



# Ohio Retirement Study Council

## Investment Performance Analysis

Period Ended: June 30, 2015



## 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*.

**Barclays US Agg Bond:** The **Barclays 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.

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

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

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

**Barclays Mortgage:** The **Barclays 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).

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

**Barclays US High Yield:** The **Barclays 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.

**Barclays Global High Yield:** The **Barclays 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 **HFN 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.



**Second Quarter Economic Environment**

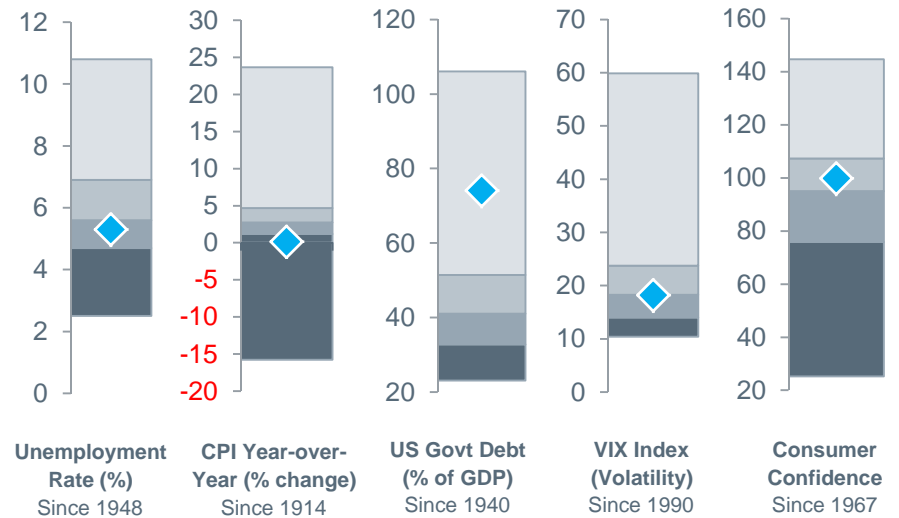
**Key Economic Indicators**

Market activity in the second quarter of 2015 saw the reversal of several major trends. First, US Dollar strength dissipated to a degree, as it sold off almost 3% relative to other developed currencies. Second, developed market interest rates, which had been trending lower and were negative in some markets, reversed sharply. Finally, oil prices, in part helped by weakness in the US Dollar, bounced off the Q1 lows and finished the second quarter higher. Relatively benign equity volatility in April and May gave way to heightened volatility in the second half of June, with investors fixated on Greece's debt situation and government intervention in China. Still, global equity markets generally finished the quarter with small gains. Uninspiring first half economic data across a number of categories was enough to convince the Federal Reserve to maintain interest rates at 0%. The Board cited below target inflation, softer GDP growth, and lower labor productivity as reasons to be wary of increasing rates. Economic data released during the second quarter was largely consistent with that view.

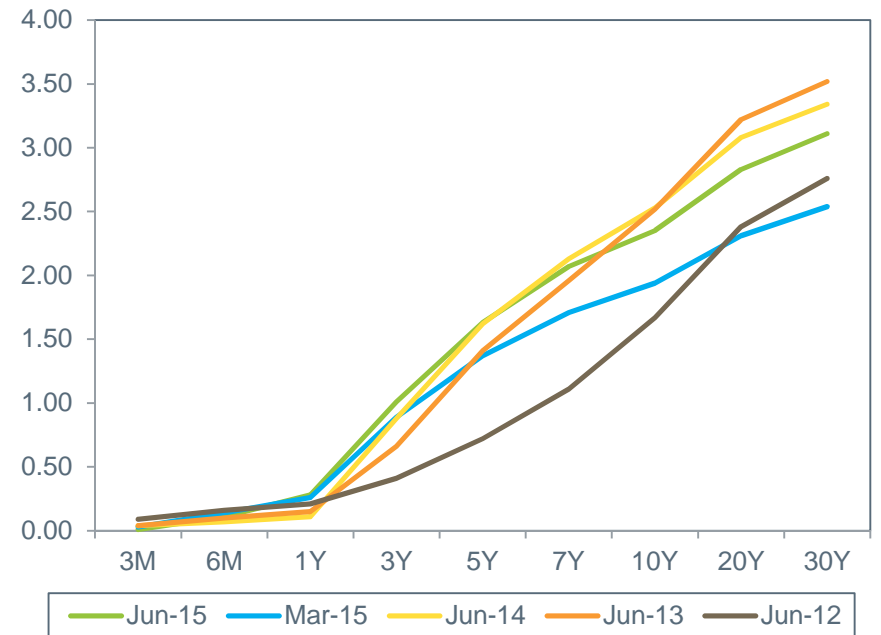
Economic Indicators	Jun-15	Mar-15	Jun-14	Jun-12	20 Yr
Federal Funds Rate (%)	0.08 ▲	0.06	0.09	0.09	2.74
Breakeven Infl. - 1 Yr (%)	0.73 ▼	1.46	1.46	-0.09	N/A
Breakeven Infl. - 10 Yr (%)	1.89 ▲	1.78	2.24	2.10	N/A
CPI YoY (Headline) (%)	0.1 ▲	-0.1	2.1	1.7	2.3
Unemployment Rate (%)	5.3 ▼	5.5	6.1	8.2	6.0
Real GDP YoY (%)	2.3 ▼	2.9	2.6	2.5	2.4
PMI - Manufacturing	53.50 ▲	51.50	55.70	51.30	52.00
USD Total Wtd Idx	89.94 ▼	92.06	75.73	74.50	86.43
WTI Crude Oil per Barrel (\$)	59 ▲	48	105	85	54
Gold Spot per Oz (\$)	1,172 ▼	1,184	1,327	1,597	723

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	0.28	1.23	7.42	17.34	7.89
Russell 2000	0.42	4.75	6.49	17.08	8.40
MSCI EAFE (Net)	0.62	5.52	-4.22	9.54	5.12
MSCI EAFE SC (Net)	4.34	10.15	-0.77	12.40	6.59
MSCI Emg Mkts (Net)	0.69	2.95	-5.12	3.69	8.11
Barclays US Agg Bond	-1.68	-0.10	1.86	3.35	4.44
BofA ML 3 Mo US T-Bill	0.01	0.01	0.02	0.08	1.42
NCREIF ODCE (Gross)	3.82	7.34	14.43	14.41	6.85
Wilshire US REIT	-9.93	-5.73	5.21	14.73	6.92
HFN FOF Multi-Strat	0.07	2.60	3.45	3.97	2.94
Bloomberg Cmdbt (TR)	4.66	-1.56	-23.71	-3.91	-2.62

**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.



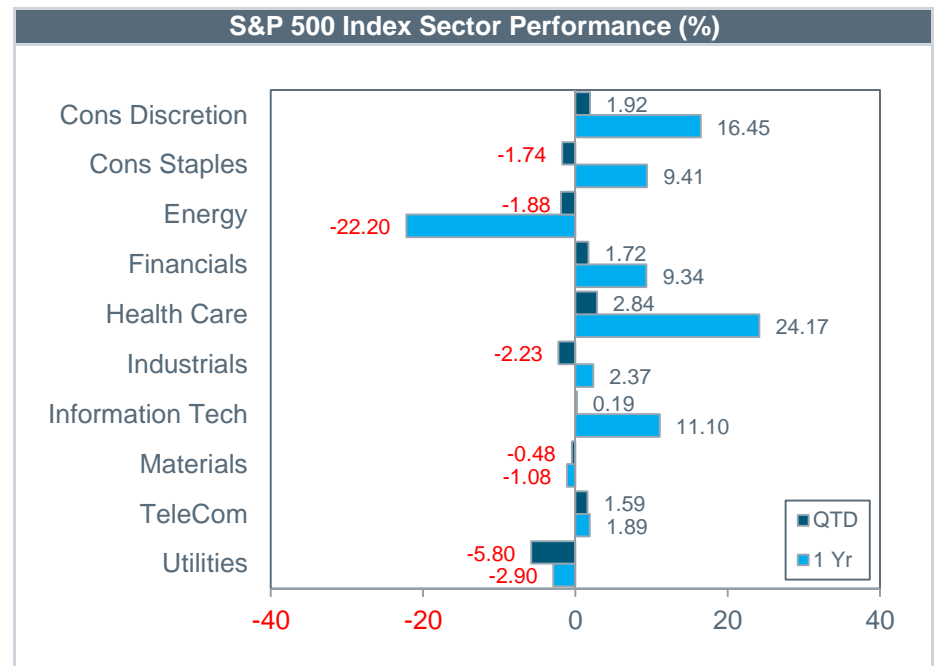
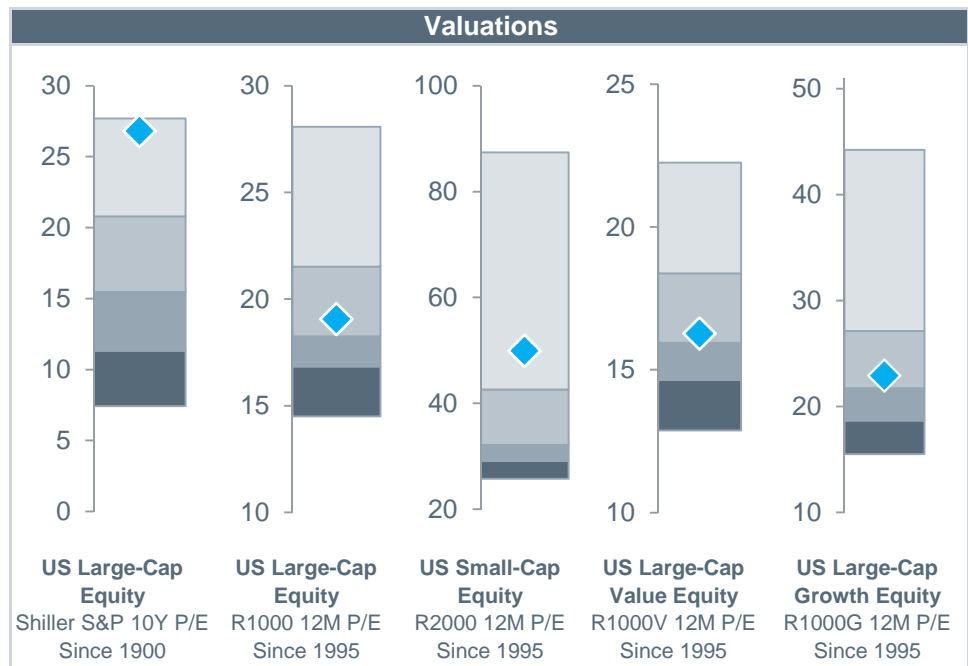
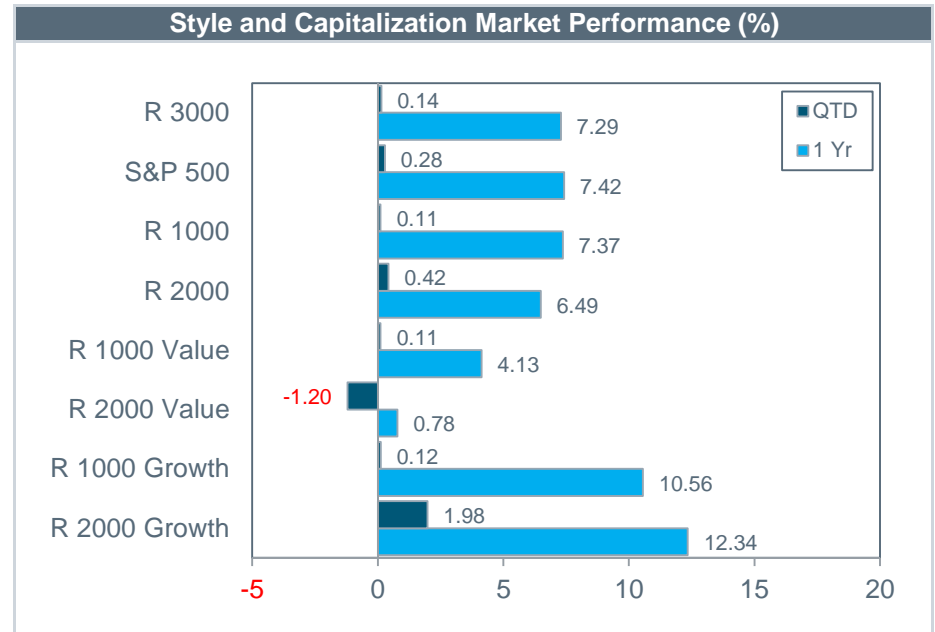
### Second Quarter Review

**Broad Market**  
 The US equity market ended the quarter relatively flat as market turmoil overseas impacted domestic markets in June and erased otherwise positive April and May performance.

**Market Cap**  
 Large-cap stocks experienced mainly flat performance, while mid-cap stocks faced strong headwinds and ended in negative territory. Micro- and small-cap stocks were the top performers during the quarter.

**Style**  
 The Russell 3000 Index finished the quarter returning 0.14%, with growth moderately outperforming value. Within the micro- and small-cap segments, growth outperformed value by 414 and 318 basis points, respectively.

**Sector**  
 Investors with exposure to the consumer discretionary and health care sectors benefited from gains in those segments. The energy, industrials, REIT and utilities sectors posted notably negative performance.



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.



**Second Quarter Review**

**Broad Market**

During the second quarter of 2015, international markets, both developed and emerging, outperformed the US markets by 48 and 55 bps, respectively.

**Market Cap & Style**

Within the developed markets, growth stocks continued to outperform value stocks; while within emerging markets, value stocks outperformed growth stocks. On average, small-cap stocks tended to outperform their larger-cap counterparts.

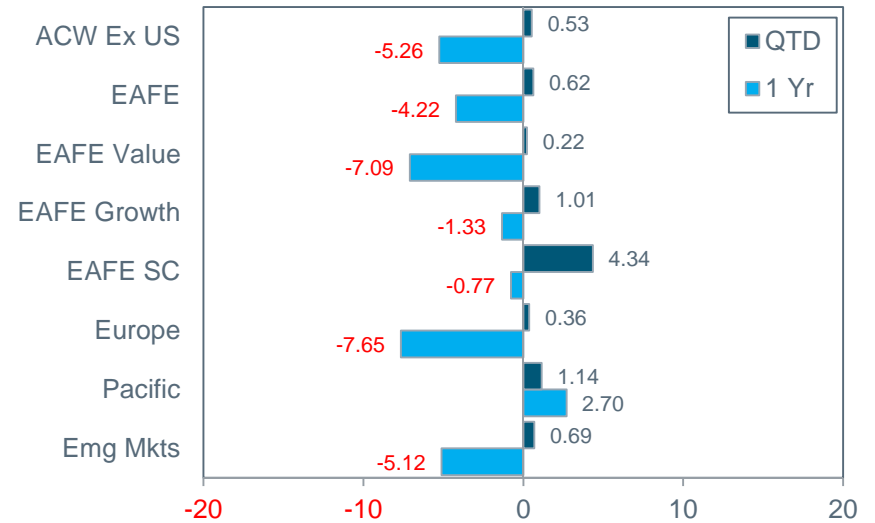
**Developed Markets**

The strongest contributor to performance for the quarter, as measured by the MSCI EAFE Index, was Japan. Japan reported 2.4% GDP growth for the previous quarter, giving some confidence that Abenomics has started to work.

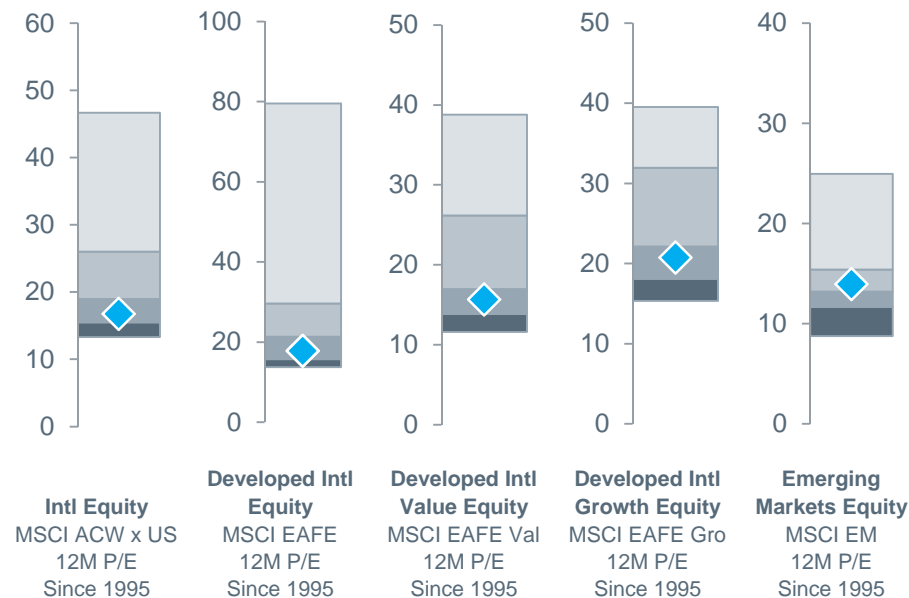
**Emerging Markets**

The emerging markets slightly outperformed their developed counterparts. Greece's debt crisis dominated the headlines yet its equity markets actually saw positive performance for the quarter. Over the past year, the Shanghai composite has risen over 150%, partially fueled by government intervention.

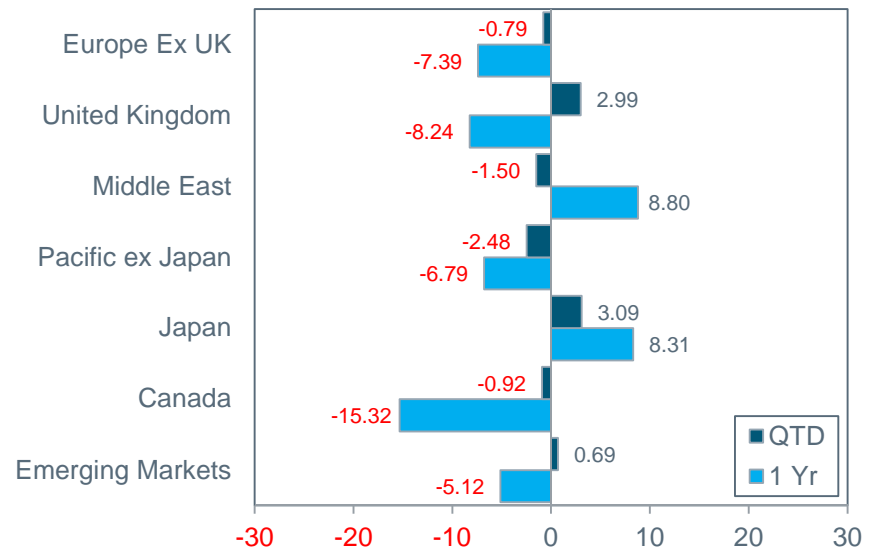
**MSCI Style and Capitalization Market Performance (%)**



**Valuations**



**MSCI Region Performance (%)**



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.



**Second Quarter Review**

**Broad Market**

Fixed income markets were down as rates rose and credit spreads widened. The Barclays US Aggregate Bond Index was down 1.68% posting negative returns for all three months of Q2 – the first 3-month negative run since 2008. Reduced liquidity in fixed income markets has led to higher market price volatility and increased trading costs.

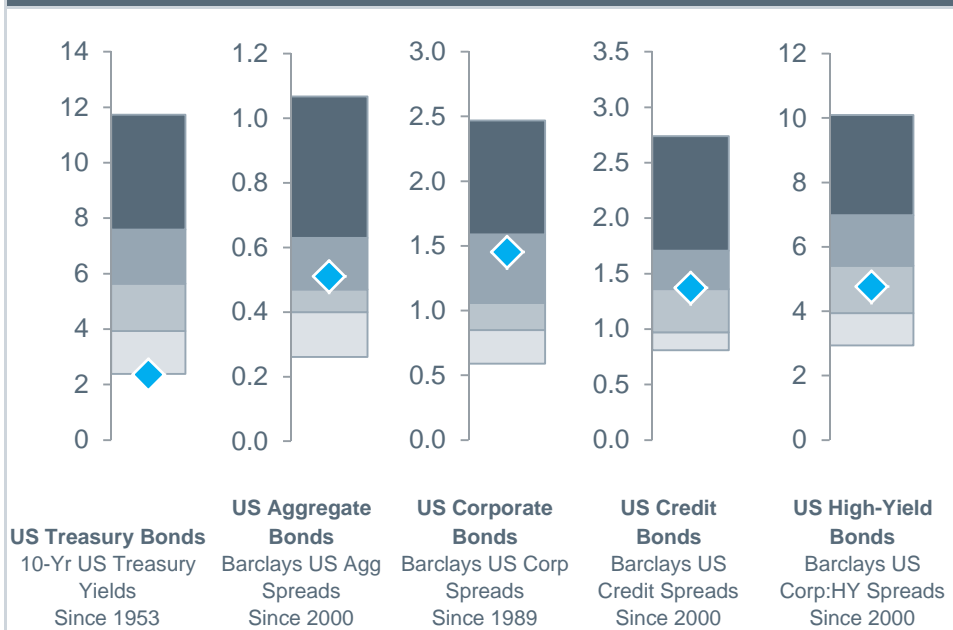
**US Treasury Market**

The 10- and 30-year Treasury yields rose by 40 and 57 basis points, respectively, in anticipation of a Fed funds rate hike. Long duration bonds suffered accordingly.

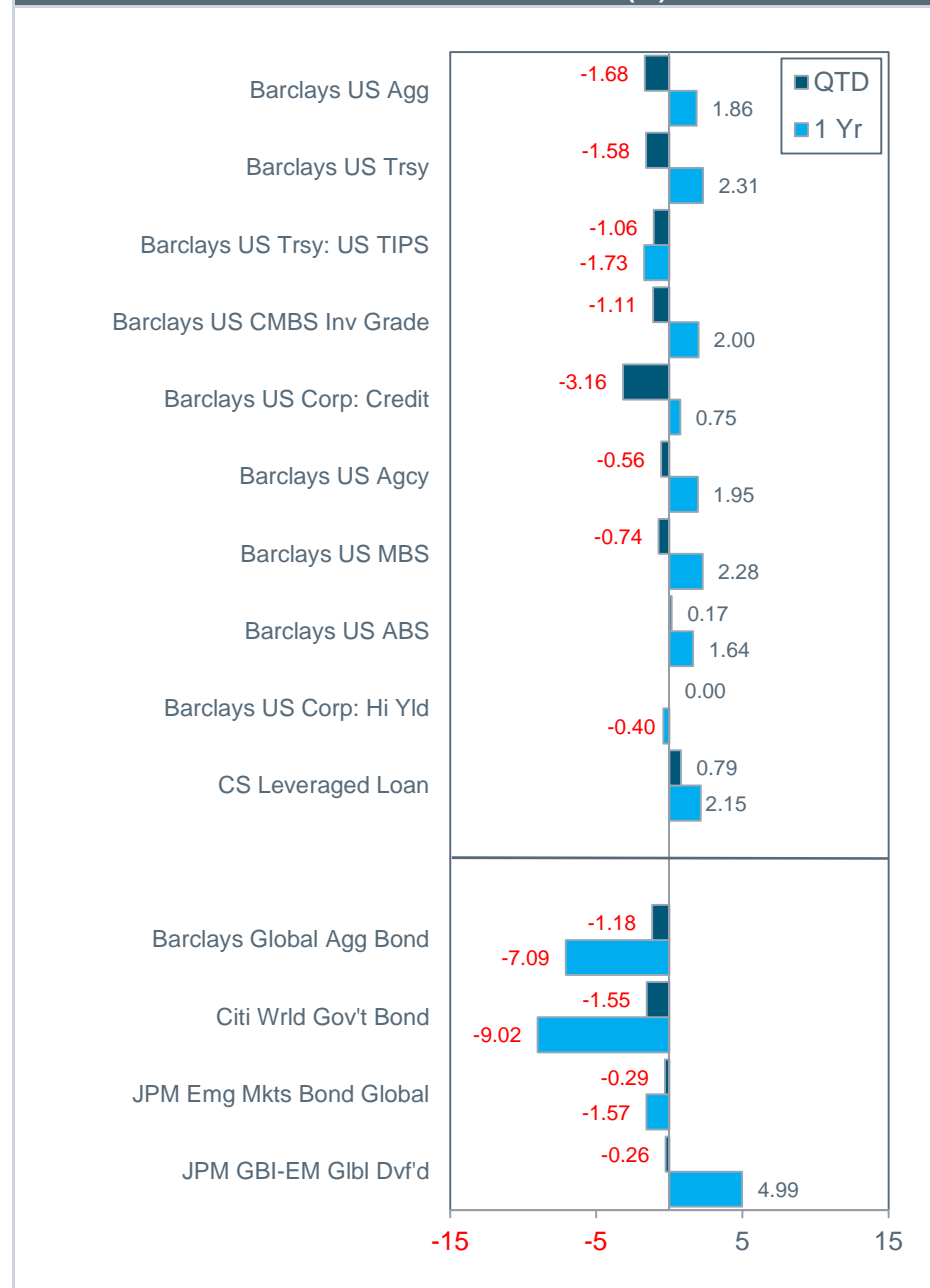
**Foreign Currency**

Government bond yields for many of the larger European countries bottomed out in April and climbed through the month of May and June as questions arose about whether Greece would be able to service its debt. Hard currency emerging market debt outperformed local currency for the ninth consecutive quarter.

**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.



**Second Quarter Review - Absolute Return**

**General Market - Hedge Funds**

Most hedge fund strategies generated positive returns in the second quarter, adding to gains realized in Q1. Long/Short equity funds in particular are having a strong 2015. Top tier managers have added alpha on both their long and short positions as they were able to capture the majority of equity market upside during the months of April and May, and protected capital well toward the end of June as markets sold off.

