloomberg Mortgage Index (1 Qtr Lag)	1.72	3.63	3.61	2.65	3.49	4.65	3.43	3.78	-1.20	3.71
Difference	2.99	2.00	2.17	3.22	3.72	0.59	-0.22	4.78	7.92	1.57
<b>OP&amp;F High Yield</b>	5.60	12.80	4.74	7.12	8.05	7.58	-0.92	2.81	6.13	15.64
CS Developed Countries High Yield	8.20	17.95	4.57	7.13	7.90	7.11	-4.83	1.85	7.52	14.77
Difference	-2.60	-5.15	0.17	-0.01	0.15	0.47	3.91	0.96	-1.39	0.87
<b>OP&amp;F Global Inflation Protected Securities</b>	5.65	18.76	12.45	7.88	12.51	11.07	0.26	19.43	-10.62	14.93
Bridgewater Custom GIPS Index	0.75	16.77	10.63	5.95	8.40	7.95	-2.36	18.76	-13.10	13.49
Difference	4.90	1.99	1.82	1.93	4.11	3.12	2.62	0.67	2.48	1.44

Performance shown is gross of fees.

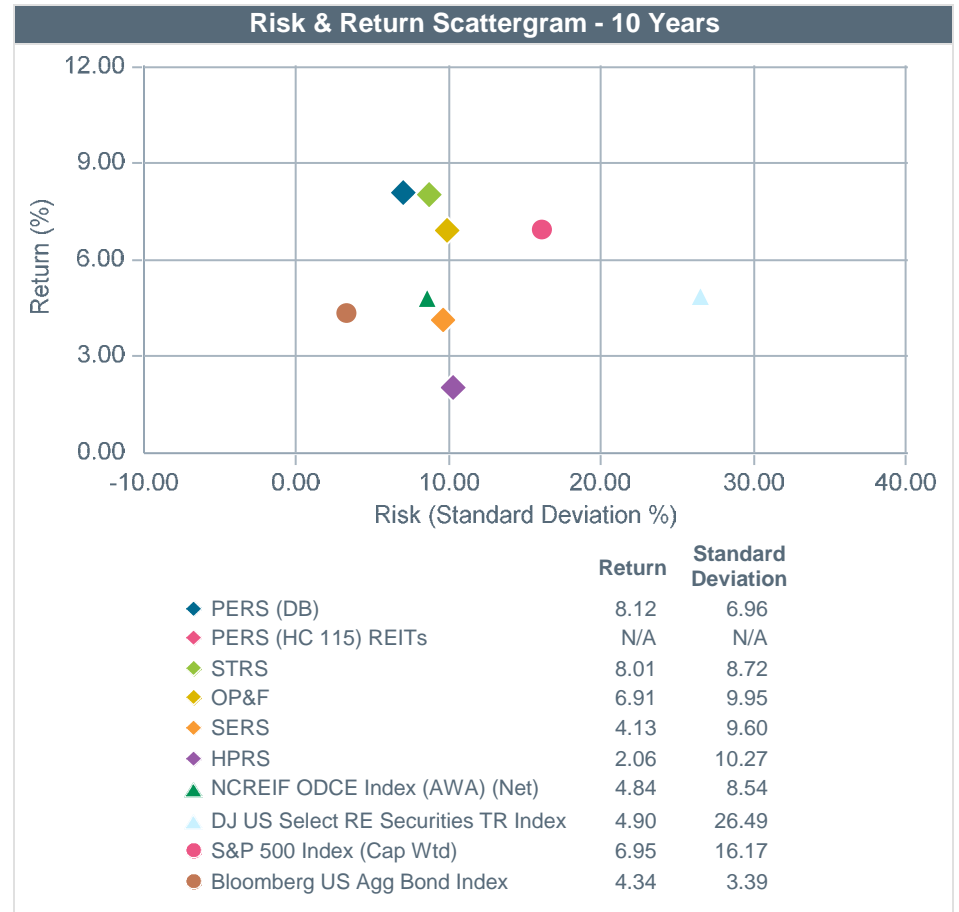
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Real Estate</b>										
<b>PERS (DB)</b>	<b>5.96</b>	<b>12.08</b>	<b>16.06</b>	<b>15.28</b>	<b>14.01</b>	<b>8.12</b>	<b>17.28</b>	<b>18.92</b>	<b>15.43</b>	<b>12.82</b>
PERS (DB) Real Estate Custom Benchmark	4.15	9.93	12.27	12.12	11.76	7.20	14.71	12.21	12.82	11.00
Difference	1.81	2.15	3.79	3.16	2.25	0.92	2.57	6.71	2.61	1.82
<b>PERS (HC 115) REITs</b>	<b>-3.66</b>	<b>6.70</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>4.41</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
DJ US Select Real Estate Securities TR Index	-3.74	6.65	N/A	N/A	N/A	N/A	4.46	N/A	N/A	N/A
Difference	0.08	0.05	N/A	N/A	N/A	N/A	-0.05	N/A	N/A	N/A
<b>STRS</b>	<b>2.62</b>	<b>9.68</b>	<b>12.82</b>	<b>12.83</b>	<b>13.23</b>	<b>8.01</b>	<b>11.36</b>	<b>17.57</b>	<b>10.36</b>	<b>15.40</b>
STRS Real Estate Custom Benchmark	2.34	8.10	11.48	11.17	12.15	7.13	11.89	14.54	9.72	11.69
Difference	0.28	1.58	1.34	1.66	1.08	0.88	-0.53	3.03	0.64	3.71
<b>OP&amp;F</b>	<b>4.95</b>	<b>13.14</b>	<b>16.16</b>	<b>15.32</b>	<b>14.14</b>	<b>6.91</b>	<b>16.83</b>	<b>18.57</b>	<b>15.11</b>	<b>13.06</b>
NCREIF ODCE Index (AWA) (Net) (1 Qtr Lag)	3.77	9.08	11.42	11.34	11.37	5.05	13.86	11.36	11.97	10.47
Difference	1.18	4.06	4.74	3.98	2.77	1.86	2.97	7.21	3.14	2.59
<b>SERS</b>	<b>3.48</b>	<b>10.27</b>	<b>12.75</b>	<b>12.85</b>	<b>11.48</b>	<b>4.13</b>	<b>13.81</b>	<b>14.22</b>	<b>12.00</b>	<b>14.02</b>
SERS Real Estate Custom Benchmark	3.87	9.26	11.32	11.19	11.01	6.90	13.48	11.26	11.00	11.00
Difference	-0.39	1.01	1.43	1.66	0.47	-2.77	0.33	2.96	1.00	3.02
<b>HPRS</b>	<b>4.98</b>	<b>7.75</b>	<b>11.82</b>	<b>11.11</b>	<b>7.33</b>	<b>2.06</b>	<b>6.34</b>	<b>22.02</b>	<b>13.78</b>	<b>6.46</b>
NCREIF Property Index (1 Qtr Lag)	3.84	9.22	11.31	11.18	11.09	7.22	13.48	11.26	11.00	11.00
Difference	1.14	-1.47	0.51	-0.07	-3.76	-5.16	-7.14	10.76	2.78	-4.54

Performance shown may be net or gross of fees depending on underlying investments. Prior to 2008, HPRS's real estate portfolio consisted of two buildings. Since then, HPRS has shifted its focus to externally managed funds.



### Sharpe Ratio - 5 Years

PERS (DB)	6.32
PERS (HC 115) REITs	N/A
STRS	5.12
OP&F	8.63
SERS	7.04
HPRS	2.50
NCREIF ODCE Index (AWA) (Net)	8.90
S&P 500 Index (Cap Wtd)	1.59
Bloomberg US Agg Bond Index	0.69



### Sharpe Ratio - 10 Years

PERS (DB)	1.06
PERS (HC 115) REITs	N/A
STRS	0.86
OP&F	0.66
SERS	0.39
HPRS	0.17
NCREIF ODCE Index (AWA) (Net)	0.51
S&P 500 Index (Cap Wtd)	0.45
Bloomberg US Agg Bond Index	1.04

Performance shown may be net or gross of fees depending on underlying investments.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Hedge Funds</b>										
<b>PERS (DB)</b>	<b>4.38</b>	<b>3.38</b>	<b>2.01</b>	<b>4.34</b>	<b>3.56</b>	<b>2.68</b>	<b>-1.20</b>	<b>3.93</b>	<b>9.63</b>	<b>6.26</b>
PERS (DB) Hedge Funds Custom Benchmark	4.65	6.47	2.40	4.22	4.62	5.39	-1.70	2.59	7.00	7.00
Difference	-0.27	-3.09	-0.39	0.12	-1.06	-2.71	0.50	1.34	2.63	-0.74
<b>PERS (HC 115)</b>	<b>4.38</b>	<b>3.38</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-1.20</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Hedge Funds Custom Benchmark	4.65	6.47	N/A	N/A	N/A	N/A	-1.70	N/A	N/A	N/A
Difference	-0.27	-3.09	N/A	N/A	N/A	N/A	0.50	N/A	N/A	N/A
<b>STRS</b>	<b>4.82</b>	<b>3.38</b>	<b>2.02</b>	<b>4.90</b>	<b>3.86</b>	<b>4.35</b>	<b>-0.55</b>	<b>3.27</b>	<b>11.44</b>	<b>7.37</b>
HFRI FOF Comp Index	3.18	0.51	1.19	3.42	2.38	1.31	-0.27	3.37	8.96	4.79
Difference	1.64	2.87	0.83	1.48	1.48	3.04	-0.28	-0.10	2.48	2.58
<b>SERS</b>	<b>4.79</b>	<b>2.20</b>	<b>2.07</b>	<b>4.74</b>	<b>4.39</b>	<b>N/A</b>	<b>-0.05</b>	<b>4.10</b>	<b>9.80</b>	<b>7.98</b>
HFRI FOF Comp Index + 1%	3.69	1.52	2.21	4.45	3.40	N/A	0.73	4.40	10.04	5.84
Difference	1.10	0.68	-0.14	0.29	0.99	N/A	-0.78	-0.30	-0.24	2.14
<b>HPRS</b>	<b>3.74</b>	<b>0.01</b>	<b>1.51</b>	<b>4.15</b>	<b>3.21</b>	<b>3.40</b>	<b>1.21</b>	<b>3.34</b>	<b>9.47</b>	<b>7.03</b>
HFRI FOF Comp Index	3.18	0.51	1.19	3.42	2.38	1.31	-0.27	3.37	8.96	4.79
Difference	0.56	-0.50	0.32	0.73	0.83	2.09	1.48	-0.03	0.51	2.24

Performance shown is net of fees.



Performance shown is net of fees.



Performance										
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Private Equity</b>										
<b>PERS (DB)</b>	<b>4.15</b>	<b>6.72</b>	<b>10.12</b>	<b>12.98</b>	<b>14.54</b>	<b>11.04</b>	<b>6.09</b>	<b>17.94</b>	<b>16.29</b>	<b>18.54</b>
PERS (DB) Private Equity Custom Benchmark	6.60	8.48	9.91	16.78	14.43	9.17	6.04	15.41	22.81	33.20
Difference	-2.45	-1.76	0.21	-3.80	0.11	1.87	0.05	2.53	-6.52	-14.66
<b>STRS</b>	<b>5.33</b>	<b>6.76</b>	<b>11.73</b>	<b>14.25</b>	<b>14.35</b>	<b>10.46</b>	<b>9.89</b>	<b>18.90</b>	<b>20.00</b>	<b>16.27</b>
STRS Private Equity Custom Benchmark	9.33	13.85	9.51	16.03	14.86	9.34	1.48	13.67	34.86	18.73
Difference	-4.00	-7.09	2.22	-1.78	-0.51	1.12	8.41	5.23	-14.86	-2.46
<b>OP&amp;F</b>	<b>12.56</b>	<b>14.37</b>	<b>14.89</b>	<b>13.13</b>	<b>13.69</b>	<b>10.82</b>	<b>12.06</b>	<b>18.34</b>	<b>11.50</b>	<b>9.58</b>
OP&F Private Equity Custom Benchmark	8.78	18.82	13.99	19.81	16.59	10.70	2.65	21.45	24.59	33.76
Difference	3.78	-4.45	0.90	-6.68	-2.90	0.12	9.41	-3.11	-13.09	-24.18
<b>SERS</b>	<b>6.48</b>	<b>12.37</b>	<b>16.23</b>	<b>15.82</b>	<b>15.06</b>	<b>11.36</b>	<b>13.81</b>	<b>22.77</b>	<b>17.32</b>	<b>13.16</b>
Burgiss All Private Equity Benchmark	4.23	5.41	9.42	16.38	14.09	8.87	7.37	15.75	22.34	33.20
Difference	2.25	6.96	6.81	-0.56	0.97	2.49	6.44	7.02	-5.02	-20.04
<b>HPRS</b>	<b>6.09</b>	<b>11.74</b>	<b>8.20</b>	<b>8.58</b>	<b>5.93</b>	<b>3.32</b>	<b>0.85</b>	<b>12.41</b>	<b>15.54</b>	<b>3.12</b>
HPRS Private Equity Custom Benchmark	6.09	11.74	14.07	20.01	14.65	12.43	9.64	21.15	25.63	33.50
Difference	0.00	0.00	-5.87	-11.43	-8.72	-9.11	-8.79	-8.74	-10.09	-30.38

Performance shown is net of fees. HPRS's private equity portfolio did not begin in earnest until after 2008. Therefore longer period trailing returns relative to the benchmark may not be relevant.

