



Ohio Retirement Study Council

Investment Performance Analysis

Period Ended: December 31, 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.

Fourth Quarter Economic Environment

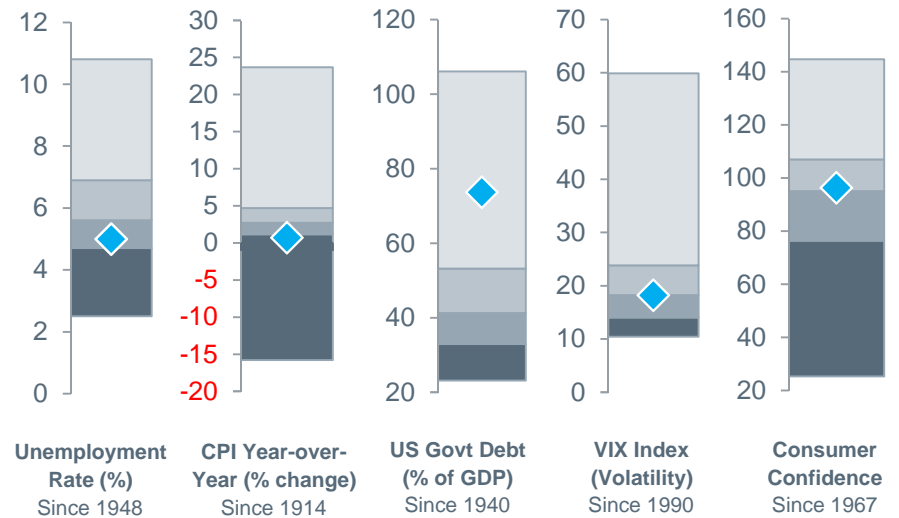
Key Economic Indicators

World equity markets rallied in October following a period of heightened volatility during the prior quarter. Positive price momentum proved to be short lived, however, as most markets gave back a significant portion of early gains by quarter's end. Headwinds included substantial US Dollar strengthening, diverging central bank monetary policies, commodity market dislocations, and emerging market asset volatility. World equity, bond, and commodity markets each ended the year in negative territory, with commodities and emerging market equities suffering the largest declines. In a move that was widely anticipated, the FOMC voted to raise the benchmark Federal Funds rate by 25 basis points during its December meeting. In Europe, Mario Draghi and the European Central Bank (ECB) expanded monetary stimulus measures. In China, pressure on foreign exchange reserves driven by the US Dollar peg led the People's Bank of China (PBoC) to formally adjust its currency management strategy, shifting to a trade-weighted basket of currencies to manage the value of the Yuan.

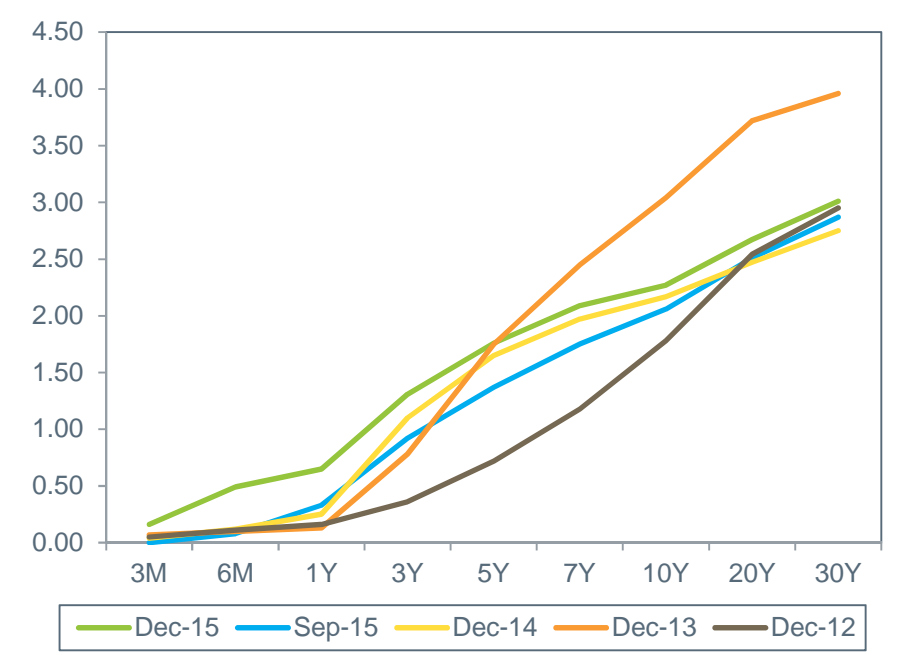
Economic Indicators	Dec-15	Sep-15	Dec-14	Dec-12	20 Yr
Federal Funds Rate (%)	0.20 ▲	0.07	0.06	0.09	2.60
Breakeven Infl. - 1 Yr (%)	0.85 ▲	-1.75	-0.21	1.31	N/A
Breakeven Infl. - 10 Yr (%)	1.58 ▲	1.43	1.68	2.45	N/A
CPI YoY (Headline) (%)	0.7 ▲	0.0	1.7	2.0	2.2
Unemployment Rate (%)	5.0 ▼	5.1	6.0	7.8	6.0
Real GDP YoY (%)	1.9 ▼	2.1	2.9	2.4	2.4
PMI - Manufacturing	48.00 ▼	50.00	55.80	51.80	52.10
USD Total Wtd Idx	94.46 ▲	92.32	85.13	73.54	86.65
WTI Crude Oil per Barrel (\$)	37 ▼	45	53	92	55
Gold Spot per Oz (\$)	1,061 ▼	1,115	1,185	1,675	741

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	7.04	1.38	1.38	12.57	7.31
Russell 2000	3.59	-4.41	-4.41	9.18	6.80
MSCI EAFE (Net)	4.71	-0.81	-0.81	3.60	3.03
MSCI EAFE SC (Net)	6.79	9.59	9.59	6.32	4.55
MSCI Emg Mkts (Net)	0.66	-14.92	-14.92	-4.80	3.62
Barclays US Agg Bond	-0.57	0.55	0.55	3.25	4.52
BofA ML 3 Mo US T-Bill	0.03	0.05	0.05	0.07	1.24
NCREIF ODCE (Gross)	3.34	15.01	15.01	13.66	6.53
Wilshire US REIT	7.47	4.23	4.23	12.44	7.31
HFN FOF Multi-Strat	0.17	-1.24	-1.24	1.90	1.95
Bloomberg Comdty (TR)	-10.52	-24.66	-24.66	-13.47	-6.43

Key Economic Indicators



Treasury Yield Curve (%)



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

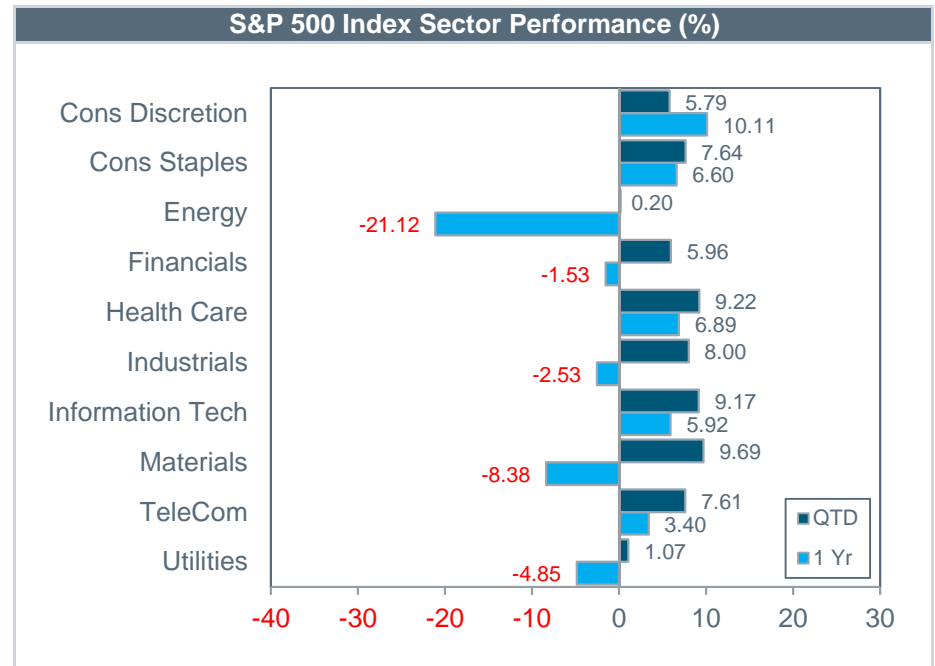
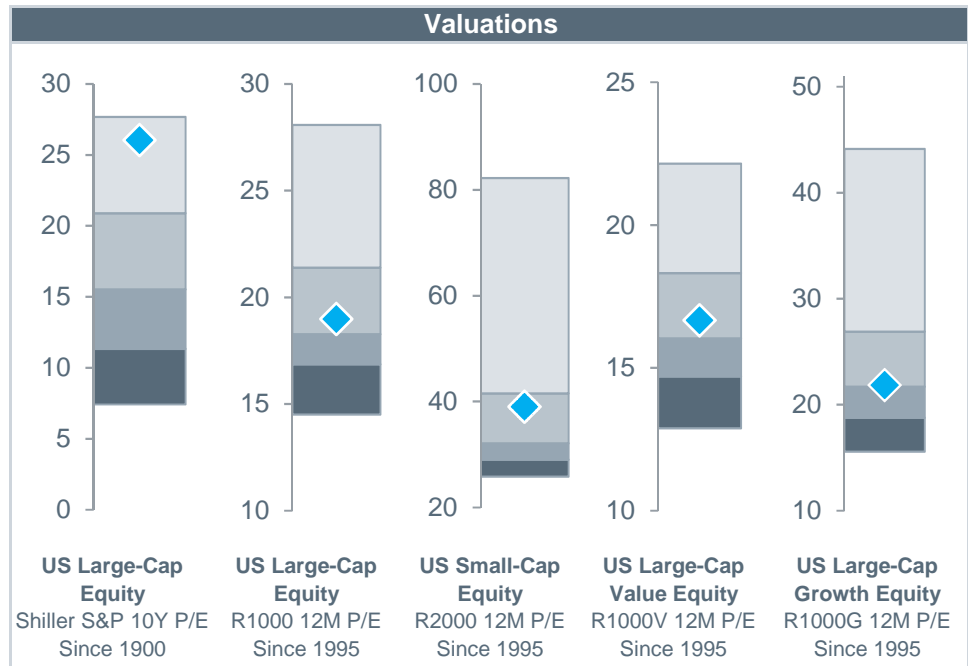
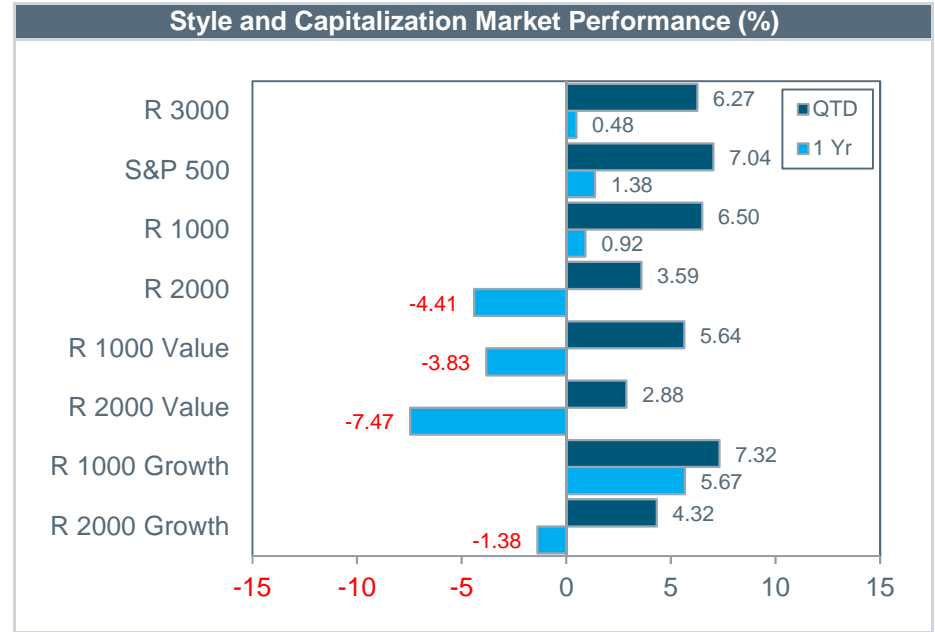


Fourth Quarter Review

Broad Market
 The US equity market recovered during the fourth quarter, erasing losses incurred during the global sell-off in August. Despite poor performance in November and December, the Russell 3000 Index delivered strong returns in October and finished the quarter up 6.3%. The strong fourth quarter lifted the broad US equity market into positive territory for the year, with the Russell 3000 Index posting a return of 0.5% for 2015. While the index avoided a loss, 2015 marked the lowest calendar year return for the index since 2008.

Market Cap
 Large-cap stocks continued to outpace small-cap. The top ten largest stocks in the S&P 500 Index averaged a 23.4% return for the year, while the remaining 490 stocks averaged a -2.0% return.

Style and Sector
 Growth leadership persisted across the market cap spectrum.



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



Fourth Quarter Review

Broad Market

Developed international equity markets finished the quarter in positive territory after a strong start in October.

Market Cap & Style

Growth continued to outperform value, resulting in increased style dispersion. In contrast to the US, small-cap stocks outperformed large-cap stocks.

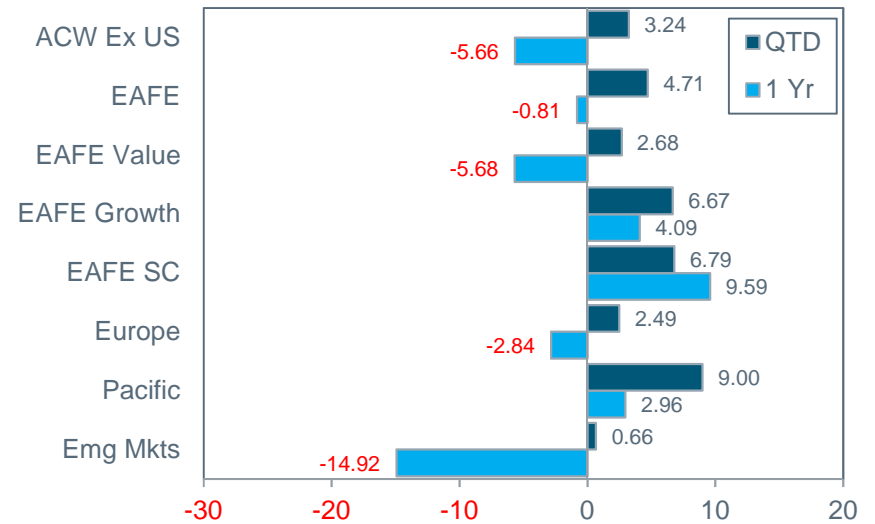
Developed Markets

By region, returns were mainly positive with only a few developed market countries lagging the general market. Central bank policies continued to diverge with monetary stimulus continuing in Europe, but pausing in Japan.

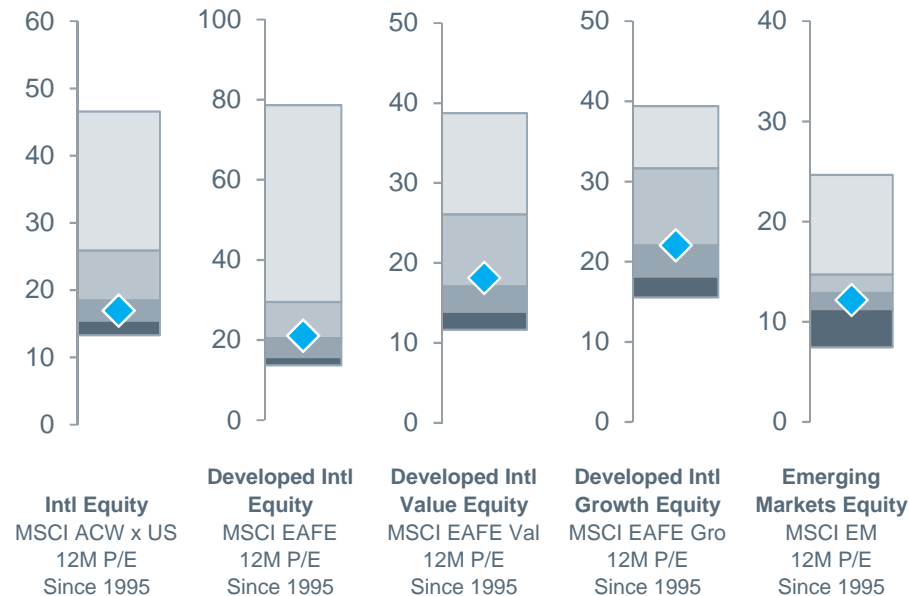
Emerging Markets

Emerging markets equity lagged their developed counterparts by a wide margin, but still delivered slightly positive returns during the quarter. Prior to the selloff in 2016, China was the strongest contributor to performance in Q4.

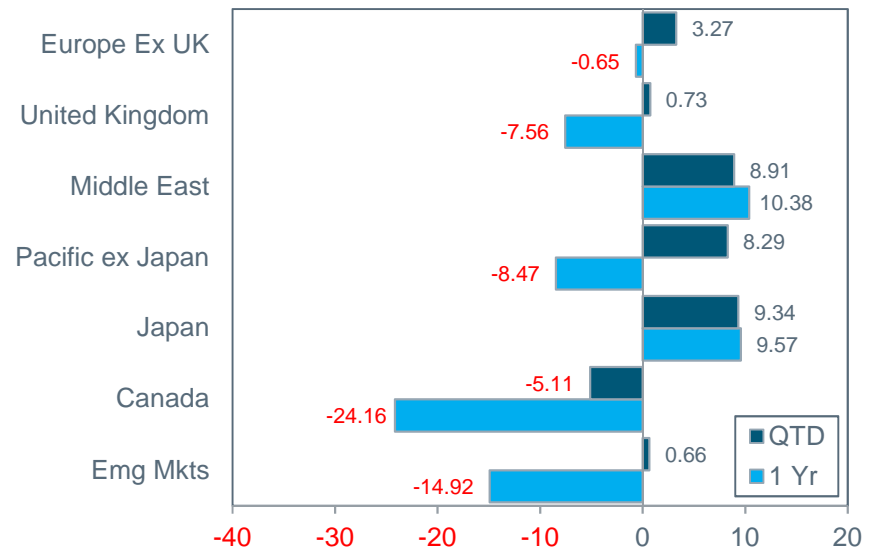
MSCI Style and Capitalization Market Performance (%)



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.



Fourth Quarter Review

Broad Market

The Barclays US Aggregate Bond Index finished the quarter and year with relatively poor returns of -0.6% and 0.6%, respectively. Currency fluctuations continue to drive global bond returns. As the dollar strengthened during the quarter, the Citigroup World Government Bond Index returned -1.2% and ended at -3.6% for the year.

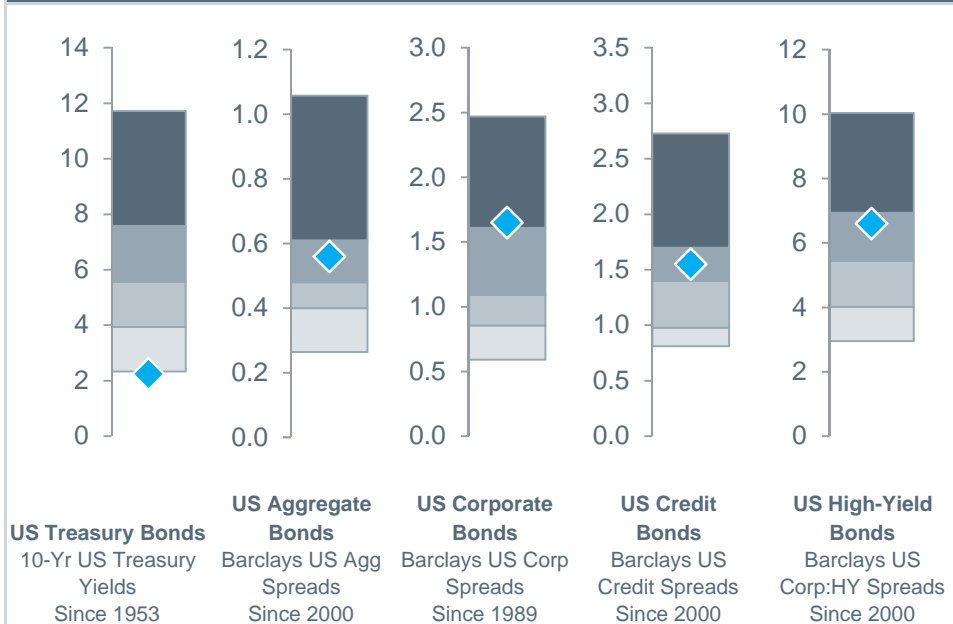
Credit Market

The BofA ML US High Yield Master II Index returned -4.6% for the year, as the US high yield market continued to suffer from depressed oil and commodity prices.