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

In April and May, most GTAA managers posted gains and outperformed a relatively-undiversified, US-centric 60/40 allocation; however, the majority posted losses for the quarter due to the volatility that occurred in June. In a break from performance characteristics of the past two quarters, valuation driven managers outperformed growth-oriented equity strategies. Thematic and/or secular focuses on yield-oriented holdings, however, were a key determinant in the underperformance of several managers as yield-sensitive equities, especially REITs, lagged.

**Second Quarter Review - Real Assets**

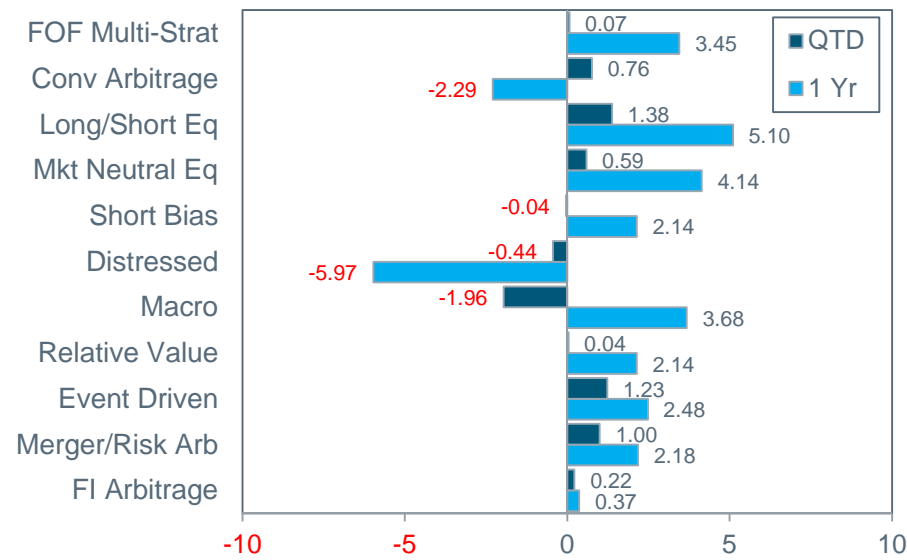
**General Market - Diversified Inflation Strategies (DIS)**

Even with low short-term inflation expectations, disparate measures of inflation, a difficult quarter for equities and rising real yields, most diversified inflation strategies outperformed a moderate duration TIPS allocation. Managers with larger energy and agricultural commodities exposures saw a key reversal of their underperformance from earlier in the year. Managers with larger US REIT equity allocations underperformed. Managers with larger TIPS exposures, especially those in longer duration securities, underperformed the broader group.

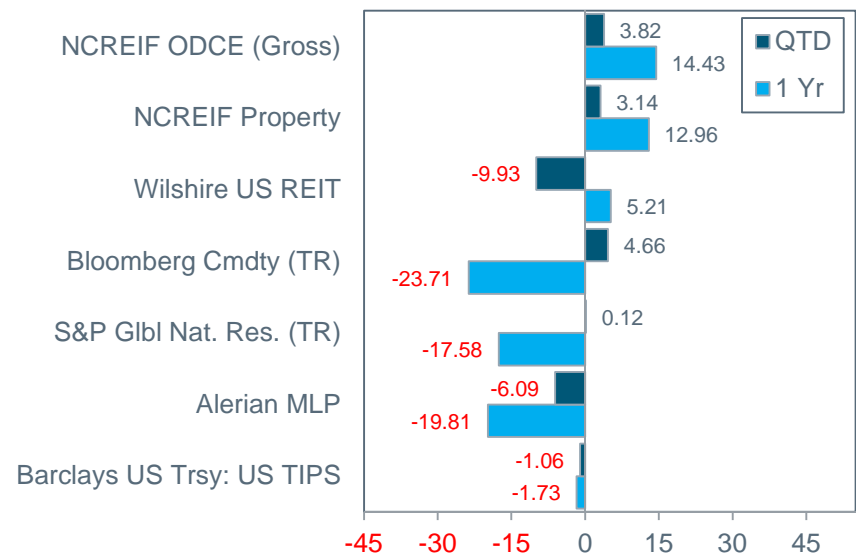
**General Market - Real Estate**

While real estate securities returns were hampered by rising long-term interest rates in Q2, as evidenced by a -8.93% return in the FTSE NAREIT All REITS Index, private real estate continued its run of strong, positive returns. Preliminary reports from the NCREIF ODCE Index show that US Core Real Estate returned 3.82% for the quarter and 14.43% for the trailing year, marking the 21st consecutive quarter of positive returns in this sector.

**HFN Hedge Fund Performance (%)**



**Real Asset Performance (%)**





Annual Asset Class Performance

As of June 30, 2015

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	YTD
Best	12.35	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	10.15
	8.44	16.56	55.81	31.45	26.19	32.18	16.23	5.24	58.21	26.86	15.99	18.23	32.39	19.31	7.34
	7.89	14.81	47.25	25.55	21.39	26.34	15.97	2.06	46.78	22.04	13.56	17.59	29.30	13.69	5.52
	7.28	10.25	38.59	20.25	21.36	19.31	11.63	-2.35	31.78	18.88	9.24	17.32	22.78	12.50	4.75
	6.61	5.54	36.18	18.33	13.82	18.37	11.17	-10.01	28.60	16.83	7.84	16.34	13.94	5.97	2.95
	5.64	3.58	28.97	13.06	13.54	16.32	9.91	-20.47	27.18	16.36	4.98	16.00	9.10	4.89	2.60
	5.28	3.12	28.68	11.13	6.75	15.79	6.97	-26.16	26.46	15.12	2.11	15.81	7.44	3.64	2.53
	4.42	1.78	23.93	10.88	5.33	11.85	6.60	-33.79	18.91	15.06	0.10	10.94	1.86	3.03	1.23
	2.49	-1.41	11.93	9.15	4.91	9.85	5.49	-35.65	11.41	10.16	-4.18	8.82	0.07	2.45	0.34
	-2.62	-6.17	9.28	8.56	4.55	4.85	5.00	-37.00	9.72	7.75	-5.55	6.98	-2.02	0.04	0.01
	-11.89	-7.83	8.39	8.46	3.07	4.33	1.87	-39.20	5.93	6.54	-12.14	4.80	-2.60	-2.19	-0.10
	-12.53	-15.94	5.87	6.79	2.84	2.71	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.90	-1.56
	-19.51	-20.48	4.10	4.34	2.74	2.07	-1.57	-47.01	0.21	4.77	-15.94	0.11	-8.83	-4.95	-4.47
Worst	-21.44	-22.10	1.15	1.33	2.43	0.41	-17.55	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-5.73
	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	Barclays US Agg Bond - FI	Barclays US Corp: Hi Yield - FI	Barclays US Trsy: US TIPS - FI	Barclays US Gov/Credit: Lng - FI	NCREIF ODCE (Gross) - Real Estate	Wilshire US REIT - REITs	HFN FOF Multi-Strat (Net) - ARS	Bloomberg Cmdty (TR) - Commod.	BofA ML 3 Mo T-Bill - Cash Equiv	



Summary

All six Ohio Funds delivered positive absolute performance during the first half of 2015, with mixed relative results. Five of the six plans outperformed the All Public Funds > \$1B-Total Fund median 1-year return of 3.0%.

Over the trailing 3-year period, five of the six plans outperformed their respective benchmarks and the All Public Funds Universe. The six Ohio Funds earned returns ranging from 8.7% to 12.0%. Over the trailing 5-year period, four of the six plans outperformed their respective benchmarks and the All Public Funds > \$1B Universe.

Over the trailing 3- and 5-year time periods, all six plans outperformed their respective actuarial interest rates of 8.25% for OP&F, 8.0% for HPRS and PERS (DB), 7.75% for SERS and STRS, and 6.70% for PERS (HC). However over a more complete market cycle, the six plans have trailed these respective absolute benchmarks.

Asset Allocation & Performance

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>PERS (DB)</b>	<b>77,802,614</b>	<b>2.97</b>	<b>3.31</b>	<b>10.98</b>	<b>11.32</b>	<b>6.50</b>	<b>6.94</b>	<b>7.25</b>	<b>14.65</b>	<b>14.78</b>	<b>0.58</b>
PERS (DB) Total Fund Benchmark		2.53	2.00	9.93	10.46	6.07	6.50	5.83	14.24	15.35	-0.88
Difference		0.44	1.31	1.05	0.86	0.43	0.44	1.42	0.41	-0.57	1.46
Rank		46	46	41	39	54	45	33	62	9	57
<b>PERS (HC)</b>	<b>11,954,347</b>	<b>1.53</b>	<b>0.22</b>	<b>8.67</b>	<b>9.60</b>	<b>5.91</b>	<b>6.25</b>	<b>5.46</b>	<b>11.54</b>	<b>13.85</b>	<b>-0.38</b>
PERS (HC) Total Fund Benchmark		1.45	0.17	8.11	9.15	5.61	6.15	5.03	10.70	13.54	-0.71
Difference		0.08	0.05	0.56	0.45	0.30	0.10	0.43	0.84	0.31	0.33
Rank		93	98	88	84	81	77	76	83	32	80
<b>STRS</b>	<b>74,172,655</b>	<b>3.58</b>	<b>5.45</b>	<b>11.88</b>	<b>11.93</b>	<b>6.58</b>	<b>7.33</b>	<b>7.95</b>	<b>17.39</b>	<b>13.60</b>	<b>1.49</b>
STRS Total Fund Benchmark		3.22	5.07	12.13	11.98	6.82	7.21	8.26	18.09	13.93	0.83
Difference		0.36	0.38	-0.25	-0.05	-0.24	0.12	-0.31	-0.70	-0.33	0.66
Rank		11	5	22	15	47	15	20	26	45	33
<b>OP&amp;F</b>	<b>14,526,949</b>	<b>3.75</b>	<b>3.68</b>	<b>11.99</b>	<b>12.72</b>	<b>7.32</b>	<b>7.81</b>	<b>6.79</b>	<b>16.93</b>	<b>15.41</b>	<b>2.57</b>
OP&F Total Fund Benchmark		2.27	2.04	10.40	11.49	6.39	6.89	6.87	14.61	14.94	2.43
Difference		1.48	1.64	1.59	1.23	0.93	0.92	-0.08	2.32	0.47	0.14
Rank		9	38	17	1	14	2	43	31	3	25
<b>SERS</b>	<b>12,823,797</b>	<b>3.96</b>	<b>4.50</b>	<b>11.94</b>	<b>11.34</b>	<b>5.99</b>	<b>6.75</b>	<b>6.92</b>	<b>16.86</b>	<b>14.42</b>	<b>-0.07</b>
SERS Total Fund Benchmark		2.86	3.87	10.42	10.02	5.93	6.45	6.66	15.34	13.56	-0.07
Difference		1.10	0.63	1.52	1.32	0.06	0.30	0.26	1.52	0.86	0.00
Rank		7	14	20	36	78	61	36	34	18	74
<b>HPRS</b>	<b>851,570</b>	<b>2.70</b>	<b>3.51</b>	<b>11.57</b>	<b>10.48</b>	<b>6.21</b>	<b>6.47</b>	<b>6.73</b>	<b>19.59</b>	<b>11.45</b>	<b>-2.85</b>
HPRS Total Fund Benchmark		2.73	3.96	10.95	11.25	6.94	7.19	7.03	16.79	13.07	1.20
Difference		-0.03	-0.45	0.62	-0.77	-0.73	-0.72	-0.30	2.80	-1.62	-4.05
Rank		56	41	29	60	69	75	47	8	90	99
<i>All Public Plans &gt; \$1B-TF Median</i>		<i>2.82</i>	<i>3.16</i>	<i>10.78</i>	<i>11.00</i>	<i>6.55</i>	<i>6.90</i>	<i>6.59</i>	<i>15.84</i>	<i>13.37</i>	<i>0.77</i>

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.

**Summary**

Five of the six plans outperformed their respective benchmarks during the first half of 2015, net of investment management fees.

Over the trailing 3-year period, five of the six plans outperformed their respective benchmarks. The six Ohio Funds earned returns ranging from 8.5% to 11.7%. Over the trailing 5-year period, four of the six plans outperformed their respective benchmarks.

Over the trailing 3- and 5-year time periods, all six plans outperformed their respective actuarial interest rates of 8.25% for **OP&F**, 8.0% for **HPRS** and **PERS (DB)**, 7.75% for **SERS** and **STRS**, and 6.70% for **PERS (HC)**. However over a more complete market cycle, the six plans have trailed these respective absolute benchmarks.

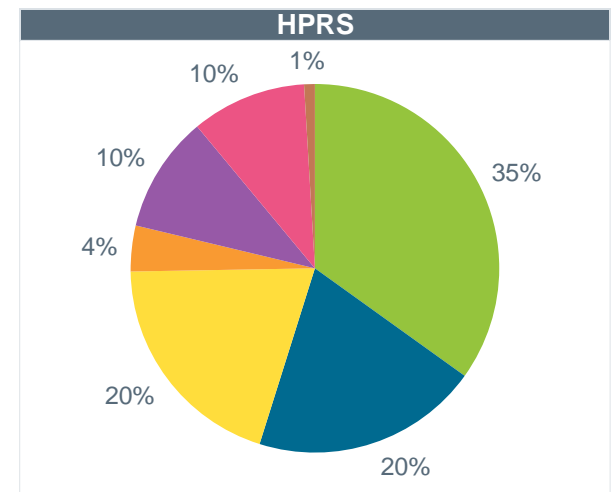
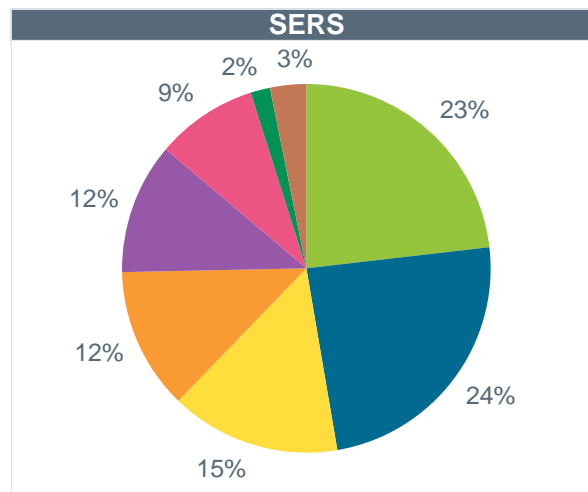
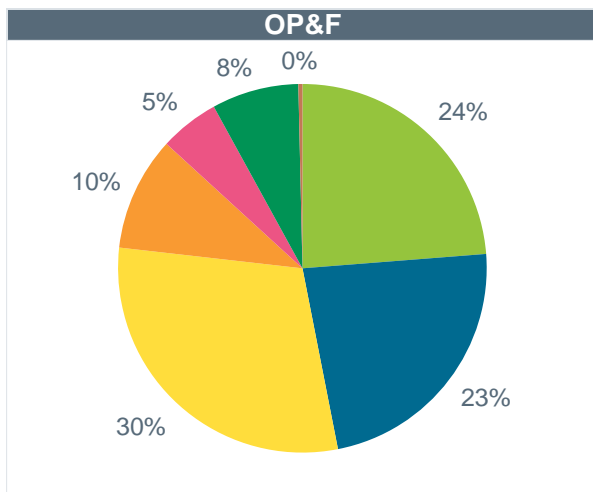
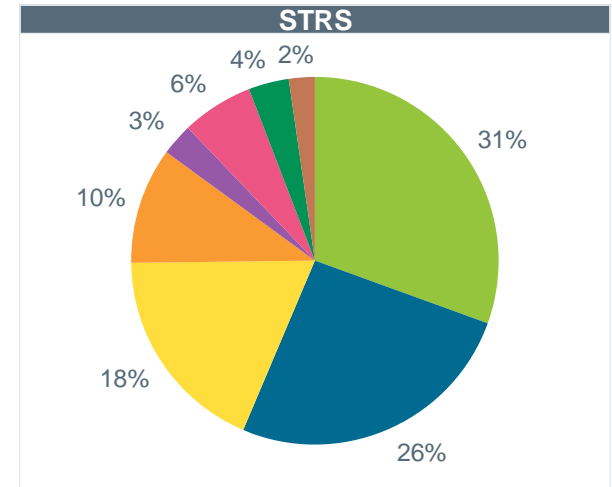
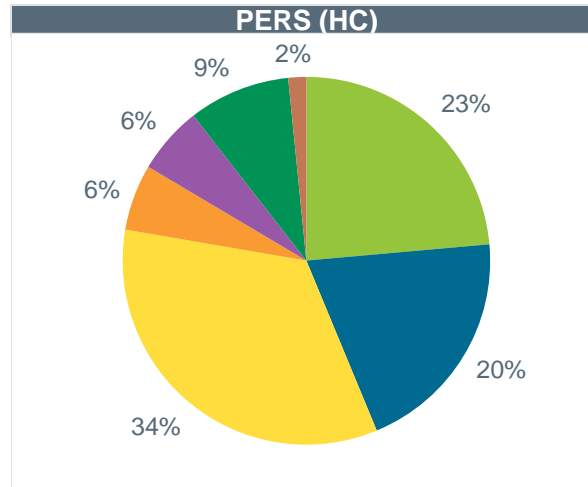
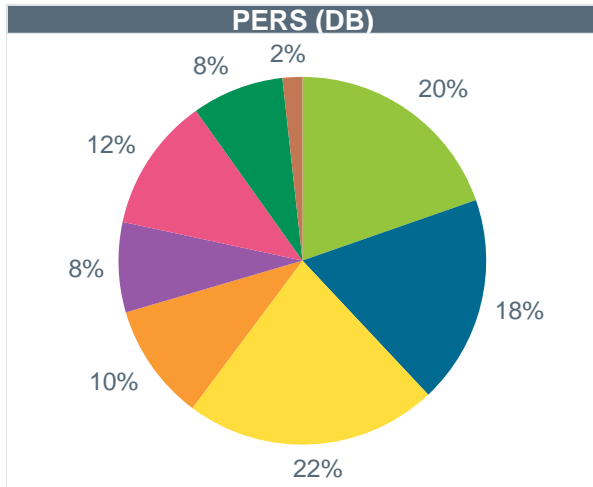
**Asset Allocation & Performance - Net of Fees**

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>PERS (DB)</b>	<b>77,802,614</b>	<b>2.85</b>	<b>3.04</b>	<b>10.71</b>	<b>11.08</b>	<b>6.33</b>	<b>6.82</b>	<b>6.96</b>	<b>14.38</b>	<b>14.54</b>	<b>0.36</b>
PERS (DB) Total Fund Benchmark		2.53	2.00	9.93	10.46	6.07	6.50	5.83	14.24	15.35	-0.88
Difference		0.32	1.04	0.78	0.62	0.26	0.32	1.13	0.14	-0.81	1.24
<b>PERS (HC)</b>	<b>11,954,347</b>	<b>1.50</b>	<b>0.08</b>	<b>8.52</b>	<b>9.58</b>	<b>5.89</b>	<b>6.24</b>	<b>5.28</b>	<b>11.36</b>	<b>13.72</b>	<b>-0.38</b>
PERS (HC) Total Fund Benchmark		1.45	0.17	8.11	9.15	5.61	6.15	5.03	10.70	13.54	-0.71
Difference		0.05	-0.09	0.41	0.43	0.28	0.09	0.25	0.66	0.18	0.33
<b>STRS</b>	<b>74,172,655</b>	<b>3.51</b>	<b>5.32</b>	<b>11.74</b>	<b>11.80</b>	<b>6.46</b>	<b>7.21</b>	<b>7.82</b>	<b>17.25</b>	<b>13.47</b>	<b>1.38</b>
STRS Total Fund Benchmark		3.22	5.07	12.13	11.98	6.82	7.21	8.26	18.09	13.93	0.83
Difference		0.29	0.25	-0.39	-0.18	-0.36	0.00	-0.44	-0.84	-0.46	0.55
<b>OP&amp;F</b>	<b>14,526,949</b>	<b>3.46</b>	<b>3.06</b>	<b>11.43</b>	<b>12.22</b>	<b>6.89</b>	<b>7.42</b>	<b>6.20</b>	<b>16.41</b>	<b>14.98</b>	<b>2.16</b>
OP&F Total Fund Benchmark		2.27	2.04	10.40	11.49	6.39	6.89	6.87	14.61	14.94	2.43
Difference		1.19	1.02	1.03	0.73	0.50	0.53	-0.67	1.80	0.04	-0.27
<b>SERS</b>	<b>12,823,797</b>	<b>3.66</b>	<b>3.87</b>	<b>11.21</b>	<b>10.56</b>	<b>5.24</b>	<b>6.07</b>	<b>6.25</b>	<b>16.09</b>	<b>13.55</b>	<b>-0.85</b>
SERS Total Fund Benchmark		2.86	3.87	10.42	10.02	5.93	6.45	6.66	15.34	13.56	-0.07
Difference		0.80	0.00	0.79	0.54	-0.69	-0.38	-0.41	0.75	-0.01	-0.78
<b>HPRS</b>	<b>851,570</b>	<b>2.54</b>	<b>3.13</b>	<b>11.25</b>	<b>10.13</b>	<b>5.90</b>	<b>6.14</b>	<b>6.30</b>	<b>19.35</b>	<b>11.13</b>	<b>-3.23</b>
HPRS Total Fund Benchmark		2.73	3.96	10.95	11.25	6.94	7.19	7.03	16.79	13.07	1.20
Difference		-0.19	-0.83	0.30	-1.12	-1.04	-1.05	-0.73	2.56	-1.94	-4.43

Performance shown is net of all investment management costs.

Summary

PERS (DB) has the smallest allocation to public equities among the six plans and the highest allocation to total alternatives (incl. real estate).  
 PERS (HC) has the highest allocation to fixed income and does not have a dedicated allocation to private equity.  
 STRS has the highest allocation to public equities and the second lowest allocation to fixed income among the six plans.  
 OP&F has the second highest allocation to fixed income relative to the other plans and does not have a dedicated allocation to hedge funds.  
 SERS has the smallest allocation to fixed income and the highest allocations to hedge funds and real estate.  
 HPRS has the highest allocation to domestic equity and the smallest allocation to real estate among the six plans.



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

Allocations shown may not sum up to 100% exactly due to rounding.

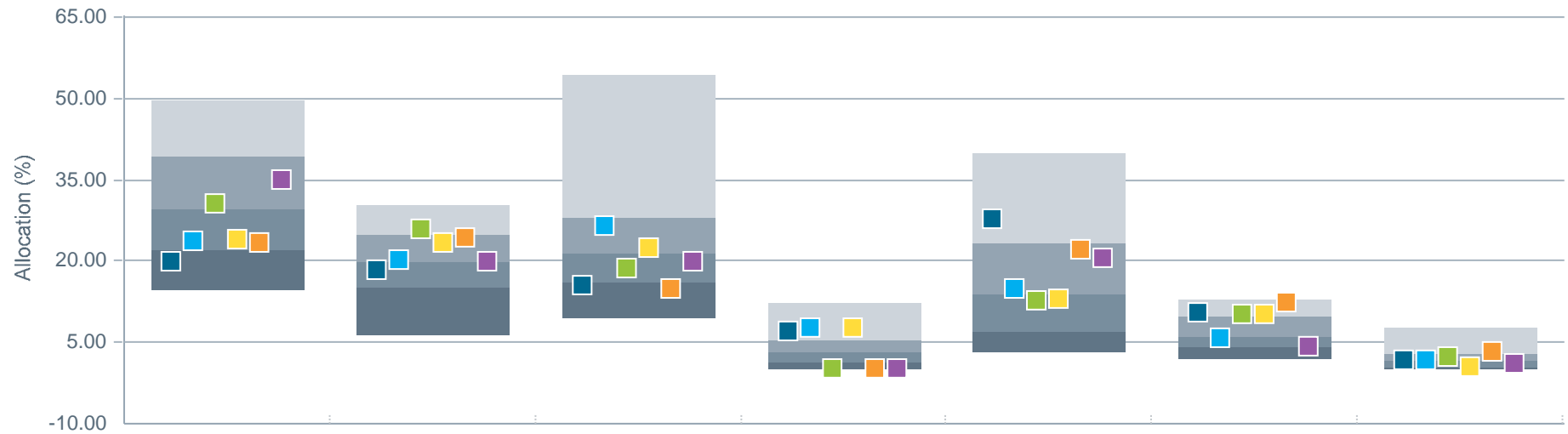


Summary

All six plans are diversified across multiple traditional (equity and fixed income) and alternative (real estate, real assets, private equity, hedge funds, etc.) asset classes, as compared to peers.

- **PERS (DB)** has a below median US Equity allocation and top quartile allocation to Alternatives and Real Estate. The US Fixed Income allocation is below median. **PERS (DB)** also allocates to Intl. Fixed Income.
- **PERS (HC)** has a lower allocation to US Equity and an above-median allocation to US and Intl. Fixed Income.
- **STRS** has an allocation to US Equity that is in line with peers and an allocation to Intl. Equity that is above median. The allocation to US Fixed Income is lower than peers.
- **OP&F** has a lower allocation to US Equity while Intl. Equity is above the peer median. The US Fixed Income allocation is in line with peers. **OP&F** also allocates to Intl. Fixed Income.
- **SERS**'s allocation to US Fixed Income is below median, while allocations to Alternatives and Real Estate are top quartile amongst peers.
- **HPRS** has a higher allocation to US Equity and an Intl. Equity allocation in line with the peer median. **HPRS**'s allocation to Real Estate is below median.