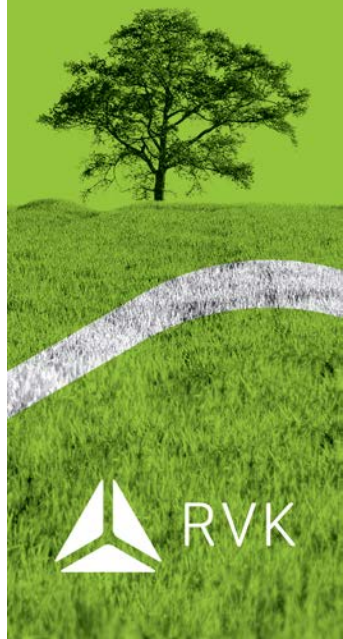
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Other Alternatives</b>										
<b>PERS (DB) Opportunistic Investments</b>	<b>-4.11</b>	<b>0.89</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.12</b>	<b>N/A</b>	<b>-3.06</b>	<b>4.15</b>
PERS (DB) Opportunistic Custom Benchmark	-4.11	1.04	1.27	1.56	N/A	N/A	0.84	1.93	-1.34	5.43
Difference	0.00	-0.15	N/A	N/A	N/A	N/A	0.28	N/A	-1.72	-1.28
<b>PERS (DB) Commodities</b>	<b>1.70</b>	<b>11.92</b>	<b>-19.93</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-32.44</b>	<b>-32.12</b>	<b>N/A</b>	<b>N/A</b>
S&P Goldman Sachs Commodity Index (TR)	1.37	11.37	-20.60	N/A	N/A	N/A	-32.86	-33.06	N/A	N/A
Difference	0.33	0.55	0.67	N/A	N/A	N/A	0.42	0.94	N/A	N/A
<b>PERS (DB) Risk Parity</b>	<b>0.47</b>	<b>15.51</b>	<b>4.32</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-10.42</b>	<b>9.73</b>	<b>N/A</b>	<b>N/A</b>
PERS (DB) Risk Parity Custom Benchmark	3.02	7.00	5.97	N/A	N/A	N/A	3.30	7.64	N/A	N/A
Difference	-2.55	8.51	-1.65	N/A	N/A	N/A	-13.72	2.09	N/A	N/A
<b>PERS (DB) GTAA</b>	<b>5.76</b>	<b>6.58</b>	<b>3.96</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.94</b>	<b>4.44</b>	<b>N/A</b>	<b>N/A</b>
PERS (DB) GTAA Custom Benchmark	2.26	5.77	2.86	N/A	N/A	N/A	-0.69	3.61	N/A	N/A
Difference	3.50	0.81	1.10	N/A	N/A	N/A	1.63	0.83	N/A	N/A
<b>PERS (HC 115) Opportunistic</b>	<b>-4.11</b>	<b>0.89</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.12</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) Opportunistic Custom Benchmark	-4.11	1.04	N/A	N/A	N/A	N/A	0.84	N/A	N/A	N/A
Difference	0.00	-0.15	N/A	N/A	N/A	N/A	0.28	N/A	N/A	N/A
<b>PERS (HC 115) Commodities</b>	<b>1.70</b>	<b>11.92</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-32.44</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
S&P Goldman Sachs Commodity Index (TR)	1.37	11.37	N/A	N/A	N/A	N/A	-32.86	N/A	N/A	N/A
Difference	0.33	0.55	N/A	N/A	N/A	N/A	0.42	N/A	N/A	N/A
<b>PERS (HC 115) Risk Parity</b>	<b>0.47</b>	<b>15.51</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-10.42</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) Risk Parity Custom Benchmark	3.02	7.00	N/A	N/A	N/A	N/A	3.30	N/A	N/A	N/A
Difference	-2.55	8.51	N/A	N/A	N/A	N/A	-13.72	N/A	N/A	N/A
<b>PERS (HC 115) GTAA</b>	<b>5.76</b>	<b>6.58</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.94</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC 115) GTAA Custom Benchmark	2.26	5.77	N/A	N/A	N/A	N/A	-0.69	N/A	N/A	N/A
Difference	3.50	0.81	N/A	N/A	N/A	N/A	1.63	N/A	N/A	N/A

Performance shown may be net or gross of fees depending on underlying investments. PERS (DB) funded a new opportunistic investments portfolio in the third quarter of 2014. Historical performance is represented by an opportunistic investments portfolio that was closed at the end of 2013.

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>Other Alternatives</b>										
<b>STRS Opportunistic Investments ex HF</b>	6.24	4.33	6.80	9.70	10.53	N/A	4.57	11.66	11.91	16.56
STRS Opportunistic Custom Benchmark	8.26	11.63	7.37	13.54	11.82	N/A	-0.52	11.45	32.26	15.28
Difference	-2.02	-7.30	-0.57	-3.84	-1.29	N/A	5.09	0.21	-20.35	1.28
<b>OP&amp;F Timber</b>	0.86	2.99	4.28	N/A	N/A	N/A	1.03	8.99	3.07	N/A
Consumer Price Index + 5%	2.65	7.18	6.24	N/A	N/A	N/A	5.77	5.79	6.58	N/A
Difference	-1.79	-4.19	-1.96	N/A	N/A	N/A	-4.74	3.20	-3.51	N/A
<b>OP&amp;F MLPs</b>	6.93	20.42	-0.16	N/A	N/A	N/A	-20.31	16.91	32.25	N/A
Alerian MLP Index	3.13	18.30	-5.80	N/A	N/A	N/A	-32.59	4.80	27.58	N/A
Difference	3.80	2.12	5.64	N/A	N/A	N/A	3.28	12.11	4.67	N/A
<b>SERS Opportunistic Investments</b>	11.88	8.81	3.49	N/A	N/A	N/A	-5.64	7.96	N/A	N/A
SERS Opportunistic Custom Benchmark	4.15	6.65	4.90	N/A	N/A	N/A	1.48	6.66	N/A	N/A
Difference	7.73	2.16	-1.41	N/A	N/A	N/A	-7.12	1.30	N/A	N/A
<b>HPRS Real Assets</b>	1.72	4.16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HPRS Real Assets Custom Benchmark	2.41	9.17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	-0.69	-5.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Performance shown may be net or gross of fees depending on underlying investments. STRS opportunistic investments portfolio includes Hedge Funds.

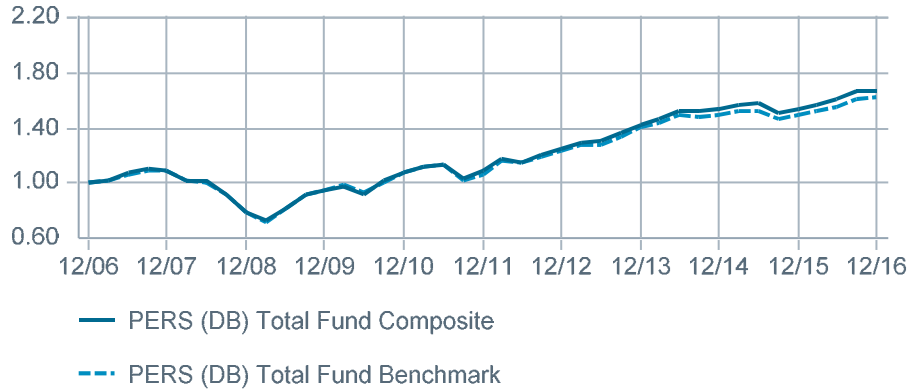
# Plan Specific Pages



**Summary**

- PERS (DB) has generated an annualized 0.40% of alpha over the trailing 5-year period and 0.38% over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

**Growth of \$1 - 10 Years**



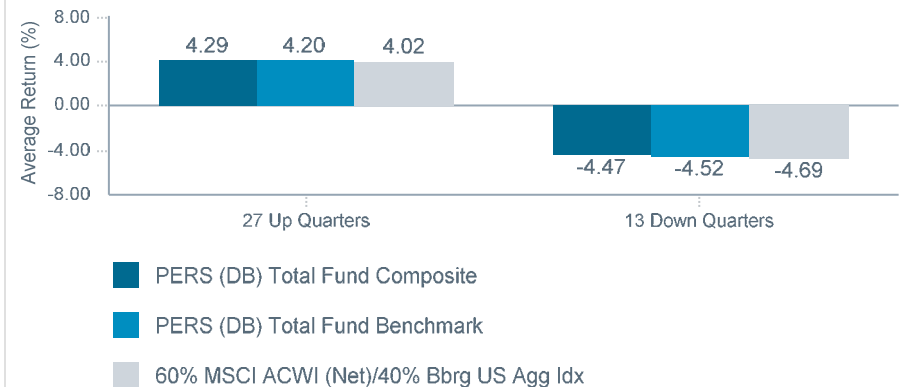
**MPT Stats**

	<b>5 Years</b>	<b>10 Years</b>
Maximum Return	7.87	12.34
Minimum Return	-4.18	-13.81
Standard Deviation	5.25	10.93
vs. PERS (DB) Total Fund Benchmark		
Info Ratio	0.40	0.34
Tracking Error	0.76	0.91
Alpha	0.40	0.38
vs. S&P 500 Index (Cap Wtd)		
Beta	0.49	0.65
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.67	0.45

**Asset Allocation vs. Targets**

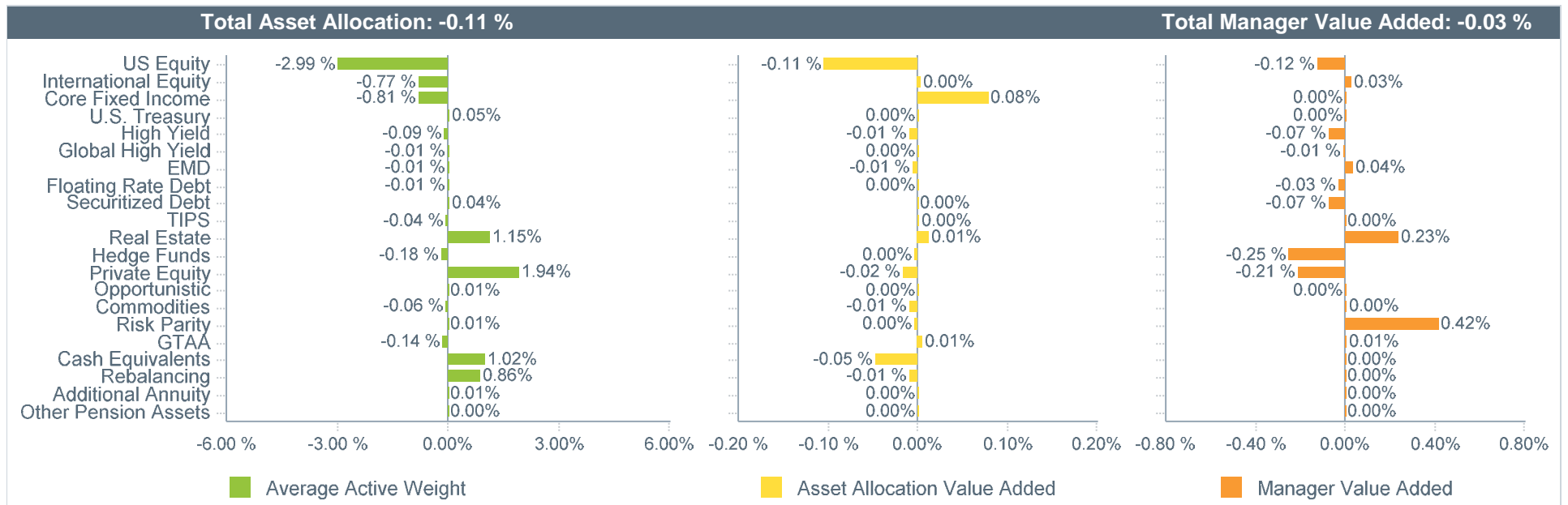
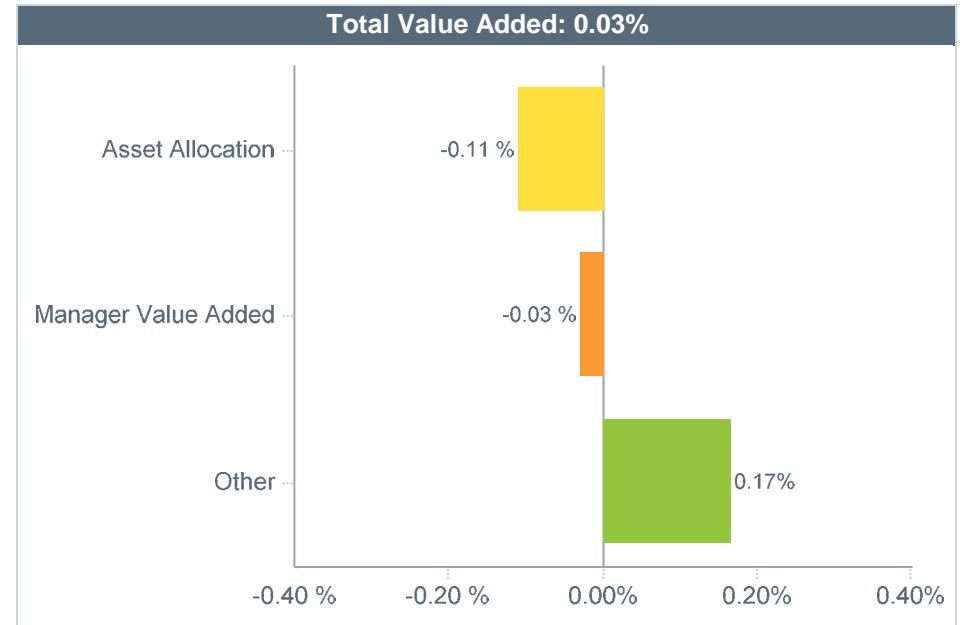
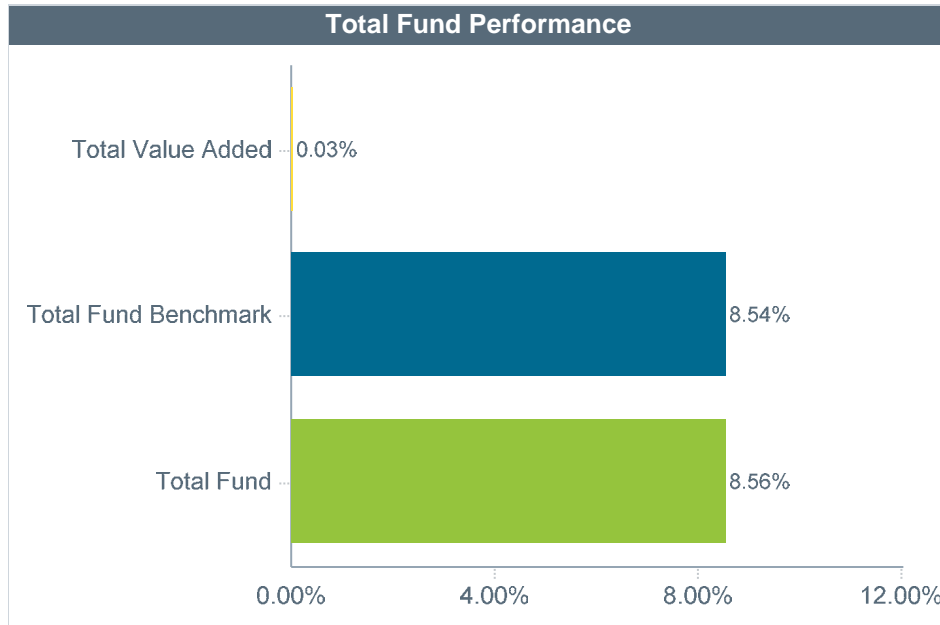
	<b>Market Value (\$)</b>	<b>Allocation (%)</b>	<b>Target (%)</b>
US Equity	15,972,261,608	20.69	22.40
International Equity	13,533,886,638	17.53	18.50
Core Fixed Income	6,458,465,939	8.37	9.80
U.S. Treasury	746,876,467	0.97	1.00
High Yield	2,286,147,801	2.96	3.00
Global High Yield	764,829,475	0.99	1.00
EMD	4,521,399,946	5.86	6.00
Floating Rate Debt	134,174,347	0.17	0.20
Securitized Debt	772,844,984	1.00	1.00
TIPS	710,310,819	0.92	1.00
Real Estate	8,016,903,831	10.39	10.00
Hedge Funds	6,105,592,878	7.91	8.00
Private Equity	8,855,243,016	11.47	10.00
Opportunistic	82,680,024	0.11	0.10
Commodities	791,717,104	1.03	1.00
Risk Parity	3,840,010,516	4.98	5.00
GTAA	1,400,127,774	1.81	2.00
Cash Equivalents	750,097,189	0.97	0.00
Rebalancing	1,422,501,451	1.84	0.00
Additional Annuity	17,228,712	0.02	0.00
Other Pension Assets	184	0.00	0.00
<b>Total Fund</b>	<b>77,183,300,705</b>	<b>100.00</b>	<b>100.00</b>