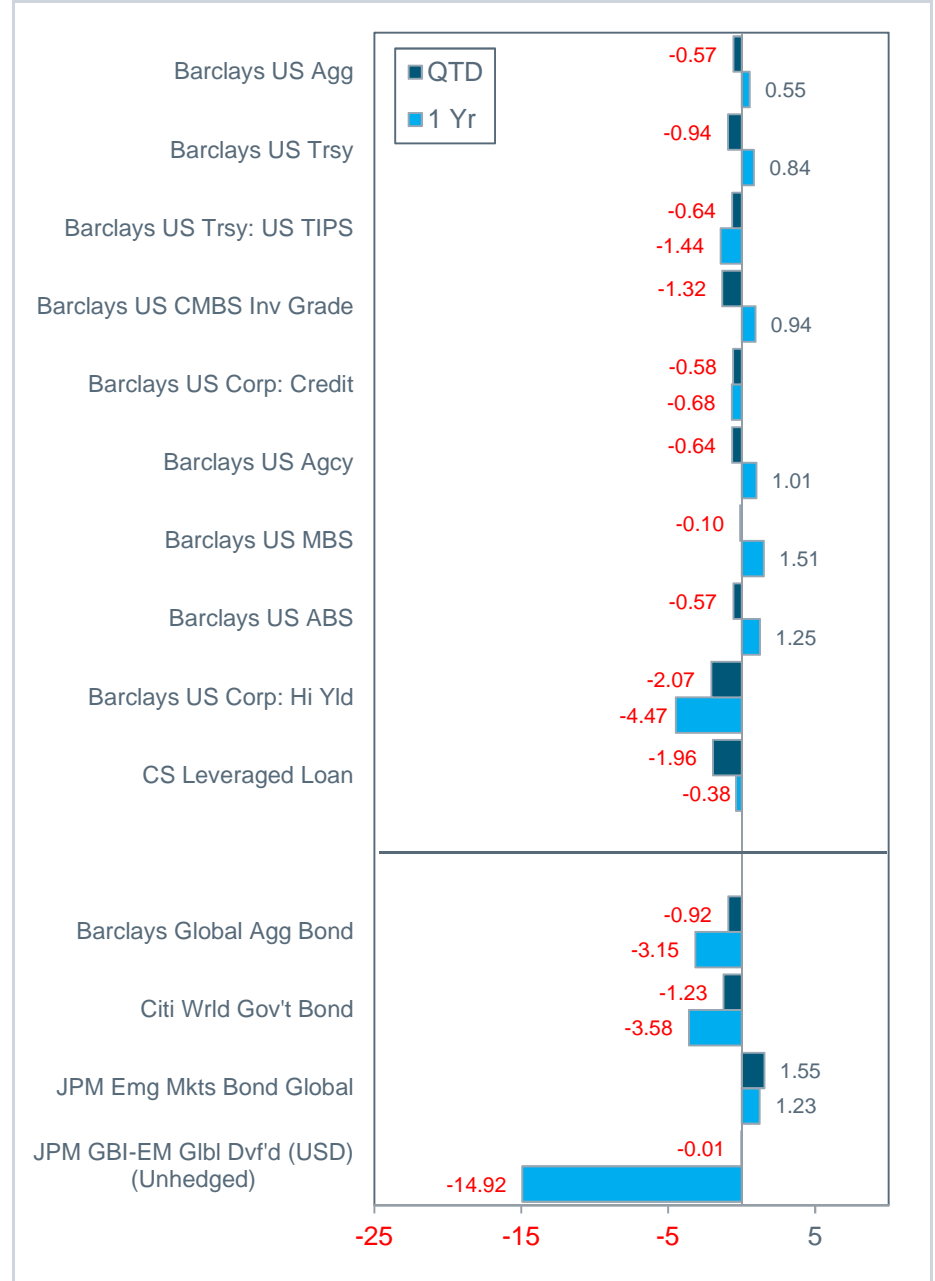
Emerging Market Debt

Weakness in emerging markets and a fairly aggressive trend of devaluation among emerging market currencies caused the JPM GBI-EM Global Diversified Index to finish the year at -14.9%, the worst calendar year return since the inception of the local currency index.

Valuations



Fixed Income Performance (%)



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



Fourth Quarter Review - Absolute Return

General Market - Hedge Funds

Hedge funds returns were mixed for the fourth quarter, capping off a year that saw a widening of dispersion across hedge fund strategies. Outsized equity market gains in the month of October were a relative detractor, as many hedged equity managers de-risked portfolios following drawdowns in the third quarter. Managers tracked closely by RVK were generally able to generate alpha in both long and short positions over the course of the year. Distressed debt was the worst performing strategy for the quarter and year.

General Market - Global Tactical Asset Allocation (GTAA)

Diversification did not reward investors in 2014, and 2015 saw a continuation of a similar theme wherein most GTAA managers underperformed a standard 60/40 blend. Managers with significant allocations to emerging markets equity or that relied on short US equity exposure in favor of other regional exposures provided the highest level of underperformance. Risk parity managers provided disparate returns with most poor performers suffering from difficult performance in credit-sensitive fixed income, TIPS, and non-US equity.

Fourth Quarter Review - Real Assets

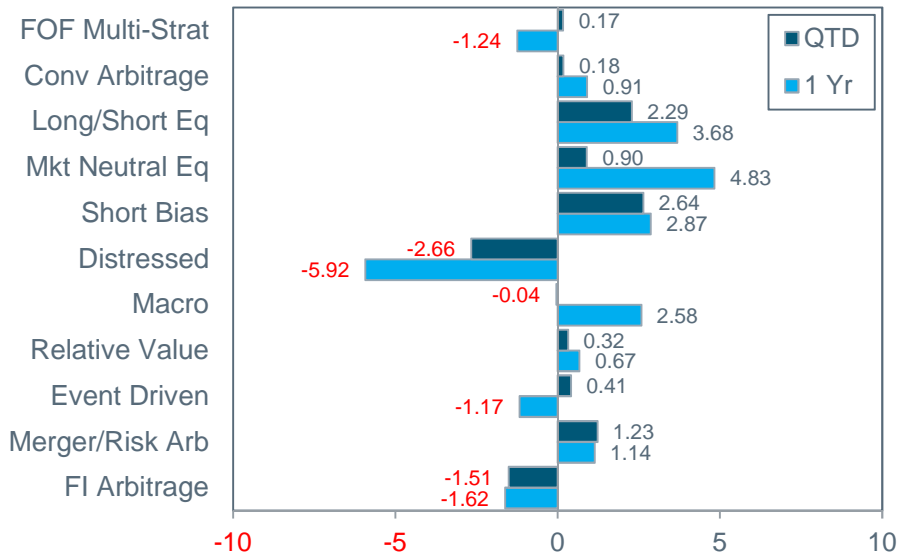
General Market - Diversified Inflation Strategies (DIS)

In a year with historically low inflation expectations, strategies designed to protect against inflation underperformed by a wide margin. Deflationary headwinds included a strengthening US Dollar, sharp declines in commodity prices (particularly crude oil), and weakening growth expectations for major exporting nations. REITs allocations were a bright spot while MLP, commodities, and natural resource equity exposures detracted significantly.

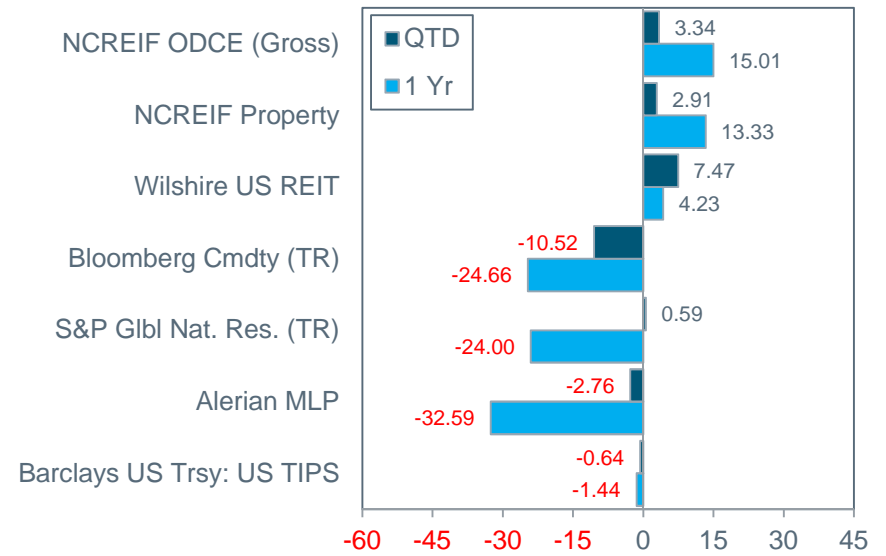
General Market - Real Estate

As a result of continued demand for well-occupied, well-located property, core real estate investors were rewarded with strong positive returns in the fourth quarter. In particular, the NCREIF-ODCE Index marked its 24th consecutive quarter of gains with an estimated 3.3% return. Even as US property valuations surpass all-time peak levels, as measured by capitalization rates, fundamentals amongst major property types remain strong and increased dry powder indicates continued investor appetite.

HFN Hedge Fund Performance (%)



Real Asset Performance (%)



Annual Asset Class Performance

As of December 31, 2015

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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	15.01
	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	9.59
	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	4.23
	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	1.38
	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	0.55
	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	0.05
	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	-0.81
	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	-1.24
	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	-1.44
	-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	-3.30
	-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	-4.41
	-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	-4.47
	-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	-14.92
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	-24.66
	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	

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



Summary

During 2015, four of the six plans outperformed their custom benchmarks and the All Public Funds > \$1B-Total Fund median 1-year return of 0.07%.

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 4.8% to 9.1%. Over the trailing 5-year period, five of the six plans outperformed their respective benchmarks and four plans outperformed the All Public Funds > \$1B Universe.

Over the trailing 5-year time period, four of the 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 5.0% for **PERS (HC)**. However over a more complete market cycle (10 years), five of 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
PERS (DB)	74,453,885	-2.32	0.58	7.34	7.38	9.92	5.88	7.25	14.65	14.78	0.58
PERS (DB) Total Fund Benchmark		-2.33	0.14	6.58	6.72	9.42	5.55	5.83	14.24	15.35	-0.88
Difference		0.01	0.44	0.76	0.66	0.50	0.33	1.42	0.41	-0.57	1.46
Rank		37	34	45	33	38	49	33	61	9	57
PERS (HC)	10,755,164	-3.54	-2.66	4.83	5.49	9.19	5.17	5.46	11.54	13.85	-0.38
PERS (HC) Total Fund Benchmark		-3.27	-1.86	4.49	5.16	8.78	5.16	5.03	10.70	13.54	-0.71
Difference		-0.27	-0.20	0.34	0.33	0.41	0.01	0.43	0.84	0.31	0.33
Rank		80	96	92	97	64	81	75	82	32	80
STRS	70,756,047	-1.07	2.46	9.10	8.40	10.63	6.29	7.95	17.39	13.60	1.49
STRS Total Fund Benchmark		-1.47	1.70	9.14	8.35	10.72	6.25	8.26	18.09	13.93	0.83
Difference		0.40	0.76	-0.04	0.05	-0.09	0.04	-0.31	-0.70	-0.33	0.66
Rank		14	6	10	6	13	17	21	25	44	34
OP&F	13,831,187	-3.00	0.65	7.94	8.29	11.05	6.75	6.87	16.93	15.41	2.57
OP&F Total Fund Benchmark		-4.35	-2.18	6.21	7.12	9.78	5.66	6.87	14.61	14.94	2.43
Difference		1.35	2.83	1.73	1.17	1.27	1.09	0.00	2.32	0.47	0.14
Rank		59	31	31	7	6	1	40	31	3	25
SERS	12,368,512	-1.00	2.93	8.75	8.02	9.79	5.79	6.92	16.86	14.42	-0.07
SERS Total Fund Benchmark		-1.39	1.54	7.70	7.23	9.23	5.60	6.66	15.34	13.56	-0.07
Difference		0.39	1.39	1.05	0.79	0.56	0.19	0.26	1.52	0.86	0.00
Rank		12	1	14	13	47	57	37	34	18	74
HPRS	807,829	-2.91	-0.11	8.43	6.66	9.90	5.49	6.73	19.59	11.45	-2.85
HPRS Total Fund Benchmark		-2.45	0.21	7.80	7.47	10.14	6.27	7.03	16.79	13.07	1.20
Difference		-0.46	-0.32	0.63	-0.81	-0.24	-0.78	-0.30	2.80	-1.62	-4.05
Rank		58	55	18	56	40	70	48	8	89	99
<i>All Public Plans > \$1B-TF Median</i>		<i>-2.70</i>	<i>0.07</i>	<i>6.80</i>	<i>6.84</i>	<i>9.76</i>	<i>5.87</i>	<i>6.61</i>	<i>15.76</i>	<i>13.36</i>	<i>0.80</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

Four of the six plans outperformed their respective benchmarks during 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 4.7% to 9.0%. Over the trailing 5-year period, four of the six plans outperformed their respective benchmarks.

Over the trailing 3-year time period, three of the 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 5.0% for PERS (HC). However over a more complete market cycle (10 years), five of six plans have trailed these respective absolute benchmarks.

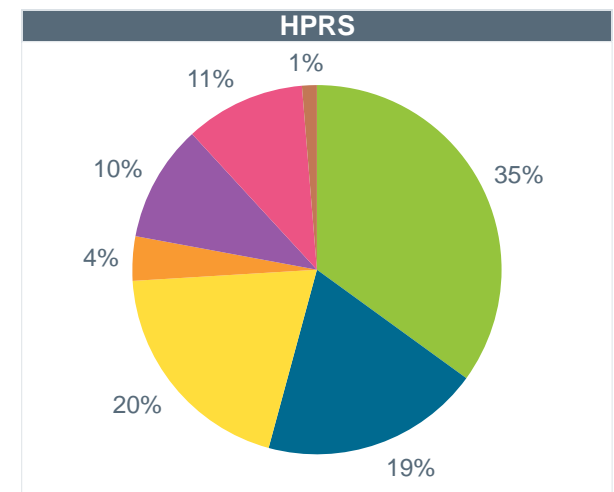
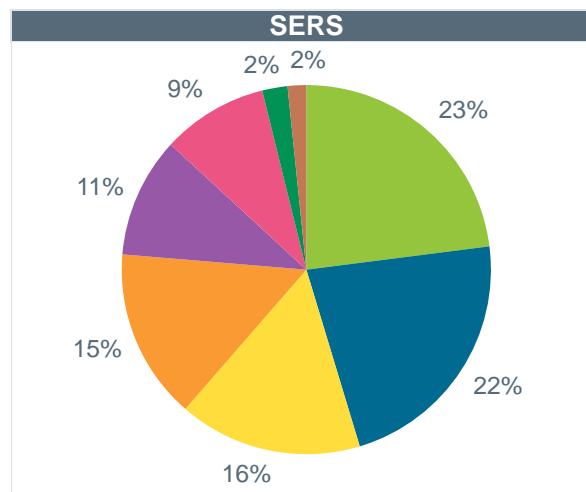
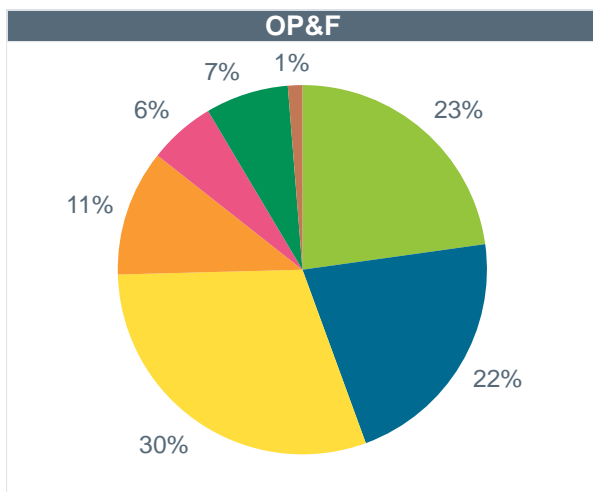
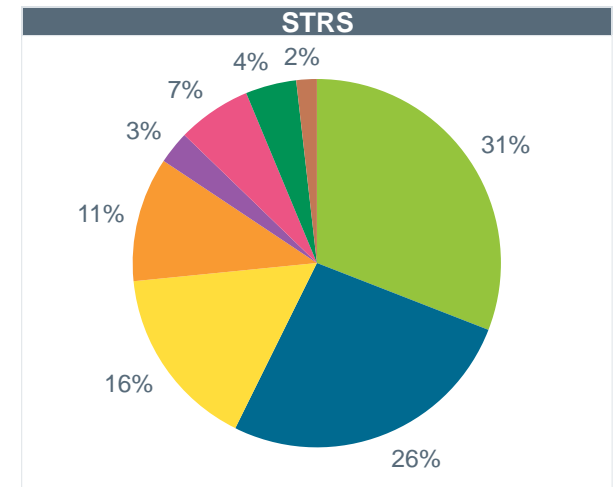
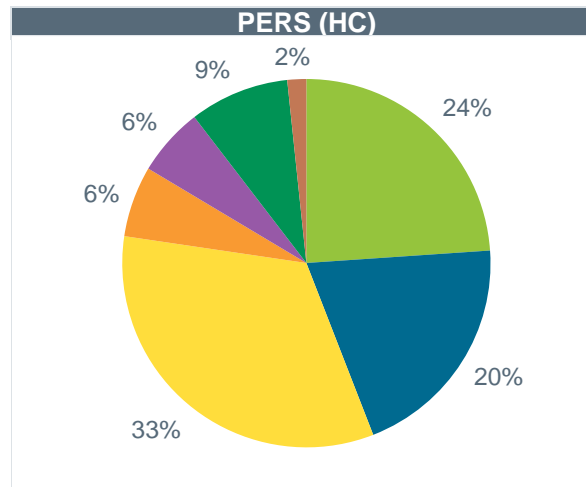
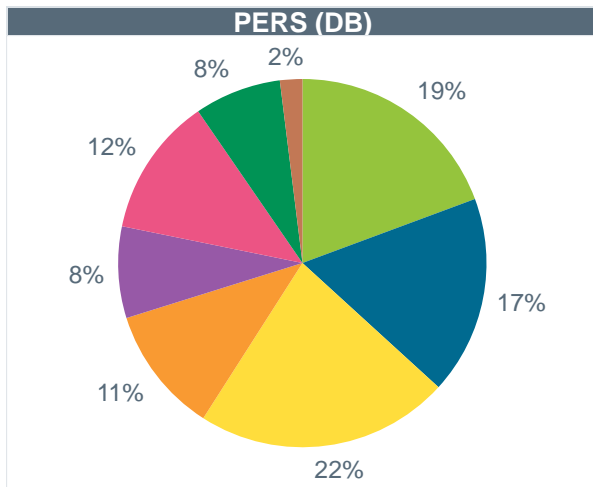
Asset Allocation & Performance - Net of Fees

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
PERS (DB)	74,453,885	-2.45	0.33	7.07	7.13	9.73	5.74	6.96	14.38	14.54	0.36
PERS (DB) Total Fund Benchmark		-2.33	0.14	6.58	6.72	9.42	5.55	5.83	14.24	15.35	-0.88
Difference		-0.12	0.19	0.49	0.41	0.31	0.19	1.13	0.14	-0.81	1.24
PERS (HC)	10,755,164	-3.63	-2.18	4.67	5.37	9.16	5.15	5.28	11.36	13.72	-0.38
PERS (HC) Total Fund Benchmark		-3.27	-1.86	4.49	5.16	8.78	5.16	5.03	10.70	13.54	-0.71
Difference		-0.36	-0.32	0.18	0.21	0.38	-0.01	0.25	0.66	0.18	0.33
STRS	70,756,047	-1.13	2.34	8.96	8.28	10.50	6.17	7.82	17.25	13.47	1.38
STRS Total Fund Benchmark		-1.47	1.70	9.14	8.35	10.72	6.25	8.26	18.09	13.93	0.83
Difference		0.34	0.64	-0.18	-0.07	-0.22	-0.08	-0.44	-0.84	-0.46	0.55
OP&F	13,831,187	-3.20	0.07	7.37	7.77	10.57	6.35	6.27	16.40	14.98	2.16
OP&F Total Fund Benchmark		-4.35	-2.18	6.21	7.12	9.78	5.66	6.87	14.61	14.94	2.43
Difference		1.06	2.25	1.16	0.65	0.79	0.69	-0.60	1.79	0.04	-0.27
SERS	12,368,512	-1.15	2.47	8.12	7.31	9.04	5.13	6.25	16.09	13.55	-0.85
SERS Total Fund Benchmark		-1.39	1.54	7.70	7.23	9.23	5.60	6.66	15.34	13.56	-0.07
Difference		0.24	0.93	0.42	0.08	-0.19	-0.47	-0.41	0.75	-0.01	-0.78
HPRS	807,829	-3.05	-0.44	8.10	6.32	9.57	5.17	6.30	19.35	11.13	-3.23
HPRS Total Fund Benchmark		-2.45	0.21	7.80	7.47	10.14	6.27	7.03	16.79	13.07	1.20
Difference		-0.60	-0.65	0.30	-1.15	-0.57	-1.10	-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.