Plan Sponsor Peer Group Analysis - Total Fund Asset Allocation



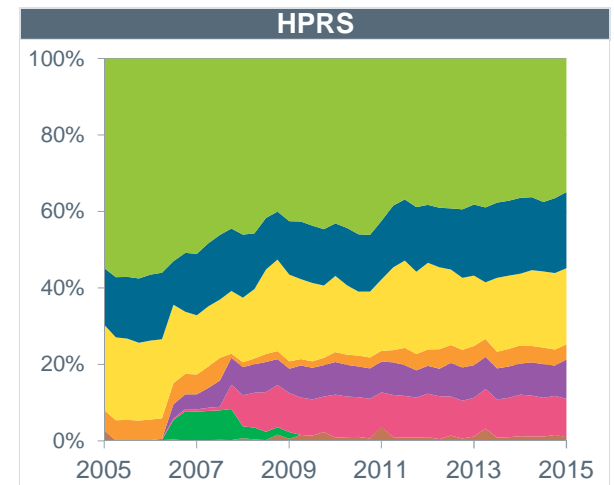
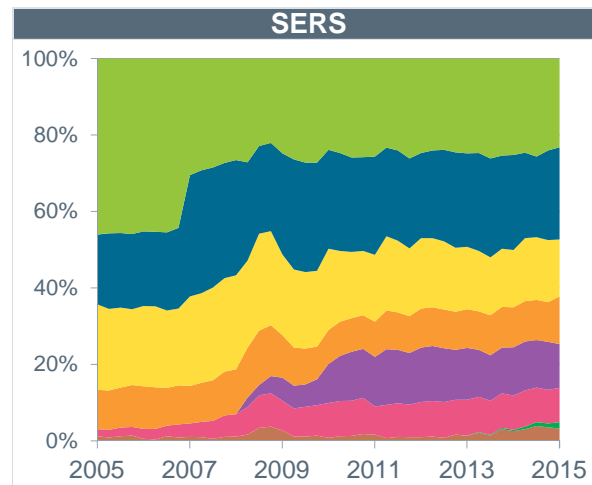
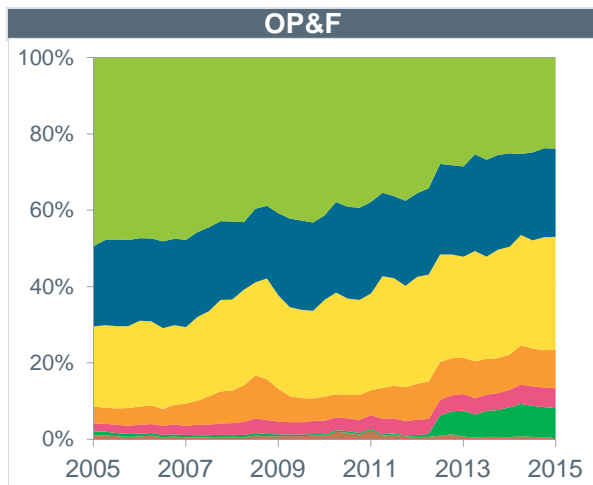
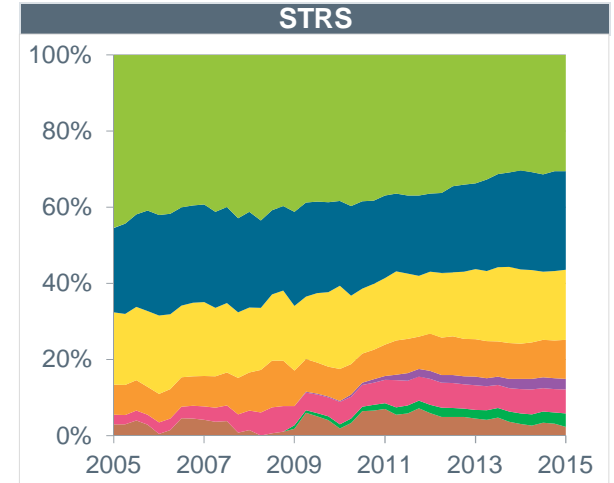
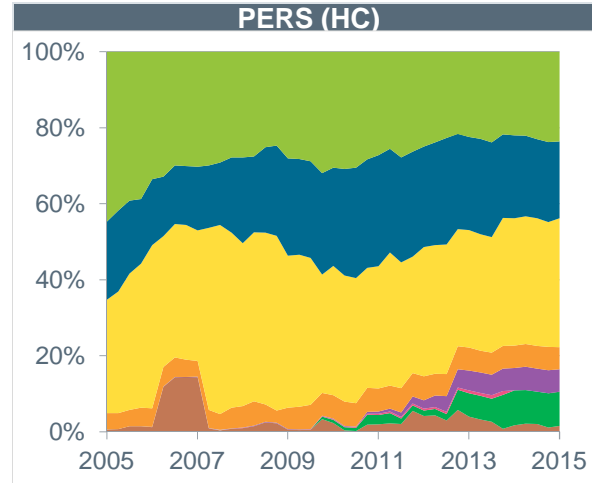
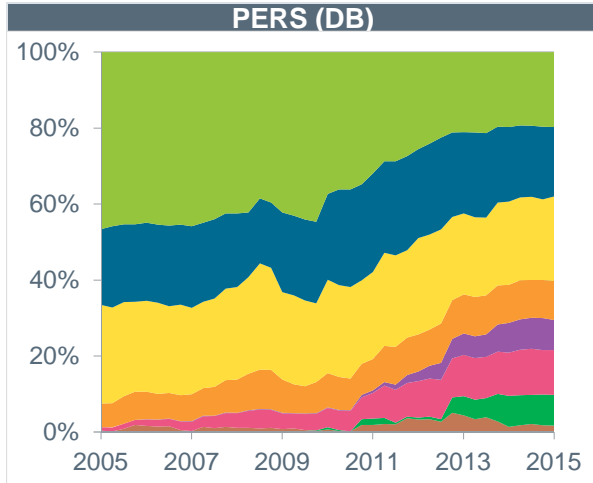
	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
■ PERS (DB)	19.66 (84)	18.35 (56)	15.34 (79)	6.91 (18)	27.71 (16)	10.26 (17)	1.77 (49)
■ PERS (HC)	23.57 (71)	20.18 (49)	26.39 (30)	7.58 (17)	14.90 (49)	5.80 (56)	1.58 (56)
■ STRS	30.52 (47)	25.85 (20)	18.45 (61)	0.00	12.67 (55)	10.23 (17)	2.28 (33)
■ OP&F	23.76 (71)	23.14 (33)	22.37 (45)	7.51 (17)	12.85 (54)	10.02 (19)	0.34 (81)
■ SERS	23.16 (72)	24.15 (30)	14.93 (81)	0.00	22.15 (26)	12.42 (8)	3.18 (23)
■ HPRS	34.91 (35)	19.95 (50)	19.88 (57)	0.00	20.33 (33)	4.00 (78)	0.94 (64)
Median	29.57	19.90	21.32	3.30	13.71	6.01	1.75

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.



**Summary**

Over the past ten years, domestic equity allocations have generally declined across all six plans while allocations to alternatives, particularly hedge funds and private equity, have generally increased. Allocations to international equity and fixed income have remained relatively consistent over time.



- Domestic 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)

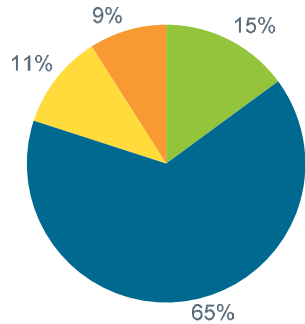
**Capital Preservation:** Conservative strategy designed to avoid risk of loss of principal.

(Includes: Core Fixed Income and Cash Equivalents)

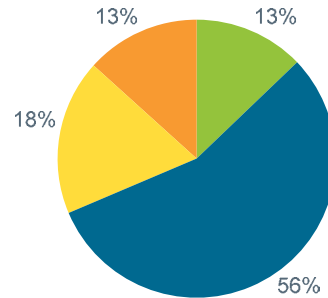
**Inflation:** Provide returns that will keep pace with normal inflationary movements in the long-term market. Designed not to lose value in an inflationary environment.

(Includes: TIPS, Commodities, Real Return, Floating Rate Debt, REITs, and Core Real Estate)

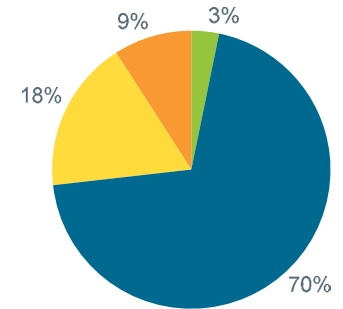
PERS (DB)



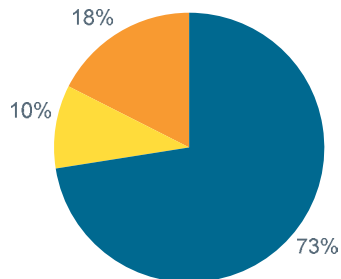
PERS (HC)



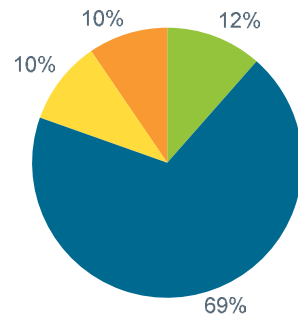
STRS



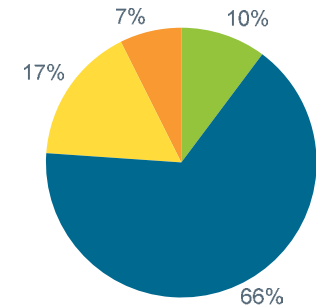
OP&F



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

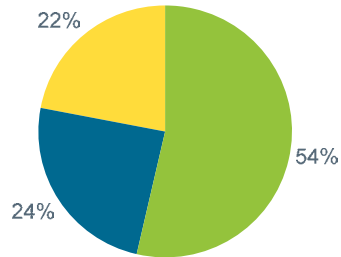
**RVK Liquidity Rating** - A qualitative method developed and calculated by RVK for determining the relative amount of liquidity in a portfolio.

**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.

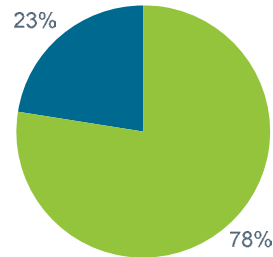
**Not Liquid Investments:** Private appraisal-based transactions, vehicle-based liquidity constraints, or privately held assets. Extreme discount to raise cash or 6-12+ months required to receive cash.

PERS (DB)



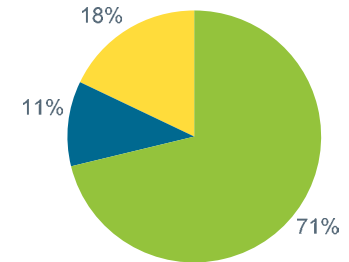
PERS (DB) Liquidity Rating 63

PERS (HC)



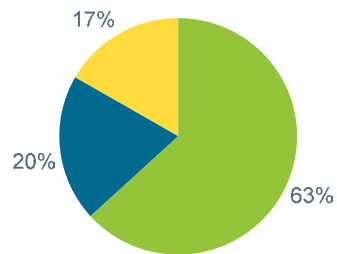
PERS (HC) Liquidity Rating 80

STRS



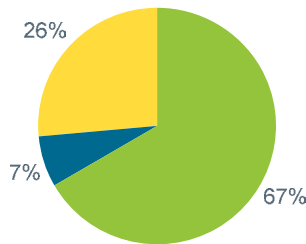
STRS Liquidity Rating 73

OP&F



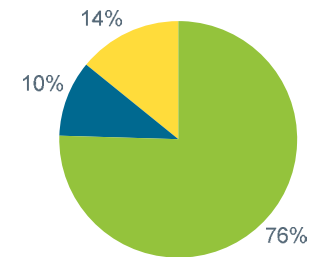
OP&F Liquidity Rating 72

SERS



SERS Liquidity Rating 67

HPRS



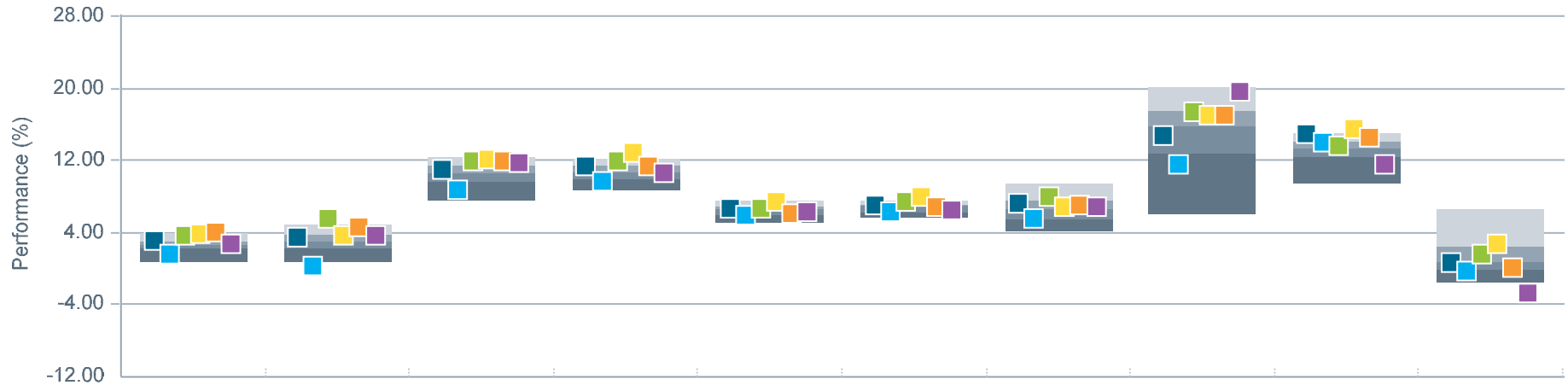
HPRS Liquidity Rating 72

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.

Summary

- Five of the six Ohio Funds outperformed the All Public Plans >\$1B-Total Fund median during the first half of 2015.
- **PERS (DB)** outperformed the median over the trailing 1-, 3-, 5-, and 10-year periods.
- **PERS (HC)** has trailed the peer median over all trailing periods shown.
- With the exception of the trailing 7-year period, **STRS** has performed in the top quartile over all other trailing periods shown.
- **OP&F** outperformed the peer median over all trailing periods and calendar years shown.
- Over the trailing 1-, 3-, and 5-year trailing periods, **SERS** has outperformed the peer universe.
- **HPRS** outperformed the peer median over the trailing 1- and 3-year periods, but trailed the universe over longer time periods.

Plan Sponsor Peer Group - Total Fund Performance



	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
■ PERS (DB)	2.97 (36)	3.31 (38)	10.98 (37)	11.32 (34)	6.50 (52)	6.94 (43)	7.25 (33)	14.65 (62)	14.78 (9)	0.58 (57)
■ PERS (HC)	1.53 (92)	0.22 (97)	8.67 (88)	9.60 (82)	5.91 (79)	6.25 (74)	5.46 (76)	11.54 (83)	13.85 (32)	-0.38 (80)
■ STRS	3.58 (7)	5.45 (3)	11.88 (16)	11.93 (12)	6.58 (45)	7.33 (13)	7.95 (20)	17.39 (26)	13.60 (45)	1.49 (33)
■ OP&F	3.75 (6)	3.68 (30)	11.99 (11)	12.72 (1)	7.32 (12)	7.81 (3)	6.79 (43)	16.93 (31)	15.41 (3)	2.57 (25)
■ SERS	3.96 (5)	4.50 (9)	11.94 (14)	11.34 (32)	5.99 (75)	6.75 (58)	6.92 (36)	16.86 (34)	14.42 (18)	-0.07 (74)
■ HPRS	2.70 (50)	3.51 (33)	11.57 (23)	10.48 (57)	6.21 (65)	6.47 (72)	6.73 (47)	19.59 (8)	11.45 (90)	-2.85 (99)
Median	2.69	2.95	10.55	10.69	6.53	6.88	6.57	15.84	13.37	0.77
Population	82	82	77	75	73	70	88	84	86	90

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

Summary

- Three of six plans have experienced higher volatility (standard deviation) than the All Public Plans > \$1B-Total Fund median over the trailing 5-year period and all six plans have experienced higher volatility over the trailing 10-year period.
- Over the trailing five-year period, PERS (DB), STRS, OP&F, and SERS have outperformed or met the universe median on both a total return and total return and total risk-adjusted return basis. PERS (HC) and HPRS have trailed the universe median Sharpe Ratio over the same time period.
- Over the trailing ten-year period, PERS (DB), STRS, and OP&F have outperformed or met the universe median on both a total return and total risk-adjusted return basis. PERS (HC), SERS, and HPRS have trailed the median Sharpe Ratio over the same period.

Plan Sponsor Peer Group Scattergram - 5 Years



Plan Sponsor Peer Group Scattergram - 10 Years



Sharpe Ratio - 5 Year

PERS (DB)	1.42
PERS (HC)	1.08
STRS	1.54
OP&F	1.45
SERS	1.44
HPRS	1.18
All Public Plans > \$1B-Total Fund Median	1.35

Sharpe Ratio - 10 Year

PERS (DB)	0.54
PERS (HC)	0.48
STRS	0.56
OP&F	0.59
SERS	0.53
HPRS	0.48
All Public Plans > \$1B-Total Fund Median	0.54

Performance shown is gross of fees.



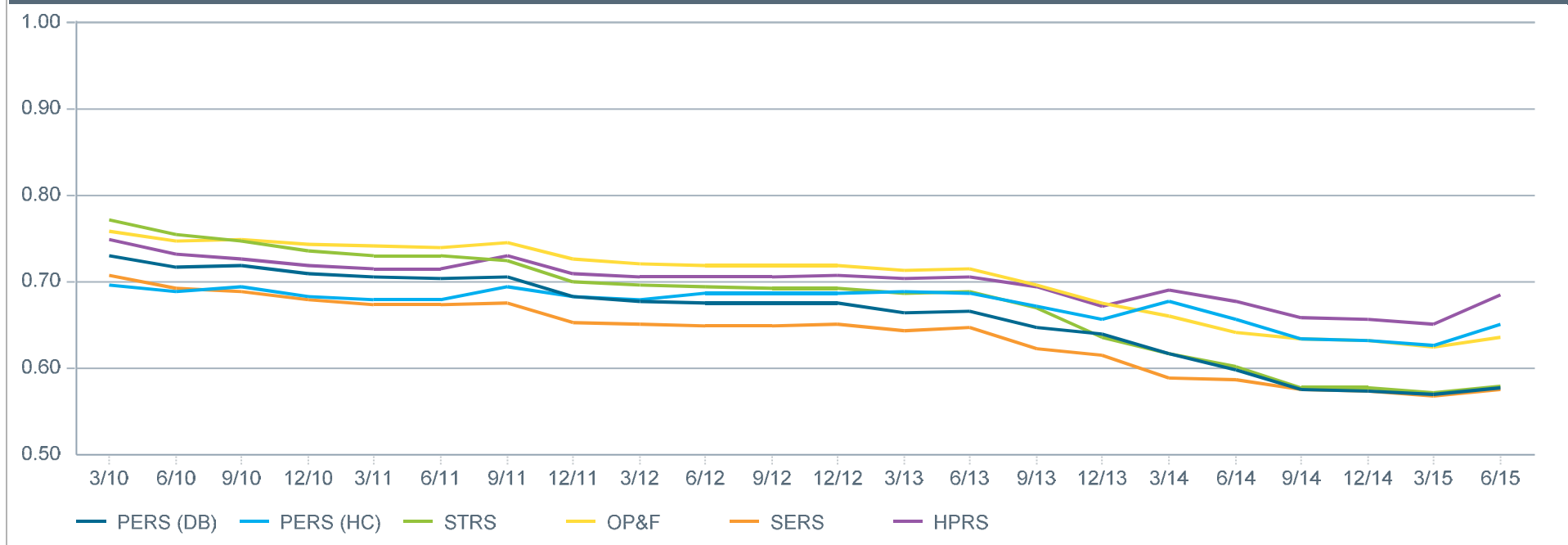
Summary

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)	0.35	0.58	0.66	0.66
PERS (HC)	0.42	0.65	0.68	0.66
STRS	0.41	0.58	0.68	0.68
OP&F	0.41	0.64	0.71	0.70
SERS	0.40	0.58	0.64	0.64
HPRS	0.53	0.69	0.70	0.70
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.

Summary

- Over the trailing two quarter period, all six plans outperformed the 1.9% return earned by the Russell 3000 Index. STRS's, OP&F's and SERS's domestic equity returns outperformed the peer median over the same period.
- Three of six funds trailed the Russell 3000 Index over the trailing 3-period and four funds trailed the index over the trailing 5-year period.
- Four of six funds trailed the broad market benchmark and peer median over the trailing 10-year period.

Performance

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Domestic Equity</b>										
<b>PERS (DB)</b>	<b>2.23</b>	<b>6.96</b>	<b>17.63</b>	<b>17.47</b>	<b>9.46</b>	<b>8.00</b>	<b>11.29</b>	<b>33.86</b>	<b>16.58</b>	<b>1.15</b>
Russell 3000 Index	1.94	7.29	17.73	17.53	9.65	8.15	12.55	33.55	16.42	1.03
Difference	0.29	-0.33	-0.10	-0.06	-0.19	-0.15	-1.26	0.31	0.16	0.12
Rank	55	55	46	56	51	61	53	59	47	34
<b>PERS (HC)</b>	<b>2.23</b>	<b>6.96</b>	<b>17.63</b>	<b>17.47</b>	<b>9.46</b>	<b>8.00</b>	<b>11.29</b>	<b>33.86</b>	<b>16.58</b>	<b>1.15</b>
Russell 3000 Index	1.94	7.29	17.73	17.53	9.65	8.15	12.55	33.55	16.42	1.03
Difference	0.29	-0.33	-0.10	-0.06	-0.19	-0.15	-1.26	0.31	0.16	0.12
Rank	55	55	46	56	51	61	53	59	47	34
<b>STRS</b>	<b>2.42</b>	<b>7.25</b>	<b>17.05</b>	<b>17.21</b>	<b>9.56</b>	<b>7.89</b>	<b>11.70</b>	<b>32.14</b>	<b>15.56</b>	<b>1.51</b>
Russell 3000 Index	1.94	7.29	17.73	17.53	9.65	8.15	12.55	33.55	16.42	1.03
Difference	0.48	-0.04	-0.68	-0.32	-0.09	-0.26	-0.85	-1.41	-0.86	0.48
Rank	50	45	69	62	48	63	44	84	71	27
<b>OP&amp;F</b>	<b>2.50</b>	<b>6.56</b>	<b>17.77</b>	<b>17.77</b>	<b>10.41</b>	<b>8.79</b>	<b>11.27</b>	<b>35.53</b>	<b>14.28</b>	<b>0.94</b>
Wilshire 5000 Index	1.67	7.09	17.45	17.33	9.54	8.16	12.71	33.07	16.06	0.98
Difference	0.83	-0.53	0.32	0.44	0.87	0.63	-1.44	2.46	-1.78	-0.04
Rank	45	58	40	29	18	10	53	24	93	41
<b>SERS</b>	<b>2.42</b>	<b>5.98</b>	<b>18.62</b>	<b>17.88</b>	<b>10.04</b>	<b>8.12</b>	<b>10.99</b>	<b>35.76</b>	<b>17.09</b>	<b>0.13</b>
Russell 3000 Index	1.94	7.29	17.73	17.53	9.65	8.15	12.55	33.55	16.42	1.03
Difference	0.48	-1.31	0.89	0.35	0.39	-0.03	-1.56	2.21	0.67	-0.90
Rank	50	70	15	20	34	59	60	19	25	50
<b>HPRS</b>	<b>2.22</b>	<b>7.73</b>	<b>18.34</b>	<b>17.36</b>	<b>10.30</b>	<b>8.55</b>	<b>11.97</b>	<b>35.56</b>	<b>16.01</b>	<b>-1.01</b>
Russell 3000 Index	1.94	7.29	17.73	17.53	9.65	8.15	12.55	33.55	16.42	1.03
Difference	0.28	0.44	0.61	-0.17	0.65	0.40	-0.58	2.01	-0.41	-2.04
Rank	56	30	24	58	24	25	36	24	62	76
<i>All Public Plans &gt; \$1B-US Equity Segment Median</i>	<i>2.38</i>	<i>7.18</i>	<i>17.49</i>	<i>17.51</i>	<i>9.47</i>	<i>8.24</i>	<i>11.42</i>	<i>34.70</i>	<i>16.51</i>	<i>0.10</i>

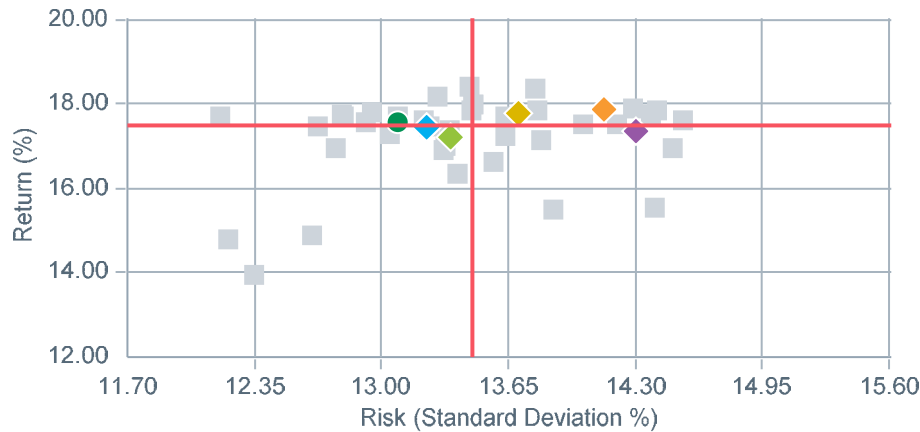
Performance shown is gross of fees. Ranks are shown against All Public Plans >\$1B-US Equity Segment.