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

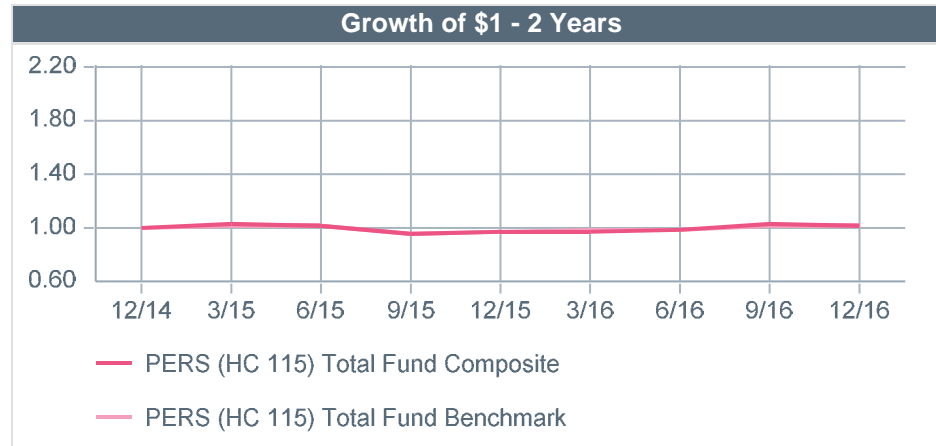




Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

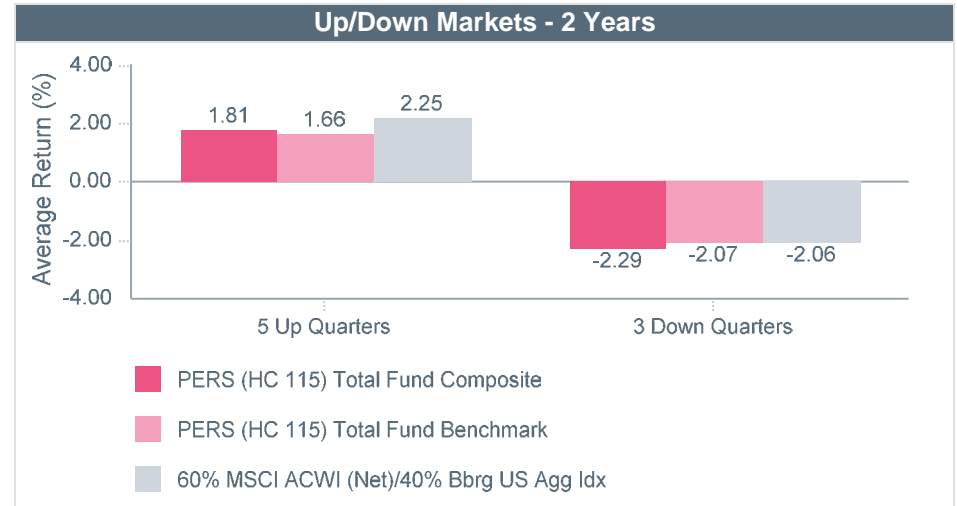


Summary	
•	PERS (HC 115) was formed in October of 2014 and has a performance inception date of January 2015.
•	PERS (HC 115) absorbed the PERS (HC) plan effective July 2016. The asset allocation policy was subsequently updated.

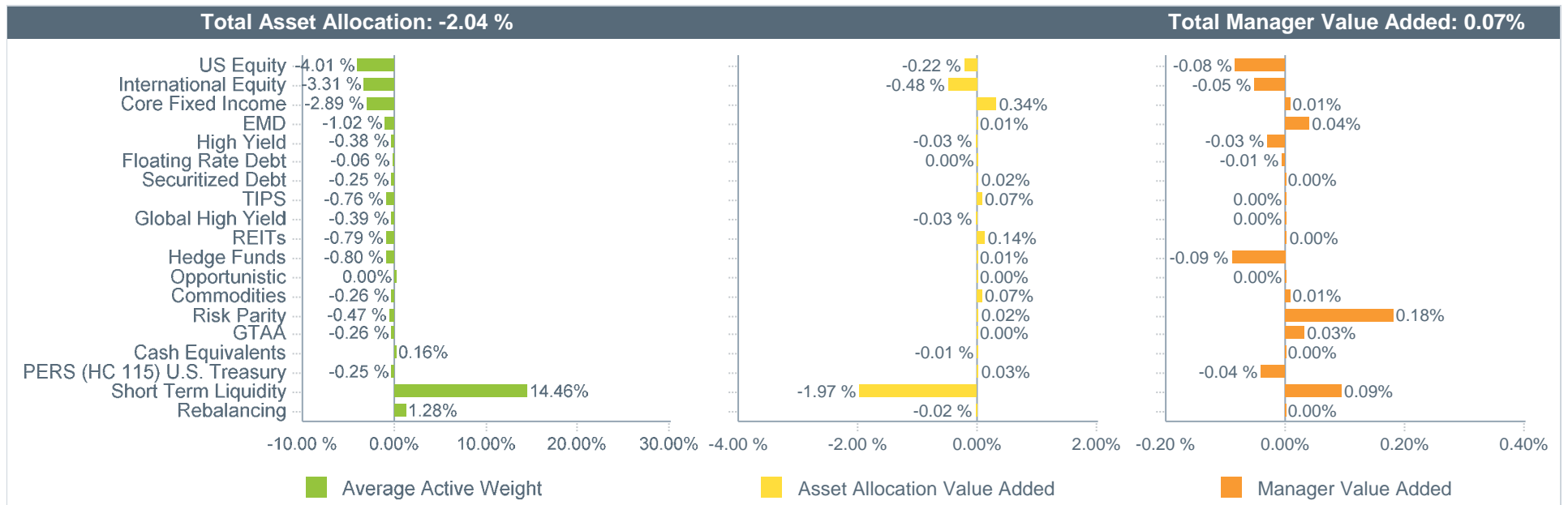
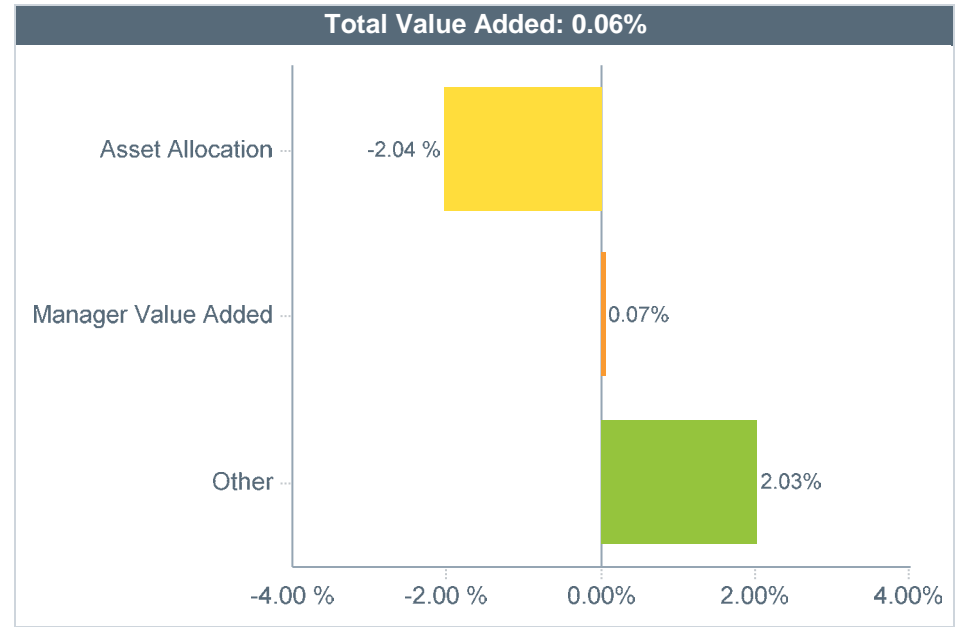
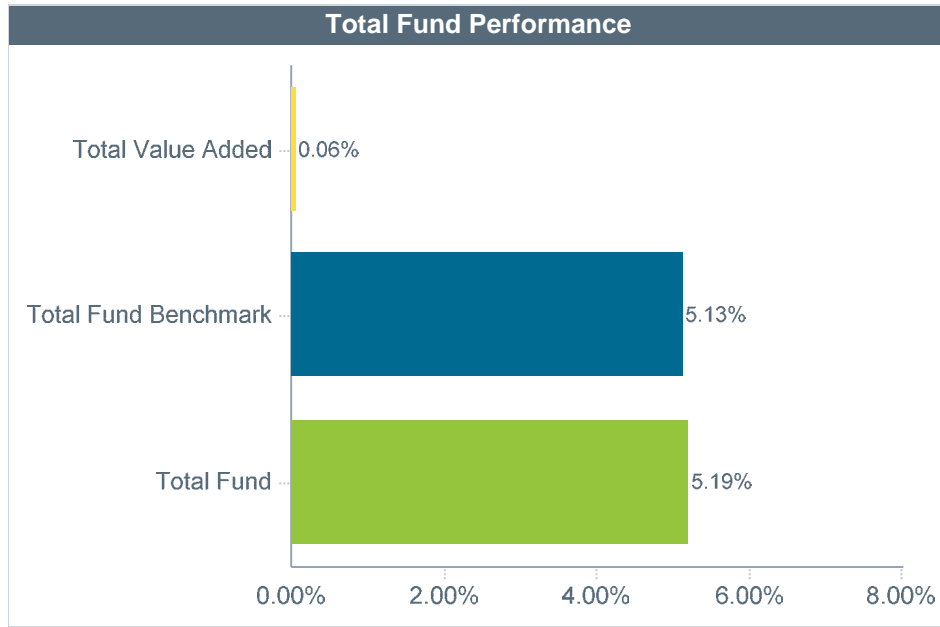


MPT Stats	
	1 Year
Maximum Return	3.42
Standard Deviation	2.81
Minimum Return	-0.49
vs. PERS (HC 115) Total Fund Benchmark	
Info Ratio	0.14
Tracking Error	0.38
Alpha	-0.34
vs. S&P 500 Index (Cap Wtd)	
Beta	0.23
vs. BofA ML 3 Mo US T-Bill Index	
Sharpe Ratio	1.72

Asset Allocation vs. Targets			
	Market Value (\$)	Allocation (%)	Target (%)
US Equity	2,782,887,436	23.50	24.50
International Equity	2,207,928,437	18.64	20.40
Core Fixed Income	1,773,254,101	14.97	16.80
EMD	691,674,651	5.84	6.00
High Yield	293,885,445	2.48	2.50
Floating Rate Debt	15,054,396	0.13	0.20
Securitized Debt	114,046,292	0.96	1.00
TIPS	576,380,242	4.87	5.00
Global High Yield	171,576,915	1.45	1.50
REITs	717,320,994	6.06	6.00
Hedge Funds	705,115,424	5.95	6.00
Opportunistic	11,404,717	0.10	0.10
Commodities	242,368,554	2.05	2.00
Risk Parity	589,425,481	4.98	5.00
GTAA	236,300,034	2.00	2.00
Cash Equivalents	49,458,025	0.42	0.00
PERS (HC 115) U.S. Treasury	115,922,416	0.98	1.00
Rebalancing	549,237,514	4.64	0.00
Total Fund	11,843,241,073	100.00	100.00