■ US 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. Cash Equivalents for PERS (DB) consists of cash, rebalancing, and additional annuity. Cash Equivalents for PERS (HC) consists of cash and rebalancing.

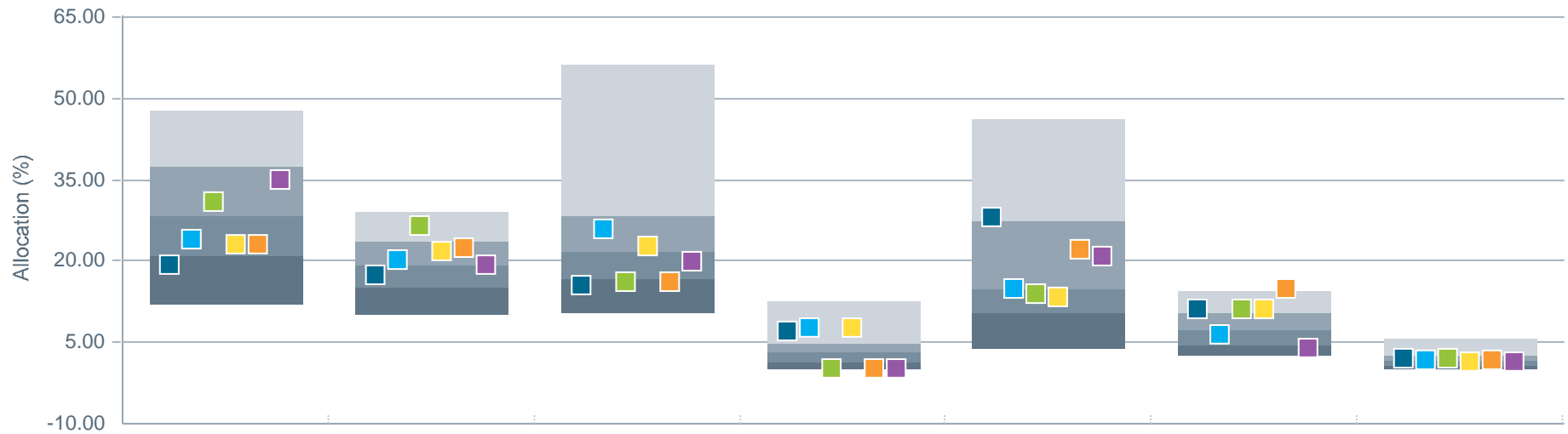


Summary

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 Intl. Equity, US Fixed Income 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 the allocation to Real Estate is in the 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

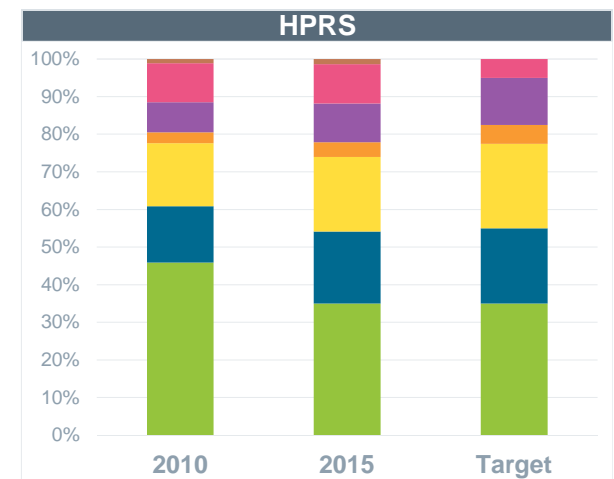
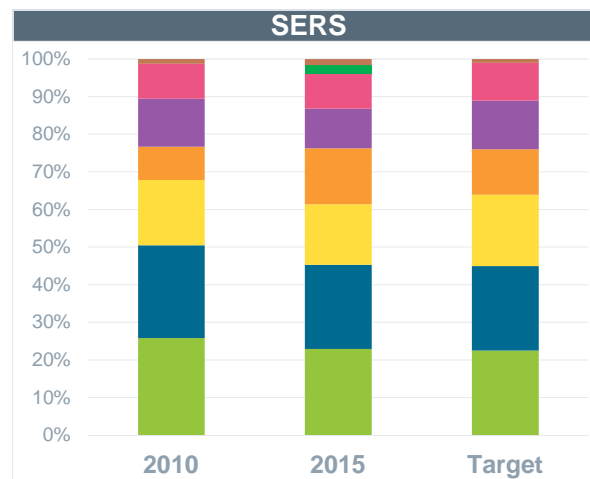
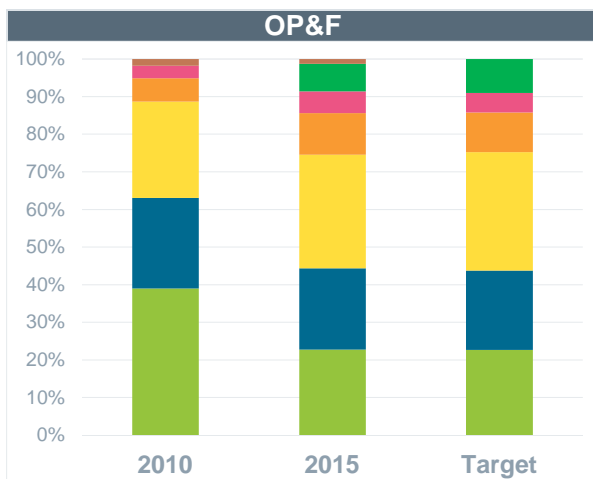
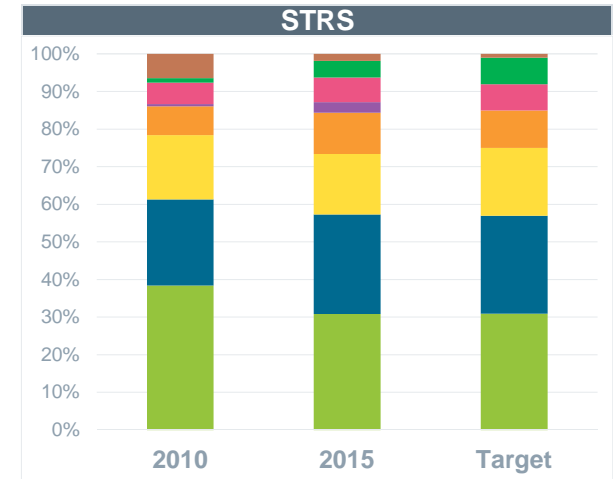
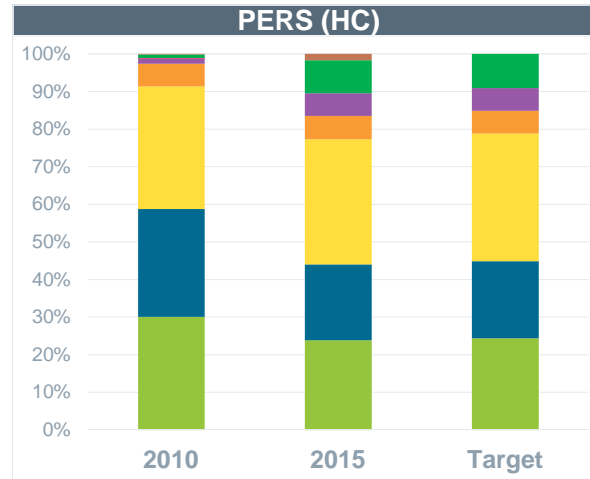
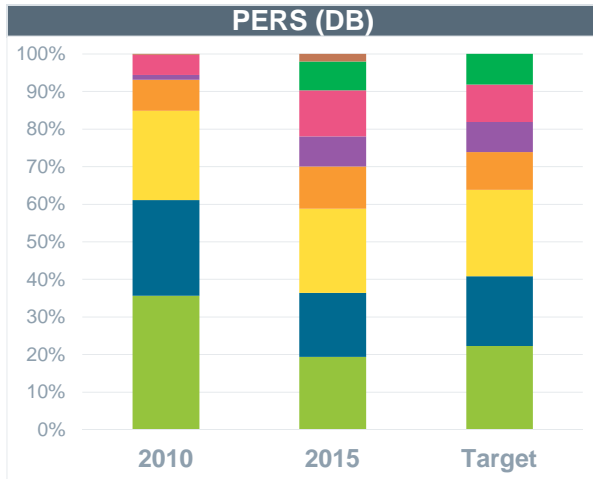


	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
■ PERS (DB)	19.32 (80)	17.43 (58)	15.43 (79)	6.86 (15)	27.85 (24)	11.14 (16)	1.97 (35)
■ PERS (HC)	23.90 (67)	20.19 (41)	25.75 (34)	7.50 (14)	14.76 (50)	6.24 (57)	1.67 (46)
■ STRS	30.90 (42)	26.40 (12)	16.13 (77)	0.00	13.85 (56)	10.92 (19)	1.80 (42)
■ OP&F	22.79 (69)	21.63 (33)	22.59 (44)	7.56 (14)	13.11 (61)	11.06 (18)	1.25 (58)
■ SERS	22.98 (69)	22.35 (29)	16.06 (78)	0.00	22.06 (35)	14.92 (3)	1.62 (49)
■ HPRS	35.00 (29)	19.21 (51)	19.82 (58)	0.00	20.77 (40)	3.89 (82)	1.31 (56)
Median	28.16	19.24	21.63	3.15	14.66	7.13	1.57

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

Summary

Over the past five years, US 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.



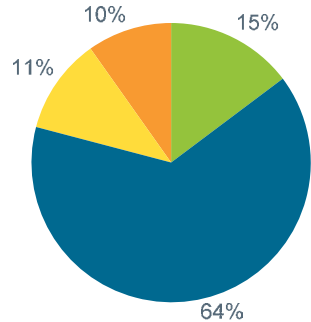
- US Equity
- International Equity
- Fixed Income
- Real Estate
- Hedge Funds
- Private Equity
- Other Alternatives
- Cash Equivalents



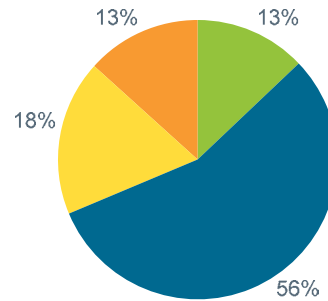
Summary

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

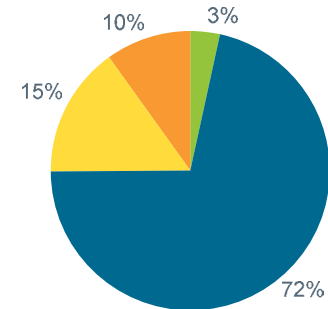
PERS (DB)



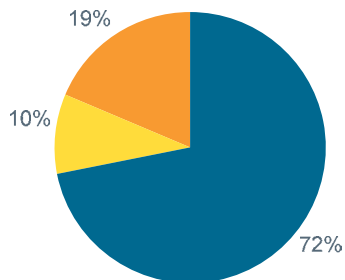
PERS (HC)



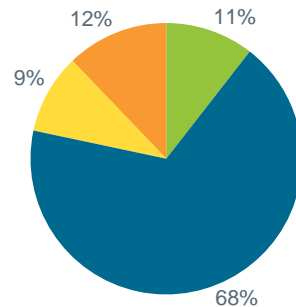
STRS



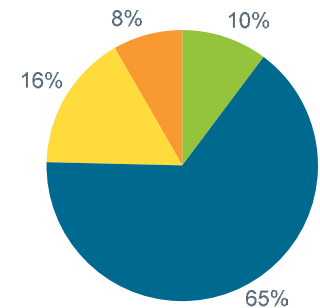
OP&F



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

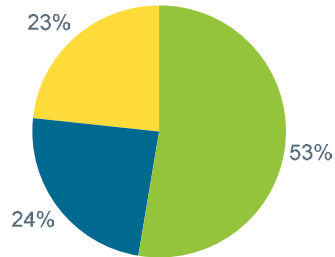
RVK Liquidity Rating - A qualitative method developed and calculated by RVK for determining the relative amount of liquidity in a portfolio.

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.

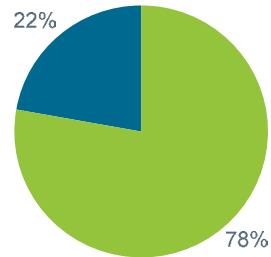
Not Liquid Investments: Private appraisal-based transactions, vehicle-based liquidity constraints, or privately held assets. Extreme discount to raise cash or 6-12+ months required to receive cash.

PERS (DB)



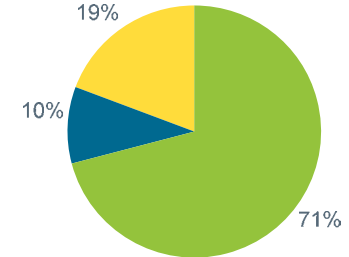
PERS (DB) Liquidity Rating 62

PERS (HC)



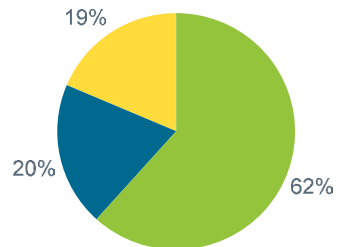
PERS (HC) Liquidity Rating 80

STRS



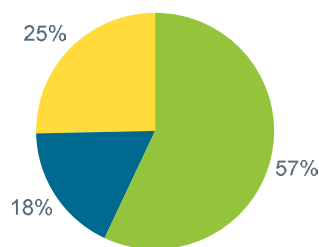
STRS Liquidity Rating 71

OP&F



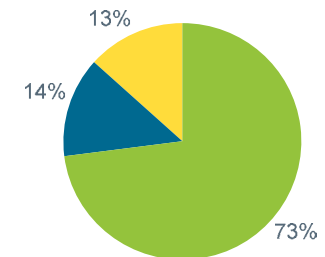
OP&F Liquidity Rating 70

SERS



SERS Liquidity Rating 63

HPRS



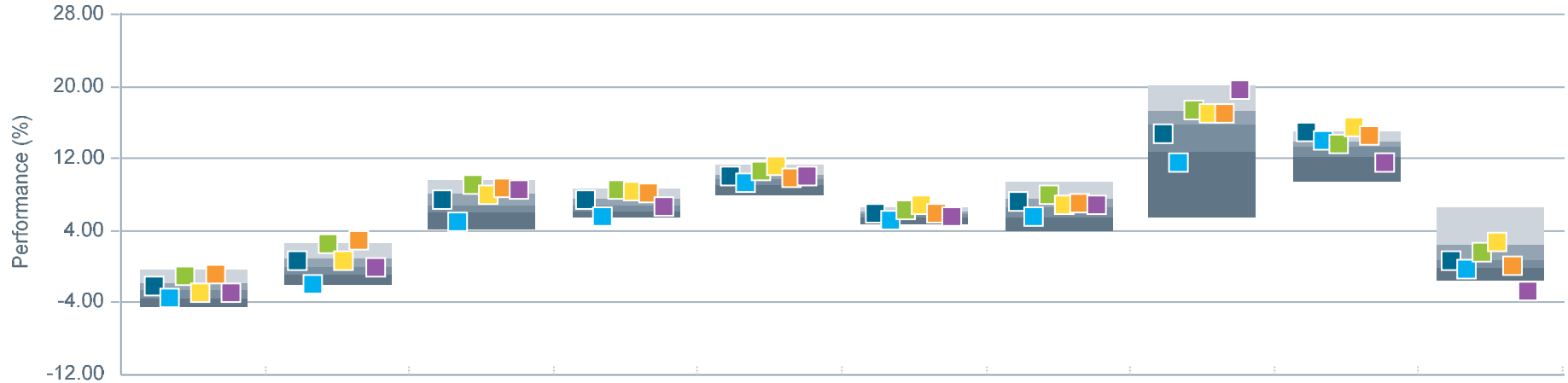
HPRS Liquidity Rating 70

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

- Four of the six Ohio Funds outperformed the All Public Plans >\$1B-Total Fund median during 2015.
- **PERS (DB)** outperformed the median over all trailing periods shown.
- **PERS (HC)** has trailed the peer median over all trailing periods shown.
- **STRS** has performed in the top quartile over all trailing periods shown.
- With the exception of the trailing 2 Quarters, **OP&F** outperformed the peer median over all other trailing periods and calendar years shown.
- Over the trailing 1-, 3-, 5-, and 7-year trailing periods, **SERS** has outperformed the peer median.
- **HPRS** outperformed the peer median over the trailing 3- and 7-year periods, but trailed over the trailing 1-, 5-, and 10-year time periods.