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

Summary

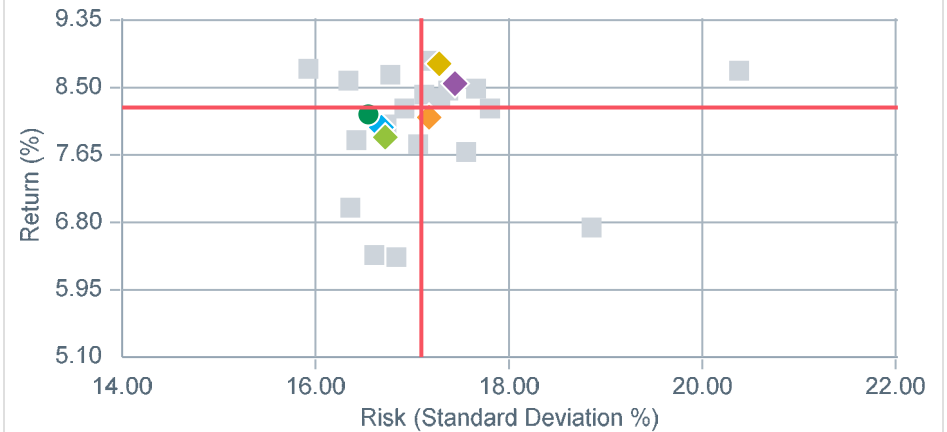
- PERS (DB)'s, PERS (HC)'s, and OP&F's domestic equity composites have earned more return for each unit of risk exposure over the trailing five-year period. STRS and SERS have earned similar levels of risk-adjusted domestic equity returns over the same period.
- Two of the six plans (OP&F and HPRS) outperformed the All Public Plans > \$1B-US Equity Segment median over the trailing ten-year period.
- All six plans have generated Sharpe Ratios in line with the peer median over the trailing ten-year period.

Plan Sponsor Peer Group Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	17.47	13.23
◆ PERS (HC)	17.47	13.23
◆ STRS	17.21	13.35
◆ OP&F	17.77	13.70
◆ SERS	17.88	14.14
◆ HPRS	17.36	14.31
● Russell 3000 Index	17.53	13.09
— Median	17.51	13.46

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	8.00	16.68
◆ PERS (HC)	8.00	16.68
◆ STRS	7.89	16.71
◆ OP&F	8.79	17.29
◆ SERS	8.12	17.18
◆ HPRS	8.55	17.44
● Russell 3000 Index	8.15	16.56
— Median	8.24	17.10

Sharpe Ratio - 5 Years

PERS (DB)	1.30
PERS (HC)	1.30
STRS	1.27
OP&F	1.28
SERS	1.25
HPRS	1.21
Russell 3000 Index	1.32
All Public Plans > \$1B-US Equity Segment Median	1.27

Sharpe Ratio - 10 Years

PERS (DB)	0.46
PERS (HC)	0.46
STRS	0.46
OP&F	0.50
SERS	0.46
HPRS	0.48
Russell 3000 Index	0.47
All Public Plans > \$1B-US Equity Segment Median	0.46

Performance shown is gross of fees.

Summary

- All six plans' international equity composites outperformed their respective benchmarks during the first half of 2015.
- All plans outperformed their respective benchmarks but four of the six plans trailed the peer group median over the trailing 1-, 3- and 5-year periods.
- All of the six plans outperformed their respective benchmarks over the trailing seven- and ten-year periods, with three plans also outperforming the peer median.

Performance

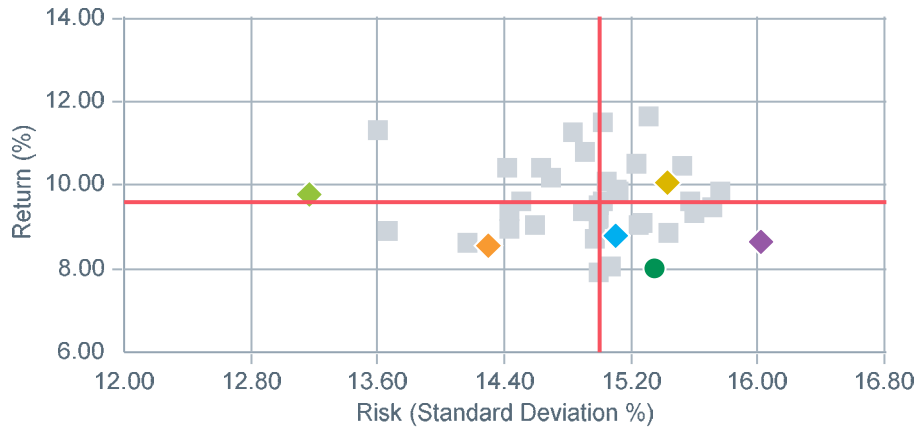
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>International Equity</b>										
<b>PERS (DB)</b>	<b>4.74</b>	<b>-3.09</b>	<b>10.73</b>	<b>8.78</b>	<b>2.17</b>	<b>6.18</b>	<b>-1.48</b>	<b>15.61</b>	<b>18.15</b>	<b>-13.39</b>
PERS (DB) International Equity Custom Benchmark	4.47	-4.81	9.02	7.44	1.27	5.40	-3.42	12.92	17.18	-14.19
Difference	0.27	1.72	1.71	1.34	0.90	0.78	1.94	2.69	0.97	0.80
Rank	83	60	71	81	72	51	26	81	75	71
<b>PERS (HC)</b>	<b>4.74</b>	<b>-3.09</b>	<b>10.73</b>	<b>8.78</b>	<b>2.16</b>	<b>6.18</b>	<b>-1.48</b>	<b>15.61</b>	<b>18.15</b>	<b>-13.39</b>
PERS (HC) International Equity Custom Benchmark	4.47	-4.81	9.02	7.44	1.27	5.40	-3.42	12.92	17.18	-14.19
Difference	0.27	1.72	1.71	1.34	0.89	0.78	1.94	2.69	0.97	0.80
Rank	83	60	71	81	72	51	26	81	75	71
<b>STRS</b>	<b>6.64</b>	<b>2.08</b>	<b>13.22</b>	<b>9.81</b>	<b>3.84</b>	<b>7.18</b>	<b>0.83</b>	<b>19.23</b>	<b>17.32</b>	<b>-12.81</b>
STRS International Equity Custom Benchmark	5.47	0.74	12.03	8.82	3.07	6.41	0.24	17.63	16.93	-13.11
Difference	1.17	1.34	1.19	0.99	0.77	0.77	0.59	1.60	0.39	0.30
Rank	13	3	16	42	15	21	9	38	85	55
<b>OP&amp;F</b>	<b>6.39</b>	<b>-1.71</b>	<b>11.64</b>	<b>10.05</b>	<b>3.24</b>	<b>7.09</b>	<b>-5.58</b>	<b>21.01</b>	<b>20.08</b>	<b>-12.37</b>
MSCI ACW Ex US Investable Mkt Index (Net)	4.59	-4.97	9.80	8.00	1.87	5.79	-3.89	15.82	17.04	-14.31
Difference	1.80	3.26	1.84	2.05	1.37	1.30	-1.67	5.19	3.04	1.94
Rank	17	28	39	35	31	24	99	18	23	45
<b>SERS</b>	<b>6.09</b>	<b>-3.38</b>	<b>10.72</b>	<b>8.56</b>	<b>2.89</b>	<b>6.79</b>	<b>-4.10</b>	<b>17.29</b>	<b>19.16</b>	<b>-13.16</b>
SERS International Equity Custom Benchmark	4.03	-5.26	9.87	7.68	2.43	5.81	-3.87	17.15	17.39	-13.12
Difference	2.06	1.88	0.85	0.88	0.46	0.98	-0.23	0.14	1.77	-0.04
Rank	26	65	72	88	39	37	89	73	38	69
<b>HPRS</b>	<b>5.27</b>	<b>-4.86</b>	<b>10.55</b>	<b>8.65</b>	<b>1.68</b>	<b>5.63</b>	<b>-4.65</b>	<b>19.05</b>	<b>18.06</b>	<b>-14.49</b>
MSCI ACW Ex US Index (Net)	4.03	-5.26	9.44	7.76	1.48	5.54	-3.87	15.29	16.83	-13.71
Difference	1.24	0.40	1.11	0.89	0.20	0.09	-0.78	3.76	1.23	-0.78
Rank	65	95	74	84	86	80	95	39	77	86
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	<i>5.56</i>	<i>-2.83</i>	<i>11.31</i>	<i>9.58</i>	<i>2.48</i>	<i>6.20</i>	<i>-3.01</i>	<i>18.10</i>	<i>18.96</i>	<i>-12.69</i>

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

**Summary**

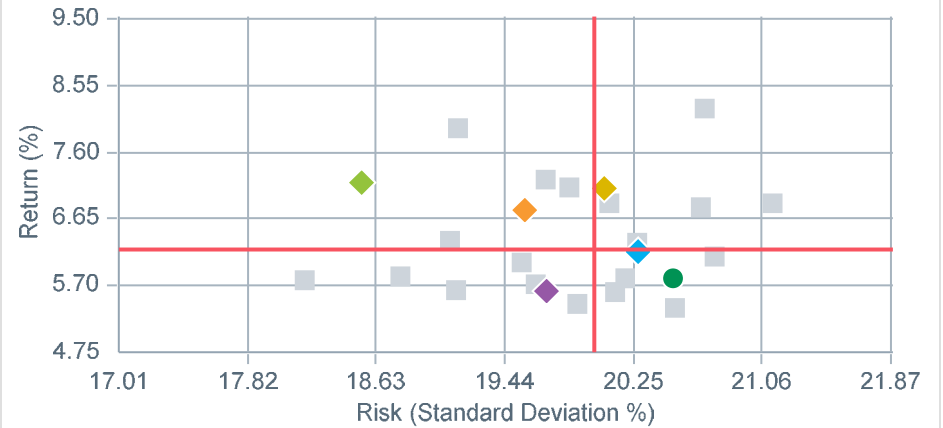
- The international equity composites for **STRS** and **OP&F** have generated higher risk-adjusted returns than peers over both the trailing 5- and 10-year periods.
- **SERS**'s international equity composite has also generated a higher Sharpe Ratio than the median peer over the trailing 10-year period.

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



	Return	Standard Deviation
◆ PERS (DB)	8.78	15.11
◆ PERS (HC)	8.78	15.11
◆ STRS	9.81	13.16
◆ OP&F	10.05	15.43
◆ SERS	8.56	14.30
◆ HPRS	8.65	16.03
● MSCI ACW Ex US IMI (Net)	8.00	15.35
— Median	9.58	15.00

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



	Return	Standard Deviation
◆ PERS (DB)	6.18	20.28
◆ PERS (HC)	6.18	20.28
◆ STRS	7.18	18.54
◆ OP&F	7.09	20.07
◆ SERS	6.79	19.57
◆ HPRS	5.63	19.71
● MSCI ACW Ex US IMI (Net)	5.79	20.51
— Median	6.20	20.00

**Sharpe Ratio - 5 Years**

PERS (DB)	0.64
PERS (HC)	0.64
STRS	0.78
OP&F	0.70
SERS	0.65
HPRS	0.60
MSCI ACW Ex US IMI (Net)	0.58
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	0.69

**Sharpe Ratio - 10 Years**

PERS (DB)	0.33
PERS (HC)	0.33
STRS	0.40
OP&F	0.38
SERS	0.37
HPRS	0.31
MSCI ACW Ex US IMI (Net)	0.31
<i>All Public Plans &gt; \$1B-Intl. Equity Segment Median</i>	0.34

Performance shown is gross of fees.



Summary

- During the first half of 2015, all six of the plans' fixed income composites outperformed the Barclays US Agg Bond Index return of -0.1%. **STRS**, **OP&F**, and **HPRS** also ranked above the peer median during the period.
- Over the one-year trailing period, five of six plans outperformed their respective index and ranked above the peer median.
- All plans' fixed income composites outperformed the broad market index over the trailing three-, five-, and seven-year periods with mixed results relative to the peer median.

Performance

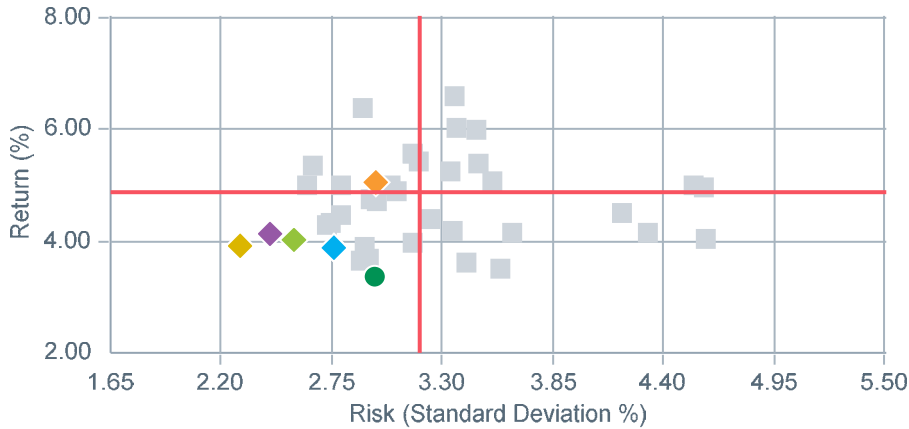
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Fixed Income</b>										
<b>PERS (DB) Core Fixed Income</b>	<b>0.10</b>	<b>2.15</b>	<b>2.53</b>	<b>3.89</b>	<b>4.68</b>	<b>4.20</b>	<b>6.47</b>	<b>-1.04</b>	<b>4.99</b>	<b>7.52</b>
PERS (DB) Core Fixed Income Custom Benchmark	-0.09	1.84	1.94	3.42	4.64	4.47	6.09	-1.94	4.33	7.84
Difference	0.19	0.31	0.59	0.47	0.04	-0.27	0.38	0.90	0.66	-0.32
Rank	85	23	66	84	85	92	33	49	85	60
<b>PERS (HC) Core Fixed Income</b>	<b>0.10</b>	<b>2.15</b>	<b>2.53</b>	<b>3.89</b>	<b>4.68</b>	<b>4.20</b>	<b>6.47</b>	<b>-1.04</b>	<b>4.99</b>	<b>7.52</b>
PERS (HC) Core Fixed Income Benchmark	-0.09	1.84	1.94	3.42	4.64	4.47	6.09	-1.94	4.33	7.84
Difference	0.19	0.31	0.59	0.47	0.04	-0.27	0.38	0.90	0.66	-0.32
Rank	85	23	66	84	85	92	33	49	85	60
<b>STRS</b>	<b>0.62</b>	<b>1.66</b>	<b>2.46</b>	<b>4.03</b>	<b>5.44</b>	<b>5.19</b>	<b>5.02</b>	<b>-1.02</b>	<b>6.14</b>	<b>7.30</b>
Barclays US Unv Bond Index	0.30	1.61	2.33	3.81	4.91	4.68	5.56	-1.35	5.53	7.40
Difference	0.32	0.05	0.13	0.22	0.53	0.51	-0.54	0.33	0.61	-0.10
Rank	44	49	68	80	58	43	81	48	65	62
<b>OP&amp;F Core Fixed Income</b>	<b>1.15</b>	<b>2.12</b>	<b>2.37</b>	<b>3.91</b>	<b>5.43</b>	<b>4.92</b>	<b>4.07</b>	<b>-1.05</b>	<b>6.31</b>	<b>6.41</b>
Barclays US Agg Bond Index	-0.10	1.86	1.83	3.35	4.59	4.44	5.97	-2.02	4.21	7.84
Difference	1.25	0.26	0.54	0.56	0.84	0.48	-1.90	0.97	2.10	-1.43
Rank	19	25	68	84	58	57	92	49	63	78
<b>SERS</b>	<b>0.25</b>	<b>1.04</b>	<b>3.37</b>	<b>5.06</b>	<b>6.65</b>	<b>5.67</b>	<b>5.84</b>	<b>-0.37</b>	<b>9.21</b>	<b>6.69</b>
Barclays US Agg Bond Index	-0.10	1.86	1.83	3.35	4.59	4.44	5.97	-2.02	4.21	7.84
Difference	0.35	-0.82	1.54	1.71	2.06	1.23	-0.13	1.65	5.00	-1.15
Rank	73	73	40	37	17	27	51	33	26	77
<b>HPRS</b>	<b>1.17</b>	<b>2.18</b>	<b>2.50</b>	<b>4.14</b>	<b>5.22</b>	<b>5.08</b>	<b>4.00</b>	<b>-0.81</b>	<b>6.55</b>	<b>7.49</b>
Barclays US Agg Bond Index	-0.10	1.86	1.83	3.35	4.59	4.44	5.97	-2.02	4.21	7.84
Difference	1.27	0.32	0.67	0.79	0.63	0.64	-1.97	1.21	2.34	-0.35
Rank	17	22	67	75	68	54	92	44	62	60
<i>All Public Plans &gt; \$1B-US Fixed Income Segment Median</i>	<i>0.50</i>	<i>1.63</i>	<i>2.96</i>	<i>4.89</i>	<i>5.68</i>	<i>5.12</i>	<i>5.90</i>	<i>-1.11</i>	<i>7.40</i>	<i>7.73</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.

Summary

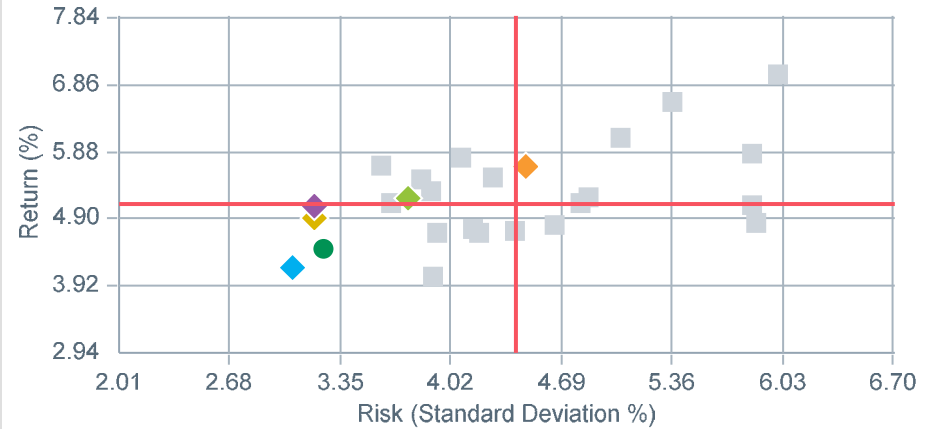
- Over the trailing 5-year period four of six plans have achieved higher or similar risk-adjusted returns than the peer median.
- Over the trailing 10-year period all six plans achieved higher risk-adjusted returns than the median peer.

Plan Sponsor Peer Group Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	3.89	2.76
◆ PERS (HC) Core Fixed Income	3.89	2.76
◆ STRS	4.03	2.56
◆ OP&F Core Fixed Income	3.91	2.30
◆ SERS	5.06	2.97
◆ HPRS	4.14	2.45
● Barclays US Agg Bond Index	3.35	2.97
— Median	4.89	3.19

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	4.20	3.06
◆ PERS (HC) Core Fixed Income	4.20	3.06
◆ STRS	5.19	3.77
◆ OP&F Core Fixed Income	4.92	3.20
◆ SERS	5.67	4.47
◆ HPRS	5.08	3.19
● Barclays US Agg Bond Index	4.44	3.25
— Median	5.12	4.42

Sharpe Ratio - 5 Years

PERS (DB) Core Fixed Income	1.37
PERS (HC) Core Fixed Income	1.37
STRS	1.53
OP&F Core Fixed Income	1.65
SERS	1.66
HPRS	1.65
Barclays US Agg Bond Index	1.10
All Public Plans > \$1B-US Fixed Income Segment Median	1.53

Sharpe Ratio - 10 Years

PERS (DB) Core Fixed Income	0.85
PERS (HC) Core Fixed Income	0.85
STRS	0.95
OP&F Core Fixed Income	1.02
SERS	0.89
HPRS	1.08
Barclays US Agg Bond Index	0.90
All Public Plans > \$1B-US Fixed Income Segment Median	0.77

Performance shown is gross of fees.

**Summary**

- The majority of each plans' additional fixed income composites have outperformed their respective benchmarks over nearly all available time periods.
- Additional fixed income composite performance provided by **PERS (DB)** and **PERS (HC)** includes U.S. Treasury, Emerging Markets Debt, High Yield, Floating Rate Debt (Bank Loans), Securitized Debt, TIPS, and Global High Yield.
- Additional fixed income composite performance provided by **OP&F** includes Mortgages, High Yield, and Global TIPS.

**Performance**

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Additional Fixed Income</b>										
<b>PERS (DB) U.S. Treasury</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays US Trsy Index	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (DB) EMD</b>	<b>-0.97</b>	<b>-9.01</b>	<b>0.43</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-1.64</b>	<b>-6.35</b>	<b>18.83</b>	<b>N/A</b>
PERS (DB) EMD Custom Benchmark	-1.59	-8.69	-0.20	N/A	N/A	N/A	-0.20	-7.76	17.74	N/A
Difference	0.62	-0.32	0.63	N/A	N/A	N/A	-1.44	1.41	1.09	N/A
<b>PERS (DB) High Yield</b>	<b>3.14</b>	<b>0.19</b>	<b>7.27</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>2.73</b>	<b>7.92</b>	<b>15.82</b>	<b>5.03</b>
Barclays U.S. High Yield Index	2.53	-0.40	7.22	N/A	N/A	N/A	2.45	8.68	15.81	4.98
Difference	0.61	0.59	0.05	N/A	N/A	N/A	0.28	-0.76	0.01	0.05
<b>PERS (DB) Floating Rate Debt</b>	<b>3.34</b>	<b>4.90</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>4.43</b>	<b>6.69</b>	<b>N/A</b>	<b>N/A</b>
CS Lvg'd Loan Index	2.87	2.15	N/A	N/A	N/A	N/A	2.06	6.15	N/A	N/A
Difference	0.47	2.75	N/A	N/A	N/A	N/A	2.37	0.54	N/A	N/A
<b>PERS (DB) Securitized Debt</b>	<b>4.45</b>	<b>8.31</b>	<b>19.39</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>17.98</b>	<b>21.25</b>	<b>24.51</b>	<b>N/A</b>
Barclays CMBS Index + 2%	1.30	3.63	5.18	N/A	N/A	N/A	5.76	2.23	11.66	N/A
Difference	3.15	4.68	14.21	N/A	N/A	N/A	12.22	19.02	12.85	N/A
<b>PERS (DB) TIPS</b>	<b>0.34</b>	<b>-1.72</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>3.66</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Barclays U.S. TIPS Index	0.34	-1.73	N/A	N/A	N/A	N/A	3.64	N/A	N/A	N/A
Difference	0.00	0.01	N/A	N/A	N/A	N/A	0.02	N/A	N/A	N/A
<b>PERS (DB) Global High Yield</b>	<b>1.16</b>	<b>-4.84</b>	<b>6.33</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.00</b>	<b>7.58</b>	<b>N/A</b>	<b>N/A</b>
Barclays Global High Yield Index	1.94	-3.88	6.72	N/A	N/A	N/A	0.01	7.33	N/A	N/A
Difference	-0.78	-0.96	-0.39	N/A	N/A	N/A	-0.01	0.25	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	2014	2013	2012	2011
<b>Additional Fixed Income</b>										
<b>PERS (HC) U.S. Treasury</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays US Trsy Index	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC) EMD</b>	-0.97	-9.01	0.43	3.96	N/A	N/A	-1.64	-6.35	18.83	2.17
PERS (HC) EMD Custom Benchmark	-1.59	-8.69	-0.20	3.76	N/A	N/A	-0.20	-7.76	17.74	3.33
Difference	0.62	-0.32	0.63	0.20	N/A	N/A	-1.44	1.41	1.09	-1.16
<b>PERS (HC) High Yield</b>	3.14	0.19	7.27	N/A	N/A	N/A	2.73	7.92	15.82	5.03
Barclays U.S. High Yield Index	2.53	-0.40	7.22	N/A	N/A	N/A	2.45	8.68	15.81	4.98
Difference	0.61	0.59	0.05	N/A	N/A	N/A	0.28	-0.76	0.01	0.05
<b>PERS (HC) Floating Rate Debt</b>	3.34	4.90	N/A	N/A	N/A	N/A	4.43	6.69	N/A	N/A
CS Lvg'd Loan Index	2.87	2.15	N/A	N/A	N/A	N/A	2.06	6.15	N/A	N/A
Difference	0.47	2.75	N/A	N/A	N/A	N/A	2.37	0.54	N/A	N/A
<b>PERS (HC) Securitized Debt</b>	4.45	8.31	19.39	N/A	N/A	N/A	17.98	21.25	24.51	N/A
Barclays CMBS Index + 2%	1.30	3.63	5.18	N/A	N/A	N/A	5.76	2.23	11.66	N/A
Difference	3.15	4.68	14.21	N/A	N/A	N/A	12.22	19.02	12.85	N/A
<b>PERS (HC) TIPS</b>	0.34	-1.72	-0.72	3.31	3.61	4.25	3.66	-8.55	6.95	13.60
Barclays U.S. TIPS Index	0.34	-1.73	-0.76	3.29	3.51	4.13	3.64	-8.61	6.98	13.56
Difference	0.00	0.01	0.04	0.02	0.10	0.12	0.02	0.06	-0.03	0.04
<b>PERS (HC) Global High Yield</b>	1.16	-4.84	6.33	N/A	N/A	N/A	0.00	7.58	N/A	N/A
Barclays Global High Yield Index	1.94	-3.88	6.72	N/A	N/A	N/A	0.01	7.33	N/A	N/A
Difference	-0.78	-0.96	-0.39	N/A	N/A	N/A	-0.01	0.25	N/A	N/A
<b>OP&amp;F Mortgages</b>	2.46	5.40	6.18	7.25	6.46	5.60	8.56	6.72	5.28	4.99
Barclays Mortgage Index (1 Qtr Lag)	2.86	5.53	2.54	3.63	4.48	4.87	3.78	-1.20	3.71	5.56
Difference	-0.40	-0.13	3.64	3.62	1.98	0.73	4.78	7.92	1.57	-0.57
<b>OP&amp;F High Yield</b>	3.21	1.47	6.77	8.68	9.34	8.01	2.81	6.13	15.64	6.00
CS Hi Yld Dvl'd Countries Only Index	2.89	-0.71	6.63	8.31	8.76	7.54	1.85	7.53	14.76	5.46
Difference	0.32	2.18	0.14	0.37	0.58	0.47	0.96	-1.40	0.88	0.54
<b>OP&amp;F Global Inflation Protected Securities</b>	4.60	8.59	7.08	13.89	11.41	10.02	19.43	-10.62	14.93	35.50
Bridewater Custom GIPS Index	0.73	5.35	3.84	8.49	7.39	6.67	18.76	-13.10	13.49	24.41
Difference	3.87	3.24	3.24	5.40	4.02	3.35	0.67	2.48	1.44	11.09

Performance shown is gross of fees.