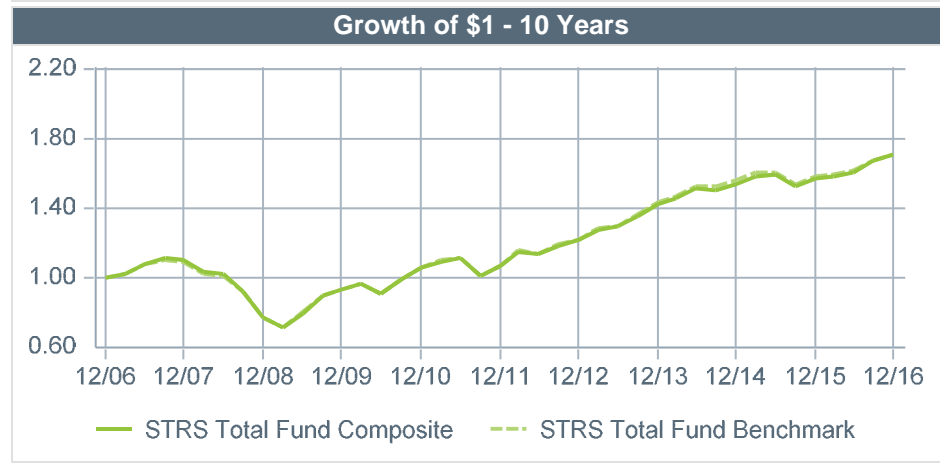
Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

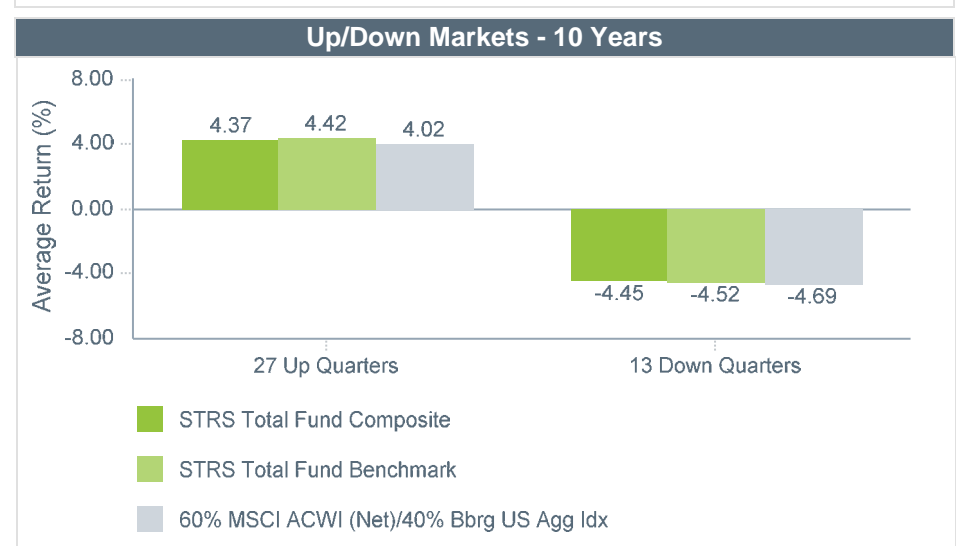


Summary	
•	STRS has generated 0.31% of alpha over the trailing 5-year period and 0.02% of alpha over the trailing 10-year period.
•	Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

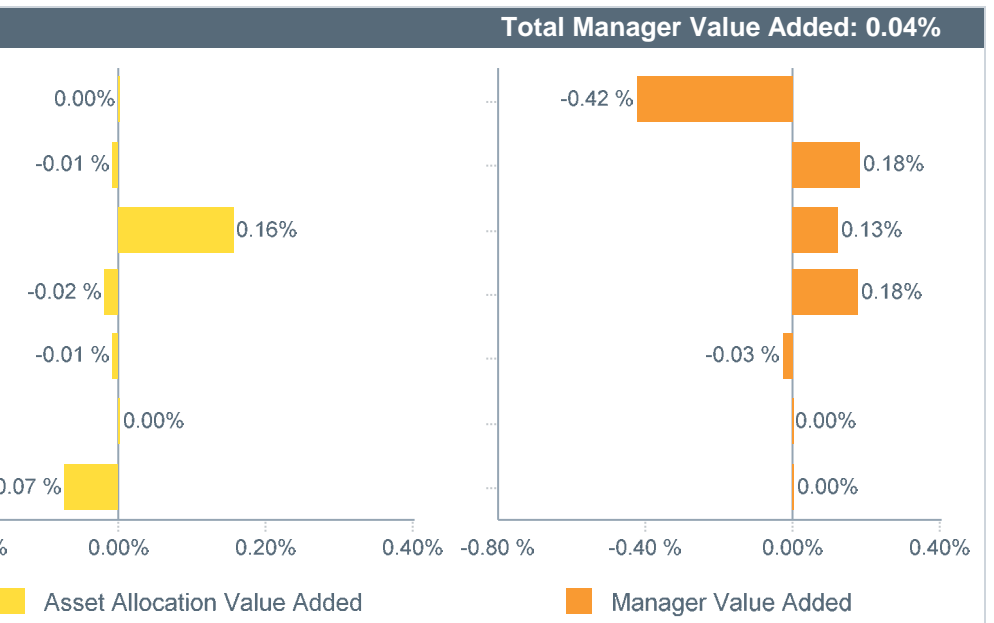
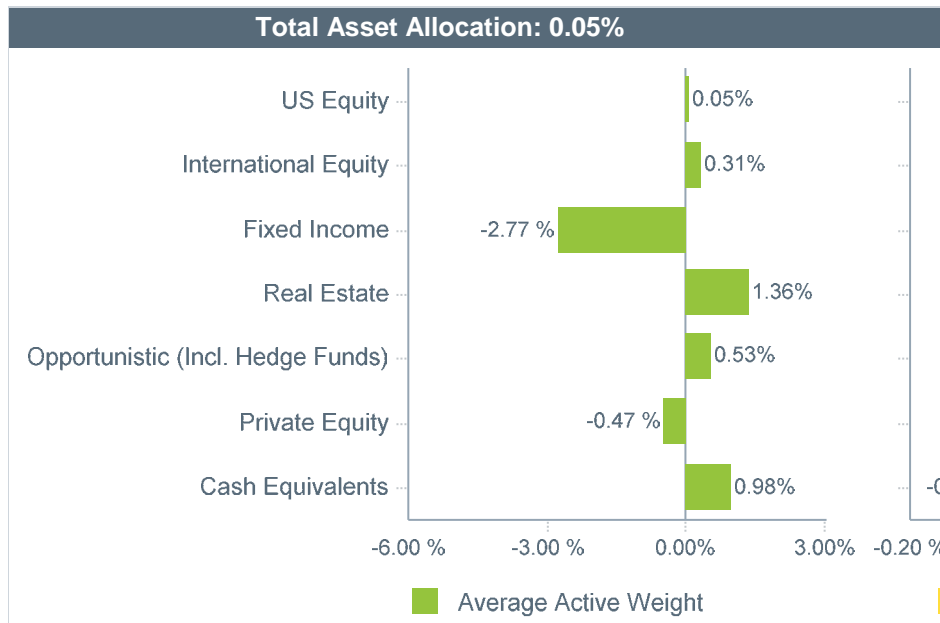
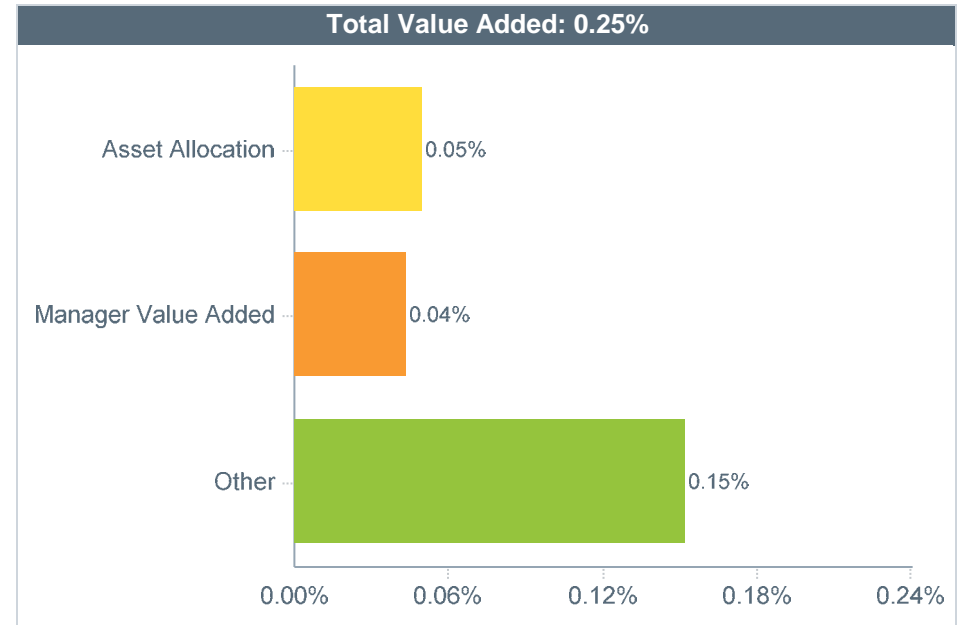
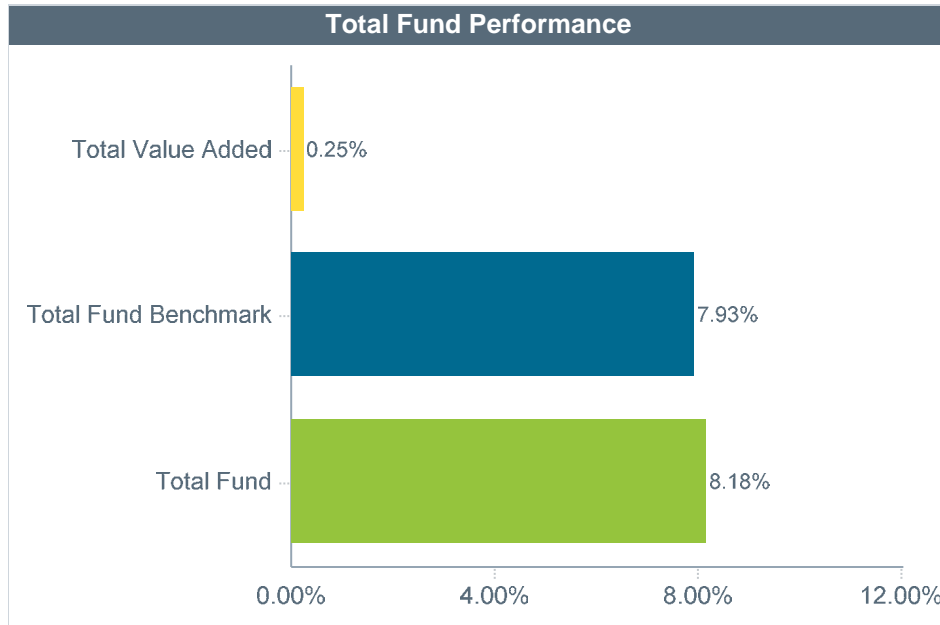


MPT Stats		
	5 Years	10 Years
Maximum Return	8.11	12.25
Minimum Return	-4.44	-15.99
Standard Deviation	5.37	11.22
vs. STRS Total Fund Benchmark		
Info Ratio	-0.16	-0.08
Tracking Error	0.38	0.63
Alpha	0.31	0.02
vs. S&P 500 Index (Cap Wtd)		
Beta	0.55	0.67
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.76	0.46

Asset Allocation vs. Targets			
	Market Value (\$)	Allocation (%)	Target (%)
US Equity	22,333,552,348	31.17	31.00
International Equity	18,955,604,710	26.45	26.00
Fixed Income	10,316,648,617	14.40	18.00
Real Estate	8,196,447,202	11.44	10.00
Opportunistic (Incl. Hedge Funds)	5,532,653,704	7.72	7.00
Private Equity	4,646,821,907	6.48	7.00
Cash Equivalents	1,679,447,249	2.34	1.00
Total Fund	71,661,175,737	100.00	100.00



Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

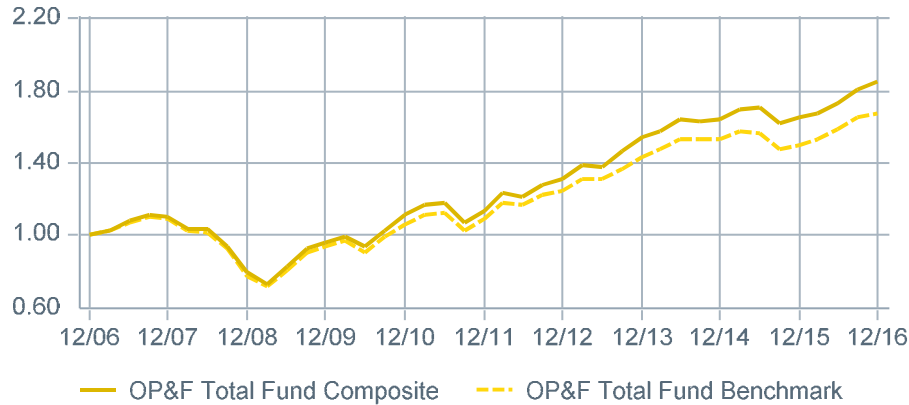


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

**Summary**

- OP&F has generated 1.04% of alpha over the trailing 5-year period and 0.93% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market and smaller down-market capture characteristics over the past 10 years.