Plan Sponsor Peer Group - Total Fund Performance



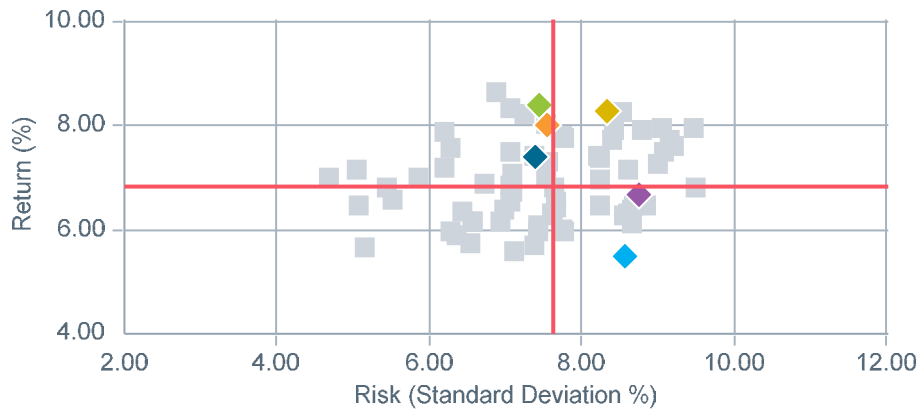
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
■ PERS (DB)	-2.32 (37)	0.58 (34)	7.34 (45)	7.38 (33)	9.92 (38)	5.88 (49)	7.25 (33)	14.65 (61)	14.78 (9)	0.58 (57)
■ PERS (HC)	-3.54 (80)	-2.06 (96)	4.83 (92)	5.49 (97)	9.19 (64)	5.17 (81)	5.46 (75)	11.54 (82)	13.85 (32)	-0.38 (80)
■ STRS	-1.07 (14)	2.46 (6)	9.10 (10)	8.40 (6)	10.63 (13)	6.29 (17)	7.95 (21)	17.39 (25)	13.60 (44)	1.49 (34)
■ OP&F	-3.00 (59)	0.65 (31)	7.94 (31)	8.29 (7)	11.05 (6)	6.75 (1)	6.87 (40)	16.93 (31)	15.41 (3)	2.57 (25)
■ SERS	-1.00 (12)	2.93 (1)	8.75 (14)	8.02 (13)	9.79 (47)	5.79 (57)	6.92 (37)	16.86 (34)	14.42 (18)	-0.07 (74)
■ HPRS	-2.91 (58)	-0.11 (55)	8.43 (18)	6.66 (56)	9.90 (40)	5.49 (70)	6.73 (48)	19.59 (8)	11.45 (89)	-2.85 (99)
Median	-2.70	0.07	6.80	6.84	9.76	5.87	6.61	15.76	13.36	0.80
Population	85	82	81	81	78	73	89	85	87	91

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

Summary

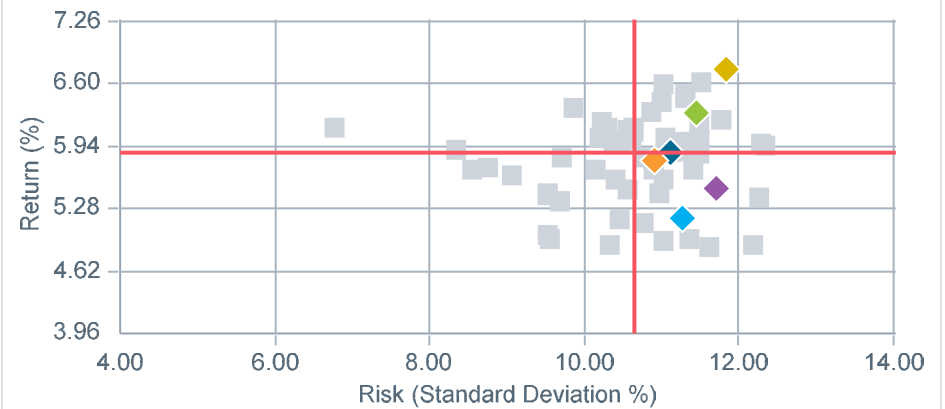
- Three of six plans have experienced higher volatility (standard deviation) than the All Public Plans > \$1B-Total Fund median over the trailing 5-year period and all six plans have experienced higher volatility over the trailing 10-year period.
- Over the trailing five-year period, PERS (DB), STRS,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

Plan Sponsor Peer Group Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	7.38	7.40
◆ PERS (HC)	5.49	8.56
◆ STRS	8.40	7.44
◆ OP&F	8.29	8.34
◆ SERS	8.02	7.55
◆ HPRS	6.66	8.76
— Median	6.84	7.62

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	5.88	11.11
◆ PERS (HC)	5.17	11.26
◆ STRS	6.29	11.46
◆ OP&F	6.75	11.84
◆ SERS	5.79	10.92
◆ HPRS	5.49	11.70
— Median	5.87	10.65

Sharpe Ratio - 5 Year

PERS (DB)	1.00
PERS (HC)	0.66
STRS	1.12
OP&F	1.00
SERS	1.06
HPRS	0.78
All Public Plans > \$1B-Total Fund Median	0.92

Sharpe Ratio - 10 Year

PERS (DB)	0.46
PERS (HC)	0.39
STRS	0.48
OP&F	0.51
SERS	0.46
HPRS	0.41
All Public Plans > \$1B-Total Fund Median	0.47

Performance shown is gross of fees.

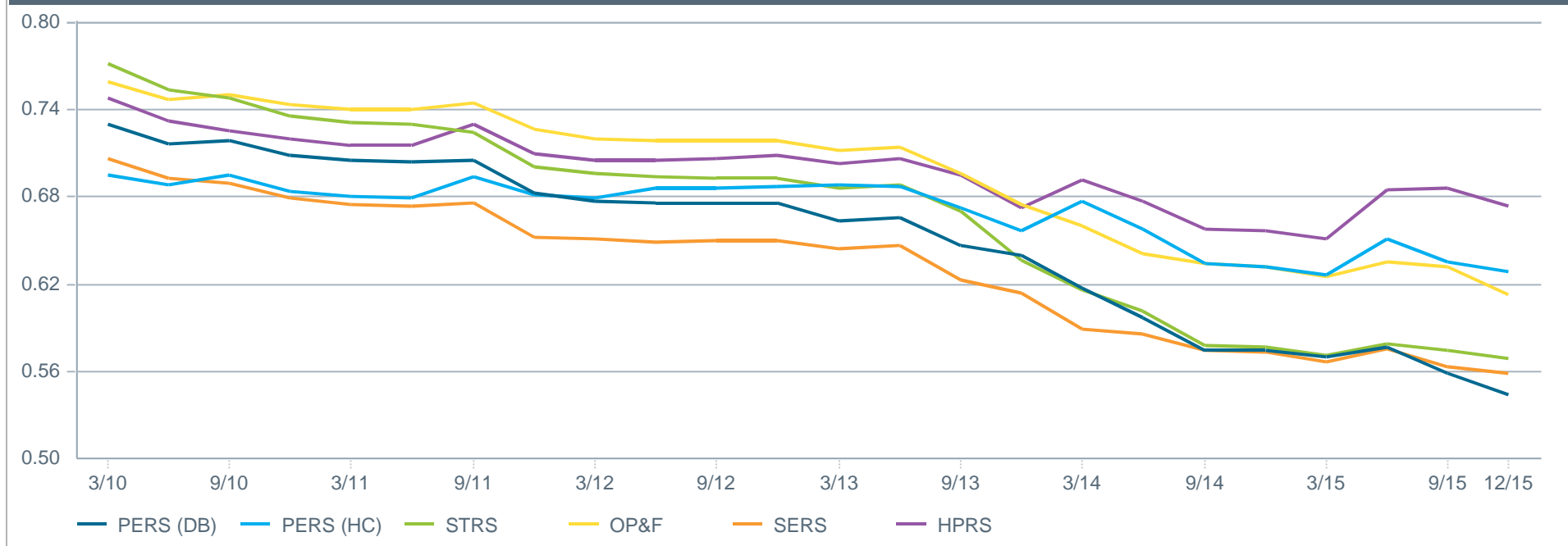
Summary

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

Equity Beta

	3 Years	5 Years	7 Years	10 Years
PERS (DB)	0.47	0.54	0.63	0.65
PERS (HC)	0.56	0.63	0.66	0.66
STRS	0.54	0.57	0.63	0.68
OP&F	0.57	0.61	0.68	0.70
SERS	0.50	0.56	0.61	0.64
HPRS	0.61	0.67	0.67	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

- During 2015, five of the six plans outperformed the 0.48% return earned by the Russell 3000 Index. All six plans' US 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 five 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

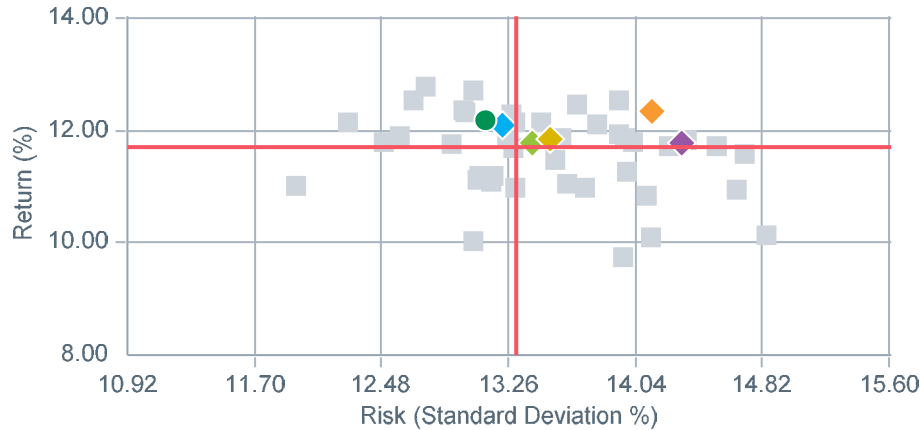
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
US Equity										
PERS (DB)	-1.52	0.68	14.47	12.08	14.97	7.14	11.29	33.86	16.58	1.15
Russell 3000 Index	-1.43	0.48	14.73	12.18	15.04	7.35	12.55	33.55	16.42	1.03
Difference	-0.09	0.20	-0.26	-0.10	-0.07	-0.21	-1.26	0.31	0.16	0.12
Rank	24	27	44	29	52	60	53	59	47	34
PERS (HC)	-1.52	0.68	14.47	12.08	14.97	7.14	11.29	33.86	16.58	1.15
Russell 3000 Index	-1.43	0.48	14.73	12.18	15.04	7.35	12.55	33.55	16.42	1.03
Difference	-0.09	0.20	-0.26	-0.10	-0.07	-0.21	-1.26	0.31	0.16	0.12
Rank	24	27	44	29	52	60	53	59	47	34
STRS	-1.56	0.83	14.17	11.79	14.77	7.02	11.70	32.14	15.56	1.51
Russell 3000 Index	-1.43	0.48	14.73	12.18	15.04	7.35	12.55	33.55	16.42	1.03
Difference	-0.13	0.35	-0.56	-0.39	-0.27	-0.33	-0.85	-1.41	-0.86	0.48
Rank	26	24	55	42	58	62	44	84	71	27
OP&F	-1.79	0.66	14.93	11.86	16.14	7.91	11.27	35.53	14.28	0.94
Wilshire 5000 Index	-0.99	0.67	14.72	12.09	15.00	7.40	12.71	33.07	16.06	0.98
Difference	-0.80	-0.01	0.21	-0.23	1.14	0.51	-1.44	2.46	-1.78	-0.04
Rank	32	27	28	34	10	6	53	24	93	41
SERS	-1.15	1.24	15.11	12.33	15.62	7.26	10.99	35.76	17.09	0.13
Russell 3000 Index	-1.43	0.48	14.73	12.18	15.04	7.35	12.55	33.55	16.42	1.03
Difference	0.28	0.76	0.38	0.15	0.58	-0.09	-1.56	2.21	0.67	-0.90
Rank	19	19	21	17	30	54	60	19	25	50
HPRS	-1.99	0.18	14.99	11.79	15.90	7.68	11.97	35.56	16.01	-1.01
Russell 3000 Index	-1.43	0.48	14.73	12.18	15.04	7.35	12.55	33.55	16.42	1.03
Difference	-0.56	-0.30	0.26	-0.39	0.86	0.33	-0.58	2.01	-0.41	-2.04
Rank	37	44	25	42	15	16	36	24	62	76
<i>All Public Plans > \$1B-US Equity Segment Median</i>	<i>-2.59</i>	<i>-0.10</i>	<i>14.30</i>	<i>11.70</i>	<i>15.23</i>	<i>7.31</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.

Summary

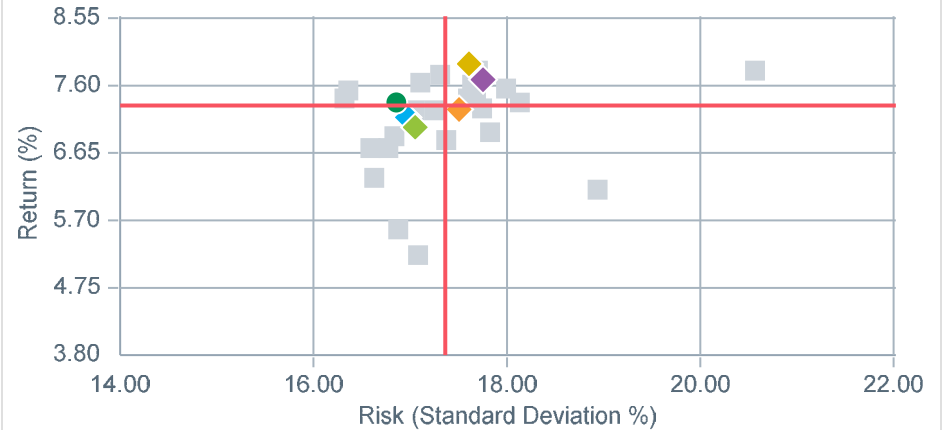
- Five of the six plans US equity composites have earned more return for each unit of risk exposure over the trailing five-year period.
- Two of the six plans (OP&F and HPRS) outperformed the All Public Plans > \$1B-US Equity Segment median over the trailing ten-year period.
- All six plans have generated 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)	12.08	13.22
◆ PERS (HC)	12.08	13.22
◆ STRS	11.79	13.40
◆ OP&F	11.86	13.52
◆ SERS	12.33	14.15
◆ HPRS	11.79	14.33
● Russell 3000 Index	12.18	13.13
— Median	11.70	13.31

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	7.14	16.96
◆ PERS (HC)	7.14	16.96
◆ STRS	7.02	17.04
◆ OP&F	7.91	17.61
◆ SERS	7.26	17.51
◆ HPRS	7.68	17.76
● Russell 3000 Index	7.35	16.87
— Median	7.31	17.35

Sharpe Ratio - 5 Years

PERS (DB)	0.94
PERS (HC)	0.94
STRS	0.91
OP&F	0.90
SERS	0.90
HPRS	0.86
Russell 3000 Index	0.95
All Public Plans > \$1B-US Equity Segment Median	0.88

Sharpe Ratio - 10 Years

PERS (DB)	0.42
PERS (HC)	0.42
STRS	0.41
OP&F	0.45
SERS	0.42
HPRS	0.44
Russell 3000 Index	0.43
All Public Plans > \$1B-US Equity Segment Median	0.42

Performance shown is gross of fees.

Summary

- All six plans' international equity composites outperformed their respective benchmarks during 2015.
- All plans outperformed their respective benchmarks but four of the six plans trailed the peer group median over the trailing 3- and 5-year periods.
- Five of the six plans outperformed their respective benchmarks over the trailing seven-year period and all plans outperformed over the trailing ten-year period. Three plans also outperformed the peer median over the seven- and ten-year trailing periods.

Performance

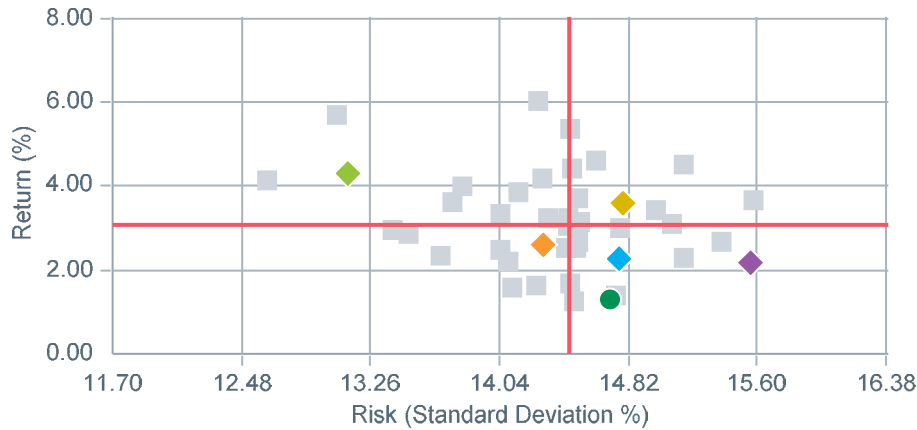
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
International Equity										
PERS (DB)	-8.36	-4.01	3.02	2.27	8.49	3.56	-1.48	15.61	18.15	-13.39
PERS (DB) International Equity Custom Benchmark	-10.11	-6.09	0.80	0.59	7.13	2.69	-3.42	12.92	17.18	-14.19
Difference	1.75	2.08	2.22	1.68	1.36	0.87	1.94	2.69	0.97	0.80
Rank	70	79	70	75	62	64	28	81	75	71
PERS (HC)	-8.36	-4.01	3.02	2.27	8.49	3.57	-1.48	15.61	18.15	-13.39
PERS (HC) International Equity Custom Benchmark	-10.11	-6.09	0.80	0.59	7.13	2.69	-3.42	12.92	17.18	-14.19
Difference	1.75	2.08	2.22	1.68	1.36	0.88	1.94	2.69	0.97	0.80
Rank	70	79	70	75	62	63	28	81	75	71
STRS	-8.95	0.30	6.44	4.29	9.84	4.60	0.83	19.23	17.32	-12.81
STRS International Equity Custom Benchmark	-7.82	-2.78	4.66	3.09	8.59	3.66	0.24	17.63	16.93	-13.11
Difference	1.87	3.08	1.78	1.20	1.25	0.94	0.59	1.60	0.39	0.30
Rank	18	12	9	21	21	32	9	38	85	55
OP&F	-6.73	-0.77	4.28	3.60	9.74	4.86	-5.58	21.01	20.08	-12.37
MSCI ACW Ex US Investable Mkt Index (Net)	-8.78	-4.60	2.02	1.27	8.09	3.18	-3.89	15.82	17.04	-14.31
Difference	2.05	3.83	2.26	2.33	1.65	1.68	-1.67	5.19	3.04	1.94
Rank	29	25	38	34	25	24	100	18	23	45
SERS	-7.97	-2.37	3.17	2.59	9.05	3.95	-4.10	17.29	19.16	-13.16
SERS International Equity Custom Benchmark	-9.32	-5.66	2.04	1.62	7.62	3.00	-3.87	17.15	17.39	-13.12
Difference	1.35	3.29	1.13	0.97	1.43	0.95	-0.23	0.14	1.77	-0.04
Rank	62	51	68	65	40	41	90	73	38	69
HPRS	-7.78	-2.91	3.29	2.16	7.23	3.37	-4.65	19.05	18.06	-14.49
MSCI ACW Ex US Index (Net)	-9.32	-5.66	1.50	1.06	7.48	2.92	-3.87	15.29	16.83	-13.71
Difference	1.54	2.75	1.79	1.10	-0.25	0.45	-0.78	3.76	1.23	-0.78
Rank	55	57	66	78	87	78	95	39	77	86
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	<i>-7.58</i>	<i>-2.36</i>	<i>3.79</i>	<i>3.09</i>	<i>8.65</i>	<i>3.79</i>	<i>-3.00</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

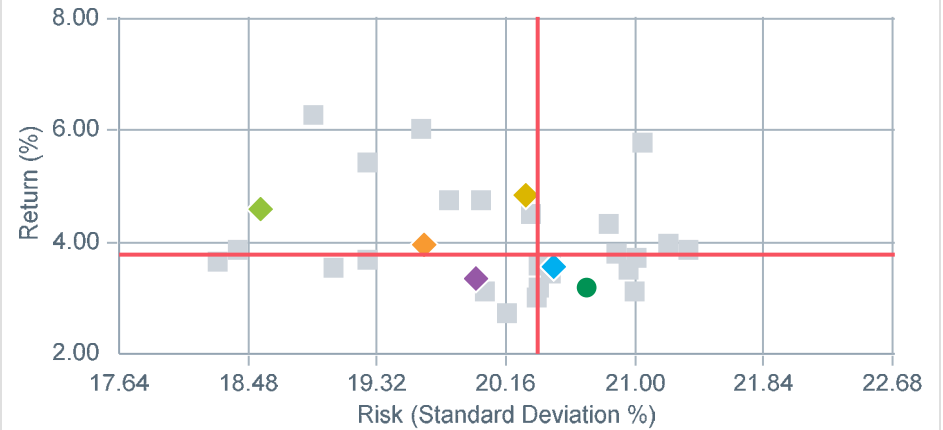
- The international equity composites for **STRS** and **OP&F** have generated higher risk-adjusted returns than peers over both the trailing 5- and 10-year periods.
- All six plans have generated Sharpe Ratios in line with or higher than the peer median over the trailing ten-year period.

Plan Sponsor Peer Group Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	2.27	14.76
◆ PERS (HC)	2.27	14.76
◆ STRS	4.29	13.12
◆ OP&F	3.60	14.79
◆ SERS	2.59	14.30
◆ HPRS	2.16	15.56
● MSCI ACW Ex US IMI (Net)	1.27	14.72
— Median	3.09	14.46

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	3.56	20.47
◆ PERS (HC)	3.57	20.47
◆ STRS	4.60	18.56
◆ OP&F	4.86	20.29
◆ SERS	3.95	19.62
◆ HPRS	3.37	19.96
● MSCI ACW Ex US IMI (Net)	3.18	20.69
— Median	3.79	20.37

Sharpe Ratio - 5 Years

PERS (DB)	0.23
PERS (HC)	0.23
STRS	0.38
OP&F	0.31
SERS	0.25
HPRS	0.22
MSCI ACW Ex US IMI (Net)	0.16
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	0.28

Sharpe Ratio - 10 Years

PERS (DB)	0.22
PERS (HC)	0.22
STRS	0.27
OP&F	0.28
SERS	0.24
HPRS	0.21
MSCI ACW Ex US IMI (Net)	0.20
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	0.23

Performance shown is gross of fees.