### Summary

- Of the plans with exposure to core and value-added real estate, three of the five plans outperformed their respective benchmark during the first half of 2015.
- **PERS (HC)**'s exposure to REITs earned -5.7% during the period.
- Over the trailing 10-year period, four of the six plans outperformed their respective benchmarks.

### Performance

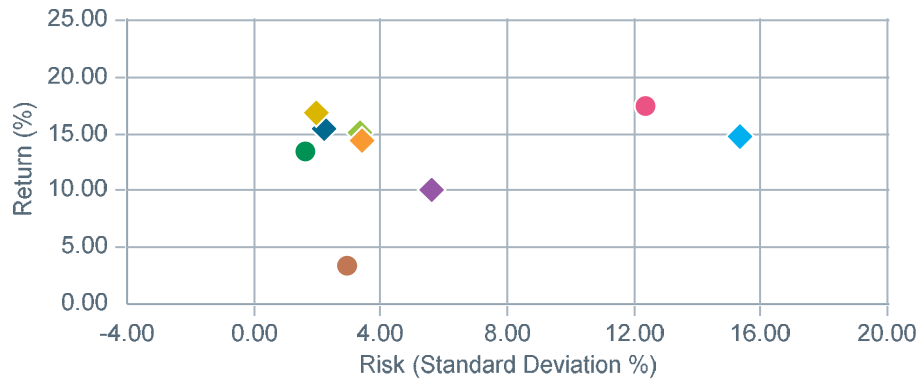
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Real Estate</b>										
<b>PERS (DB)</b>	<b>8.45</b>	<b>20.20</b>	<b>16.26</b>	<b>15.51</b>	<b>5.73</b>	<b>9.21</b>	<b>18.92</b>	<b>15.43</b>	<b>12.91</b>	<b>13.06</b>
NFI-ODCE Index (Net) + 0.85% (1 Qtr Lag)	6.71	13.25	12.39	13.31	5.35	8.04	12.21	12.82	11.00	16.10
Difference	1.74	6.95	3.87	2.20	0.38	1.17	6.71	2.61	1.91	-3.04
<b>PERS (HC) REITs</b>	<b>-5.66</b>	<b>5.25</b>	<b>8.83</b>	<b>14.67</b>	<b>7.77</b>	<b>6.93</b>	<b>31.79</b>	<b>1.38</b>	<b>17.17</b>	<b>9.61</b>
DJ US Select Real Estate Securities TR Index	-5.69	5.25	8.67	14.38	7.49	6.68	31.85	1.31	17.09	8.87
Difference	0.03	0.00	0.16	0.29	0.28	0.25	-0.06	0.07	0.08	0.74
<b>STRS</b>	<b>4.89</b>	<b>14.14</b>	<b>13.18</b>	<b>15.10</b>	<b>5.60</b>	<b>10.88</b>	<b>17.57</b>	<b>10.36</b>	<b>15.40</b>	<b>19.07</b>
STRS Real Estate Custom Benchmark	4.97	11.87	11.34	13.17	6.35	8.45	14.54	9.72	11.69	13.85
Difference	-0.08	2.27	1.84	1.93	-0.75	2.43	3.03	0.64	3.71	5.22
<b>OP&amp;F</b>	<b>8.21</b>	<b>18.29</b>	<b>16.13</b>	<b>16.79</b>	<b>3.27</b>	<b>8.05</b>	<b>18.57</b>	<b>15.11</b>	<b>13.06</b>	<b>18.01</b>
NCREIF ODCE Index (Net) (1 Qtr Lag)	6.28	12.40	11.60	13.44	2.15	6.00	11.36	11.97	10.47	17.18
Difference	1.93	5.89	4.53	3.35	1.12	2.05	7.21	3.14	2.59	0.83
<b>SERS</b>	<b>6.89</b>	<b>13.27</b>	<b>13.21</b>	<b>14.36</b>	<b>1.70</b>	<b>5.34</b>	<b>14.22</b>	<b>12.00</b>	<b>14.02</b>	<b>9.88</b>
SERS Real Estate Custom Benchmark	6.72	12.72	11.47	12.76	5.71	8.28	11.26	11.00	11.00	16.10
Difference	0.17	0.55	1.74	1.60	-4.01	-2.94	2.96	1.00	3.02	-6.22
<b>HPRS</b>	<b>5.59</b>	<b>17.46</b>	<b>16.64</b>	<b>10.02</b>	<b>2.67</b>	<b>3.65</b>	<b>22.02</b>	<b>13.78</b>	<b>6.46</b>	<b>-3.57</b>
NCREIF Property Index (1 Qtr Lag)	6.72	12.71	11.41	12.58	5.28	8.09	11.26	11.00	10.54	14.26
Difference	-1.13	4.75	5.23	-2.56	-2.61	-4.44	10.76	2.78	-4.08	-17.83

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.

Summary

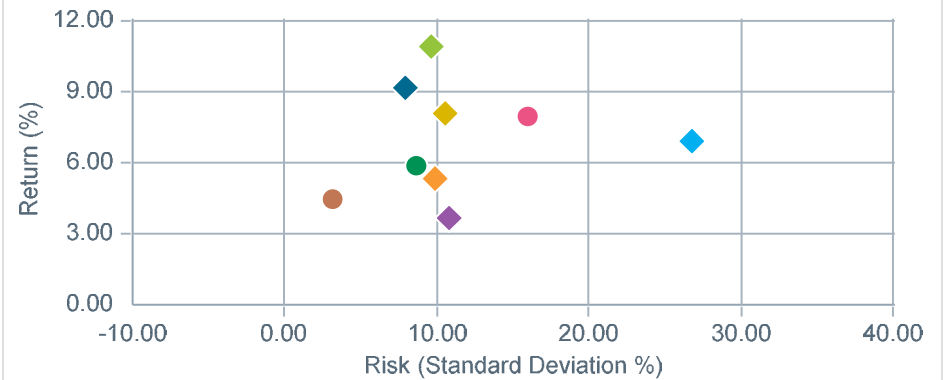
- The five plans with core and value-added real estate exposure exhibit fairly similar risk and return characteristics over the trailing 5- and 10-year periods.
- As expected, PERS (HC)'s REITs exposure exhibits risk and return characteristics similar to that of public equity markets.

Risk & Return Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	15.51	2.21
◆ PERS (HC)	14.67	15.34
◆ STRS	15.10	3.35
◆ OP&F	16.79	1.97
◆ SERS	14.36	3.39
◆ HPRS	10.02	5.60
● NCREIF ODCE Index (Net) (AWA)	13.33	1.64
● S&P 500 Index (Cap Wtd)	17.34	12.39
● Barclays US Agg Bond Index	3.35	2.97

Risk & Return Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	9.21	7.98
◆ PERS (HC)	6.93	26.84
◆ STRS	10.88	9.59
◆ OP&F	8.05	10.55
◆ SERS	5.34	9.92
◆ HPRS	3.65	10.87
● NCREIF ODCE Index (Net) (AWA)	5.86	8.74
● S&P 500 Index (Cap Wtd)	7.89	16.01
● Barclays US Agg Bond Index	4.44	3.25

Sharpe Ratio - 5 Years

PERS (DB)	6.60
PERS (HC) REITs	0.98
STRS	4.27
OP&F	8.02
SERS	4.03
HPRS	1.74
NCREIF ODCE Index (Net) (AWA)	7.78

Sharpe Ratio - 10 Years

PERS (DB)	1.00
PERS (HC) REITs	0.34
STRS	1.03
OP&F	0.68
SERS	0.45
HPRS	0.26
NCREIF ODCE Index (Net) (AWA)	0.55

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

### Summary

- The five plans with dedicated hedge fund exposure earned returns ranging from 1.4% to 3.2% during the first half of 2015.
- All plans' hedge fund composites outperformed their respective benchmarks over the trailing 3-year period.
- Among the five plans, STRS's composite has the longest available history and has earned 7.4% per annum over the trailing 10-year period.

### Performance

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Hedge Funds</b>										
<b>PERS (DB)</b>	<b>2.38</b>	<b>3.43</b>	<b>6.67</b>	<b>4.07</b>	<b>2.20</b>	<b>N/A</b>	<b>3.93</b>	<b>9.63</b>	<b>6.26</b>	<b>-2.67</b>
PERS (DB) Hedge Funds Custom Benchmark	2.20	1.03	5.09	5.58	5.45	N/A	2.59	7.00	7.00	7.00
Difference	0.18	2.40	1.58	-1.51	-3.25	N/A	1.34	2.63	-0.74	-9.67
<b>PERS (HC)</b>	<b>2.38</b>	<b>3.43</b>	<b>6.67</b>	<b>4.07</b>	<b>2.20</b>	<b>N/A</b>	<b>3.93</b>	<b>9.63</b>	<b>6.26</b>	<b>-2.67</b>
PERS (HC) Hedge Funds Custom Benchmark	2.20	1.03	5.09	5.58	5.45	N/A	2.59	7.00	7.00	7.00
Difference	0.18	2.40	1.58	-1.51	-3.25	N/A	1.34	2.63	-0.74	-9.67
<b>STRS</b>	<b>1.38</b>	<b>1.21</b>	<b>6.74</b>	<b>6.03</b>	<b>2.80</b>	<b>7.39</b>	<b>3.27</b>	<b>11.44</b>	<b>7.37</b>	<b>-1.27</b>
HFRI FOF Comp Index	2.70	3.96	6.27	4.10	1.17	3.21	3.37	8.96	4.79	-5.72
Difference	-1.32	-2.75	0.47	1.93	1.63	4.18	-0.10	2.48	2.58	4.45
<b>SERS</b>	<b>2.39</b>	<b>2.34</b>	<b>7.13</b>	<b>5.85</b>	<b>N/A</b>	<b>N/A</b>	<b>4.10</b>	<b>9.80</b>	<b>7.98</b>	<b>-1.18</b>
HFRI FOF Comp Index + 1%	3.15	4.94	6.94	4.49	N/A	N/A	4.37	9.46	4.79	-5.72
Difference	-0.76	-2.60	0.19	1.36	N/A	N/A	-0.27	0.34	3.19	4.54
<b>HPRS</b>	<b>3.16</b>	<b>3.38</b>	<b>6.74</b>	<b>4.77</b>	<b>3.26</b>	<b>N/A</b>	<b>3.34</b>	<b>9.47</b>	<b>7.03</b>	<b>-5.26</b>
HFRI FOF Comp Index	2.70	3.96	6.27	4.10	1.17	N/A	3.37	8.96	4.79	-5.72
Difference	0.46	-0.58	0.47	0.67	2.09	N/A	-0.03	0.51	2.24	0.46

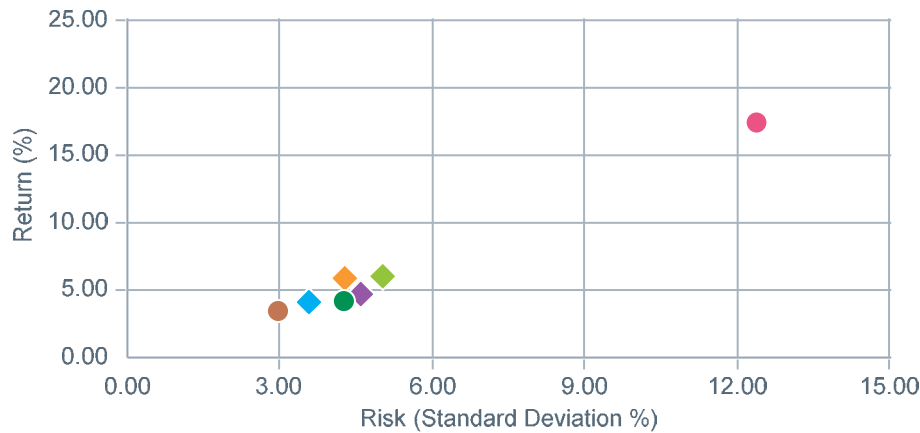
Performance shown is net of fees.



Summary

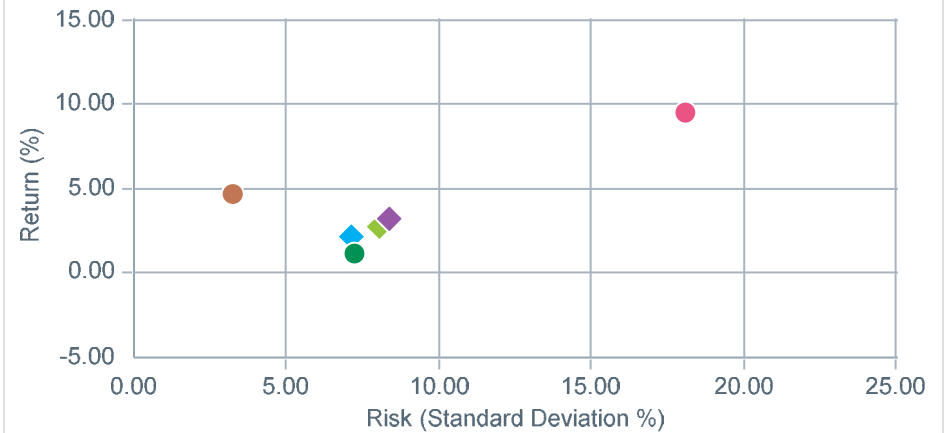
- The five plans with dedicated hedge fund exposure exhibit similar return and risk characteristics over the trailing 5- and 7-year periods.
- All plans with available history have generated more return for each unit of risk relative to the HFRI FOF Comp Index over both time periods shown.

Risk & Return Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	4.07	3.57
◆ PERS (HC)	4.07	3.57
◆ STRS	6.03	5.04
◆ SERS	5.85	4.29
◆ HPRS	4.77	4.61
● HFRI FOF Comp Index	4.10	4.27
● S&P 500 Index (Cap Wtd)	17.34	12.39
● Barclays US Agg Bond Index	3.35	2.97

Risk & Return Scattergram - 7 Years



	Return	Standard Deviation
◆ PERS (DB)	2.20	7.14
◆ PERS (HC)	2.20	7.14
◆ STRS	2.80	8.06
◆ SERS	N/A	N/A
◆ HPRS	3.26	8.36
● HFRI FOF Comp Index	1.17	7.29
● S&P 500 Index (Cap Wtd)	9.42	18.11
● Barclays US Agg Bond Index	4.59	3.28

Sharpe Ratio - 5 Years

PERS (DB)	1.12
PERS (HC)	1.12
STRS	1.18
SERS	1.34
HPRS	1.02
HFRI FOF Comp Index	0.95

Sharpe Ratio - 7 Years

PERS (DB)	0.31
PERS (HC)	0.31
STRS	0.35
SERS	N/A
HPRS	0.40
HFRI FOF Comp Index	0.16

Performance shown is net of fees.

Summary

- The five plans with dedicated private equity exposure earned time-weighted returns ranging from 1.1% to 7.8% during the first half of the 2015 calendar year.
- Over the trailing ten-year period, three of the four plans with available history have outperformed their respective benchmarks.
- RVK prefers to measure private equity performance using since inception money-weighted returns (IRR), but we have included time-weighted performance in our analysis for illustrative purposes.

Performance

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Private Equity</b>										
<b>PERS (DB)</b>	<b>3.16</b>	<b>10.75</b>	<b>15.26</b>	<b>16.75</b>	<b>10.21</b>	<b>13.33</b>	<b>17.94</b>	<b>16.29</b>	<b>18.54</b>	<b>15.93</b>
PERS (DB) Private Equity Custom Benchmark	1.79	5.48	14.46	14.83	10.38	10.06	15.41	22.81	33.20	3.55
Difference	1.37	5.27	0.80	1.92	-0.17	3.27	2.53	-6.52	-14.66	12.38
<b>STRS</b>	<b>6.28</b>	<b>12.18</b>	<b>16.60</b>	<b>15.93</b>	<b>9.36</b>	<b>11.81</b>	<b>18.90</b>	<b>20.00</b>	<b>16.27</b>	<b>11.45</b>
STRS Private Equity Custom Benchmark	2.45	8.36	18.89	19.64	12.01	10.76	13.67	34.86	18.73	4.10
Difference	3.83	3.82	-2.29	-3.71	-2.65	1.05	5.23	-14.86	-2.46	7.35
<b>OP&amp;F</b>	<b>5.12</b>	<b>11.70</b>	<b>12.58</b>	<b>13.40</b>	<b>7.33</b>	<b>11.70</b>	<b>18.34</b>	<b>11.50</b>	<b>9.58</b>	<b>17.66</b>
OP&F Private Equity Custom Benchmark	8.55	15.62	19.68	18.01	12.60	11.93	21.45	24.59	33.76	3.65
Difference	-3.43	-3.92	-7.10	-4.61	-5.27	-0.23	-3.11	-13.09	-24.18	14.01
<b>SERS</b>	<b>7.82</b>	<b>18.92</b>	<b>17.90</b>	<b>16.14</b>	<b>9.43</b>	<b>11.83</b>	<b>22.77</b>	<b>17.32</b>	<b>13.16</b>	<b>14.07</b>
Burgiss All Private Equity Benchmark	2.25	7.41	15.28	15.19	10.49	10.00	15.75	22.34	33.20	4.14
Difference	5.57	11.51	2.62	0.95	-1.06	1.83	7.02	-5.02	-20.04	9.93
<b>HPRS</b>	<b>1.05</b>	<b>1.77</b>	<b>9.04</b>	<b>5.24</b>	<b>3.84</b>	<b>N/A</b>	<b>12.41</b>	<b>15.54</b>	<b>3.12</b>	<b>-8.24</b>
HPRS Private Equity Custom Benchmark	9.12	16.06	20.07	17.52	13.74	N/A	21.15	25.63	33.50	0.47
Difference	-8.07	-14.29	-11.03	-12.28	-9.90	N/A	-8.74	-10.09	-30.38	-8.71

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.

Summary

- The majority of each plans' other alternatives composites outperform their respective benchmarks over nearly all available time periods.
- Other alternatives composite performance provided by PERS (DB) and PERS (HC) includes Opportunistic Investments, Commodities, Risk Parity, and GTAA.
- Other alternatives composite performance provided by OP&F includes Timber and MLPs.
- Opportunistic Investments performance was provided by STRS and SERS.

Performance

Trailing Performance (%)

Calendar Year Performance (%)

2 Quarters      1 Year      3 Years      5 Years      7 Years      10 Years      2014      2013      2012      2011

Other Alternatives

<b>PERS (DB) Opportunistic Investments</b>	<b>0.12</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>-3.06</b>	<b>4.15</b>	<b>4.84</b>
PERS (DB) Opportunistic Custom Benchmark	0.03	N/A	N/A	N/A	N/A	N/A	N/A	-1.34	5.43	5.06
Difference	0.09	N/A	N/A	N/A	N/A	N/A	N/A	-1.72	-1.28	-0.22
<b>PERS (DB) Commodities</b>	<b>0.05</b>	<b>-35.92</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-32.12</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
S&P Goldman Sachs Commodity Index (TR)	-0.21	-36.81	N/A	N/A	N/A	N/A	-33.06	N/A	N/A	N/A
Difference	0.26	0.89	N/A	N/A	N/A	N/A	0.94	N/A	N/A	N/A
<b>PERS (DB) Risk Parity</b>	<b>0.44</b>	<b>-5.64</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>9.73</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (DB) Risk Parity Custom Benchmark	1.99	4.70	N/A	N/A	N/A	N/A	7.64	N/A	N/A	N/A
Difference	-1.55	-10.34	N/A	N/A	N/A	N/A	2.09	N/A	N/A	N/A
<b>PERS (DB) GTAA</b>	<b>2.45</b>	<b>1.83</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>4.44</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (DB) GTAA Custom Benchmark	1.09	-0.79	N/A	N/A	N/A	N/A	3.61	N/A	N/A	N/A
Difference	1.36	2.62	N/A	N/A	N/A	N/A	0.83	N/A	N/A	N/A
<b>PERS (HC) Opportunistic Investments</b>	<b>0.12</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>-3.06</b>	<b>4.25</b>	<b>4.84</b>
PERS (HC) Opportunistic Custom Benchmark	0.03	N/A	N/A	N/A	N/A	N/A	N/A	-1.34	5.43	5.06
Difference	0.09	N/A	N/A	N/A	N/A	N/A	N/A	-1.72	-1.18	-0.22
<b>PERS (HC) Commodities</b>	<b>0.05</b>	<b>-35.92</b>	<b>-10.03</b>	<b>-4.08</b>	<b>N/A</b>	<b>N/A</b>	<b>-32.12</b>	<b>-0.68</b>	<b>0.30</b>	<b>1.17</b>
S&P Goldman Sachs Commodity Index	-0.21	-36.81	-10.71	0.27	N/A	N/A	-33.06	-1.22	0.08	24.99
Difference	0.26	0.89	0.68	-4.35	N/A	N/A	0.94	0.54	0.22	-23.82
<b>PERS (HC) Risk Parity</b>	<b>0.44</b>	<b>-5.64</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>9.73</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC) Risk Parity Custom Benchmark	1.99	4.70	N/A	N/A	N/A	N/A	7.64	N/A	N/A	N/A
Difference	-1.55	-10.34	N/A	N/A	N/A	N/A	2.09	N/A	N/A	N/A

Performance shown may be net or gross of fees depending on underlying investments. PERS (DB) and PERS (HC) 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.

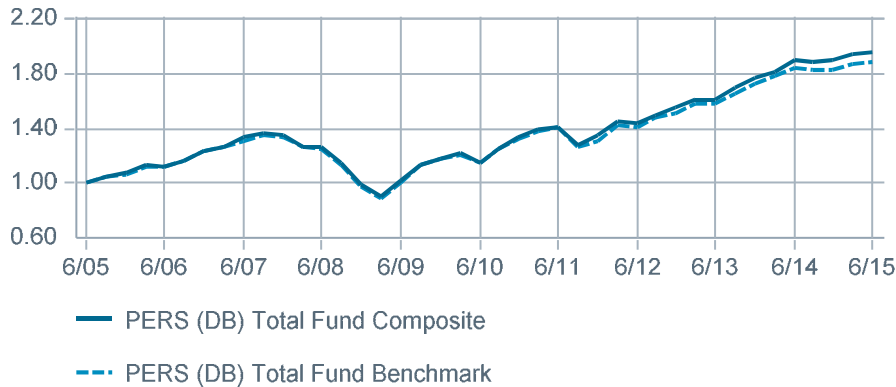
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>Other Alternatives</b>										
<b>PERS (HC) GTAA</b>	<b>2.45</b>	<b>1.83</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>4.44</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
PERS (HC) GTAA Custom Benchmark	1.09	-0.79	N/A	N/A	N/A	N/A	3.61	N/A	N/A	N/A
Difference	1.36	2.62	N/A	N/A	N/A	N/A	0.83	N/A	N/A	N/A
<b>STRS Opportunistic Investments</b>	<b>2.03</b>	<b>3.08</b>	<b>8.74</b>	<b>8.81</b>	<b>N/A</b>	<b>N/A</b>	<b>7.47</b>	<b>11.68</b>	<b>12.00</b>	<b>3.89</b>
STRS Opportunistic Custom Benchmark	1.43	6.23	16.58	16.38	N/A	N/A	11.45	32.26	15.28	0.02
Difference	0.60	-3.15	-7.84	-7.57	N/A	N/A	-3.98	-20.58	-3.28	3.87
<b>OP&amp;F Timber</b>	<b>0.93</b>	<b>5.07</b>	<b>5.00</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>8.99</b>	<b>3.07</b>	<b>N/A</b>	<b>N/A</b>
Consumer Price Index + 5%	4.14	5.13	6.38	N/A	N/A	N/A	5.79	6.58	N/A	N/A
Difference	-3.21	-0.06	-1.38	N/A	N/A	N/A	3.20	-3.51	N/A	N/A
<b>OP&amp;F MLPs</b>	<b>-4.25</b>	<b>-10.79</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>16.91</b>	<b>32.25</b>	<b>N/A</b>	<b>N/A</b>
Alerian MLP Index	-11.00	-19.81	N/A	N/A	N/A	N/A	4.80	27.58	N/A	N/A
Difference	6.74	9.02	N/A	N/A	N/A	N/A	12.11	4.67	N/A	N/A
<b>SERS Opportunistic Investments</b>	<b>2.77</b>	<b>6.33</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>7.96</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
SERS Opportunistic Custom Benchmark	2.86	3.87	N/A	N/A	N/A	N/A	6.66	N/A	N/A	N/A
Difference	-0.09	2.46	N/A	N/A	N/A	N/A	1.30	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.

**Summary**

- PERS (DB) has earned a return of 1.4% for each unit of risk over the trailing 5-year period and 0.5% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, the plan has exhibited similar up-market capture and larger down-market capture characteristics over the past ten years.