**Growth of \$1 - 10 Years**



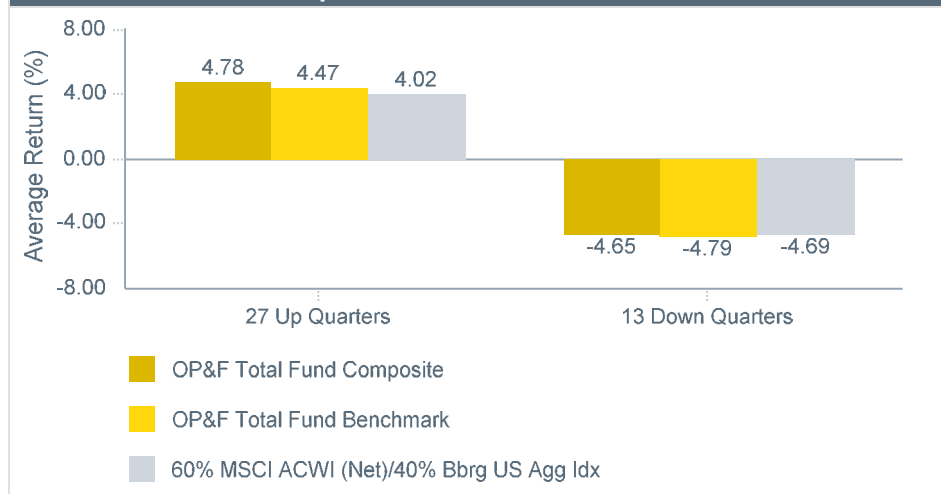
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	3,087,243,181	21.31	19.80
International Equity	2,914,864,200	20.12	19.10
High Yield Fixed Income	2,072,975,892	14.31	14.10
Global TIPS	1,242,183,234	8.58	9.40
Core Fixed Income	1,240,292,809	8.56	10.20
Mortgages	37,403,583	0.26	0.00
Real Estate	1,580,688,303	10.91	11.20
Private Markets	897,824,002	6.20	5.60
MLPs	1,044,716,289	7.21	7.50
Timber	290,153,834	2.00	3.10
Cash Equivalents	76,864,996	0.53	0.00
<b>Total Fund</b>	<b>14,485,210,323</b>	<b>100.00</b>	<b>100.00</b>

**MPT Stats**

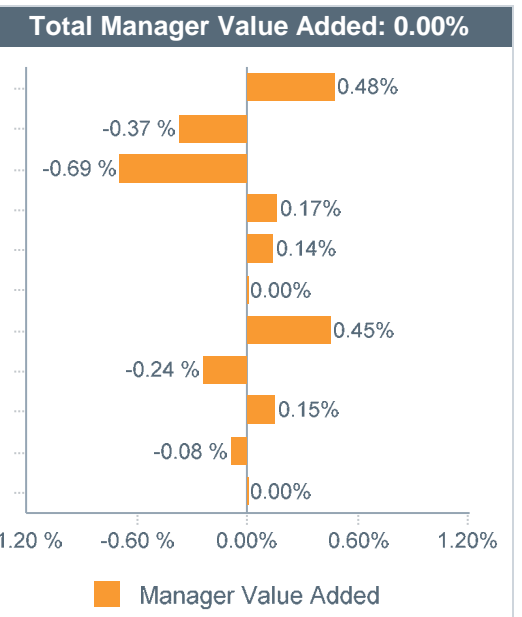
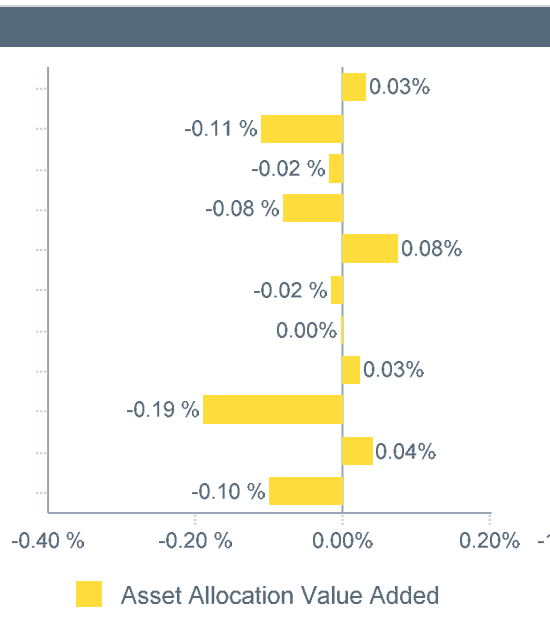
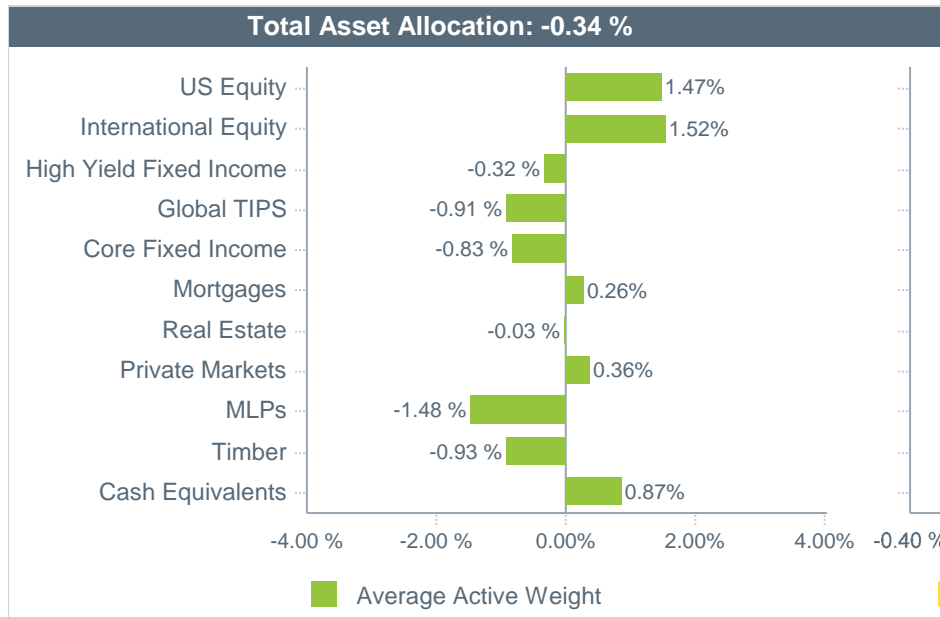
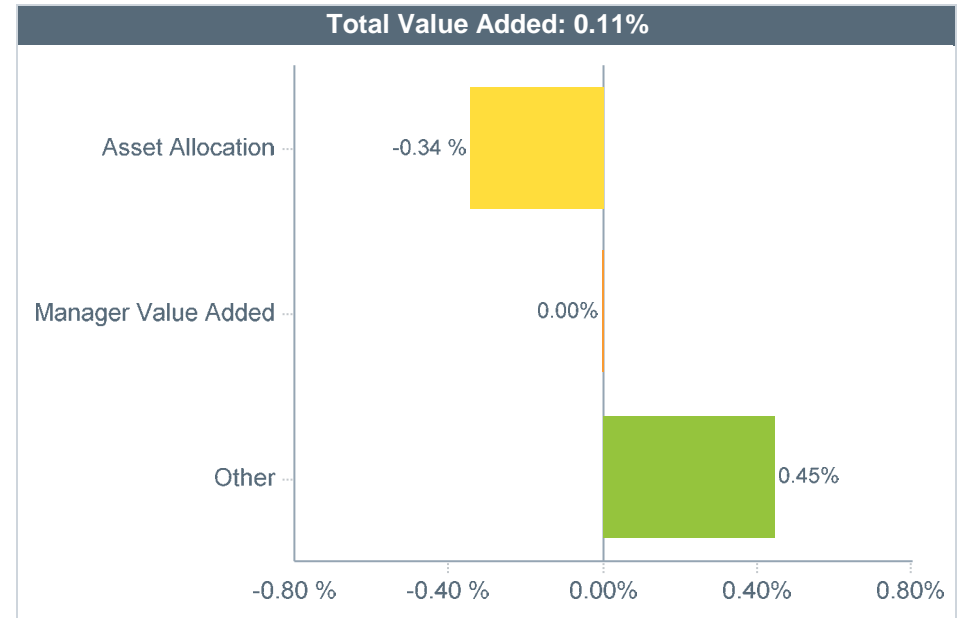
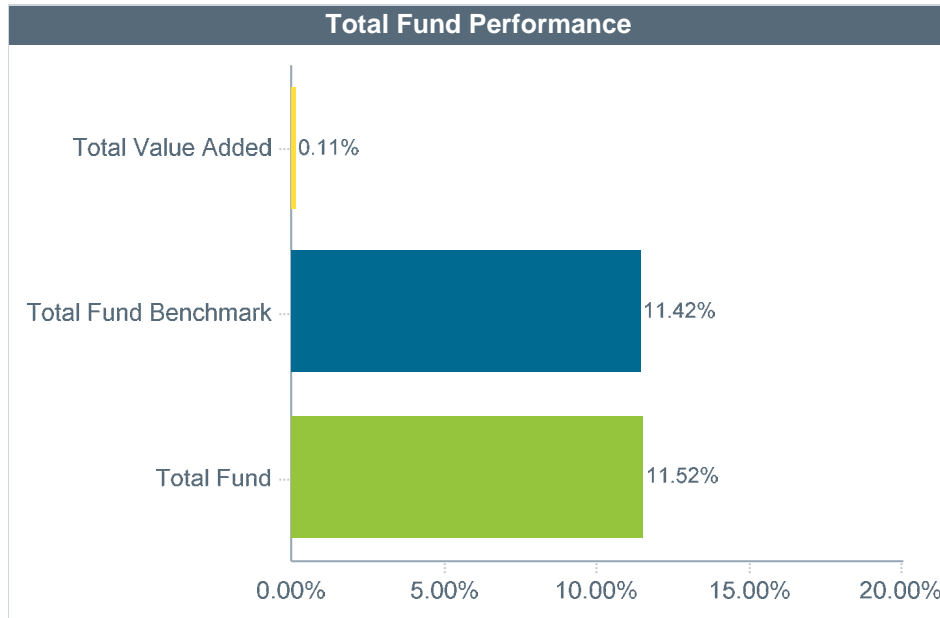
	5 Years	10 Years
Maximum Return	8.40	13.00
Minimum Return	-5.33	-15.45
Standard Deviation	6.04	11.68
vs. OP&F Total Fund Benchmark		
Info Ratio	0.95	0.97
Tracking Error	1.14	1.06
Alpha	1.04	0.93
vs. S&P 500 Index (Cap Wtd)		
Beta	0.57	0.69
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.62	0.51

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



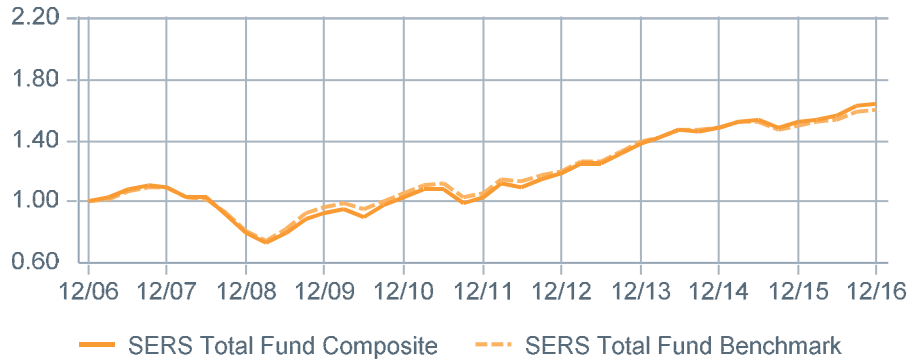


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

**Summary**

- SERS has lost 0.25% of alpha over the trailing 5-year period and lost 0.05% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, SERS has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

**Growth of \$1 - 10 Years**



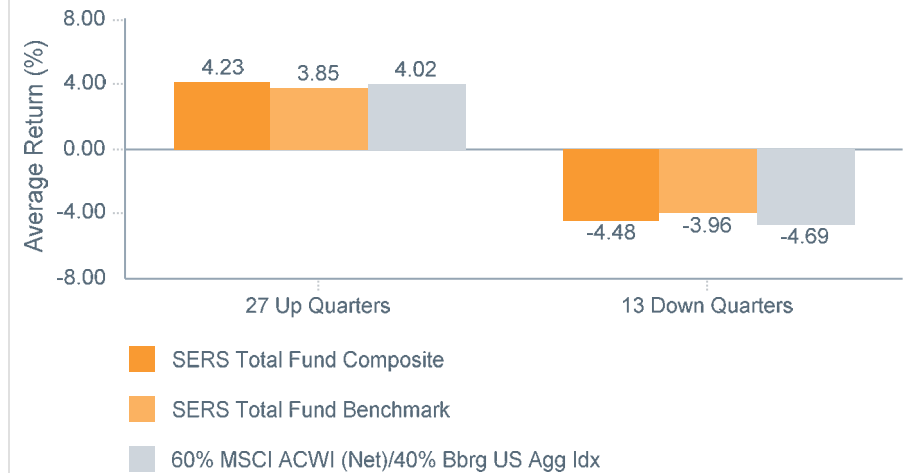
**MPT Stats**

	5 Years	10 Years
Maximum Return	8.11	11.01
Minimum Return	-3.77	-13.65
Standard Deviation	5.48	10.70
vs. SERS Total Fund Benchmark		
Info Ratio	0.88	0.20
Tracking Error	1.22	1.76
Alpha	-0.25	-0.05
vs. S&P 500 Index (Cap Wtd)		
Beta	0.53	0.63
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.72	0.44