Summary

- During 2015, four of the six plans' fixed income composites outperformed the Barclays US Agg Bond Index return of 0.55%. Five of the six plans ranked above the peer median during the period.
- Over the three-year trailing period, four of the six plans outperformed their respective index and three plans ranked above the peer median.
- All plans' fixed income composites outperformed their respective index over the trailing 5- and 7-year periods with mixed results relative to the peer median.

Performance

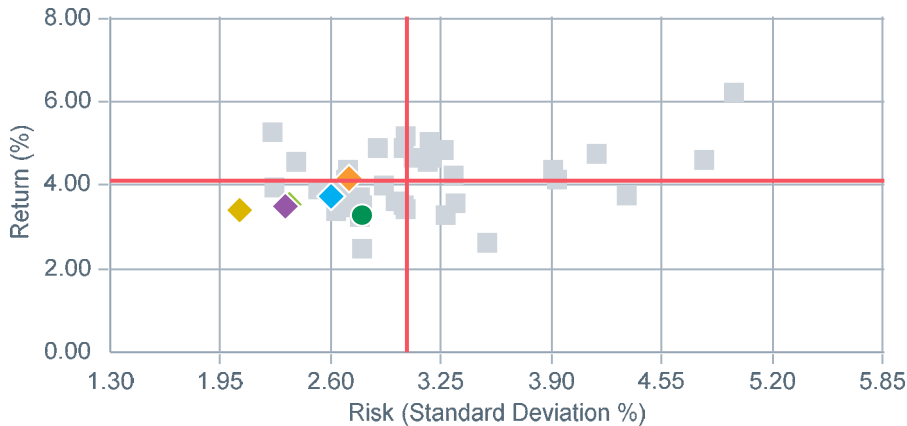
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
Fixed Income										
PERS (DB) Core Fixed Income	0.86	0.96	2.08	3.73	5.03	4.24	6.47	-1.04	4.99	7.52
PERS (DB) Core Fixed Income Custom Benchmark	0.65	0.56	1.51	3.31	4.14	4.55	6.09	-1.94	4.33	7.84
Difference	0.21	0.40	0.57	0.42	0.89	-0.31	0.38	0.90	0.66	-0.32
Rank	7	19	38	67	75	82	33	49	85	60
PERS (HC) Core Fixed Income	0.86	0.96	2.08	3.73	5.03	4.24	6.47	-1.04	4.99	7.52
PERS (HC) Core Fixed Income Benchmark	0.65	0.56	1.51	3.31	4.14	4.55	6.09	-1.94	4.33	7.84
Difference	0.21	0.40	0.57	0.42	0.89	-0.31	0.38	0.90	0.66	-0.32
Rank	7	19	38	67	75	82	33	49	85	60
STRS	-0.02	0.60	1.50	3.56	6.00	5.14	5.02	-1.02	6.14	7.30
Barclays US Unv Bond Index	0.13	0.43	1.51	3.46	4.70	4.67	5.56	-1.35	5.53	7.40
Difference	-0.15	0.17	-0.01	0.10	1.30	0.47	-0.54	0.33	0.61	-0.10
Rank	25	30	55	73	45	37	81	48	65	62
OP&F Core Fixed Income	0.19	1.45	1.50	3.42	5.46	4.96	4.18	-1.05	6.31	6.41
Barclays US Agg Bond Index	0.65	0.55	1.44	3.25	4.09	4.52	5.97	-2.02	4.21	7.84
Difference	-0.46	0.90	0.06	0.17	1.37	0.44	-1.79	0.97	2.10	-1.43
Rank	21	9	55	82	60	52	91	49	63	78
SERS	-0.39	-0.14	1.74	4.18	7.12	5.59	5.84	-0.37	9.21	6.69
Barclays US Agg Bond Index	0.65	0.55	1.44	3.25	4.09	4.52	5.97	-2.02	4.21	7.84
Difference	-1.04	-0.69	0.30	0.93	3.03	1.07	-0.13	1.65	5.00	-1.15
Rank	46	59	46	48	23	21	51	33	26	77
HPRS	-0.62	0.54	1.22	3.50	5.45	4.89	4.00	-0.81	6.55	7.49
Barclays US Agg Bond Index	0.65	0.55	1.44	3.25	4.09	4.52	5.97	-2.02	4.21	7.84
Difference	-1.27	-0.01	-0.22	0.25	1.36	0.37	-1.97	1.21	2.34	-0.35
Rank	60	31	71	76	60	53	92	44	62	60
<i>All Public Plans > \$1B-US Fixed Income Segment Median</i>	<i>-0.47</i>	<i>0.09</i>	<i>1.64</i>	<i>4.11</i>	<i>5.85</i>	<i>5.00</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

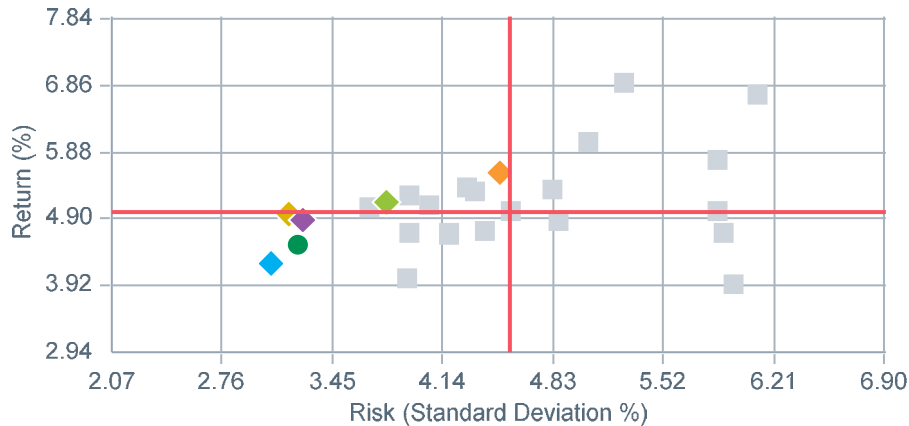
- Over the trailing 5-year period all six plans achieved higher risk-adjusted returns than the peer median.
- Over the trailing 10-year period all six plans achieved higher risk-adjusted returns than the median peer.

Plan Sponsor Peer Group Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	3.73	2.61
◆ PERS (HC) Core Fixed Income	3.73	2.61
◆ STRS	3.56	2.36
◆ OP&F Core Fixed Income	3.42	2.06
◆ SERS	4.18	2.70
◆ HPRS	3.50	2.33
● Barclays US Agg Bond Index	3.25	2.79
— Median	4.11	3.05

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	4.24	3.07
◆ PERS (HC) Core Fixed Income	4.24	3.07
◆ STRS	5.14	3.78
◆ OP&F Core Fixed Income	4.96	3.18
◆ SERS	5.59	4.50
◆ HPRS	4.89	3.26
● Barclays US Agg Bond Index	4.52	3.24
— Median	5.00	4.56

Sharpe Ratio - 5 Years

PERS (DB) Core Fixed Income	1.39
PERS (HC) Core Fixed Income	1.39
STRS	1.47
OP&F Core Fixed Income	1.61
SERS	1.51
HPRS	1.47
Barclays US Agg Bond Index	1.14
All Public Plans > \$1B-US Fixed Income Segment Median	1.30

Sharpe Ratio - 10 Years

PERS (DB) Core Fixed Income	0.92
PERS (HC) Core Fixed Income	0.92
STRS	0.99
OP&F Core Fixed Income	1.10
SERS	0.92
HPRS	1.07
Barclays US Agg Bond Index	0.99
All Public Plans > \$1B-US Fixed Income Segment Median	0.82

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
Additional Fixed Income										
PERS (DB) U.S. Treasury	0.82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays US Trsy Index	0.81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (DB) EMD	-5.92	-6.82	-4.96	N/A	N/A	N/A	-1.64	-6.35	18.83	N/A
PERS (DB) EMD Custom Benchmark	-5.63	-7.12	-5.09	N/A	N/A	N/A	-0.20	-7.76	17.74	N/A
Difference	-0.29	0.30	0.13	N/A	N/A	N/A	-1.44	1.41	1.09	N/A
PERS (DB) High Yield	-5.70	-2.74	2.55	5.58	N/A	N/A	2.73	7.92	15.82	5.03
Barclays U.S. High Yield Index	-6.82	-4.47	2.08	5.28	N/A	N/A	2.45	8.68	15.81	4.98
Difference	1.12	1.73	0.47	0.30	N/A	N/A	0.28	-0.76	0.01	0.05
PERS (DB) Floating Rate Debt	-0.49	2.83	4.64	N/A	N/A	N/A	4.43	6.69	N/A	N/A
CS Lvg'd Loan Index	-3.16	-0.38	2.57	N/A	N/A	N/A	2.06	6.15	N/A	N/A
Difference	2.67	3.21	2.07	N/A	N/A	N/A	2.37	0.54	N/A	N/A
PERS (DB) Securitized Debt	0.46	4.93	14.50	N/A	N/A	N/A	17.98	21.25	24.51	N/A
Barclays CMBS Index + 2%	1.27	2.59	3.52	N/A	N/A	N/A	5.76	2.23	11.66	N/A
Difference	-0.81	2.34	10.98	N/A	N/A	N/A	12.22	19.02	12.85	N/A
PERS (DB) TIPS	-1.76	-1.43	N/A	N/A	N/A	N/A	3.66	N/A	N/A	N/A
Barclays U.S. TIPS Index	-1.78	-1.44	N/A	N/A	N/A	N/A	3.64	N/A	N/A	N/A
Difference	0.02	0.01	N/A	N/A	N/A	N/A	0.02	N/A	N/A	N/A
PERS (DB) Global High Yield	-5.13	-4.03	1.07	N/A	N/A	N/A	0.00	7.58	N/A	N/A
Barclays Global High Yield Index	-4.57	-2.72	1.45	N/A	N/A	N/A	0.01	7.33	N/A	N/A
Difference	-0.56	-1.31	-0.38	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
Additional Fixed Income										
PERS (HC) U.S. Treasury	0.82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays US Trsy Index	0.81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC) EMD	-5.92	-6.82	-4.96	0.83	N/A	N/A	-1.64	-6.35	18.83	2.17
PERS (HC) EMD Custom Benchmark	-5.63	-7.12	-5.09	0.79	N/A	N/A	-0.20	-7.76	17.74	3.33
Difference	-0.29	0.30	0.13	0.04	N/A	N/A	-1.44	1.41	1.09	-1.16
PERS (HC) High Yield	-5.70	-2.74	2.55	5.58	N/A	N/A	2.73	7.92	15.82	5.03
Barclays U.S. High Yield Index	-6.82	-4.47	2.08	5.28	N/A	N/A	2.45	8.68	15.81	4.98
Difference	1.12	1.73	0.47	0.30	N/A	N/A	0.28	-0.76	0.01	0.05
PERS (HC) Floating Rate Debt	-0.49	2.83	4.64	N/A	N/A	N/A	4.43	6.69	N/A	N/A
CS Lvg'd Loan Index	-3.16	-0.38	2.57	N/A	N/A	N/A	2.06	6.15	N/A	N/A
Difference	2.67	3.21	2.07	N/A	N/A	N/A	2.37	0.54	N/A	N/A
PERS (HC) Securitized Debt	0.46	4.93	14.50	N/A	N/A	N/A	17.98	21.25	24.51	N/A
Barclays CMBS Index + 2%	1.27	2.59	3.52	N/A	N/A	N/A	5.76	2.23	11.66	N/A
Difference	-0.81	2.34	10.98	N/A	N/A	N/A	12.22	19.02	12.85	N/A
PERS (HC) TIPS	-1.76	-1.43	-2.23	2.57	4.40	4.05	3.66	-8.55	6.95	13.60
Barclays U.S. TIPS Index	-1.78	-1.44	-2.27	2.55	4.31	3.93	3.64	-8.61	6.98	13.56
Difference	0.02	0.01	0.04	0.02	0.09	0.12	0.02	0.06	-0.03	0.04
PERS (HC) Global High Yield	-5.13	-4.63	1.07	N/A	N/A	N/A	0.00	7.58	N/A	N/A
Barclays Global High Yield Index	-4.57	-2.72	1.45	N/A	N/A	N/A	0.01	7.33	N/A	N/A
Difference	-0.56	-1.31	-0.38	N/A	N/A	N/A	-0.01	0.25	N/A	N/A
OP&F Mortgages	0.73	3.21	6.14	5.74	6.28	5.19	8.56	6.72	5.28	4.99
Barclays Mortgage Index (1 Qtr Lag)	0.55	3.43	1.98	3.03	4.36	4.71	3.78	-1.20	3.71	5.56
Difference	0.18	-0.22	4.16	2.71	1.92	0.48	4.78	7.92	1.57	-0.57
OP&F High Yield	-4.03	-0.95	2.63	5.79	12.21	7.33	2.81	6.13	15.64	6.00
CS Hi Yld Dvl'd Countries Only Index	-7.50	-4.83	1.39	4.76	12.12	6.56	1.85	7.53	14.76	5.46
Difference	3.47	3.88	1.24	1.03	0.09	0.77	0.96	-1.40	0.88	0.54
OP&F Global Inflation Protected Securities	-4.15	0.26	2.29	10.76	11.26	9.50	19.43	-10.62	14.93	35.50
Bridewater Custom GIPS Index	-3.06	-2.36	0.25	7.31	7.37	6.33	18.76	-13.10	13.49	24.41
Difference	-1.09	2.62	2.04	3.45	3.89	3.17	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 2015.
- PERS (HC)'s exposure to REITs earned 10.7% during the period.
- Over the trailing 10-year period, four of the six plans outperformed their respective benchmarks.

Performance

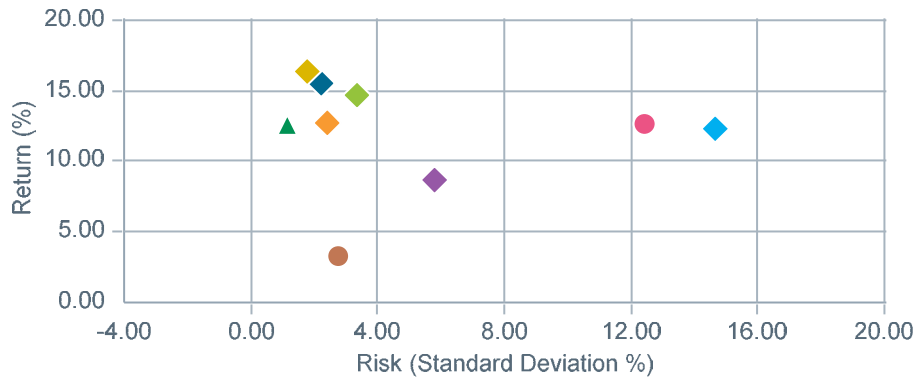
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
Real Estate										
PERS (DB)	8.14	17.28	17.20	15.50	7.92	8.41	18.92	15.43	12.91	13.06
PERS (DB) Real Estate Custom Benchmark	7.50	14.71	13.24	13.35	6.39	7.83	12.21	12.82	11.00	16.10
Difference	0.64	2.57	3.96	2.15	1.53	0.58	6.71	2.61	1.91	-3.04
PERS (HC) REITs	10.68	4.41	11.74	12.37	16.99	7.31	31.79	1.38	17.17	9.61
DJ US Select Real Estate Securities TR Index	10.77	4.46	11.75	12.21	16.70	7.07	31.85	1.31	17.09	8.87
Difference	-0.09	-0.05	-0.01	0.16	0.29	0.24	-0.06	0.07	0.08	0.74
STRS	6.16	11.36	13.05	14.70	7.67	9.93	17.57	10.36	15.40	19.07
STRS Real Estate Custom Benchmark	6.59	11.89	12.04	12.33	9.40	8.10	14.54	9.72	11.69	13.85
Difference	-0.43	-0.53	1.01	2.37	-1.73	1.83	3.03	0.64	3.71	5.22
OP&F	7.96	16.83	16.83	16.30	4.92	8.11	18.57	15.11	13.06	18.01
NCREIF ODCE Index (Net) (1 Qtr Lag)	7.15	13.87	12.40	12.95	3.27	5.72	11.36	11.97	10.47	17.18
Difference	0.81	2.96	4.43	3.35	1.65	2.39	7.21	3.14	2.59	0.83
SERS	6.47	13.81	13.34	12.77	4.06	5.12	14.22	12.00	14.02	9.88
SERS Real Estate Custom Benchmark	6.33	13.48	11.91	12.55	7.86	8.00	11.26	11.00	11.00	16.10
Difference	0.14	0.33	1.43	0.22	-3.80	-2.88	2.96	1.00	3.02	-6.22
HPRS	0.85	6.11	13.78	8.62	4.83	2.37	22.02	13.78	6.46	-3.57
NCREIF Property Index (1 Qtr Lag)	6.33	13.47	11.90	12.10	7.55	7.72	11.26	11.00	10.54	14.26
Difference	-5.48	-7.36	1.88	-3.48	-2.72	-5.35	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

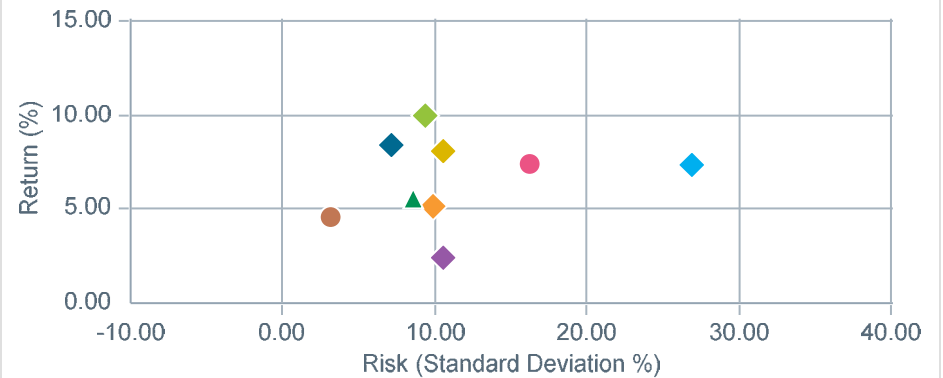
- The five plans with core and value-added real estate exposure exhibit fairly similar risk and return characteristics over the trailing 5- and 10-year periods.
- As expected, PERS (HC)'s REITs exposure exhibits risk and return characteristics similar to that of public equity markets.

Risk & Return Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	15.50	2.22
◆ PERS (HC)	12.37	14.69
◆ STRS	14.70	3.36
◆ OP&F	16.30	1.81
◆ SERS	12.77	2.41
◆ HPRS	8.62	5.81
▲ NCREIF ODCE Index (AWA) (Net)	12.60	1.14
● S&P 500 Index (Cap Wtd)	12.57	12.46
● Barclays US Agg Bond Index	3.25	2.79

Risk & Return Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	8.41	7.14
◆ PERS (HC)	7.31	26.88
◆ STRS	9.93	9.33
◆ OP&F	8.11	10.56
◆ SERS	5.12	9.87
◆ HPRS	2.37	10.55
▲ NCREIF ODCE Index (AWA) (Net)	5.55	8.65
● S&P 500 Index (Cap Wtd)	7.31	16.31
● Barclays US Agg Bond Index	4.52	3.24

Sharpe Ratio - 5 Years

PERS (DB)	6.58
PERS (HC) REITs	0.87
STRS	4.16
OP&F	8.50
SERS	5.05
HPRS	1.45
NCREIF ODCE Index (AWA) (Net)	10.58

Sharpe Ratio - 10 Years

PERS (DB)	1.02
PERS (HC) REITs	0.36
STRS	0.97
OP&F	0.70
SERS	0.44
HPRS	0.16
NCREIF ODCE Index (AWA) (Net)	0.54

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 -1.2% to 1.2% during 2015.
- Three of five hedge fund composites outperformed their respective benchmarks over the trailing 5- and 7-year period.
- Among the five plans, STRS's composite has the longest available history and has earned 6.6% per annum over the trailing 10-year period.