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



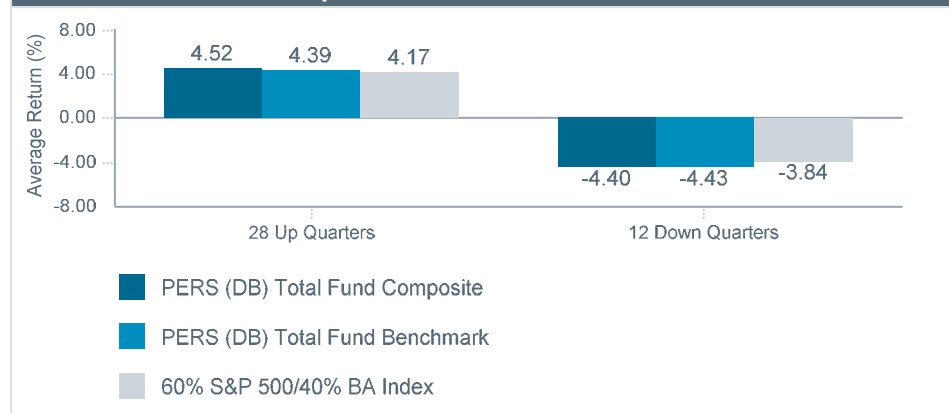
**MPT Stats**

	5 Years	10 Years
Maximum Return	9.71	12.34
Minimum Return	-9.24	-13.81
Standard Deviation	7.79	11.00
vs. PERS (DB) Total Fund Benchmark		
Info Ratio	0.86	0.44
Tracking Error	0.92	0.92
Alpha	0.89	0.48
vs. S&P 500 Index (Cap Wtd)		
Beta	0.58	0.66
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.42	0.54

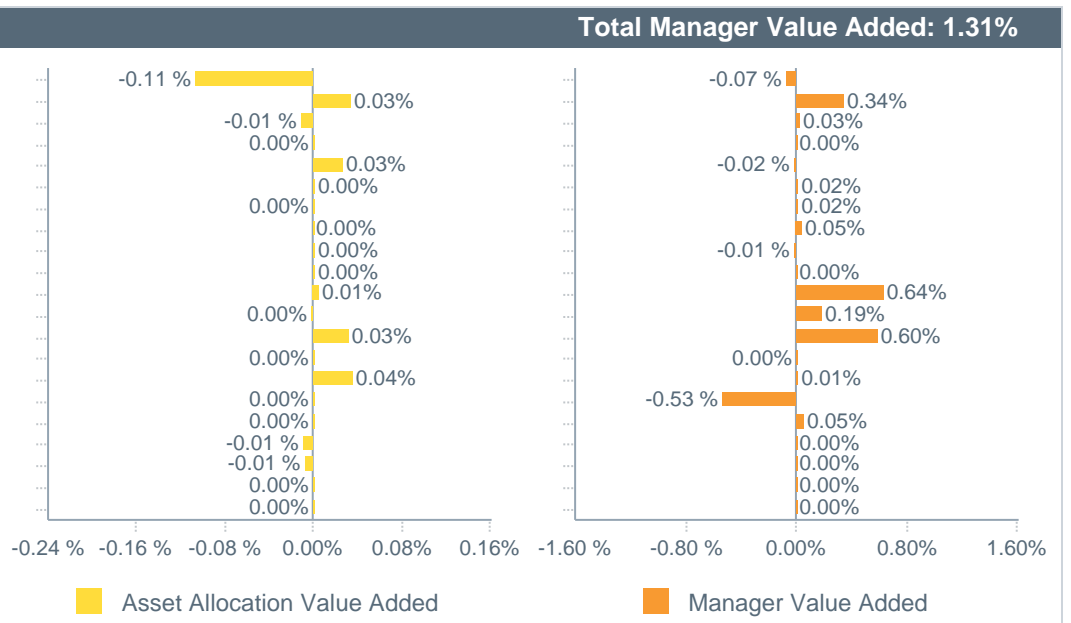
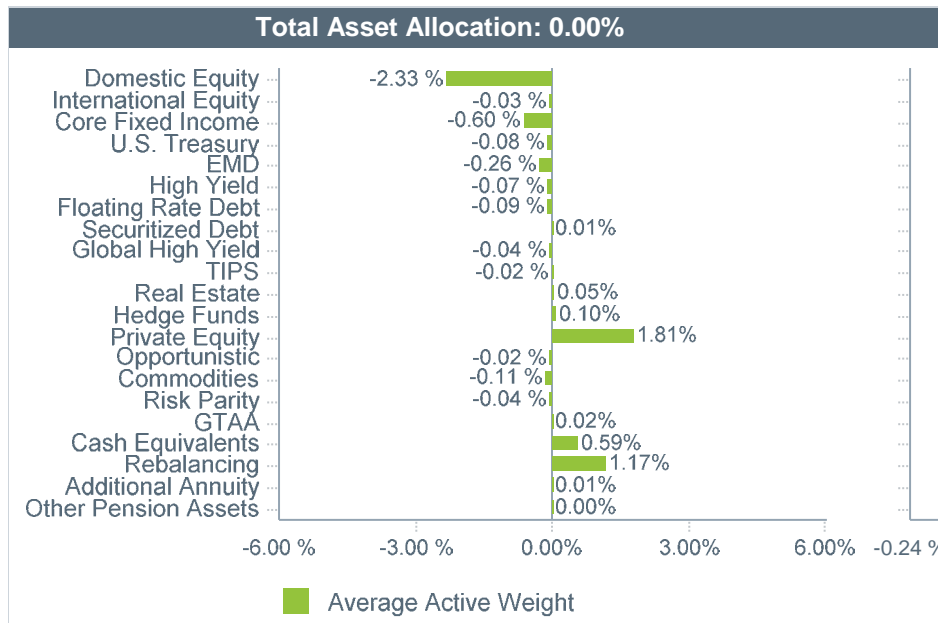
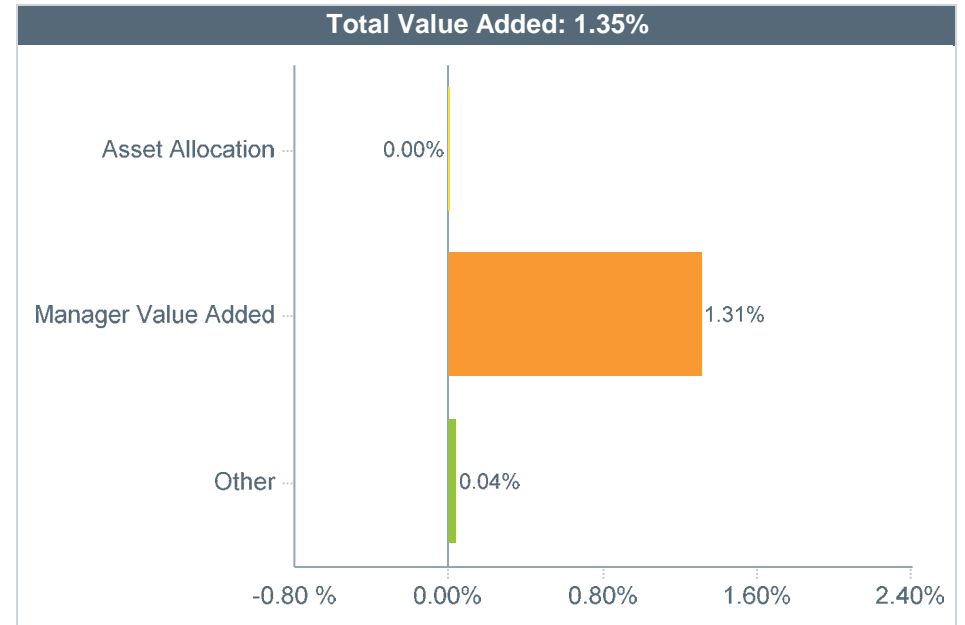
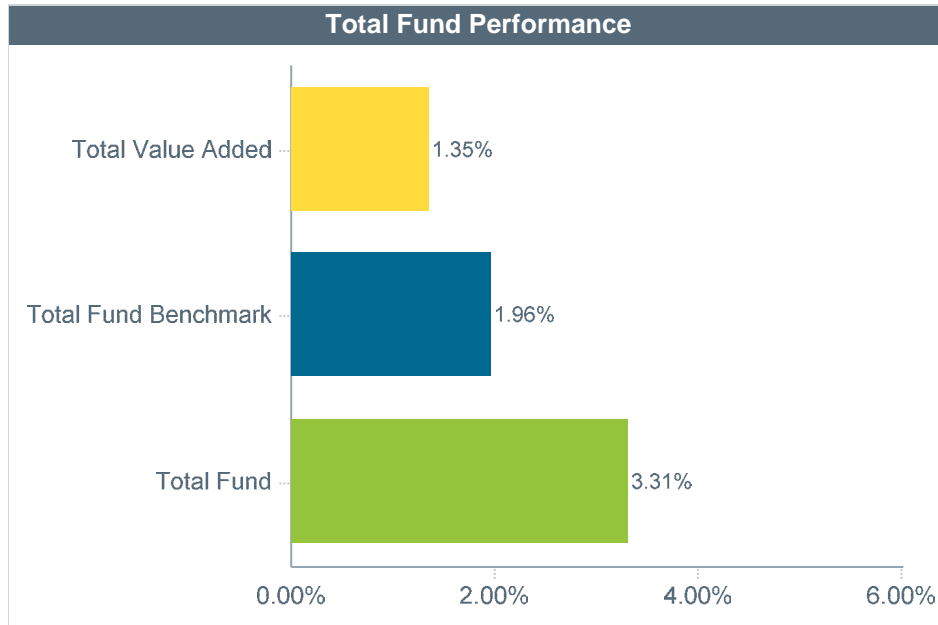
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	15,280,570,855	19.64	22.10
International Equity	14,264,030,964	18.33	18.80
Core Fixed Income	6,911,095,361	8.88	9.40
U.S. Treasury	769,616,559	0.99	1.00
EMD	4,633,952,227	5.96	6.00
High Yield	2,309,865,129	2.97	3.00
Floating Rate Debt	387,329,518	0.50	0.60
Securitized Debt	787,387,751	1.01	1.00
Global High Yield	738,137,957	0.95	1.00
TIPS	756,433,676	0.97	1.00
Real Estate	7,973,026,775	10.25	10.00
Hedge Funds	6,164,147,464	7.92	8.00
Private Equity	9,167,008,603	11.78	10.00
Opportunistic	79,540,653	0.10	0.10
Commodities	760,664,907	0.98	1.00
Risk Parity	3,876,199,771	4.98	5.00
GTAA	1,570,720,075	2.02	2.00
Cash Equivalents	260,532,380	0.33	0.00
Rebalancing	1,093,602,432	1.41	0.00
Additional Annuity	18,651,099	0.02	0.00
Other Pension Assets	100,138	0.00	0.00
Total Fund	77,802,614,295	100.00	100.00

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.

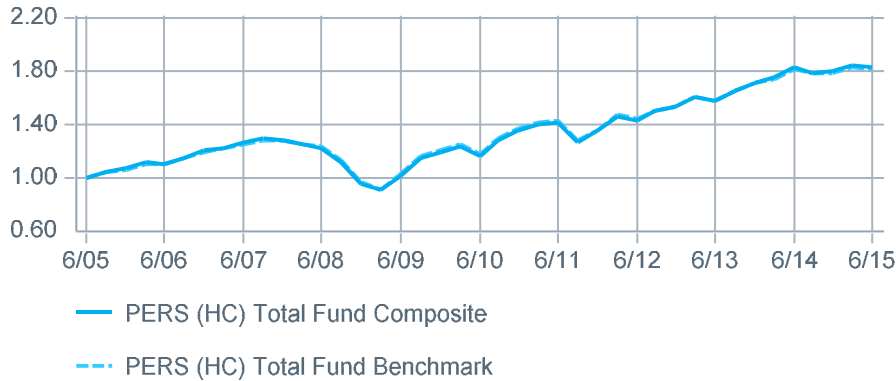


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

**Summary**

- PERS (HC) has earned a return of 1.1% for each unit of risk over the trailing 5-year period and 0.5% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, the plan has exhibited similar up-market and larger down-market capture characteristics over the past ten years.

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



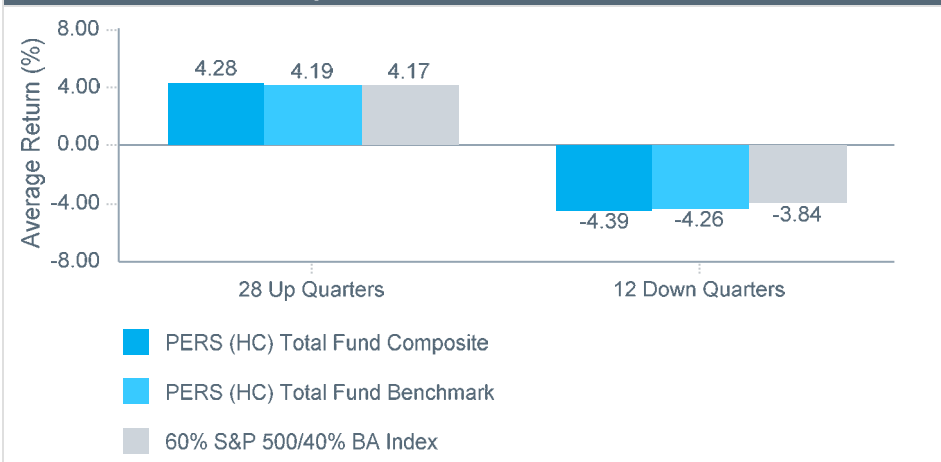
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	2,817,060,393	23.57	24.10
International Equity	2,412,126,623	20.18	20.80
Core Fixed Income	1,952,187,986	16.33	16.40
U.S. Treasury	122,038,181	1.02	1.00
High Yield	301,875,710	2.53	2.50
Global High Yield	181,176,947	1.52	1.50
EMD	725,133,243	6.07	6.00
Floating Rate Debt	55,420,138	0.46	0.60
TIPS	600,312,931	5.02	5.00
Securitized Debt	123,339,524	1.03	1.00
REITs	693,463,379	5.80	6.00
Hedge Funds	710,307,017	5.94	6.00
Opportunistic	12,335,866	0.10	0.10
Risk Parity	580,779,025	4.86	5.00
GTAA	244,066,980	2.04	2.00
Commodities	233,706,426	1.95	2.00
Cash Equivalents	55,202,080	0.46	0.00
Rebalancing	133,814,738	1.12	0.00
Total Fund	11,954,347,185	100.00	100.00

**MPT Stats**

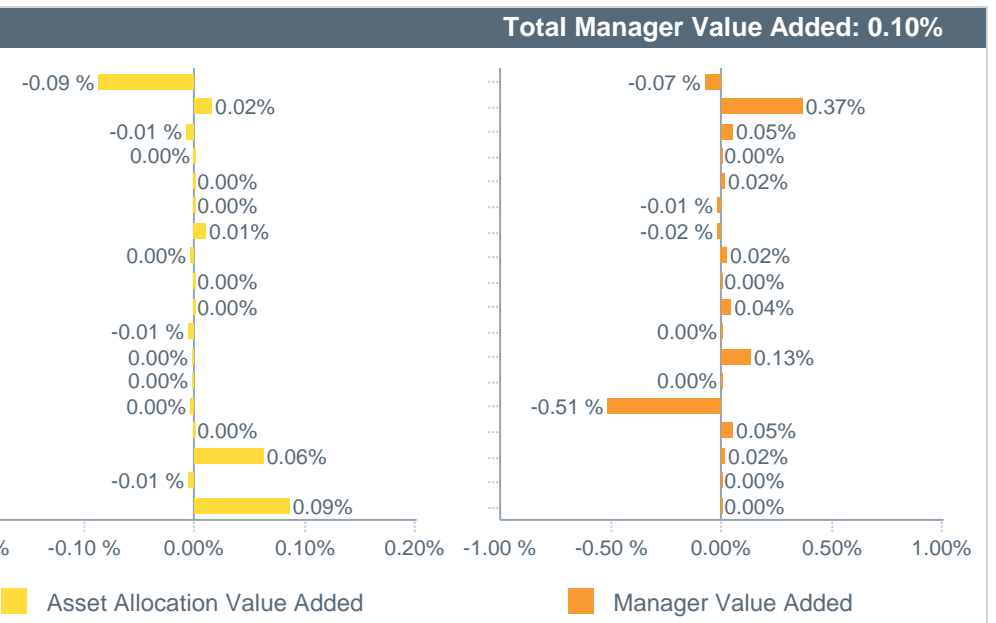
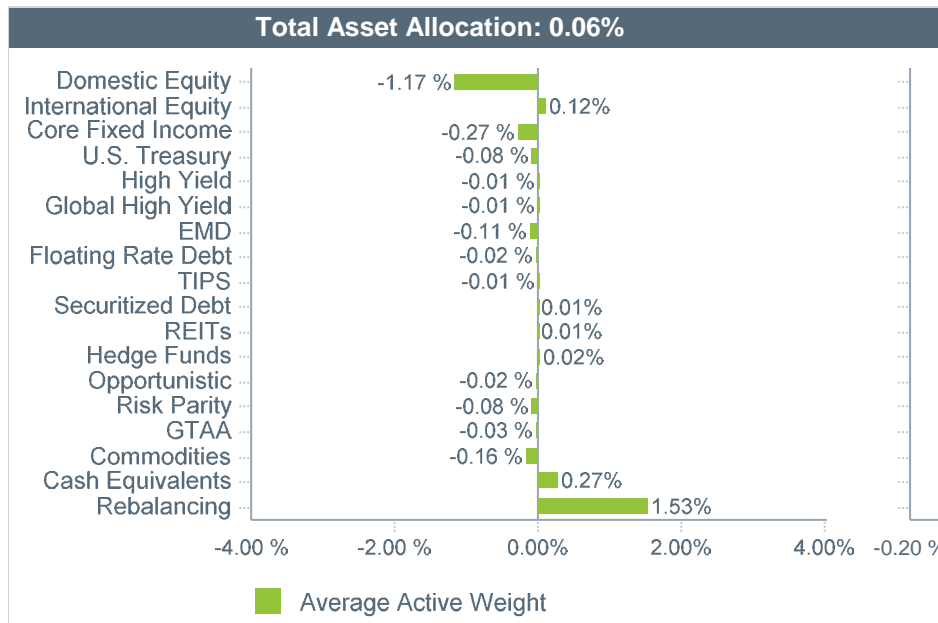
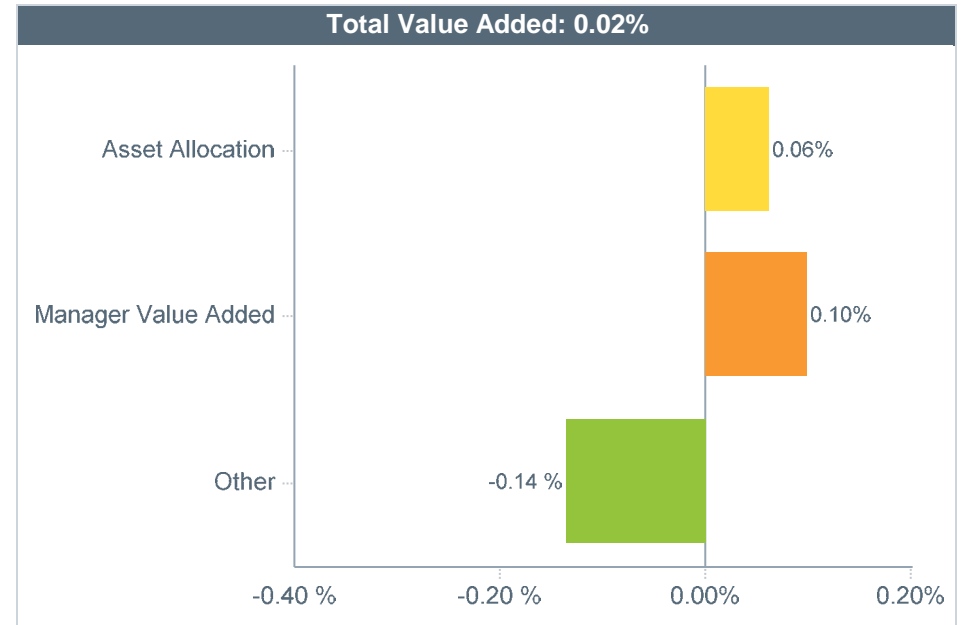
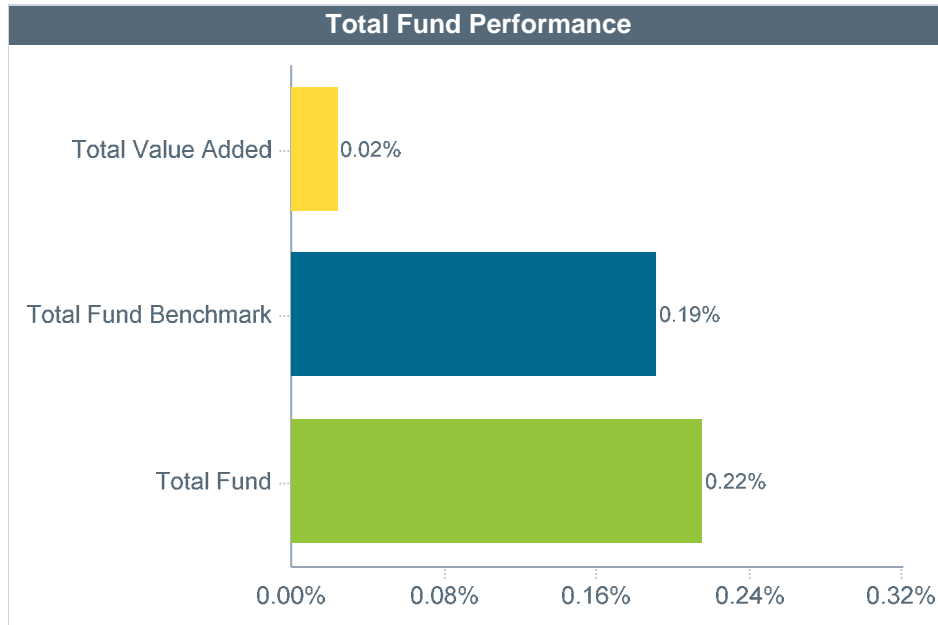
	5 Years	10 Years
Maximum Return	10.07	12.96
Standard Deviation	8.86	11.07
Minimum Return	-10.71	-14.68
vs. PERS (HC) Total Fund Benchmark		
Info Ratio	1.10	0.12
Tracking Error	0.39	0.80
Alpha	0.31	0.10
vs. S&P 500 Index (Cap Wtd)		
Beta	0.65	0.66
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.08	0.48

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.





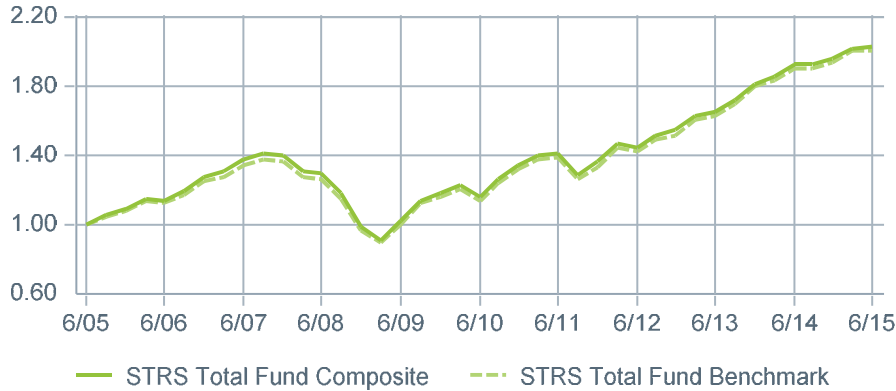
Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.



**Summary**

- STRS has earned a return of 1.5% for each unit of risk over the trailing 5-year period and 0.6% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, the plan has exhibited stronger up-market and down-market capture characteristics over the past ten years.