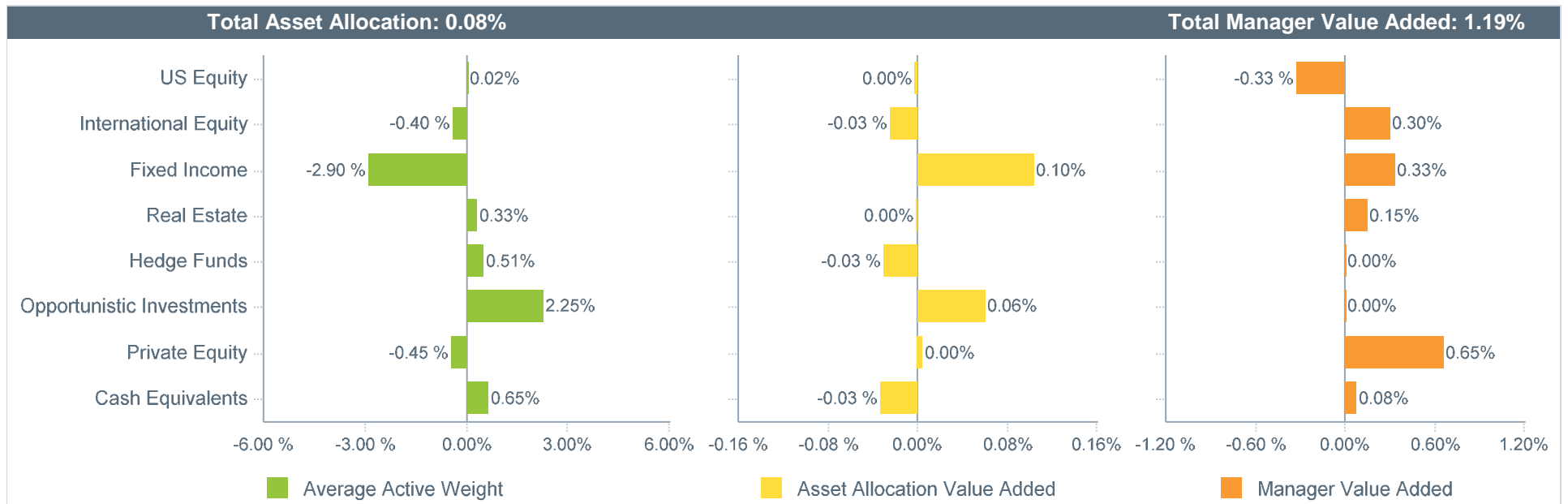
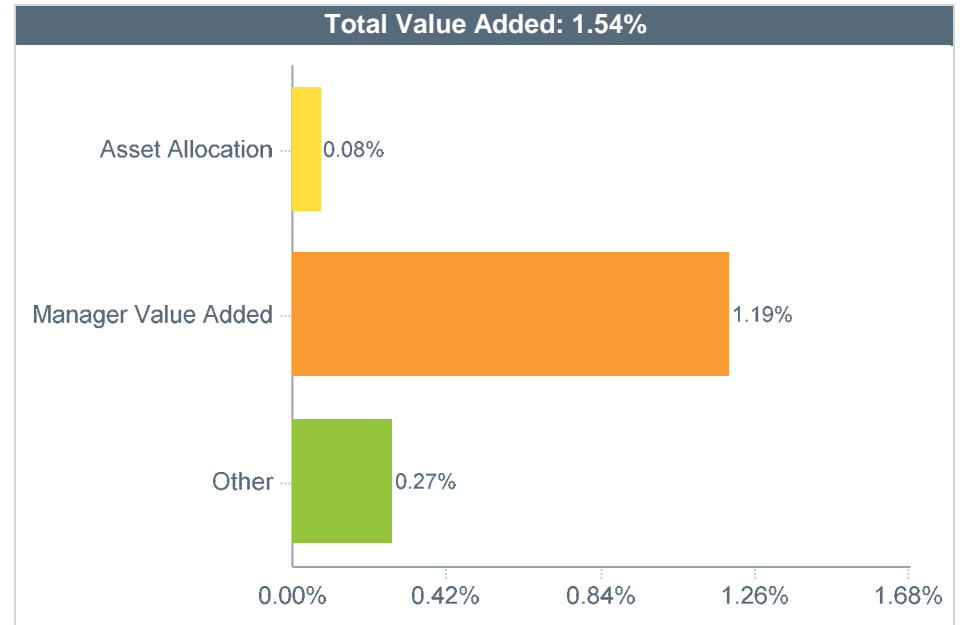
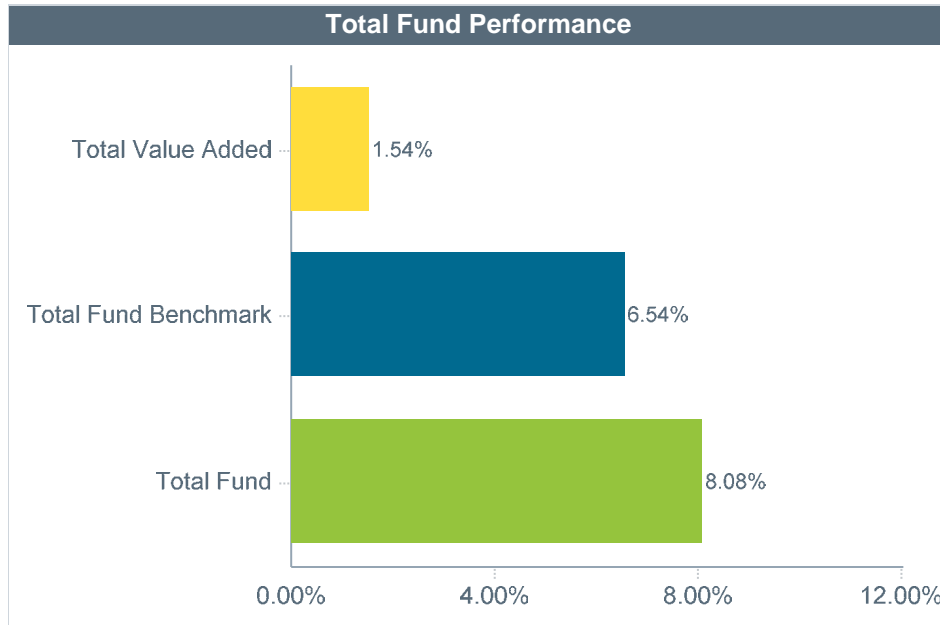
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	2,878,112,009	22.51	22.50
International Equity	2,859,694,835	22.37	22.50
Fixed Income	1,983,683,220	15.52	19.00
Real Estate	1,973,415,449	15.43	15.00
Hedge Funds	1,199,194,816	9.38	10.00
Opportunistic Investments	319,785,406	2.50	0.00
Private Equity	1,229,831,418	9.62	10.00
Cash Equivalents	341,774,993	2.67	1.00
Total Fund	12,785,492,146	100.00	100.00

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



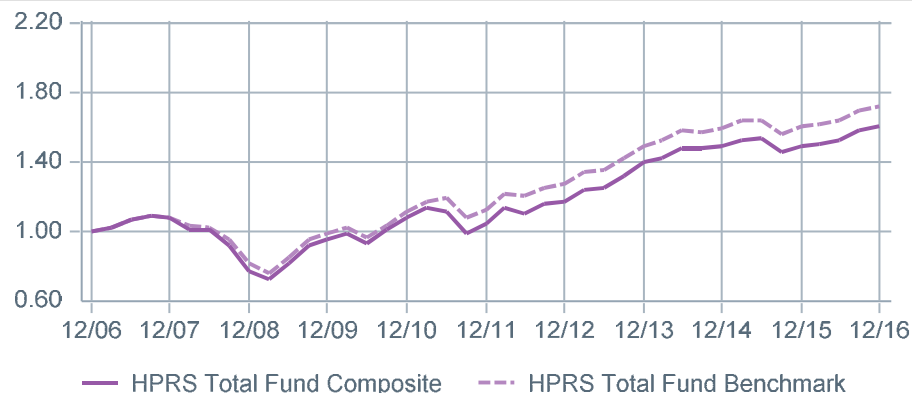
Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.



**Summary**

- HPRS has lost 0.65% of alpha over the trailing 5-year period and lost 1.06% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the total portfolio has exhibited larger up-market and smaller down-market capture characteristics over the past 10 years.

**Growth of \$1 - 10 Years**



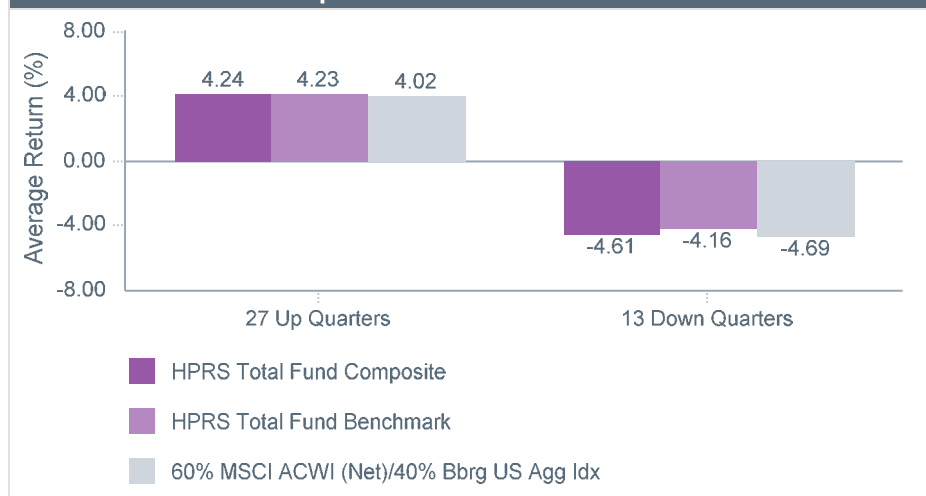
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	263,725,137	31.95	32.00
International Equity	159,780,125	19.36	20.00
Fixed Income	152,967,944	18.53	19.00
Real Estate	30,494,550	3.69	5.00
Hedge Funds	99,957,341	12.11	12.00
Private Equity	58,529,172	7.09	6.00
Real Assets	44,725,098	5.42	5.00
Cash Equivalents	15,325,233	1.86	1.00
Total Fund	825,504,601	100.00	100.00