Performance

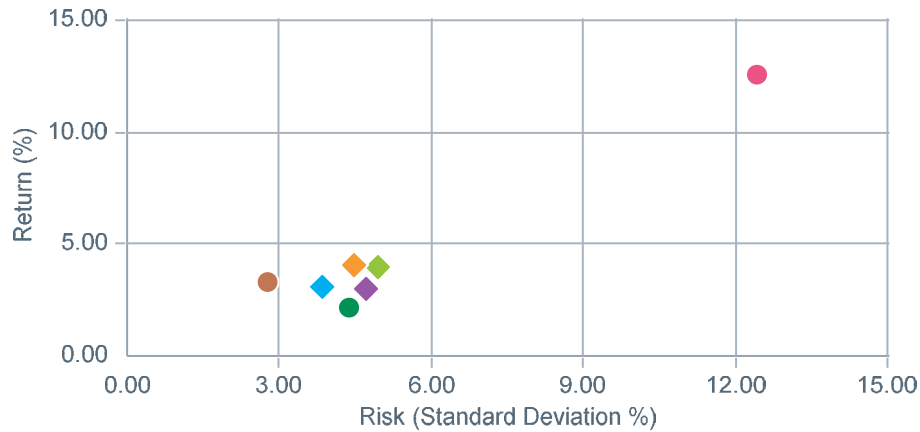
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
Hedge Funds										
PERS (DB)	-3.50	-1.20	4.03	3.09	3.93	N/A	3.93	9.63	6.26	-2.67
PERS (DB) Hedge Funds Custom Benchmark	-3.63	-1.51	2.63	4.36	4.40	N/A	2.59	7.00	7.00	7.00
Difference	0.13	0.31	1.40	-1.27	-0.47	N/A	1.34	2.63	-0.74	-9.67
PERS (HC)	-3.50	-1.20	4.03	3.09	3.93	N/A	3.93	9.63	6.26	-2.67
PERS (HC) Hedge Funds Custom Benchmark	-3.63	-1.51	2.63	4.36	4.40	N/A	2.59	7.00	7.00	7.00
Difference	0.13	0.31	1.40	-1.27	-0.47	N/A	1.34	2.63	-0.74	-9.67
STRS	-1.90	-0.55	4.60	3.94	5.53	6.55	3.27	11.44	7.37	-1.27
HFRI FOF Comp Index	-2.89	-0.26	3.95	2.10	3.91	2.27	3.37	8.96	4.79	-5.72
Difference	0.99	-0.29	0.65	1.84	1.62	4.28	-0.10	2.48	2.58	4.45
SERS	-2.39	-0.05	4.54	4.04	6.75	N/A	4.10	9.80	7.98	-1.18
HFRI FOF Comp Index + 1%	-2.41	0.74	4.99	3.13	4.94	N/A	4.40	10.04	5.84	-4.78
Difference	0.02	-0.79	-0.45	0.91	1.81	N/A	-0.30	-0.24	2.14	3.60
HPRS	-1.95	1.21	4.62	3.03	6.23	N/A	3.34	9.47	7.03	-5.26
HFRI FOF Comp Index	-2.89	-0.26	3.95	2.10	3.91	N/A	3.37	8.96	4.79	-5.72
Difference	0.94	1.47	0.67	0.93	2.32	N/A	-0.03	0.51	2.24	0.46

Performance shown is net of fees.

Summary

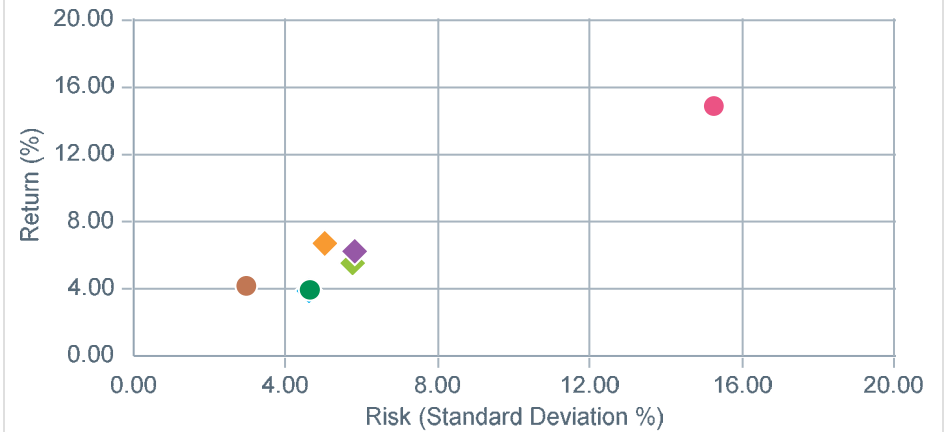
- The five plans with dedicated hedge fund exposure exhibit similar return and risk characteristics over the trailing 5- and 7-year periods.
- All plans with available history have generated more return for each unit of risk relative to the HFRI FOF Comp Index over both time periods shown.

Risk & Return Scattergram - 5 Years



	Return	Standard Deviation
◆ PERS (DB)	3.09	3.84
◆ PERS (HC)	3.09	3.84
◆ STRS	3.94	4.93
◆ SERS	4.04	4.48
◆ HPRS	3.03	4.73
● HFRI FOF Comp Index	2.10	4.39
● S&P 500 Index (Cap Wtd)	12.57	12.46
● Barclays US Agg Bond Index	3.25	2.79

Risk & Return Scattergram - 7 Years



	Return	Standard Deviation
◆ PERS (DB)	3.93	4.59
◆ PERS (HC)	3.93	4.59
◆ STRS	5.53	5.74
◆ SERS	6.75	5.05
◆ HPRS	6.23	5.80
● HFRI FOF Comp Index	3.91	4.67
● S&P 500 Index (Cap Wtd)	14.82	15.27
● Barclays US Agg Bond Index	4.09	3.01

Sharpe Ratio - 5 Years

PERS (DB)	0.80
PERS (HC)	0.80
STRS	0.80
SERS	0.90
HPRS	0.64
HFRI FOF Comp Index	0.48

Sharpe Ratio - 7 Years

PERS (DB)	0.85
PERS (HC)	0.85
STRS	0.96
SERS	1.31
HPRS	1.06
HFRI FOF Comp Index	0.83

Performance shown is net of fees.

Summary

- The five plans with dedicated private equity exposure earned time-weighted returns ranging from -0.9% to 13.8% during 2015.
- Over the trailing ten-year period, all 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
Private Equity										
PERS (DB)	2.84	6.09	13.32	14.87	11.93	11.92	17.94	16.29	18.54	15.93
PERS (DB) Private Equity Custom Benchmark	2.78	4.61	14.03	15.38	12.30	9.53	15.41	22.81	33.20	3.55
Difference	0.06	1.48	-0.71	-0.51	-0.37	2.39	2.53	-6.52	-14.66	12.38
STRS	3.40	9.89	16.17	15.23	11.46	11.39	18.90	20.00	16.27	11.45
STRS Private Equity Custom Benchmark	-0.94	1.48	15.87	13.97	17.33	9.84	13.67	34.86	18.73	4.10
Difference	4.34	8.41	0.30	1.26	-5.87	1.55	5.23	-14.86	-2.46	7.35
OP&F	6.60	12.06	13.92	13.77	9.58	11.12	18.34	11.50	9.58	17.66
OP&F Private Equity Custom Benchmark	-5.43	2.65	15.81	16.58	13.16	10.38	21.45	24.59	33.76	3.65
Difference	12.03	9.41	-1.89	-2.81	-3.58	0.74	-3.11	-13.09	-24.18	14.01
SERS	5.55	13.81	17.90	16.17	10.96	10.99	22.77	17.32	13.16	14.07
Burgiss All Private Equity Benchmark	3.87	7.37	14.99	16.10	12.59	9.71	15.75	22.34	33.20	4.14
Difference	1.68	6.44	2.91	0.07	-1.63	1.28	7.02	-5.02	-20.04	9.93
HPRS	-3.81	-0.93	8.77	4.02	4.99	N/A	12.41	15.54	3.12	-8.24
HPRS Private Equity Custom Benchmark	-6.02	2.55	16.00	15.92	12.98	N/A	21.15	25.63	33.50	0.47
Difference	2.21	-3.48	-7.23	-11.90	-7.99	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 plans' other alternatives composites exhibited mixed relative results versus their respective benchmarks over the time periods shown.
- 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

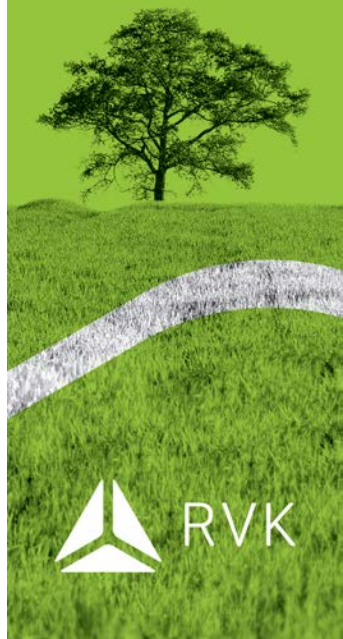
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2014	2013	2012	2011
Other Alternatives										
PERS (DB) Opportunistic Investments	1.00	1.12	N/A	N/A	N/A	N/A	N/A	-3.06	4.15	4.84
PERS (DB) Opportunistic Custom Benchmark	0.81	0.84	N/A	N/A	N/A	N/A	N/A	-1.34	5.43	5.06
Difference	0.19	0.28	N/A	N/A	N/A	N/A	N/A	-1.72	-1.28	-0.22
PERS (DB) Commodities	-32.47	-32.44	N/A	N/A	N/A	N/A	-32.12	N/A	N/A	N/A
S&P Goldman Sachs Commodity Index (TR)	-32.72	-32.86	N/A	N/A	N/A	N/A	-33.06	N/A	N/A	N/A
Difference	0.25	0.42	N/A	N/A	N/A	N/A	0.94	N/A	N/A	N/A
PERS (DB) Risk Parity	-10.81	-10.42	N/A	N/A	N/A	N/A	9.73	N/A	N/A	N/A
PERS (DB) Risk Parity Custom Benchmark	1.29	3.30	N/A	N/A	N/A	N/A	7.64	N/A	N/A	N/A
Difference	-12.10	-13.72	N/A	N/A	N/A	N/A	2.09	N/A	N/A	N/A
PERS (DB) GTAA	-1.47	0.94	N/A	N/A	N/A	N/A	4.44	N/A	N/A	N/A
PERS (DB) GTAA Custom Benchmark	-1.76	-0.69	N/A	N/A	N/A	N/A	3.61	N/A	N/A	N/A
Difference	0.29	1.63	N/A	N/A	N/A	N/A	0.83	N/A	N/A	N/A
PERS (HC) Opportunistic Investments	1.00	1.12	N/A	N/A	N/A	N/A	N/A	-3.06	4.25	4.84
PERS (HC) Opportunistic Custom Benchmark	0.81	0.84	N/A	N/A	N/A	N/A	N/A	-1.34	5.43	5.06
Difference	0.19	0.28	N/A	N/A	N/A	N/A	N/A	-1.72	-1.18	-0.22
PERS (HC) Commodities	-32.47	-32.44	-23.06	-14.30	N/A	N/A	-32.12	-0.68	0.30	1.17
S&P Goldman Sachs Commodity Index	-32.72	-32.86	-23.71	-15.18	N/A	N/A	-33.06	-1.22	0.08	-1.18
Difference	0.25	0.42	0.65	0.88	N/A	N/A	0.94	0.54	0.22	2.35
PERS (HC) Risk Parity	-10.81	-10.42	N/A	N/A	N/A	N/A	9.73	N/A	N/A	N/A
PERS (HC) Risk Parity Custom Benchmark	1.29	3.30	N/A	N/A	N/A	N/A	7.64	N/A	N/A	N/A
Difference	-12.10	-13.72	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
Other Alternatives										
PERS (HC) GTAA	-1.47	0.94	N/A	N/A	N/A	N/A	4.44	N/A	N/A	N/A
PERS (HC) GTAA Custom Benchmark	-1.76	-0.69	N/A	N/A	N/A	N/A	3.61	N/A	N/A	N/A
Difference	0.29	1.63	N/A	N/A	N/A	N/A	0.83	N/A	N/A	N/A
STRS Opportunistic Investments	0.32	2.35	7.10	7.41	N/A	N/A	7.47	11.68	12.00	3.89
STRS Opportunistic Custom Benchmark	-1.93	-0.52	13.61	11.08	N/A	N/A	11.45	32.26	15.28	0.02
Difference	2.25	2.87	-6.51	-3.67	N/A	N/A	-3.98	-20.58	-3.28	3.87
OP&F Timber	0.10	1.03	4.31	N/A	N/A	N/A	8.99	3.07	N/A	N/A
Consumer Price Index + 5%	1.56	5.77	6.05	N/A	N/A	N/A	5.79	6.58	N/A	N/A
Difference	-1.46	-4.74	-1.74	N/A	N/A	N/A	3.20	-3.51	N/A	N/A
OP&F MLPs	-26.17	-29.31	3.01	N/A	N/A	N/A	16.91	32.25	N/A	N/A
Alerian MLP Index	-24.26	-32.59	-3.40	N/A	N/A	N/A	4.80	27.58	N/A	N/A
Difference	-1.91	3.28	6.41	N/A	N/A	N/A	12.11	4.67	N/A	N/A
SERS Opportunistic Investments	-8.18	-5.64	N/A	N/A	N/A	N/A	7.96	N/A	N/A	N/A
SERS Opportunistic Custom Benchmark	-1.39	1.54	N/A	N/A	N/A	N/A	6.66	N/A	N/A	N/A
Difference	-6.79	-7.18	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.

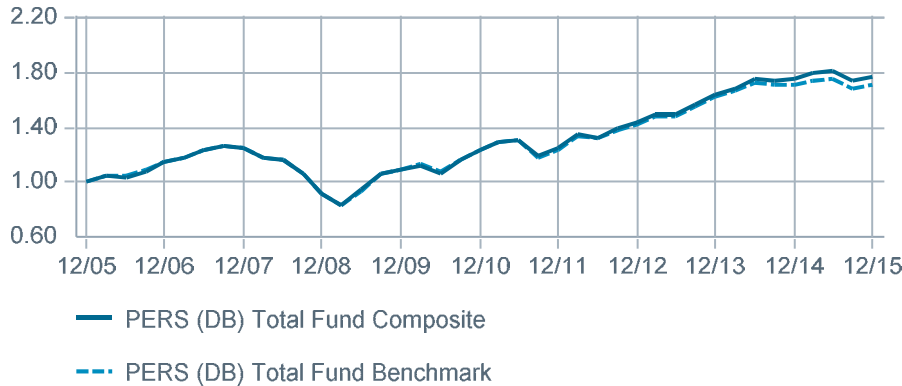
Plan Specific Pages



Summary

- PERS (DB) has earned a return of 1.0% 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



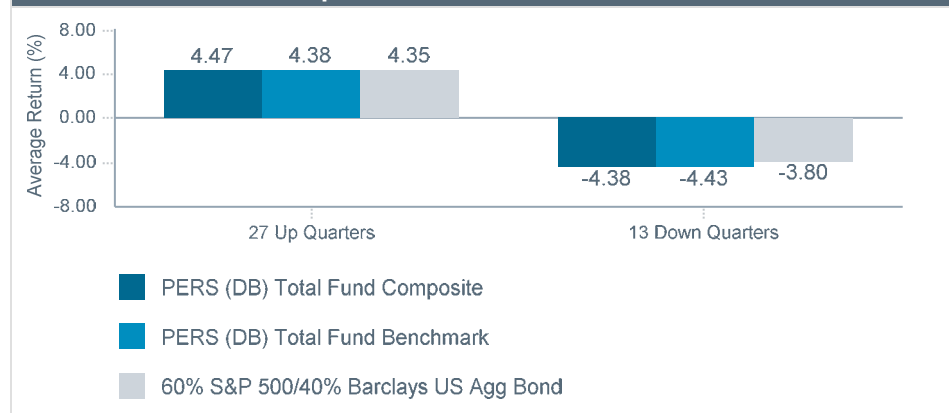
MPT Stats

	5 Years	10 Years
Maximum Return	7.87	12.34
Minimum Return	-9.24	-13.81
Standard Deviation	7.40	11.11
vs. PERS (DB) Total Fund Benchmark		
Info Ratio	0.69	0.33
Tracking Error	0.90	0.90
Alpha	0.78	0.37
vs. S&P 500 Index (Cap Wtd)		
Beta	0.54	0.65
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.00	0.46

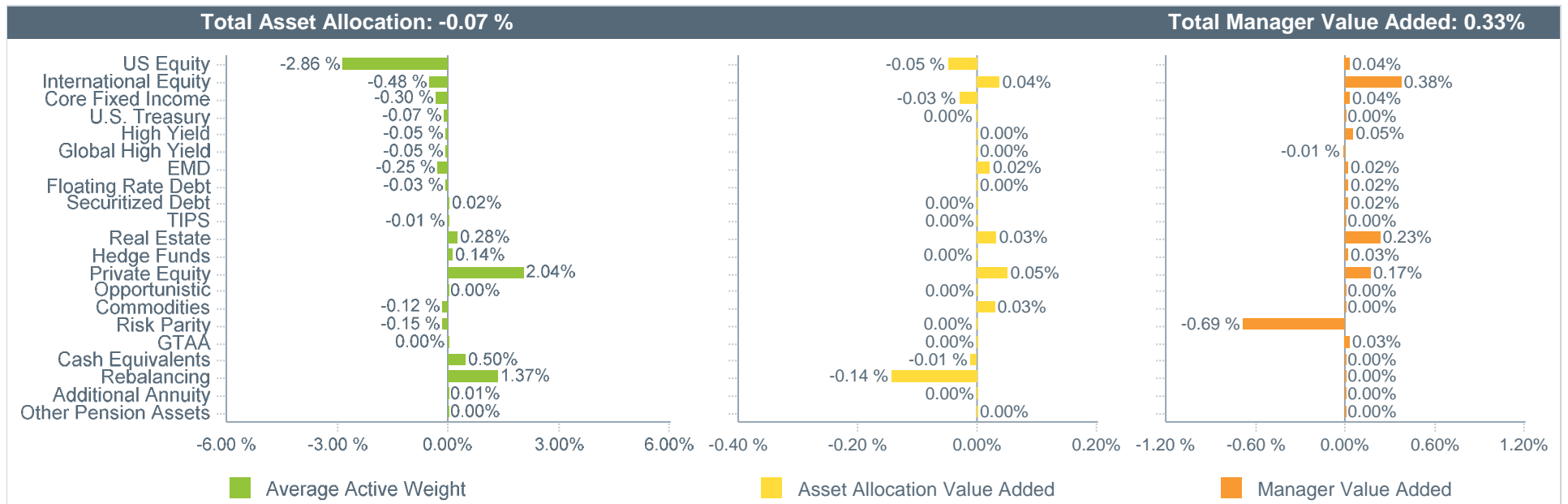
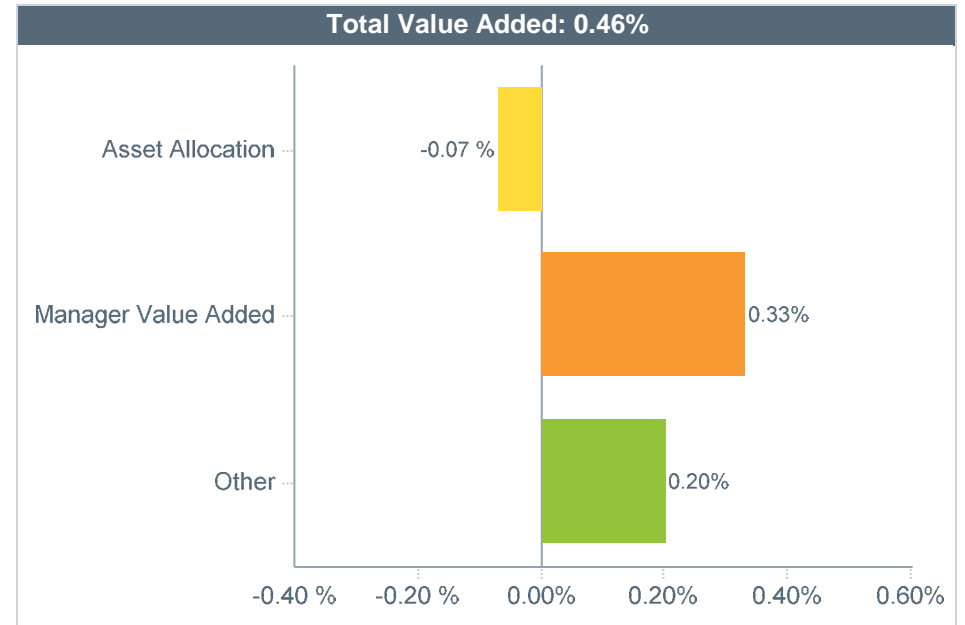
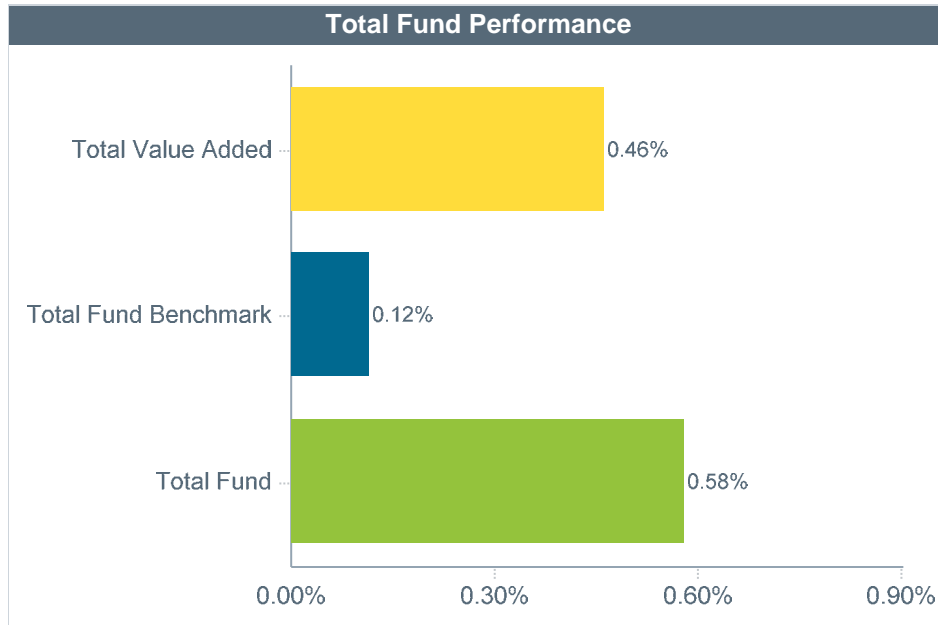
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	14,387,684,343	19.32	22.30
International Equity	12,980,813,618	17.43	18.60
Core Fixed Income	6,741,368,832	9.05	9.50
U.S. Treasury	792,946,130	1.07	1.00
High Yield	2,169,603,677	2.91	3.00
Global High Yield	713,721,774	0.96	1.00
EMD	4,390,659,561	5.90	6.00
Floating Rate Debt	277,973,560	0.37	0.50
Securitized Debt	784,089,194	1.05	1.00
TIPS	721,901,196	0.97	1.00
Real Estate	8,291,168,497	11.14	10.00
Hedge Funds	5,988,964,741	8.04	8.00
Private Equity	9,079,491,025	12.19	10.00
Opportunistic	80,042,166	0.11	0.10
Commodities	600,409,143	0.81	1.00
Risk Parity	3,508,155,744	4.71	5.00
GTAA	1,478,008,198	1.99	2.00
Cash Equivalents	560,468,872	0.75	0.00
Rebalancing	885,998,294	1.19	0.00
Additional Annuity	18,018,978	0.02	0.00
Other Pension Assets	2,397,173	0.00	0.00
Total Fund	74,453,884,715	100.00	100.00