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



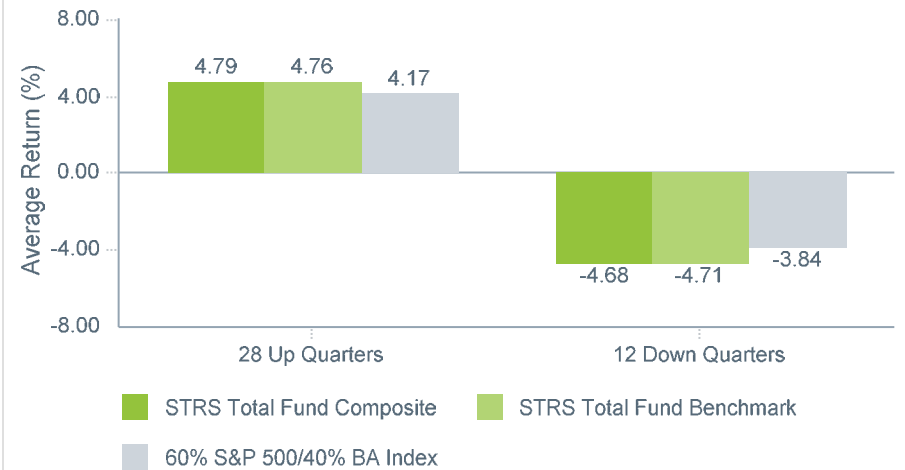
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	22,638,635,453	30.52	31.00
International Equity	19,177,007,778	25.85	26.00
Fixed Income	13,685,277,744	18.45	18.00
Real Estate	7,584,287,969	10.23	10.00
Opportunistic (Incl. Hedge Funds)	4,725,619,509	6.37	7.00
Private Equity	4,672,467,139	6.30	7.00
Cash Equivalents	1,689,359,238	2.28	1.00
<b>Total Fund</b>	<b>74,172,654,830</b>	<b>100.00</b>	<b>100.00</b>

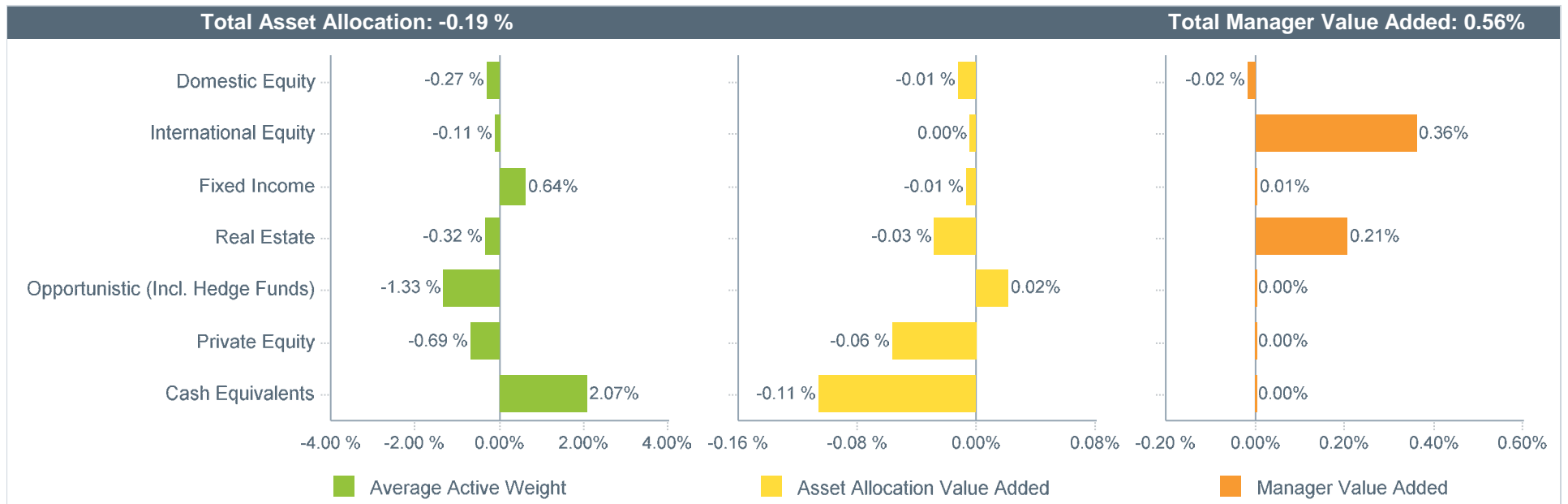
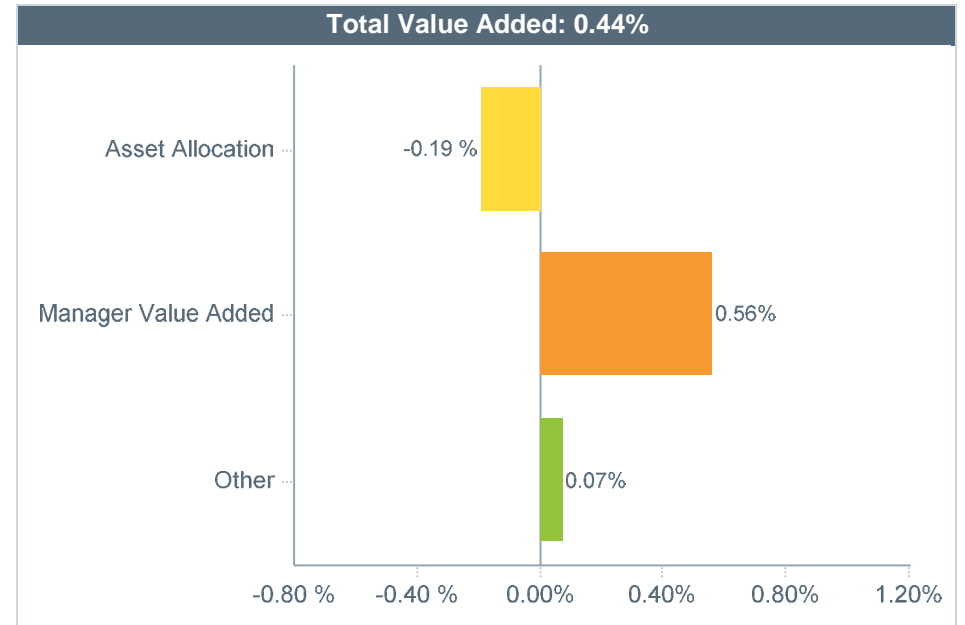
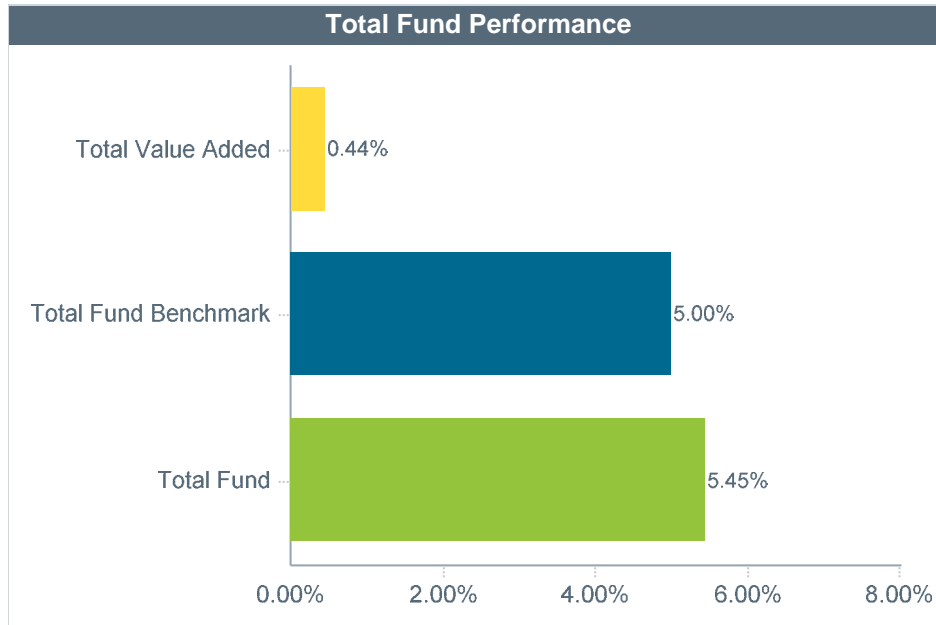
**MPT Stats**

	5 Years	10 Years
Maximum Return	8.86	12.25
Minimum Return	-8.92	-15.99
Standard Deviation	7.55	11.34
vs. STRS Total Fund Benchmark		
Info Ratio	-0.14	0.16
Tracking Error	0.54	0.71
Alpha	0.55	0.16
vs. S&P 500 Index (Cap Wtd)		
Beta	0.58	0.68
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.54	0.56

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.

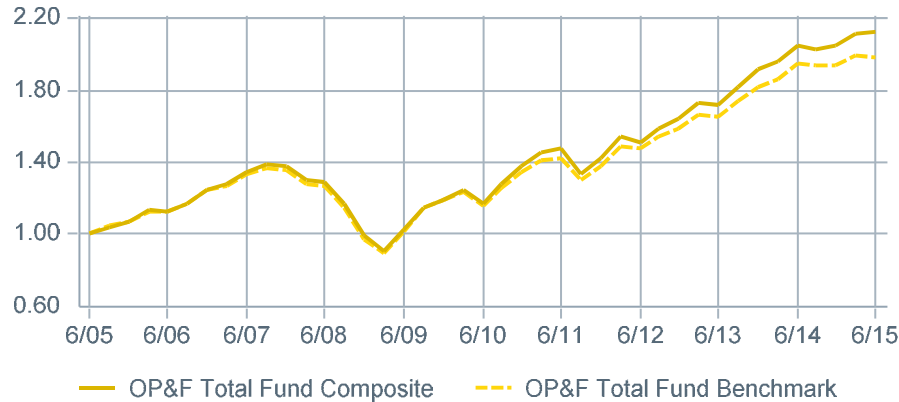


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

**Summary**

- OP&F has earned a return of 1.5% for each unit of risk over the trailing 5-year period and 0.6% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, the plan has exhibited stronger up-market and down-market capture characteristics over the past ten years.

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



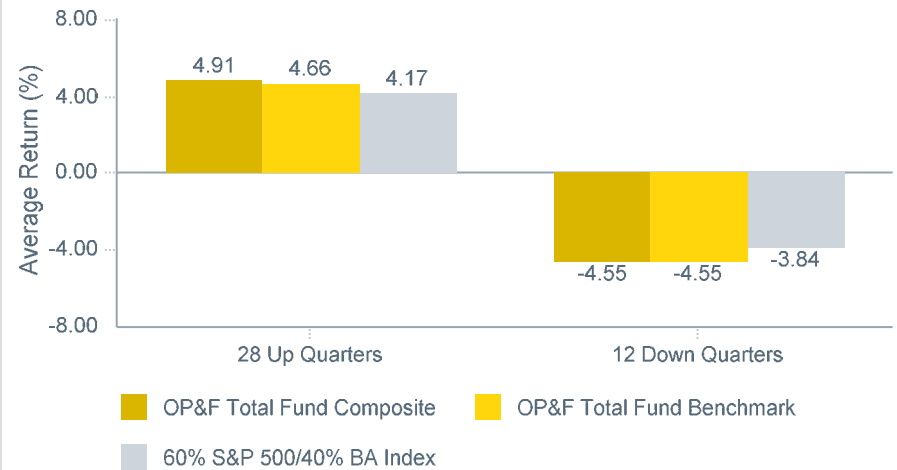
**MPT Stats**

	5 Years	10 Years
Maximum Return	10.07	13.00
Minimum Return	-9.75	-15.45
Standard Deviation	8.57	11.64
vs. OP&F Total Fund Benchmark		
Info Ratio	1.20	0.69
Tracking Error	1.01	1.02
Alpha	0.21	0.59
vs. S&P 500 Index (Cap Wtd)		
Beta	0.64	0.70
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.45	0.59

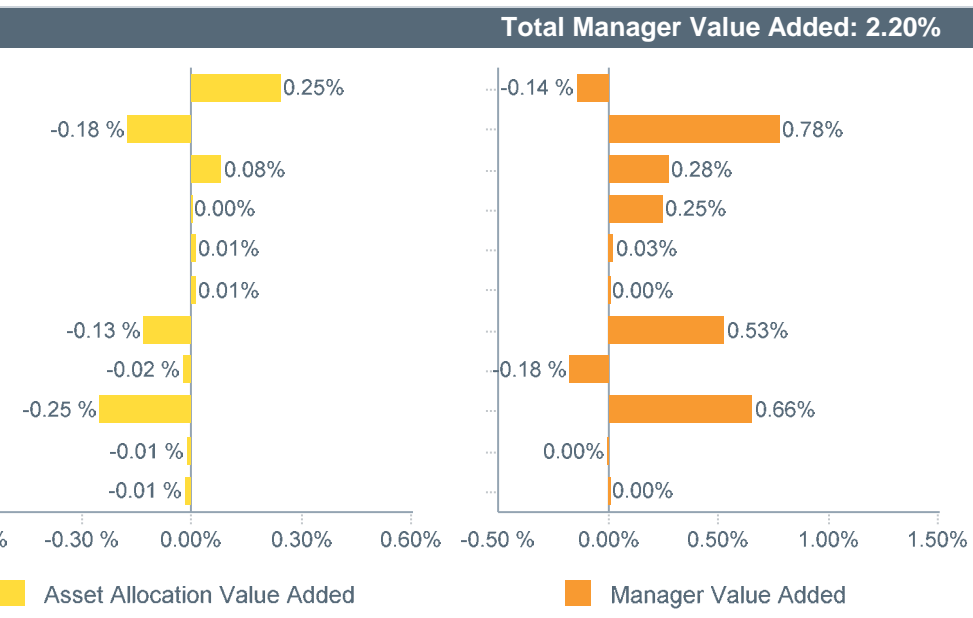
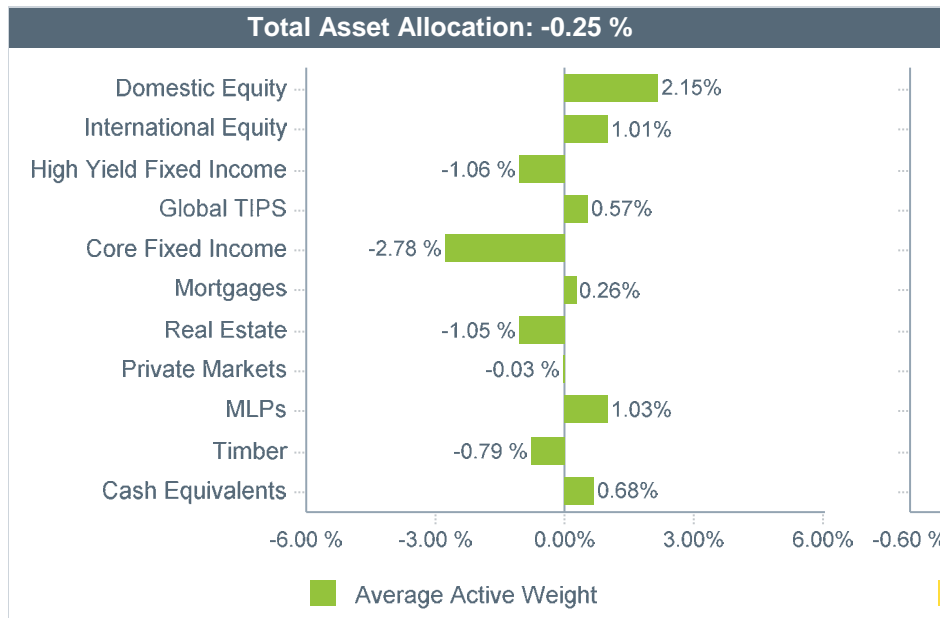
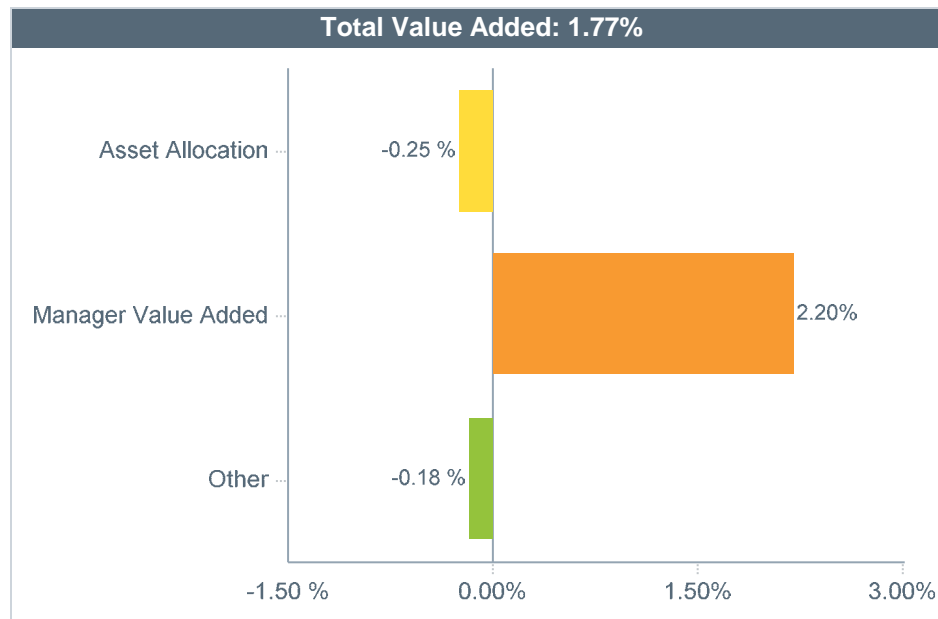
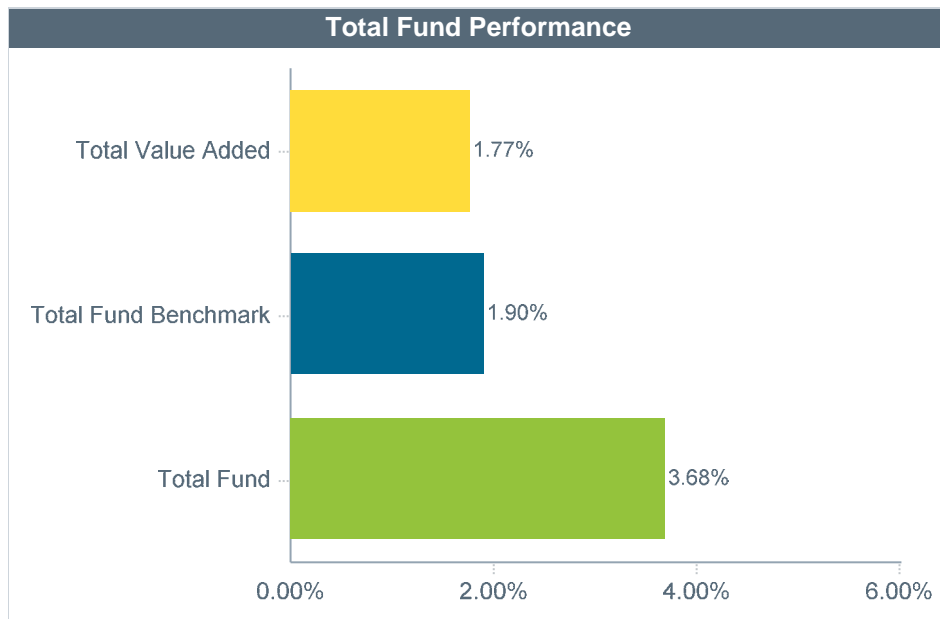
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	3,452,327,971	23.76	24.00
International Equity	3,361,652,274	23.14	23.00
High Yield Fixed Income	1,844,400,604	12.70	12.00
Global TIPS	1,091,241,433	7.51	7.00
Core Fixed Income	1,367,626,802	9.41	12.00
Mortgages	37,913,654	0.26	0.00
Real Estate	1,454,960,099	10.02	10.00
Private Markets	760,819,813	5.24	5.00
MLPs	888,839,624	6.12	6.00
Timber	217,688,682	1.50	1.00
Cash Equivalents	49,477,635	0.34	0.00
Total Fund	14,526,948,590	100.00	100.00

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.

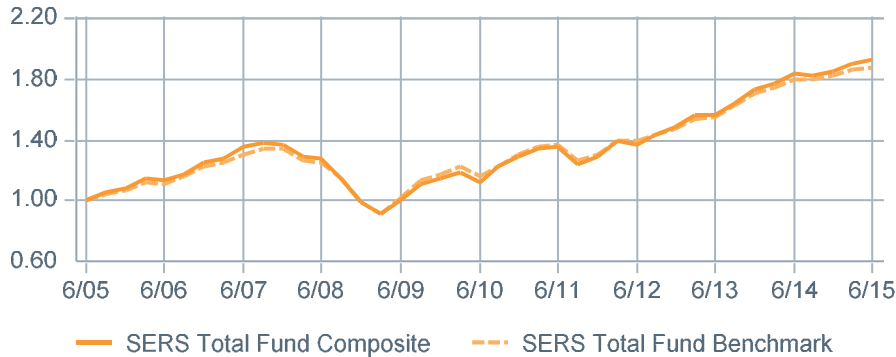


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

**Summary**

- SERS has earned a return of 1.4% for each unit of risk over the trailing 5-year period and 0.5% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, SERS has exhibited similar up-market and larger down-market capture characteristics over the past ten years.

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



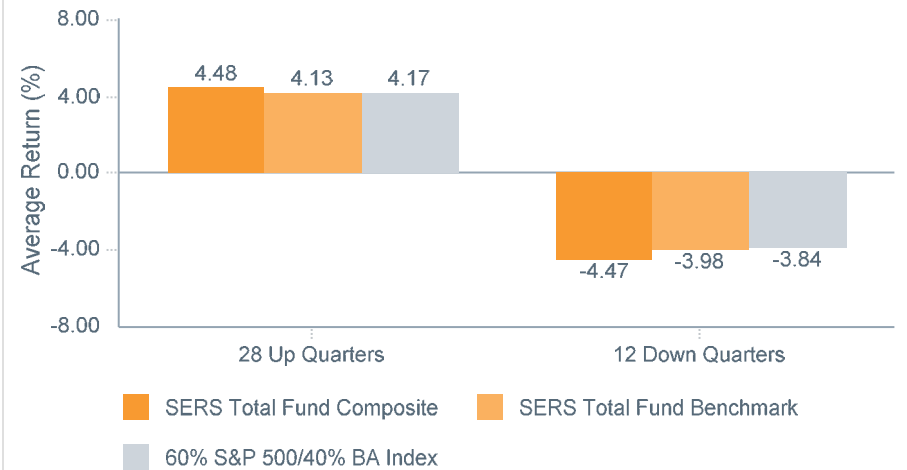
**MPT Stats**

	5 Years	10 Years
Maximum Return	8.54	11.01
Minimum Return	-9.12	-13.65
Standard Deviation	7.73	10.84
vs. SERS Total Fund Benchmark		
Info Ratio	0.66	0.21
Tracking Error	2.01	1.81
Alpha	-0.88	-0.17
vs. S&P 500 Index (Cap Wtd)		
Beta	0.58	0.64
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.44	0.53

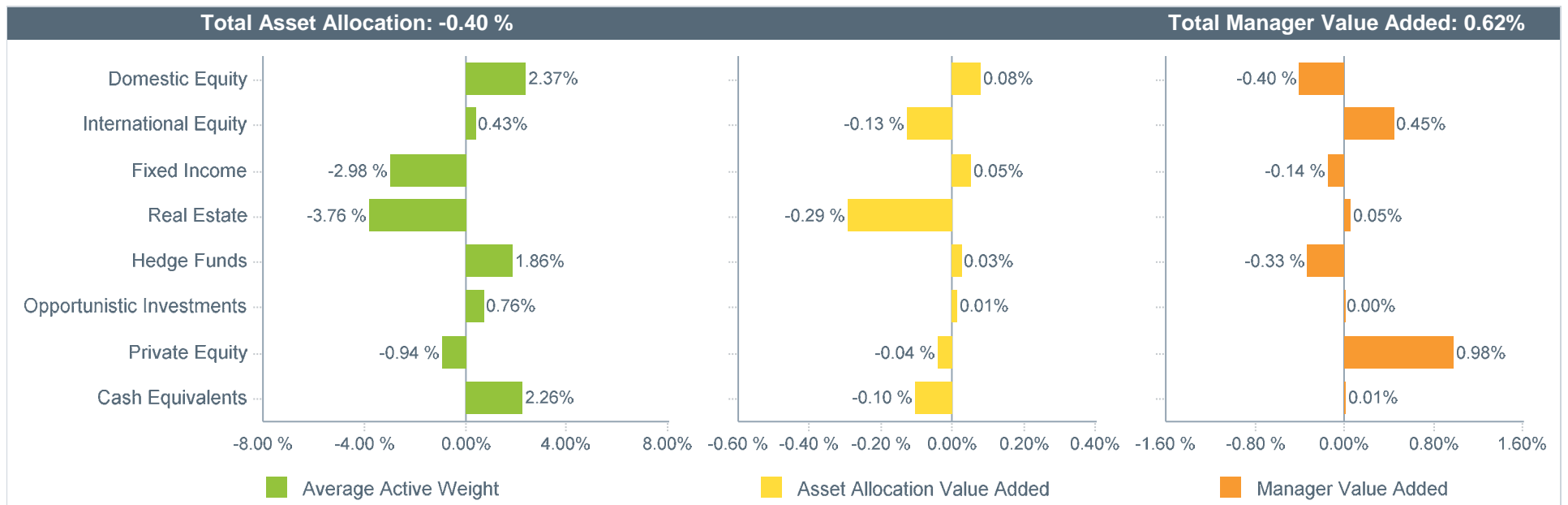
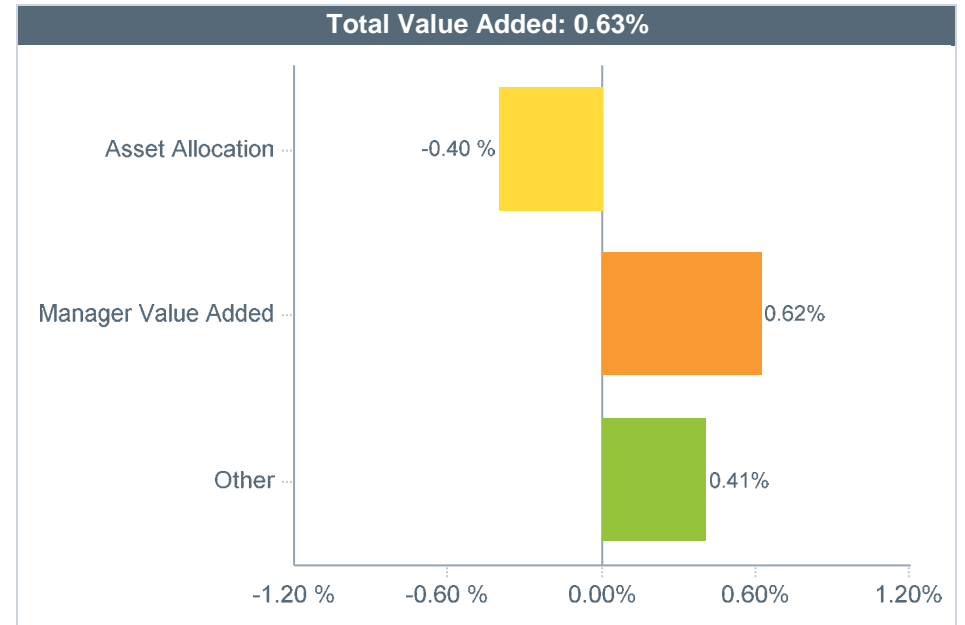
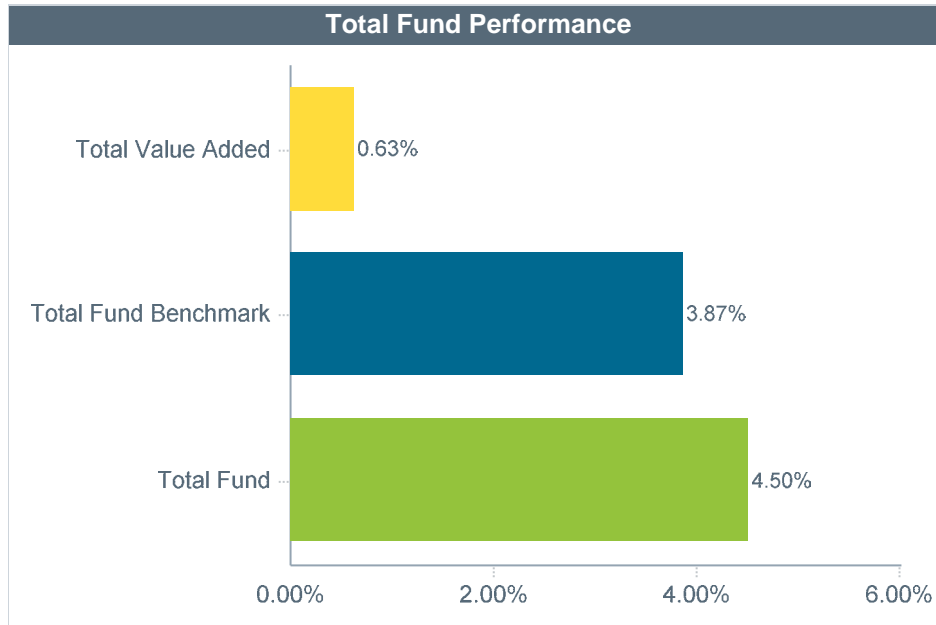
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	2,970,411,666	23.16	22.50
International Equity	3,096,646,417	24.15	22.50
Fixed Income	1,915,065,853	14.93	19.00
Real Estate	1,593,033,579	12.42	12.00
Hedge Funds	1,476,967,319	11.52	13.00
Opportunistic Investments	219,766,545	1.71	0.00
Private Equity	1,143,672,335	8.92	10.00
Cash Equivalents	408,233,280	3.18	1.00
Total Fund	12,823,796,994	100.00	100.00

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.