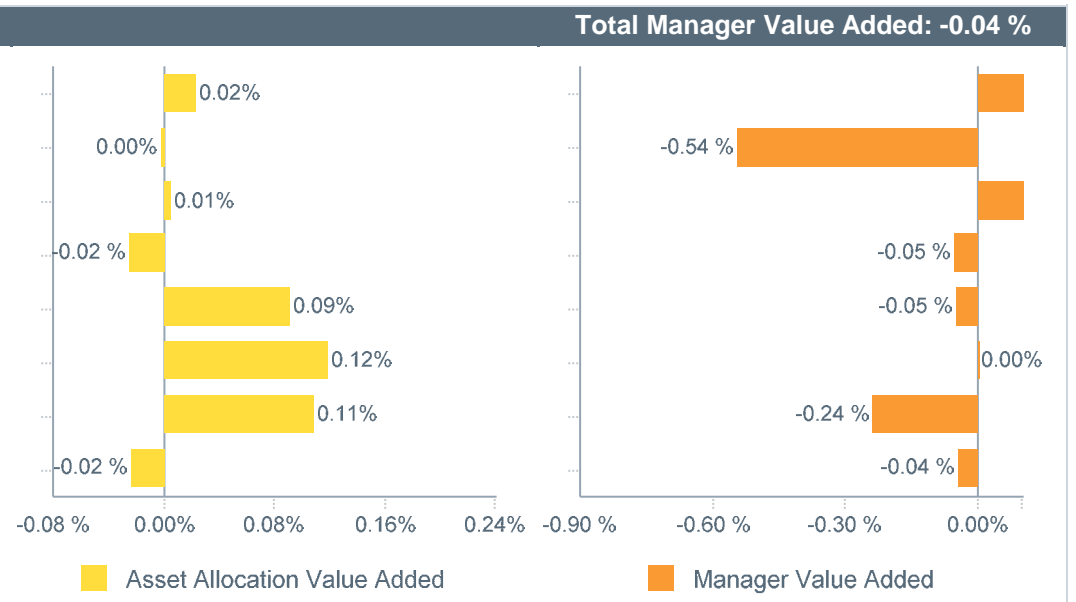
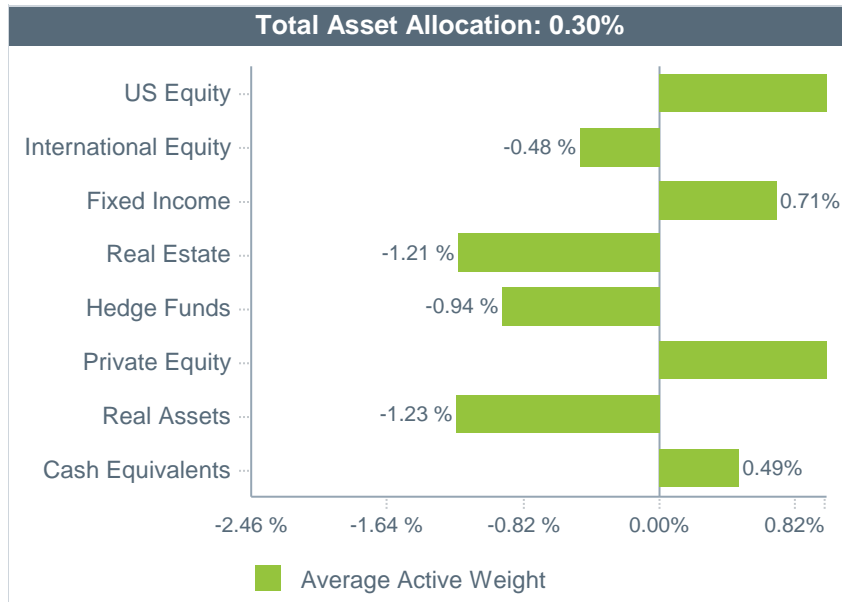
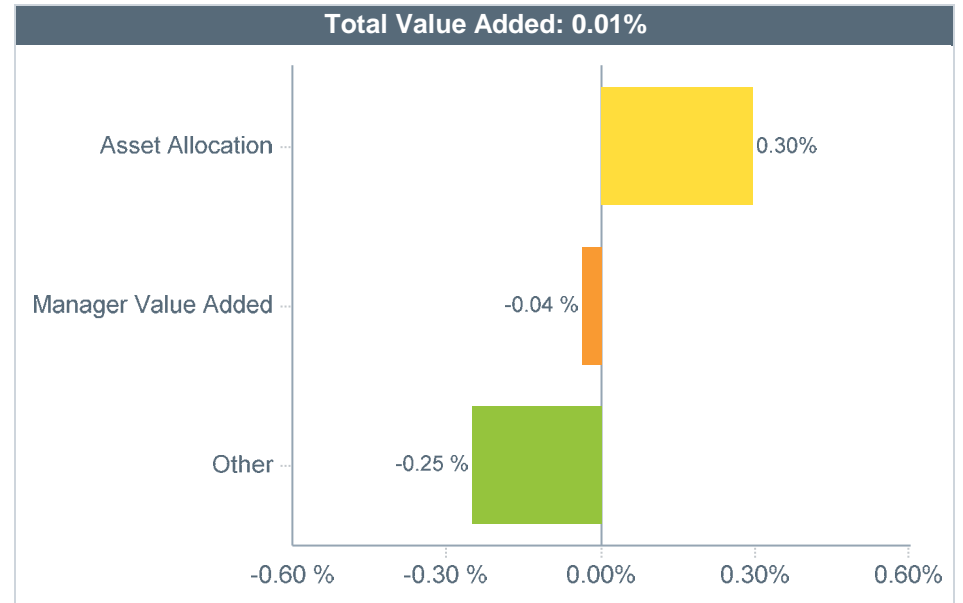
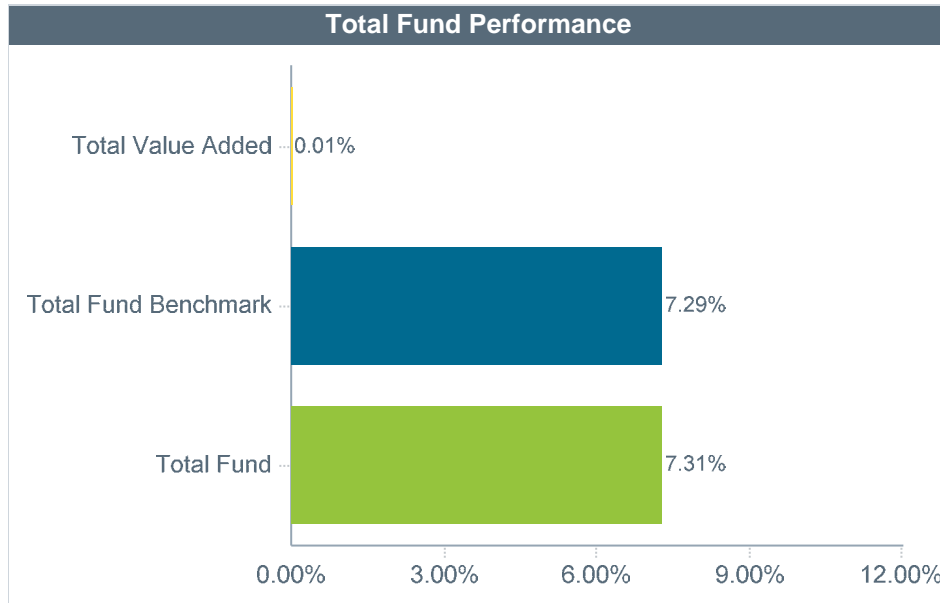
**MPT Stats**

	5 Years	10 Years
Maximum Return	8.19	12.56
Minimum Return	-5.33	-16.16
Standard Deviation	6.10	11.51
vs. HPRS Total Fund Benchmark		
Info Ratio	0.15	-0.35
Tracking Error	1.03	1.64
Alpha	-0.65	-1.06
vs. S&P 500 Index (Cap Wtd)		
Beta	0.64	0.69
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.42	0.40

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.



Ohio Retirement Study Council  
**HPRS Total Fund Performance vs. Peers**

As of December 31, 2016

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2015	2014	2013	2012
<b>HPRS</b>	<b>825,505</b>	<b>5.44</b>	<b>7.31</b>	<b>4.67</b>	<b>8.86</b>	<b>7.78</b>	<b>4.85</b>	<b>0.15</b>	<b>6.73</b>	<b>19.59</b>	<b>11.45</b>
HPRS Total Fund Benchmark		4.59	7.30	4.79	8.73	8.27	5.56	0.19	7.03	16.79	13.07
Difference		0.85	0.01	-0.12	0.13	-0.49	-0.71	-0.04	-0.30	2.80	-1.62
<i>All Public Plans &gt; \$1B-TF Median</i>		4.53	7.84	4.66	8.31	7.89	5.17	0.21	6.59	15.61	13.20
Rank		18	68	50	30	57	69	53	46	11	88
Population		89	87	86	84	81	77	94	74	64	62
<i>All Public Plans \$250M to \$1B-TF Median</i>		4.63	8.34	4.60	8.68	8.17	5.22	0.31	6.38	16.49	13.02
Rank		27	70	50	43	72	70	58	39	18	86
Population		48	47	45	45	44	37	61	55	56	51

Performance shown is gross of fees but is net of embedded fees on externally managed real estate and alternative investments.

## Appendix

### Performance Related Comments

- Performance shown is gross of fees unless otherwise noted and is annualized for periods greater than one year.
- Total Fund performance shown is net of embedded fees on externally managed real estate and alternative investments.
- All quarterly market value and performance data, including custom benchmark performance, is provided by the individual Plans.
- In 2005, the 401(h) Health Care Trust portfolio assets were segregated from the pension portfolio and invested with a more conservative asset-allocation. In 2014, the 115 Health Care Trust portfolio was created as another funding vehicle for post-employment health care for members in the Traditional Pension Plan and Combined Plan. Assets were segregated into the 115 Health Care Trust beginning September 2014, with the initial health care disbursements from the trust commencing late 2015 for January 2016 premium reimbursements. Favorable rulings from the Internal Revenue Service received March 2016 allowed OPERS to consolidate health care assets from the VEBA Trust and the 401(h) Health Care Trust into the 115 Health Care Trust.

### Asset Class Fee Comparison – as of 12/31/2016

(annualized fees shown in basis points)							
	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
<span style="color: blue;">■</span> PERS (DB)	6	27	14	48	70	116	43
<span style="color: red;">■</span> PERS (HC 115)	1	4	3	4	-	13	7
<span style="color: green;">■</span> STRS	11	20	9	46	73	173	70
<span style="color: yellow;">■</span> OP&F	30	34	52	155	250	-	77
<span style="color: orange;">■</span> SERS	30	39	23	120	158	149	111
<span style="color: purple;">■</span> HPRS	33	76	48	153	116	94	84

- Fees for Private Equity are based on committed capital, with the exception of OP&F and SERS, which are based on AUM.
- PERS (DB) and PERS (HC 115) Other Alternatives include Risk Parity, GTAA, Commodities and Opportunistic.
- STRS Other Alternatives include Opportunistic/Diversified Investments excluding Hedge Fund exposure.
- OP&F Other Alternatives include Timber and MLPs.
- SERS Other Alternatives include Opportunistic Investments.
- HPRS Other Alternatives fees include Real Assets.

## Appendix

### Percentage of Assets Managed by External Managers – as of 12/31/2016

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
<b>PERS (DB)</b>	64%	17%	78%	48%	100%	100%	100%	86%
<b>PERS (HC 115)</b>	41%	17%	78%	32%	-	-	100%	77%
<b>STRS</b>	30%	10%	42%	15%	14%	96%	100%	62%
<b>OP&amp;F</b>	100%	100%	100%	100%	100%	100%	-	100%
<b>SERS</b>	97%	100%	100%	100%	100%	100%	100%	88%
<b>HPRS</b>	100%	100%	100%	100%	100%	100%	100%	100%

- PERS (DB) and PERS (HC 115) Other Alternatives include Risk Parity, GTAA, Commodities and Opportunistic.
- STRS Other Alternatives include Opportunistic/Diversified Investments excluding Hedge Fund exposure.
- OP&F Other Alternatives include Timber and MLPs.
- SERS Other Alternatives include Opportunistic Investments.
- SERS has one internally-managed Cash mandate.
- HPRS Other Alternatives fees include Real Assets.

### Percentage of Actively Managed Assets – as of 12/31/2016

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
<b>PERS (DB)</b>	82%	40%	78%	91%	100%	100%	100%	100%
<b>PERS (HC 115)</b>	70%	40%	78%	82%	-	-	100%	100%
<b>STRS</b>	86%	60%	100%	100%	85%	100%	100%	100%
<b>OP&amp;F</b>	88%	55%	100%	100%	100%	100%	-	100%
<b>SERS</b>	83%	58%	68%	100%	97%	100%	100%	100%
<b>HPRS</b>	84%	51%	100%	100%	100%	100%	100%	100%

- PERS (DB) and PERS (HC 115) Other Alternatives include Risk Parity, GTAA, Commodities and Opportunistic.
- STRS Other Alternatives include Opportunistic/Diversified Investments excluding Hedge Fund exposure.
- OP&F Other Alternatives include Timber and MLPs.
- SERS Other Alternatives include Opportunistic Investments.
- SERS has one internally-managed Cash mandate.
- HPRS Other Alternatives fees include Real Assets.

## Custom Benchmark Glossary

### PERS (DB) Total Fund Custom Benchmark:

- 22.4% Russell 3000 Index
- 18.5% PERS (DB) International Equity Custom Benchmark
- 9.8% PERS (DB) Core Fixed Income Custom Benchmark
- 1.0% Bloomberg U.S. Treasury Index
- 3.0% Bloomberg U.S. High Yield Index
- 1.0% Bloomberg Global High Yield Index
- 6.0% PERS (DB) EMD Custom Benchmark
- 0.2% CS Leveraged Loan Index
- 1.0% Bloomberg CMBS + 2%
- 1.0% Bloomberg U.S. TIPS Index
- 10.0% PERS (DB) Real Estate Custom Benchmark
- 8.0% PERS (DB) Hedge Funds Custom Benchmark
- 10.0% PERS (DB) Private Equity Custom Benchmark
- 0.1% PERS (DB) Opportunistic Custom Benchmark
- 1.0% S&P Goldman Sachs Commodity Index (TR)
- 5.0% PERS (DB) Risk Parity Custom Benchmark
- 2.0% PERS (DB) GTAA Custom Benchmark

### PERS (HC 115) Total Fund Custom Benchmark:

- 24.5% Russell 3000 Index
- 20.4% PERS (HC 115) International Equity Custom Benchmark
- 16.8% PERS (HC 115) Core Fixed Income Custom Benchmark
- 6.0% PERS (HC 115) EMD Custom Benchmark
- 2.5% Bloomberg U.S. High Yield Index
- 0.2% CS Leveraged Loan Index
- 1.0% Bloomberg CMBS + 2%
- 5.0% Bloomberg U.S. TIPS Index
- 1.5% Bloomberg Global High Yield Index
- 6.0% Dow Jones U.S. Select Real Estate Securities TR Index
- 6.0% PERS (HC 115) Hedge Funds Custom Benchmark
- 0.1% PERS (HC 115) Opportunistic Custom Benchmark
- 2.0% S&P Goldman Sachs Commodity Index (TR)
- 5.0% PERS (HC 115) Risk Parity Custom Benchmark
- 2.0% PERS (HC 115) GTAA Custom Benchmark
- 1.0% BofA ML 3 Mo US T-Bill Index

### STRS Total Fund Custom Benchmark:

- 31.0% Russell 3000 Index
- 20.8% MSCI World Ex US Index (50% Hedged)
- 5.2% MSCI Emerging Markets Index
- 18.0% Bloomberg US Universal Index
- 10.0% STRS Real Estate Custom Benchmark
- 7.0% Opportunistic Composite Performance
- 7.0% Private Equity Composite Performance
- 1.0% BofA ML 3 Mo US T-Bill Index

### OP&F Total Fund Custom Benchmark:

- 21.3% Wilshire 5000 Index
- 20.1% MSCI ACW Ex US IMI Index (Net)
- 10.1% Bloomberg US Aggregate Bond Index
- 13.7% CS High Yield Dev. Countries Only Index
- 8.8% Bridgewater Custom GIPS Index
- 10.8% NCREIF ODCE (Net) (1 Quarter Lag)
- 2.6% CPI + 5%
- 7.2% Alerian MLP Index
- 5.4% OP&F Private Equity Custom Benchmark

### SERS Total Fund Custom Benchmark:

- 22.5% Russell 3000 Index
- 22.5% SERS International Equity Custom Benchmark
- 19.0% Bloomberg US Aggregate Bond Index
- 15.0% SERS Real Estate Custom Benchmark
- 10.0% HFRI FOF Composite Index + 1%
- 10.0% Burgiss All Private Equity (1 Quarter Lag)
- 1.0% Citigroup 30 Day T-Bill Index

### HPRS Total Fund Custom Benchmark:

- 32.0% Russell 3000 Index
- 20.0% MSCI ACW Ex US IM Index (USD) (Net)
- 19.0% HPRS Fixed Income Custom Benchmark
- 5.0% NCREIF Property Index
- 12.0% HFRI FOF Composite Index
- 6.0% HPRS Total Private Equity Custom Composite
- 5.0% HPRS Real Assets Custom Index
- 1.0% BofA Merrill Lynch 91-Day T-Bill