Up/Down Markets - 10 Years



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

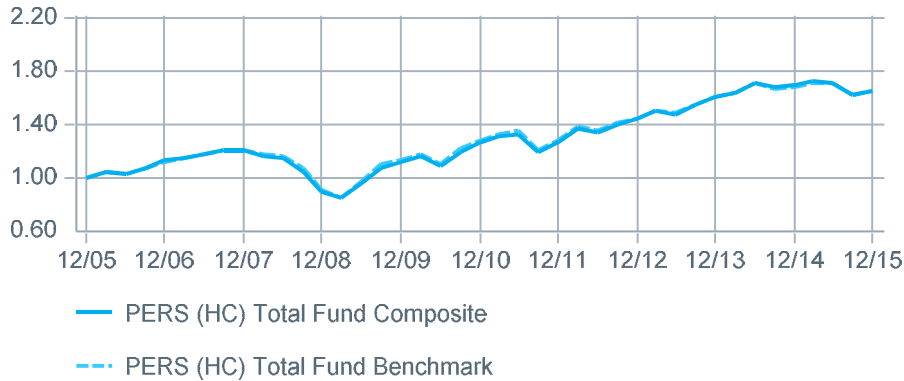


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- PERS (HC) has earned a return of 0.7% for each unit of risk over the trailing 5-year period and 0.4% 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



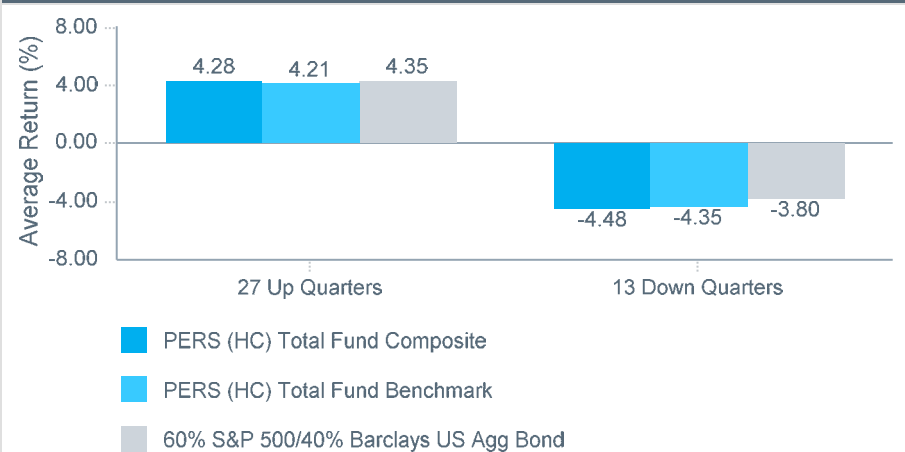
MPT Stats

	5 Years	10 Years
Maximum Return	8.58	12.96
Standard Deviation	8.56	11.26
Minimum Return	-10.71	-14.68
vs. PERS (HC) Total Fund Benchmark		
Info Ratio	0.83	0.02
Tracking Error	0.40	0.79
Alpha	0.21	0.02
vs. S&P 500 Index (Cap Wtd)		
Beta	0.63	0.66
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	0.66	0.39

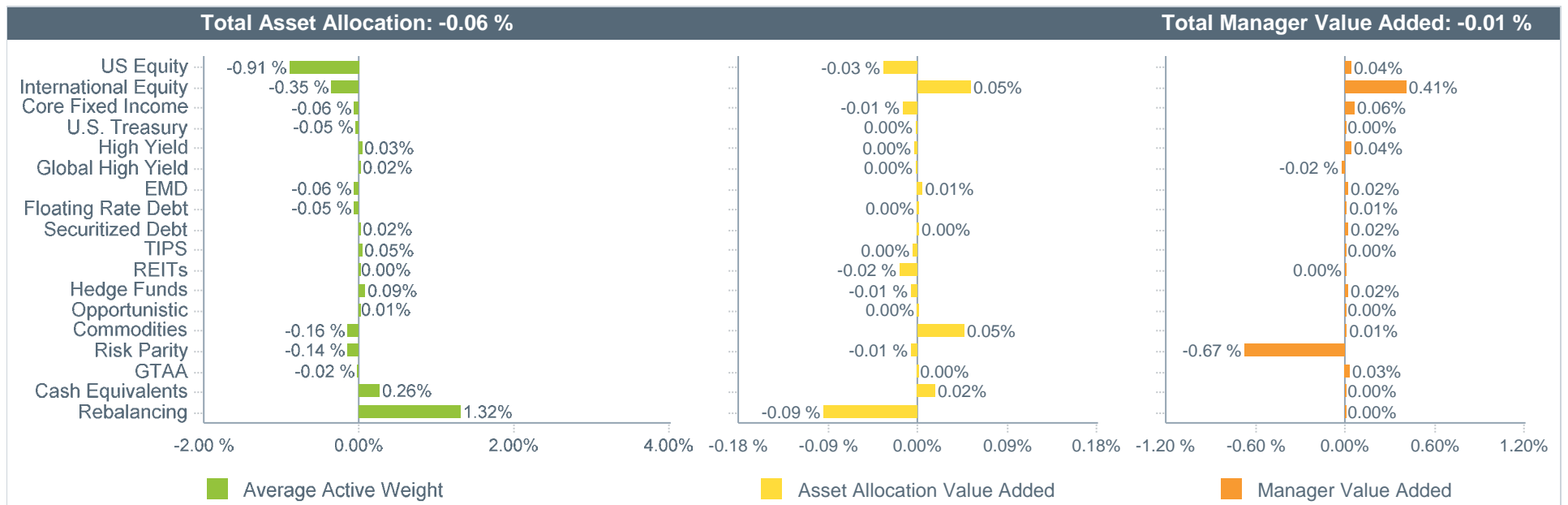
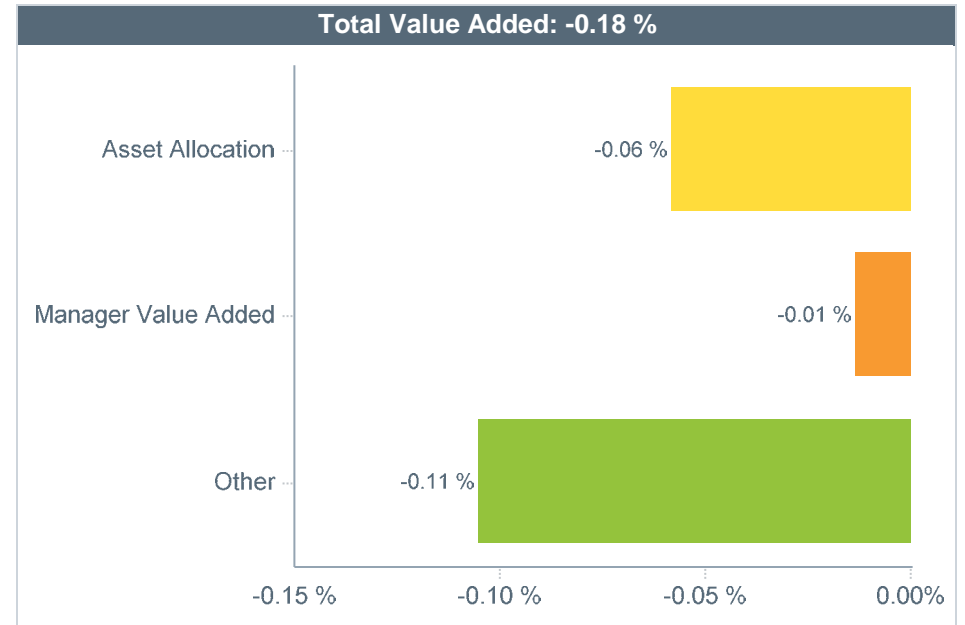
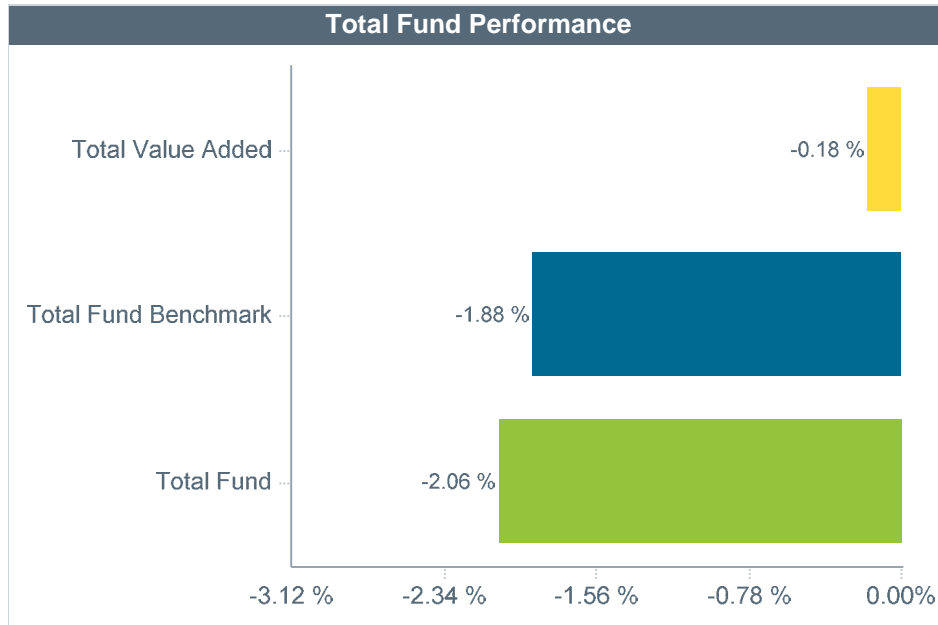
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	2,570,070,709	23.90	24.40
International Equity	2,171,798,823	20.19	20.50
Core Fixed Income	1,717,017,177	15.96	16.50
U.S. Treasury	110,160,092	1.02	1.00
High Yield	261,685,646	2.43	2.50
Global High Yield	161,604,360	1.50	1.50
EMD	644,898,547	6.00	6.00
Floating Rate Debt	27,775,059	0.26	0.50
Securitized Debt	109,992,215	1.02	1.00
TIPS	542,334,588	5.04	5.00
REITs	670,910,373	6.24	6.00
Hedge Funds	648,908,932	6.03	6.00
Opportunistic	12,458,635	0.12	0.10
Commodities	188,814,375	1.76	2.00
Risk Parity	522,457,170	4.86	5.00
GTAA	214,330,852	1.99	2.00
Cash Equivalents	37,274,078	0.35	0.00
Rebalancing	142,672,221	1.33	0.00
Total Fund	10,755,163,852	100.00	100.00

Up/Down Markets - 10 Years



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

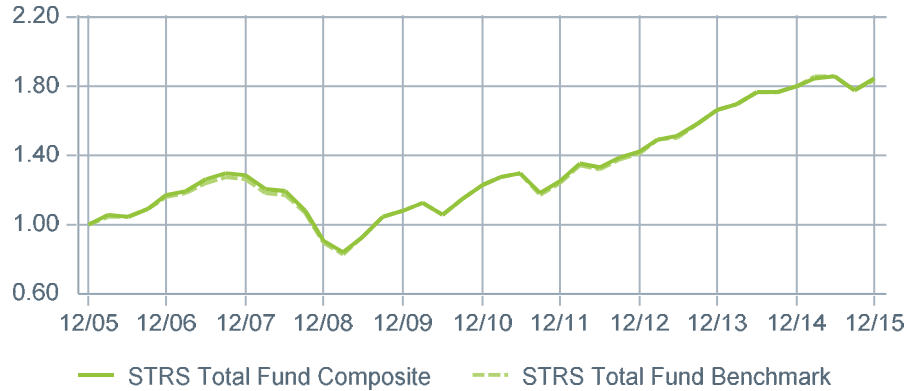


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- STRS 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 stronger up-market and down-market capture characteristics over the past ten years.

Growth of \$1 - 10 Years



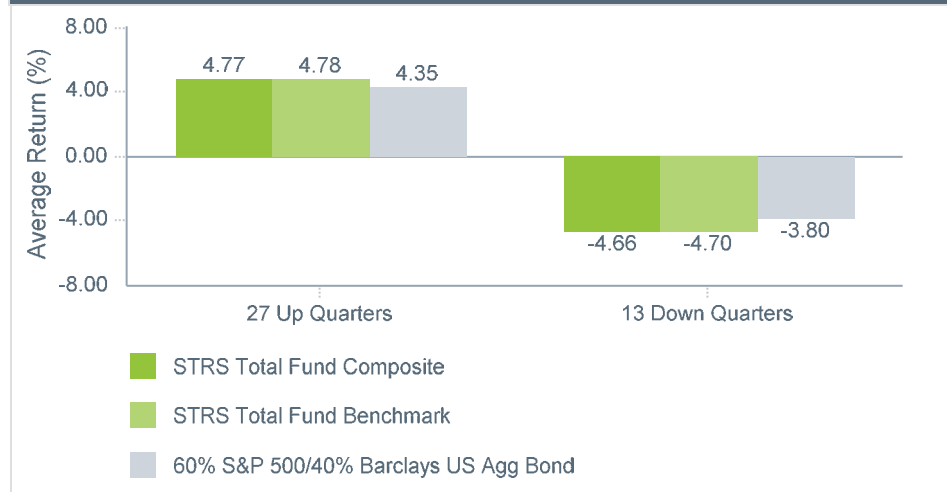
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	21,863,713,957	30.90	31.00
International Equity	18,680,011,628	26.40	26.00
Fixed Income	11,411,258,267	16.13	18.00
Real Estate	7,729,623,800	10.92	10.00
Opportunistic (Incl. Hedge Funds)	5,206,166,543	7.36	7.00
Private Equity	4,590,430,907	6.49	7.00
Cash Equivalents	1,274,842,310	1.80	1.00
Total Fund	70,756,047,412	100.00	100.00

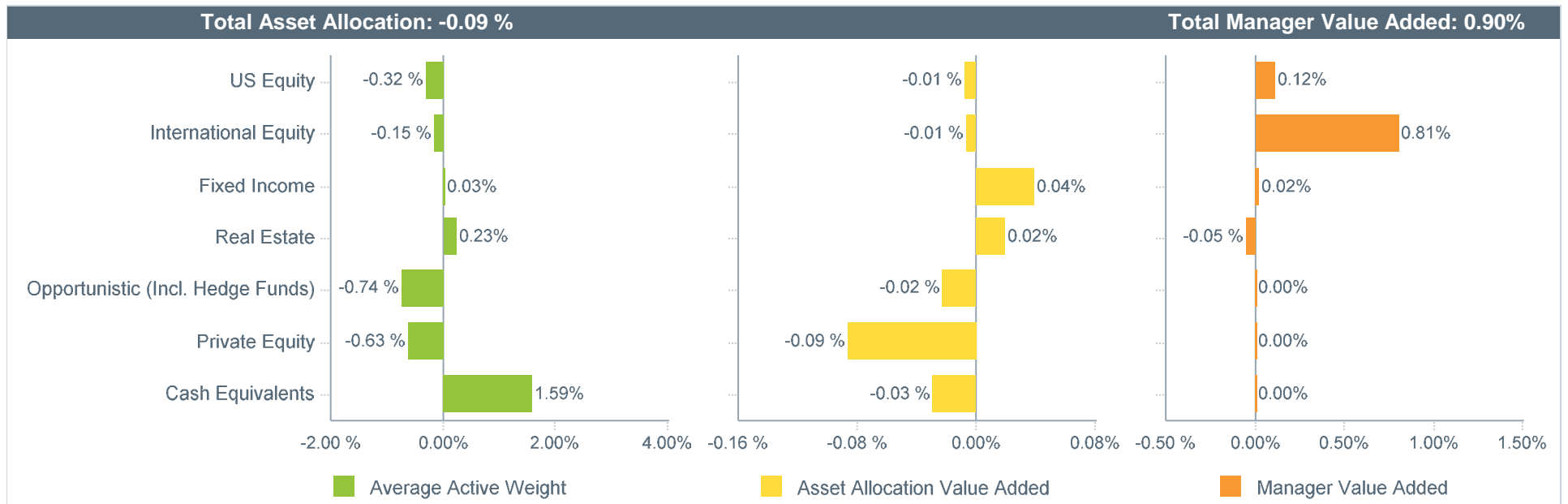
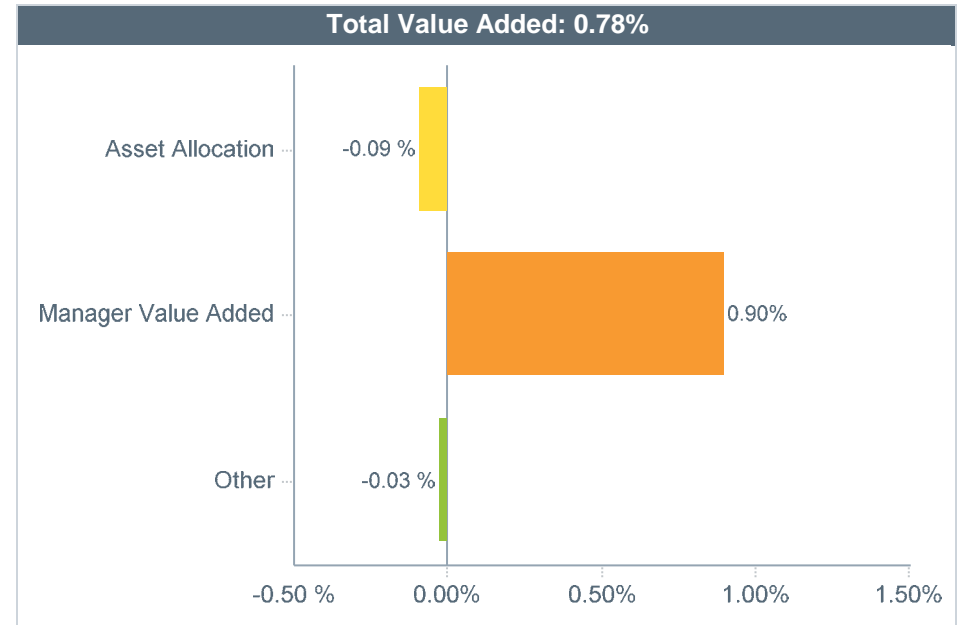
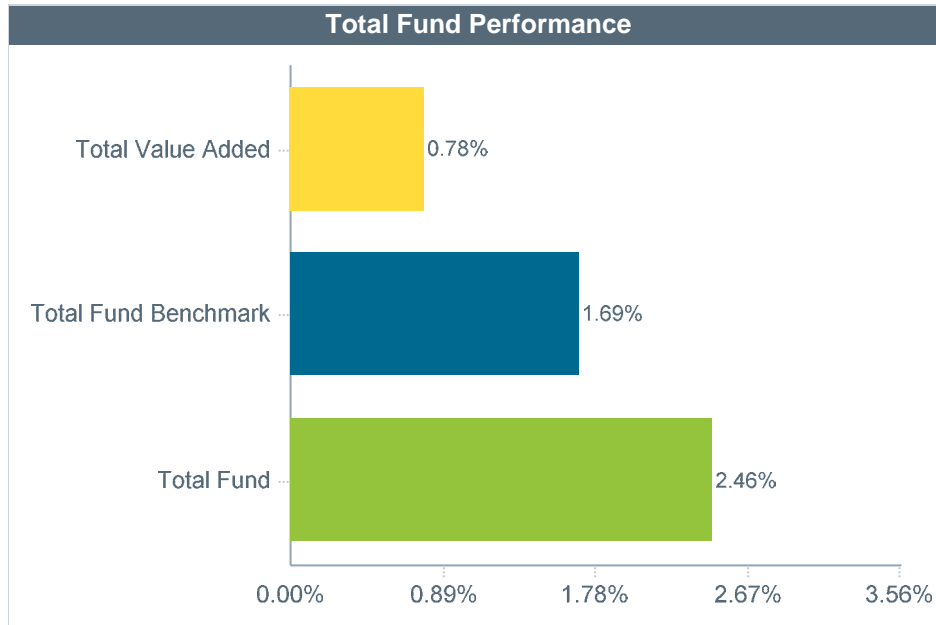
MPT Stats