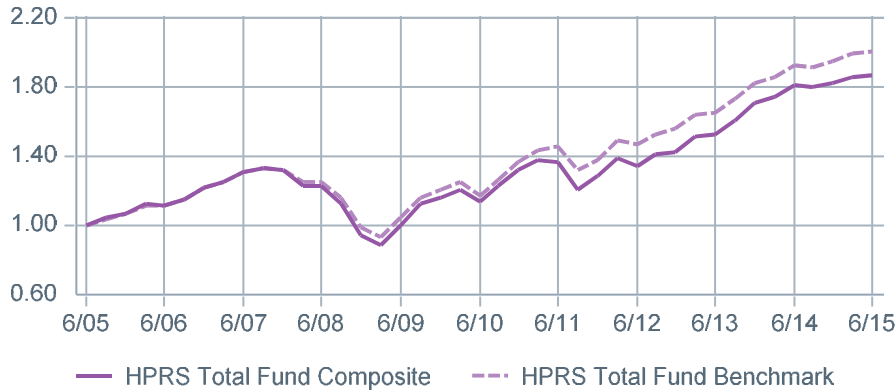
Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.



**Summary**

- HPRS has earned a return of 1.2% for each unit of risk over the trailing 5-year period and 0.5% for each unit of risk over the trailing 10-year period.
- Relative to a US 60 Equity/40 Bonds, the total portfolio has exhibited similar up-market capture and larger down-market capture characteristics over the past ten years.

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



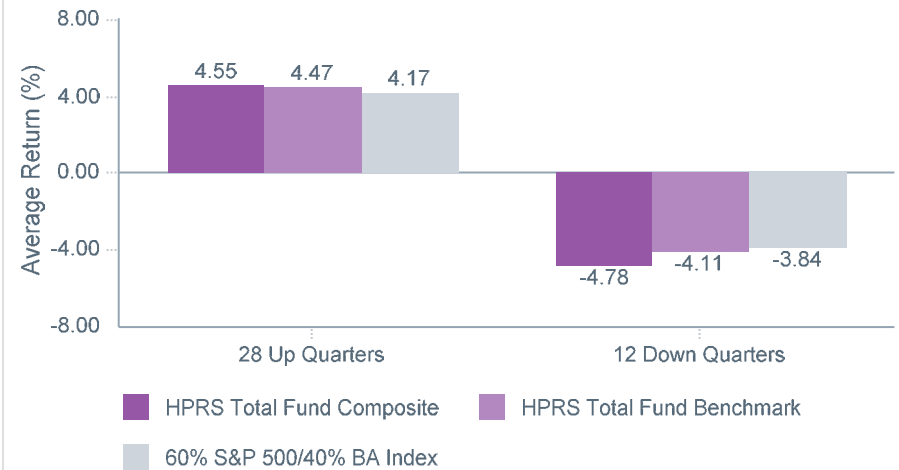
**Asset Allocation vs. Targets**

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	297,262,087	34.91	35.00
International Equity	169,882,005	19.95	20.00
Fixed Income	169,295,112	19.88	22.50
Real Estate	34,033,272	4.00	5.00
Hedge Funds	87,121,894	10.23	12.50
Private Equity	85,996,646	10.10	5.00
Cash Equivalents	7,978,741	0.94	0.00
Total Fund	851,569,757	100.00	100.00

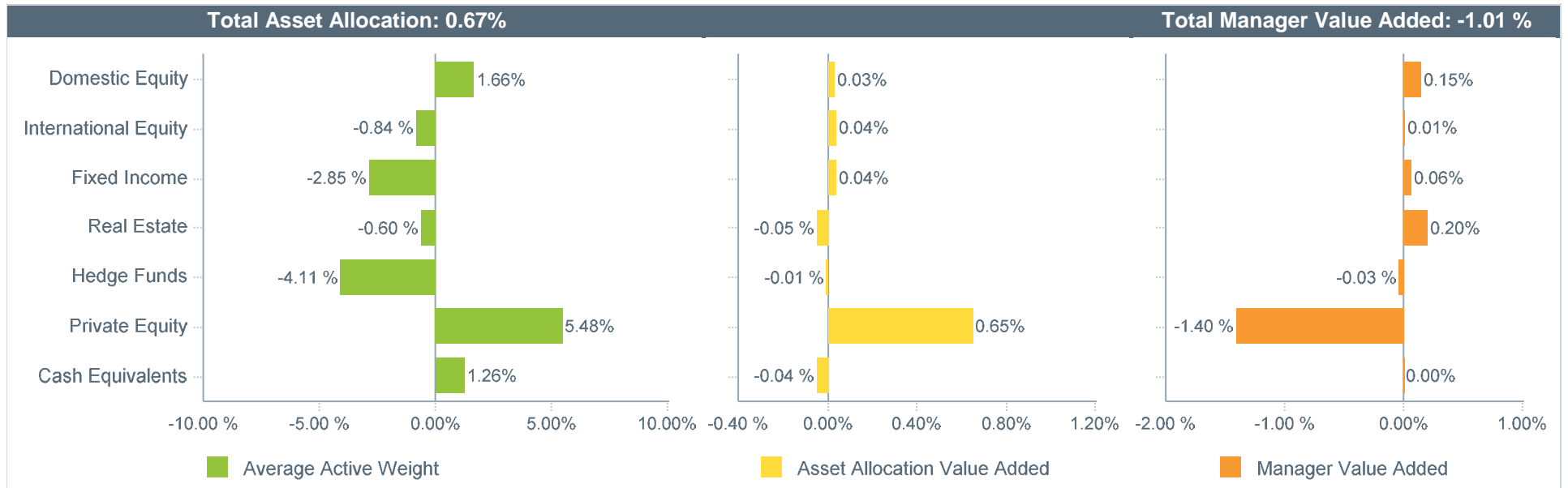
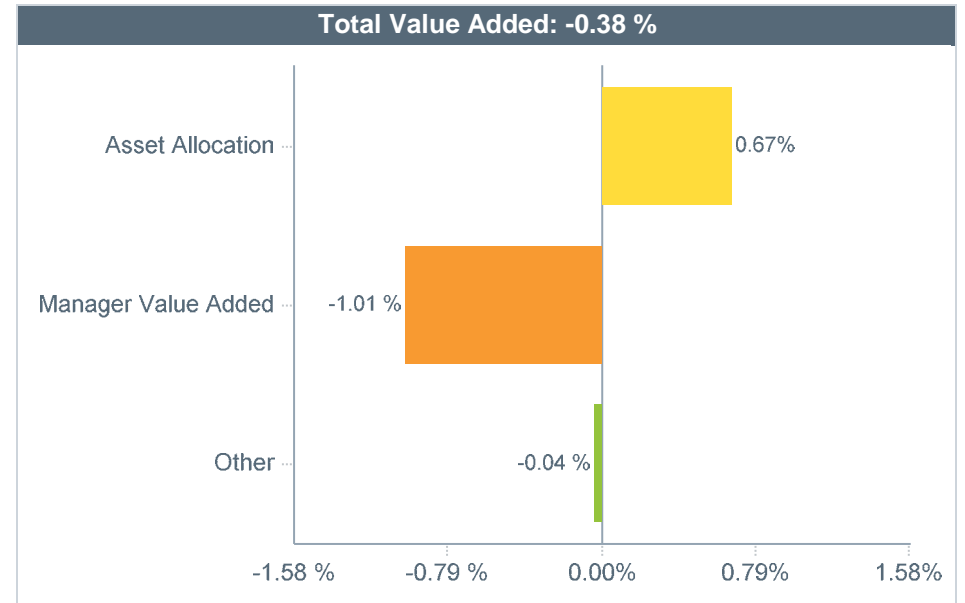
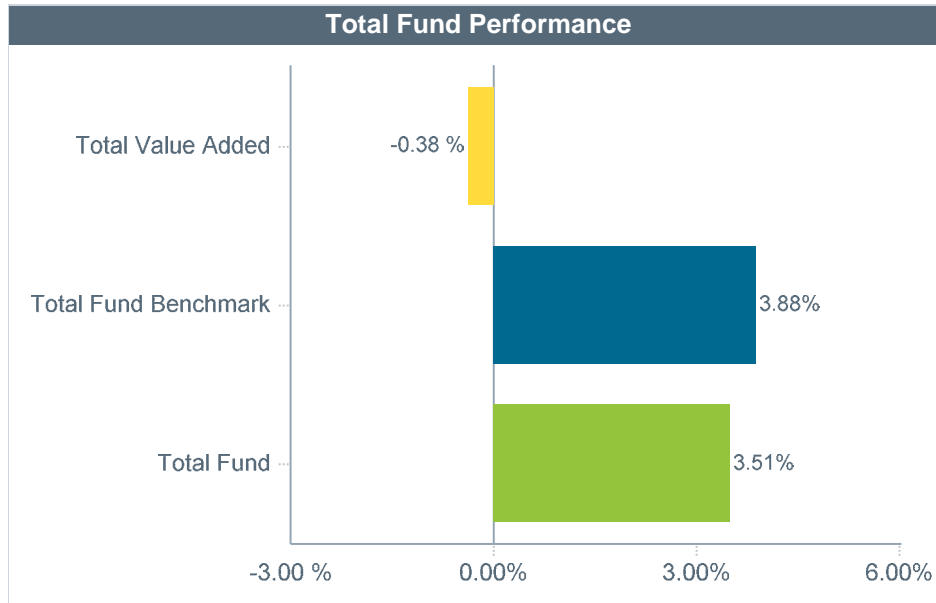
**MPT Stats**

	5 Years	10 Years
Maximum Return	8.19	12.56
Minimum Return	-11.24	-16.16
Standard Deviation	8.82	11.52
vs. HPRS Total Fund Benchmark		
Info Ratio	-0.34	-0.34
Tracking Error	1.81	1.67
Alpha	-2.12	-1.23
vs. S&P 500 Index (Cap Wtd)		
Beta	0.69	0.70
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.18	0.48

**Up/Down Markets - 10 Years**



Performance shown is gross of fees. Calculations are based on quarterly periodicity.



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 June 30, 2015

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>HPRS</b>	<b>851,570</b>	<b>2.70</b>	<b>3.51</b>	<b>11.57</b>	<b>10.48</b>	<b>6.21</b>	<b>6.47</b>	<b>6.73</b>	<b>19.59</b>	<b>11.45</b>	<b>-2.85</b>
HPRS Total Fund Benchmark		2.73	3.96	10.95	11.25	6.94	7.19	7.03	16.79	13.07	1.20
Difference		-0.03	-0.45	0.62	-0.77	-0.73	-0.72	-0.30	2.80	-1.62	-4.05
<i>All Public Plans &gt; \$1B-TF Median</i>		2.69	2.95	10.55	10.69	6.53	6.88	6.57	15.84	13.37	0.77
Rank		50	33	23	57	65	72	47	8	90	99
Population		82	82	77	75	73	70	88	84	86	90
<i>All Public Plans \$250M to \$1B-TF Median</i>		2.42	3.14	11.10	11.20	6.59	6.68	6.35	16.37	12.91	0.89
Rank		39	40	40	73	67	57	38	19	84	100
Population		38	38	37	35	34	30	52	57	55	55

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

**Summary**

- PERS (HC 115) was formed in October of 2014 and has a performance inception date of January 2015.
- PERS (HC 115) has adopted the same asset allocation policy as PERS (HC).

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>PERS (HC 115) Total Fund</b>	<b>399,488</b>	<b>1.65</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>	<b>N/A</b>
PERS (HC 115) Total Fund Benchmark		1.45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>All Public Plans \$250M to \$1B-TF Median</i>		2.52	3.33	11.10	11.18	6.68	6.49	6.35	16.37	12.91	0.89
Rank		83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Population		54	54	53	50	49	42	52	57	55	55
<b>PERS (HC 115) Domestic Equity</b>	<b>95,292</b>	<b>2.23</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>	<b>N/A</b>
Russell 3000 Index		1.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) International Equity</b>	<b>83,059</b>	<b>4.74</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>	<b>N/A</b>
PERS (HC 115) International Equity Custom Benchmark		4.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Core Fixed Income</b>	<b>66,596</b>	<b>0.10</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>	<b>N/A</b>
PERS (HC 115) Core Fixed Income Custom Benchmark		-0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) U.S. Treasury</b>	<b>4,065</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>	<b>N/A</b>	<b>N/A</b>
Barclays US Trsy Index		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) EMD</b>	<b>24,240</b>	<b>-0.97</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>	<b>N/A</b>
PERS (HC 115) EMD Custom Benchmark		-1.59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) High Yield</b>	<b>10,105</b>	<b>3.14</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>	<b>N/A</b>
Barclays U.S. High Yield Index		2.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Floating Rate Debt</b>	<b>2,432</b>	<b>3.34</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>	<b>N/A</b>
CS Lvg'd Loan Index		2.87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.47	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>	<b>4,043</b>	<b>4.45</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>	<b>N/A</b>
Barclays CMBS Index + 2%		1.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		3.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Ohio Retirement Study Council  
**PERS (HC 115) Performance & Asset Allocation**

As of June 30, 2015

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
<b>PERS (HC 115) TIPS</b>	<b>20,314</b>	<b>0.34</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>	<b>N/A</b>
Barclays U.S. TIPS Index		0.34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Global High Yield</b>	<b>6,040</b>	<b>1.16</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>	<b>N/A</b>
Barclays Gbl Hig Yld Index		1.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-0.78	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) REITs</b>	<b>23,326</b>	<b>-5.66</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>	<b>N/A</b>
DJ US Select Real Estate Securities TR Index		-5.69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Hedge Funds</b>	<b>24,140</b>	<b>2.38</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>	<b>N/A</b>
PERS (HC 115) Hedge Funds Custom Benchmark		2.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Opportunistic</b>	<b>407</b>	<b>0.12</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>	<b>N/A</b>
PERS (HC 115) Opportunistic Custom Benchmark		0.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Commodities</b>	<b>8,129</b>	<b>0.05</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>	<b>N/A</b>
S&P Goldman Sachs Commodity Index		-0.21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) Risk Parity</b>	<b>19,378</b>	<b>0.44</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>	<b>N/A</b>
PERS (HC 115) Risk Parity Custom Benchmark		1.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-1.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>PERS (HC 115) GTAA</b>	<b>7,920</b>	<b>2.45</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>	<b>N/A</b>
PERS (HC 115) GTAA Custom Benchmark		1.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		1.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Ohio Retirement Study Council  
**PERS (HC 115) Asset Allocation vs. Targets**

As of June 30, 2015

	Market Value (\$)	Allocation (%)	Target (%)
Domestic Equity	95,292,493	23.85	24.10
International Equity	83,059,239	20.79	20.80
Core Fixed Income	66,596,286	16.67	16.40
U.S. Treasury	4,065,097	1.02	1.00
High Yield	10,105,124	2.53	2.50
Global High Yield	6,039,970	1.51	1.50
EMD	24,240,240	6.07	6.00
Floating Rate Debt	2,432,033	0.61	0.60
TIPS	20,314,079	5.09	5.00
Securitized Debt	4,042,830	1.01	1.00
REITs	23,326,139	5.84	6.00
Hedge Funds	24,140,423	6.04	6.00
Opportunistic	407,060	0.10	0.10
Risk Parity	19,378,177	4.85	5.00
GTAA	7,919,543	1.98	2.00
Commodities	8,129,046	2.03	2.00
Cash Equivalents	136	0.00	0.00
Total Fund	399,487,914	100.00	100.00

Allocations shown may not sum up to 100% exactly due to rounding.

## 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.

### Asset Class Fee Comparison – as of 06/30/2015

(annualized fees shown in basis points)							
	Domestic Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	8	27	30	61	34	34	106
■ PERS (HC)	2	5	7	0	6	-	13
■ PERS (HC 115)	0.1	0.2	0.2	0	0.1	-	0.2
■ STRS	10	19	8	47	82	72	192
■ OP&F	34	30	47	254	-	200	-
■ SERS	31	34	23	100	74	65	137
■ HPRS	33	62	44	134	101	98	103

- Fees for Private Equity are based on committed capital, with the exception of OP&F, which is based on AUM.
- Fees for PERS (DB), PERS (HC) and PERS (HC 115) are based on six month estimates multiplied by two.
- PERS (DB), PERS (HC), and PERS (HC) Alternatives include risk parity and GTAA.
- STRS Alternatives include Private Equity and Opportunistic/Diversified Investments (Incl. Hedge Funds).
- SERS Alternatives include only opportunistic investments. These fees reflect the current ramp-up period, with fees assessed on commitments and not AUM.
- HPRS Alternatives fees include Private Equity and Hedge Funds.



## Appendix

### Percentage of Assets Managed by External Managers – as of 06/30/2015

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	65%	21%	78%	44%	100%	86%	100%	100%
■ PERS (HC)	49%	21%	78%	44%	0%	77%	-	100%
■ PERS (HC 115)	50%	21%	78%	44%	0%	76%	-	100%
■ STRS	28%	10%	43%	15%	13%	84%	96%	100%
■ OP&F	100%	100%	100%	100%	100%	100%	100%	-
■ SERS	97%	100%	100%	100%	100%	100%	100%	100%
■ HPRS	100%	100%	100%	100%	100%	100%	100%	100%

- PERS (DB), PERS (HC) and PERS (HC 115) Alternatives include Risk Parity and GTAA, Commodities and Opportunistic.
- STRS Alternatives include Private Equity and Opportunistic/Diversified Investments (Incl. Hedge Funds).
- OP&F Alternatives include Timber and MLPs.
- SERS has one internally managed Cash mandate.
- HPRS Alternatives include Private Equity and Hedge Funds.

### Percentage of Actively Managed Assets – as of 06/30/2015

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	91%	34%	78%	100%	100%	100%	100%	100%
■ PERS (HC)	84%	34%	78%	100%	0%	100%	-	100%
■ PERS (HC 115)	85%	34%	78%	100%	0%	100%	-	100%
■ STRS	87%	62%	100%	100%	86%	100%	100%	100%
■ OP&F	87%	54%	100%	100%	100%	100%	100%	-
■ SERS	78%	49%	60%	100%	96%	100%	100%	100%
■ HPRS	77%	50%	73%	100%	100%	100%	100%	100%

- PERS (DB), PERS (HC) and PERS (HC 115) Alternatives include Risk Parity, GTAA, Commodities and Opportunistic.
- STRS Alternatives include Private Equity and Opportunistic/Diversified Investments (Incl. Hedge Funds).
- OP&F Alternatives include Timber and MLPs.
- HPRS Alternatives include Private Equity and Hedge Funds.

## Custom Benchmark Glossary

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

- 22.1% Russell 3000 Index
- 18.8% PERS (DB) International Equity Custom Benchmark
- 9.4% PERS (DB) Core Fixed Income Custom Benchmark
- 1% Barclays U.S. Treasury Index
- 1% Barclays U.S. TIPS Index
- 6% PERS (DB) EMD Custom Benchmark
- 0.6% CS Leveraged Loan Index
- 1% Barclays CMBS + 2%
- 3% Barclays U.S. High Yield Index
- 1% Barclays Global High Yield Index
- 10% PERS (DB) Private Equity Custom Benchmark
- 10% NFI-ODCE Index (Net) + 0.85% (1 Quarter Lag)
- 8% PERS (DB) Hedge Funds Custom Benchmark
- 0.1% PERS (DB) Opportunistic Custom Benchmark
- 1% S&P Goldman Sachs Commodity Index (TR)
- 5% PERS (DB) Risk Parity Custom Benchmark
- 2% PERS (DB) GTAA Custom Benchmark

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

- 24.1% Russell 3000 Index
- 20.8% PERS (HC) International Equity Custom Benchmark
- 16.4% PERS (HC) Core Fixed Income Custom Benchmark
- 1% Barclays U.S. Treasury Index
- 5% Barclays U.S. TIPS Index
- 6% PERS (HC) EMD Custom Benchmark
- 0.6% CS Leveraged Loan Index
- 1% Barclays CMBS + 2%
- 2.5% Barclays U.S. High Yield Index
- 1.5% Barclays Global High Yield Index
- 6% Dow Jones U.S. Select Real Estate Securities TR Index
- 6% PERS (HC) Hedge Funds Custom Benchmark
- 0.1% PERS (HC) Opportunistic Custom Benchmark
- 2% S&P Goldman Sachs Commodity Index (TR)
- 5% PERS (HC) Risk Parity Custom Benchmark
- 2% PERS (HC) GTAA Custom Benchmark

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

- Composition and target percentages are identical to the PERS (HC) Total Fund Custom Benchmark.
  - Sub-composite custom benchmarks are identical to PERS (HC) sub-composite custom benchmarks.

### STRS Total Fund Custom Benchmark:

- 31% Russell 3000 Index
- 20.8% MSCI World Ex US Index (50% Hedged)
- 5.2% MSCI Emerging Markets Index
- 18% Barclays US Universal Index
- 10% STRS Custom Real Estate Benchmark
- 7% Opportunistic Composite Performance
- 7% Private Equity Composite Performance
- 1% BofA ML 3 Mo US T-Bill Index

### OP&F Total Fund Custom Benchmark:

- 24% Wilshire 5000 Index
- 23% MSCI ACW Ex US IMI Index (Net)
- 12% Barclays US Aggregate Bond Index
- 12% CS High Yield Dev. Countries Only Index
- 10% NCREIF ODCE (Net) (1 Quarter Lag)
- 5% Wilshire 5000 + 3% (1 Quarter Lag)
- 1% CPI + 5%
- 6% Alerian MLP Index
- 7% Bridgewater Custom GIPS Index

### SERS Total Fund Custom Benchmark:

- 22.5% Russell 3000 Index
- 22.5% MSCI ACWI Ex US (Net) Index
- 19% Barclays US Aggregate Bond Index
- 12% NCREIF Property Index (1 Quarter Lag)
- 13% HFRI FOF Composite Index + 1%
- 10% Burgiss All Private Equity (1 Quarter Lag)
- 1% Citigroup 30 Day T-Bill Index

### HPRS Total Fund Custom Benchmark:

- 35% Russell 3000 Index
- 20% MSCI ACWI Ex US Index
- 22.5% Barclays US Aggregate Bond Index
- 5% NCREIF Index
- 12.5% HFRI FOF Composite Index
- 5% Wilshire 5000 + 3% (1 Quarter Lag)

## 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:**

- Barclays Capital Aggregate Index weightings with a maximum allocation to treasuries and government-related issues of 25% with corresponding pro-rata increases to the credit and securitized sectors

### **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) Private Equity Custom Benchmark:**

- 60% Russell 3000 Index
- 40% MSCI ACWI Ex US IMI + 300 basis points

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

- 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) 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) Core Fixed Income Custom Benchmark:**

- Barclays Capital Aggregate Index weightings with a maximum allocation to treasuries and government-related issues of 25% with corresponding pro-rata increases to the credit and securitized sectors

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

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

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

- The minimum of 700 basis points or 3-month LIBOR plus 400 basis points

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

- The market weight of underlying portfolio benchmarks

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

- The market weight of underlying portfolio benchmarks

### **PERS (HC) 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%

### **SERS International Equity Custom Benchmark:**

- MSCI ACWI ex-US (Net) Index
- 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 Private Equity Custom Benchmark:**

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

## 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

**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.



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