## Custom Benchmark Glossary

### **PERS (DB) International Equity Custom Benchmark:**

- 55% MSCI World Ex US Index
- 10% MSCI World Ex US Small Cap Index
- 31% MSCI Emerging Markets Index
- 4% MSCI Emerging Markets Small Cap Index

### **PERS (DB) Core Fixed Income Custom Benchmark:**

- Bloomberg US Aggregate Bond Index

### **PERS (DB) EMD Custom Benchmark:**

- 50% JP Morgan Emerging Markets Bond Index Global
- 50% JP Morgan Government Bond Index-Emerging Markets Global Diversified

### **PERS (DB) Real Estate Custom Benchmark:**

- NFI-ODCE Index (Net) + 0.85% (1 Quarter Lag)
- Prior to 2013: NCREIF Property Index (1 Quarter Lag)

### **PERS (DB) Private Equity Custom Benchmark:**

- State Street Private Equity Index (1 Quarter Lag)
- Prior to 2015: 60% Russell 3000 Index, 40% MSCI ACWI Ex US IMI plus 300 basis points (1 Quarter Lag)
- Prior to 2013: Russell 3000 Index + 300 bps (1 Quarter Lag)

### **PERS (DB) Hedge Funds Custom Benchmark:**

- 20% HFRI Equity Hedge (Total) Index
- 30% HFRI Event Driven (Total) Index
- 15% HFRI Relative Value (Total) Index
- 20% HFRI Macro (Total) Index
- 15% HFRI Fund Weighted Composite Index
- Prior to 2014Q2: The minimum of 700 basis points or 3-month LIBOR plus 400 basis points

### **PERS (DB) Opportunistic Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **PERS (DB) Risk Parity Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **PERS (DB) GTAA Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **PERS (HC 115) International Equity Custom Benchmark:**

- 55% MSCI World Ex US Index
- 10% MSCI World Ex US Small Cap Index
- 31% MSCI Emerging Markets Index
- 4% MSCI Emerging Markets Small Cap Index

### **PERS (HC 115) Core Fixed Income Custom Benchmark:**

- Bloomberg US Aggregate Bond Index

### **PERS (HC 115) EMD Custom Benchmark:**

- 50% JP Morgan Emerging Markets Bond Global Index
- 50% JP Morgan Government Bond Index-Emerging Markets Global Diversified

### **PERS (HC 115) Hedge Funds Custom Benchmark:**

- 20% HFRI Equity Hedge (Total) Index
- 30% HFRI Event Driven (Total) Index
- 15% HFRI Relative Value (Total) Index
- 20% HFRI Macro (Total) Index
- 15% HFRI Fund Weighted Composite Index

### **PERS (HC 115) Opportunistic Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **PERS (HC 115) Risk Parity Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **PERS (HC 115) GTAA Custom Benchmark:**

- The market weight of underlying portfolio benchmarks

### **STRS International Equity Custom Benchmark:**

- 80% MSCI EAFE Index
- 20% MSCI Emerging Markets Index

### **STRS Real Estate Custom Benchmark:**

- 85% NCREIF Property Index
- 15% FTSE NAREIT Equity REITs Index

### **STRS Private Equity Custom Benchmark:**

- Russell 3000 + 100 basis points

### **STRS Opportunistic Custom Benchmark:**

- Russell 3000 - 100 basis points

### **OP&F Private Equity Custom Benchmark:**

- Wilshire 5000 + 3% (1 Quarter Lag)
- Prior to 2007Q1: Wilshire 5000 (1 Quarter Lag)
- Prior to 2006Q4: Wilshire 5000 + 5%

## Custom Benchmark Glossary

### SERS International Equity Custom Benchmark:

- MSCI ACW Ex US Index (USD) (Net)
- Prior to 2014Q1: MSCI ACWI ex-US (Net) Index (dev. markets 50% hedged)
- Prior to 2013Q3: MSCI ACWI ex-US (Gross) Index (dev. markets 50% hedged)

### SERS Real Estate Custom Benchmark:

- NCREIF Property Index (1 Quarter Lag)
- Prior to 2010Q3: 80% NCREIF/20% NAREIT

### SERS Opportunistic Custom Benchmark:

- SERS Total Fund Custom Benchmark

### HPRS Fixed Income Custom Benchmark:

- 53% Bloomberg Aggregate Bond Index
- 15.7% Citi WGBI
- 15.7% Credit Suisse Leveraged Loans
- 15.6% BofA Merrill Lynch 91-Day T-Bill

### HPRS Total Private Equity Custom Benchmark:

- Wilshire 5000 + 3% (1 Quarter Lag)
- Prior to 2010Q3: CPI + 5%

### HPRS Real Assets Custom Benchmark:

- 60% NCREIF Timberland
- 40% Alerian MLP

## Glossary

**Alpha** - A measure of the difference between a portfolio's actual returns and its expected performance, given its level of risk as measured by beta. It is a measure of the portfolio's historical performance not explained by movements of the market.

**Benchmark** - A standard against which the performance of a fund or investment manager can be measured.

**Beta** - A measure of the sensitivity of a portfolio to the movements in the market. A beta of 1.0 indicates the same level of stock market risk as the S&P 500 Index (Cap Wtd), unless otherwise noted. Lower betas indicate lower stock market risk. Beta is a measure of a portfolio's non-diversifiable or systematic risk.

### Capital Markets Review -

**Breakeven Inflation** - Measures the expected inflation rate at each stated maturity by taking the difference between the real yield of the inflation-linked maturity curve and the yield of the closest nominal Treasury maturity.

**Consumer Confidence** - Measures domestic consumer confidence as defined by the degree of optimism on the state of the economy that consumers express through saving and spending.

**Consumer Price Index (CPI)** - Measures the change in the price level of consumer goods and services.

Option-Adjusted Spread - Measures the flat spread of an index or bond to the Treasury yield curve after removing the effect of any embedded options.

**Purchasing Managers Index (PMI)** - Measures economic activity by surveying purchasing managers on a monthly basis as to whether business conditions have improved, worsened, or stayed the same.

**US Dollar Total Weighted Index** - Measures the value of the US Dollar relative to a basket of other world currencies. It is calculated as the weighted geometric mean of the dollar's value versus the EUR, GBP, CAD, SEK, CHF, and JPY.

**VIX** - Measures the implied volatility of S&P 500 Index options by looking at the market's expectation of the S&P 500 Index volatility over the next 30 day period. Commonly referred to as the "fear index" or the "fear gauge."

**Downside Risk** - A measure similar to standard deviation, but focuses only on the negative returns of the fund or investment. The higher the factor, the riskier the fund or investment.

**Correlation** - A statistical measure of the relationship between asset class returns. A value of 1.00 is a perfect correlation; that is, the asset classes always move in the same direction. A value of -1.00 indicates a perfect negative correlation, in which the asset classes always move in opposite directions of each other. A value of 0 indicates there is no relationship between the direction of returns of the two asset classes. Correlation calculations only consider the direction of changes relative to two variables and not the magnitude of those changes.

**Down Market Capture** - Down market by definition is negative benchmark return and down market capture represents the ratio in % terms of the average portfolios return over the benchmark during the down market period. The lower the value of the down market capture the better the product's performance.

**Excess Return** - Arithmetic difference between the fund or investment return and the risk-free return (or other specified market index) over a specified time period, shown on an annualized basis.

**Indices** - All indices and related information are considered intellectual property and are licensed by each index provider. The indices may not be copied, used or distributed without the index provider's prior written approval. Index providers make no warranties and bear no liability with respect to the indices, any related data, their quality, accuracy, suitability and/or completeness.

**Information Ratio** - Measured by dividing the active rate of return by the tracking error. The higher the information ratio, the more value-added contribution relative to the market benchmark.

**Maximum Return** - The maximum quarterly return earned over the specified time period.

**Minimum Return** - The minimum quarterly return earned over the specified time period.

## Glossary

### Peer Groups -

**Plan Sponsor Peer Groups** - RVK utilizes the Mellon Analytical Solutions Trust Universe along with the Investment Metrics Plan Sponsor Universe. The combined Mellon Analytical Solutions Trust Universe and Investment Metrics Plan Sponsor Universe is used for comparison of total fund composite results and utilizes actual client returns compiled from consultant and custodial data. The Plan Sponsor Peer Group database includes performance and other quantitative data for over 2,100 plans which include corporate, endowment, foundation, public, and Taft Hartley plans. Plan Sponsor Peer Groups are gross of fees.

**Percentile Rankings** - Percentile rank compares an individual fund's performance with those of other funds within a defined peer group of managers possessing a similar investment style. Percentile rank identifies the percentage of a fund's peer group that has a higher return (or other comparative measurement) than the fund being ranked. Conversely, 100 minus the individual fund's ranking will identify the percentage of funds within the peer group that have a lower return than the fund being ranked.

1 - Highest Statistical Value                      100 - Lowest Statistical Value

*Example: American Funds AMCP;R-4 (RAFEX) is ranked in the 4th percentile within the IM US Equity Large-Cap Growth Funds (MF) Peer Group for the Sharpe Ratio. Within the IM US Equity Large-Cap Growth Funds peer group, 4% of the other funds performed better than American Funds AMCP;R-4 (RAFEX), while 96% of the funds performed worse.*

**Performance Methodology** - RVK calculates performance beginning with the first full month following inception. Since inception performance may vary from manager reported performance due to RVK using the first full month of returns as the inception date. Performance for both managers and composites is annualized for periods greater than one year.

**Return** - Compounded rate of return for the period.

**%Return** - The time-weighted rate of return of a portfolio for a given period.

**RVK Liquidity Rating** - A qualitative method for determining the relative amount of liquidity in a portfolio. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating.

<u>Asset Class</u>	<u>RVK Liquidity Rating</u>	<u>Asset Class</u>	<u>RVK Liquidity Rating</u>
<b><u>Liquid Investments</u></b>		<b><u>Less Liquid Investments</u></b>	
T-Bills and Treasuries	100	Fixed Income Plus Sector	50
Cash Equivalents	98	Bank Loans	50
TIPS	95	Emerging Markets Debt	50
US Large Cap Equity	95	Hedge Funds	35
Diversified Real Return	93	Hedge Funds of Funds	35
Non-US Large Cap Equity	90	<b><u>Not Liquid Investments</u></b>	
Global Tactical Asset Allocation	88	Core Real Estate	25
US Small Cap Equity	85	Core Plus Real Estate	15
REITs	85	Plus Only Real Estate	5
Non-US Small Cap Equity	85	Private Equity	5
Emerging Markets Equity	85		
Core Fixed Income	85		
Core Plus Fixed Income	80		

**Sharpe Ratio** - Represents the excess rate of return over the risk-free return (i.e., BofA ML 3 Mo US T-Bill Index unless specified otherwise), divided by the standard deviation of the excess return. The result is the absolute rate of return per unit of risk. The higher the value, the better the portfolio's historical risk-adjusted performance.

**Standard Deviation** - A statistical measure of the range of a portfolio's performance and is a commonly used proxy for overall investment risk. The variability of a return around its average return over a specified time period.

**Tracking Error** - A measure of the standard deviation of a portfolio's performance relative to the performance of the market index.



## Glossary

**Thematic Classification** - Represents dedicated manager allocations; as such, thematic allocations are approximations. RVK categorizes the following asset classes as Alpha, Capital Appreciation, Capital Preservation, and Inflation:

<u>Alpha</u>	<u>Capital Appreciation</u>	<u>Capital Preservation</u>	<u>Inflation</u>
Absolute Return Strategies	Public Equity	Core Fixed Income	TIPS
Currency Overlay	Private Equity	CMBS Fixed Income	Bank Loans
GTAA (Global Tactical Asset Allocation)	Preferred Securities	Asset Backed Fixed Income	Core Real Estate
	High Yield	Domestic Core Plus Fixed Income	Real Return
	Convertible Fixed Income	Mortgage Backed Fixed Income	Inflation Hedges
	TALF Funds	International Developed Fixed Income	REITs
	Distressed Debt	Cash Equivalents	Commodities
	Emerging Market Fixed Income	Stable Value	
	MLPs		
	Value Added Real Estate		
	Opportunistic Real Estate		

**Total Fund Attribution** - A method for identifying the sources of a total fund's over- or underperformance relative to its benchmark. The calculation identifies the contributions of positive or negative total fund excess return caused by allocation differences relative to the total fund's custom benchmark, and performance differences of the investment managers relative to the benchmark components that represent them.

### **Total Fund Performance -**

**Total Fund** - The percentage return of the total fund for the specified time period.

**Total Fund Benchmark** - The percentage return of the total fund benchmark for the specified time period; calculated using the target asset allocation and the corresponding benchmark returns.

**Total Value Added** - The percentage of over- or underperformance of the total fund as compared to the total fund benchmark.

### **Total Value Added -**

**Asset Allocation** - Shows how the variance of the total fund's actual allocation from its target allocation added to or subtracted from fund performance.

**Manager Value Added** - The portion of the total value added attributable to the outperformance or underperformance of the fund's investment managers, relative to the individual benchmarks that represent them in the total fund benchmark.

**Market Timing/Other** - The contribution of other residual factors, including estimation error and transaction timing.

**Tracking Error** - A measure of the standard deviation of a portfolio's performance relative to the performance of an appropriate market benchmark.

**Unit Value** - The dollar value of a portfolio, assuming an initial nominal investment of \$1.00, growing at the compounded rate of %Return for a given period.

**Up Market Capture** - Up market by definition is positive benchmark return and up market capture represents the ratio in % terms of the average portfolios return over the benchmark during the up market period. The higher the value of the up market capture the better the product's performance.

PORTLAND

CHICAGO

NEW YORK

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