	5 Years	10 Years
Maximum Return	8.11	12.25
Minimum Return	-8.92	-15.99
Standard Deviation	7.44	11.46
vs. STRS Total Fund Benchmark		
Info Ratio	0.02	0.05
Tracking Error	0.55	0.66
Alpha	0.49	0.08
vs. S&P 500 Index (Cap Wtd)		
Beta	0.57	0.68
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.12	0.48

Up/Down Markets - 10 Years



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

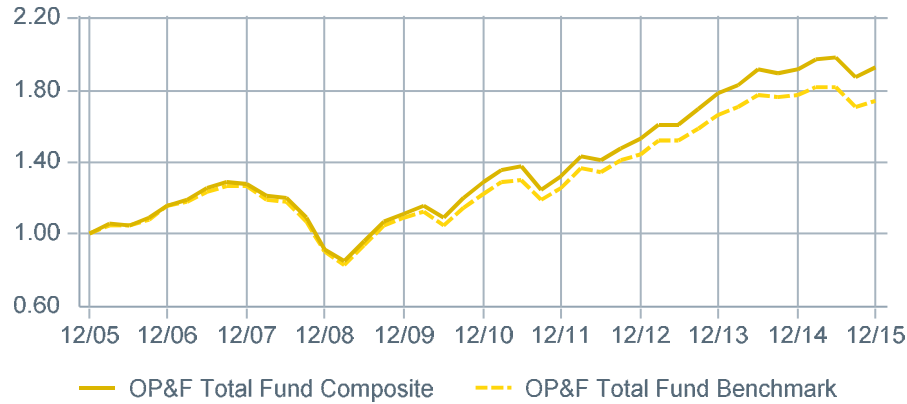


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- OP&F has earned a return of 1.0% 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 stronger up-market and down-market capture characteristics over the past ten years.

Growth of \$1 - 10 Years



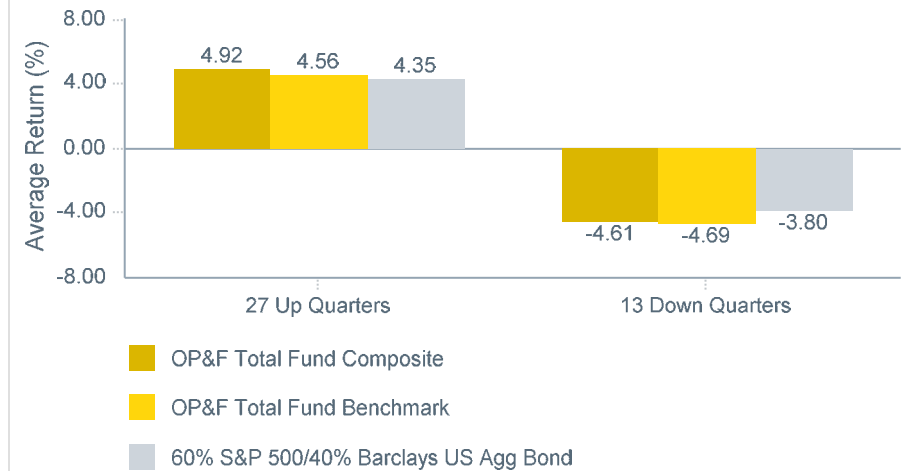
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	3,152,686,188	22.79	22.70
International Equity	2,991,198,365	21.63	21.10
High Yield Fixed Income	1,801,430,813	13.02	13.20
Global TIPS	1,045,963,309	7.56	8.20
Core Fixed Income	1,286,418,858	9.30	10.10
Mortgages	37,266,275	0.27	0.00
Real Estate	1,530,020,120	11.06	10.50
Private Markets	804,709,923	5.82	5.25
MLPs	776,424,283	5.61	6.85
Timber	232,793,114	1.68	2.10
Cash Equivalents	172,276,223	1.25	0.00
Total Fund	13,831,187,471	100.00	100.00

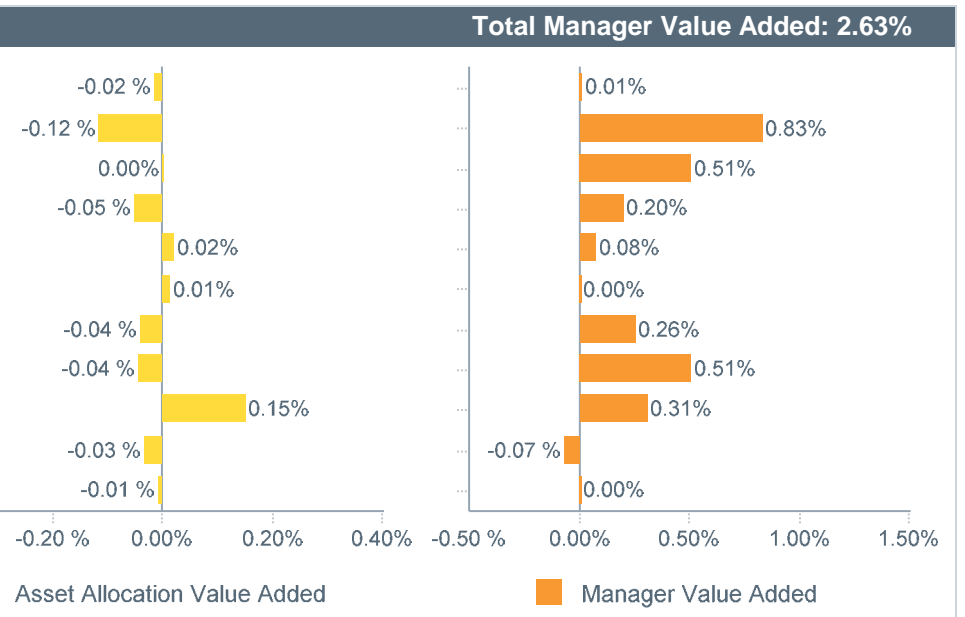
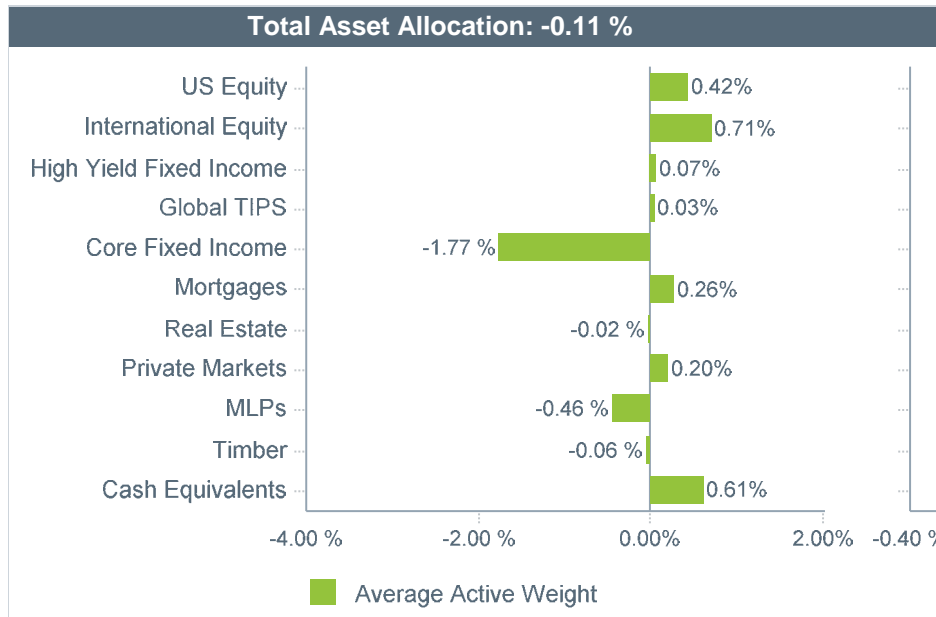
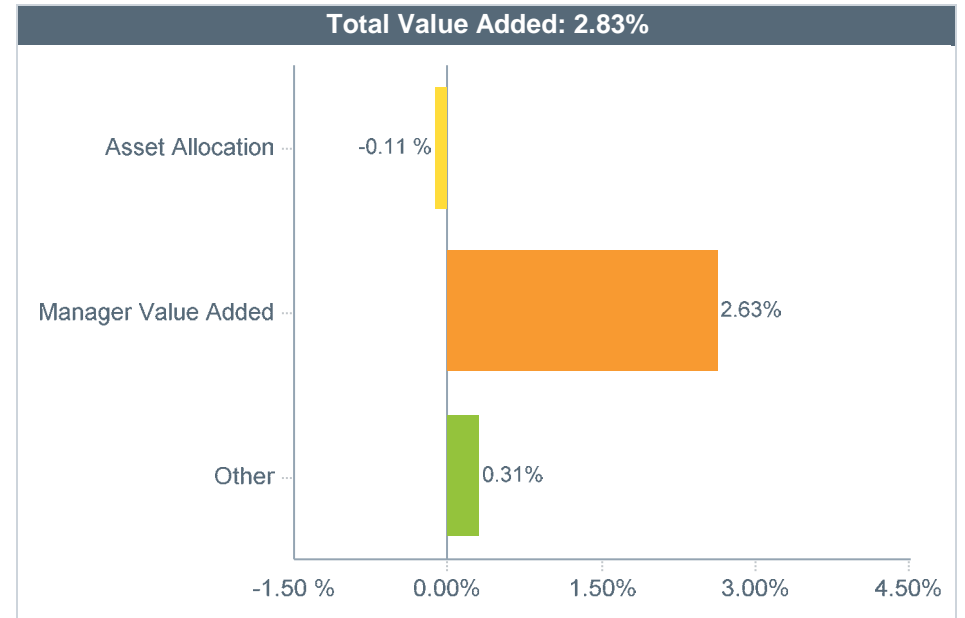
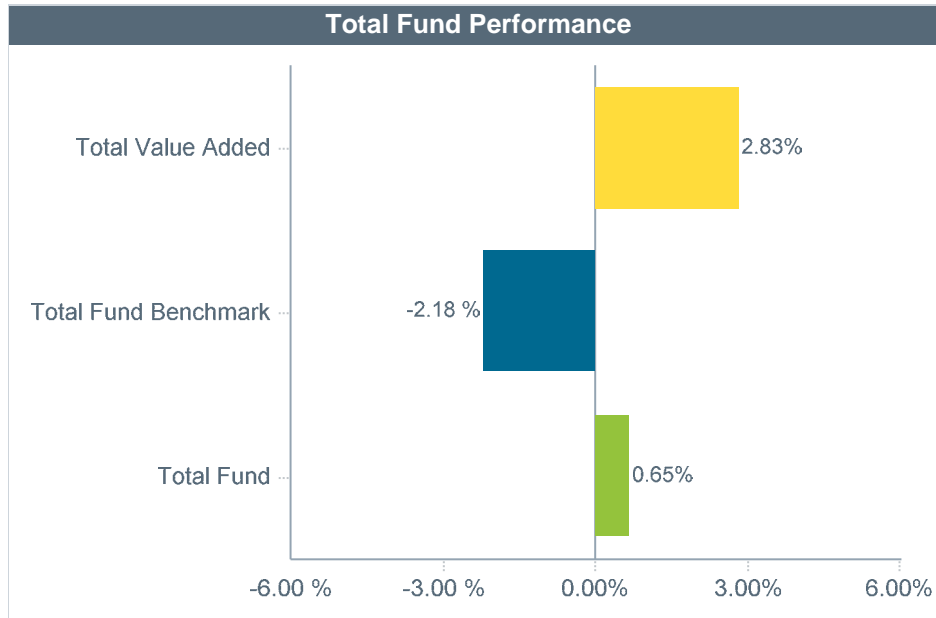
MPT Stats

	5 Years	10 Years
Maximum Return	8.40	13.00
Minimum Return	-9.75	-15.45
Standard Deviation	8.34	11.84
vs. OP&F Total Fund Benchmark		
Info Ratio	1.18	1.13
Tracking Error	0.97	0.95
Alpha	0.73	0.95
vs. S&P 500 Index (Cap Wtd)		
Beta	0.61	0.70
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.00	0.51

Up/Down Markets - 10 Years



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

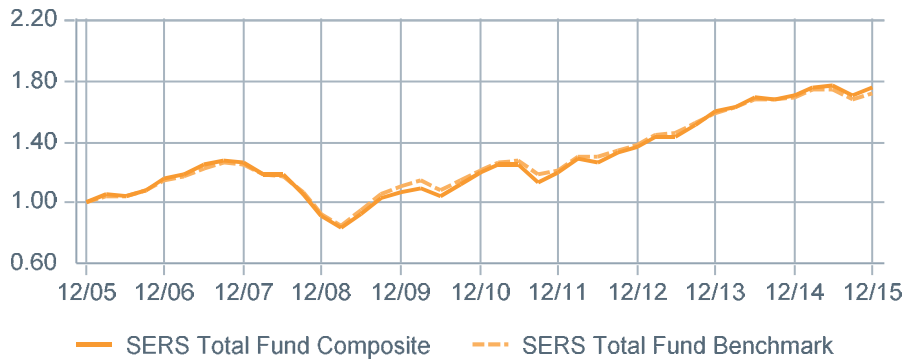


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- SERS has 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, SERS has exhibited similar up-market and larger down-market capture characteristics over the past ten years.

Growth of \$1 - 10 Years



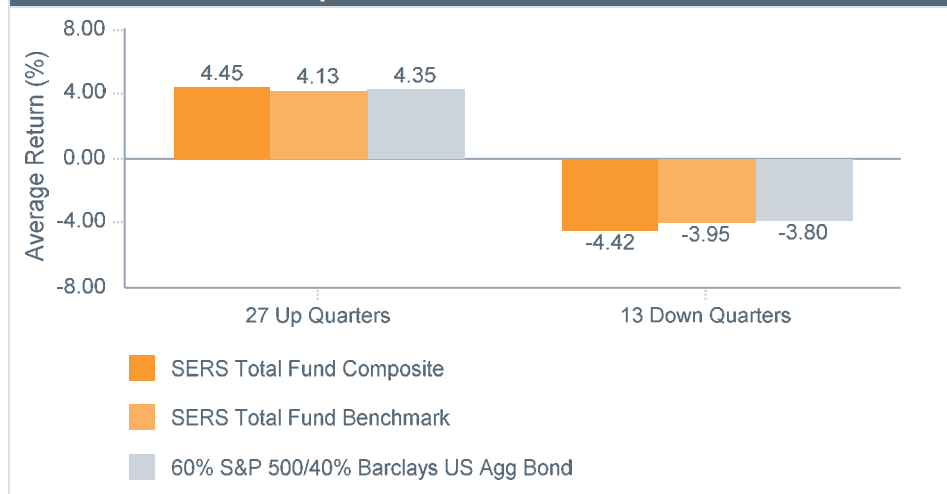
MPT Stats

	5 Years	10 Years
Maximum Return	8.11	11.01
Minimum Return	-9.12	-13.65
Standard Deviation	7.55	10.92
vs. SERS Total Fund Benchmark		
Info Ratio	0.50	0.16
Tracking Error	1.66	1.79
Alpha	-0.52	-0.19
vs. S&P 500 Index (Cap Wtd)		
Beta	0.56	0.64
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	1.06	0.46

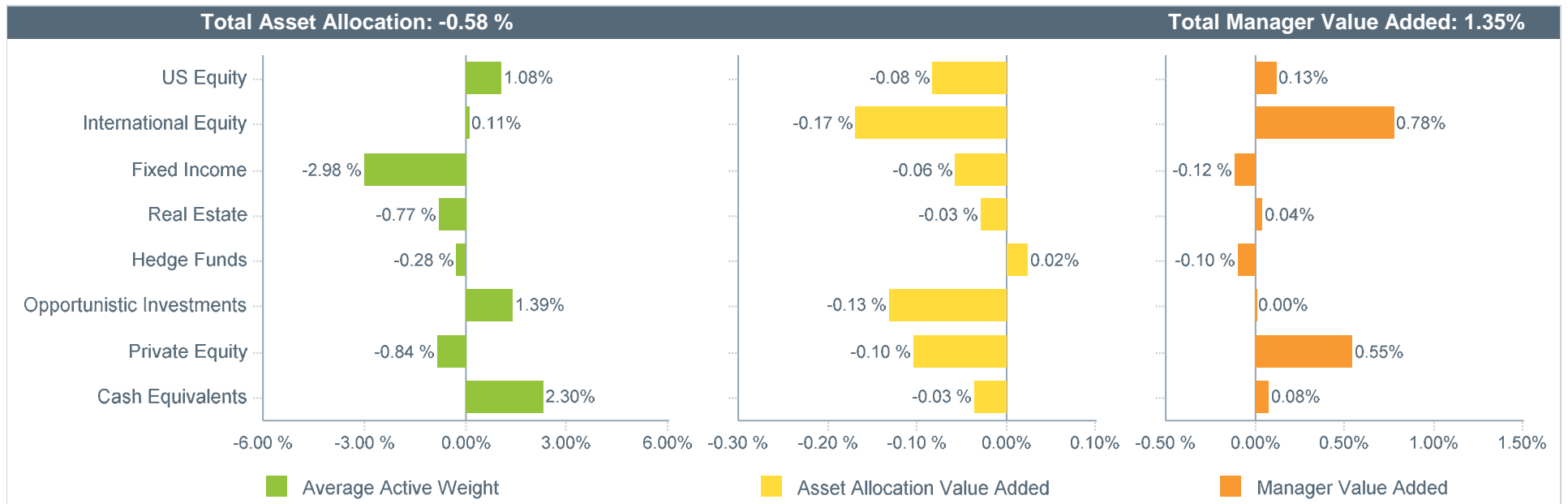
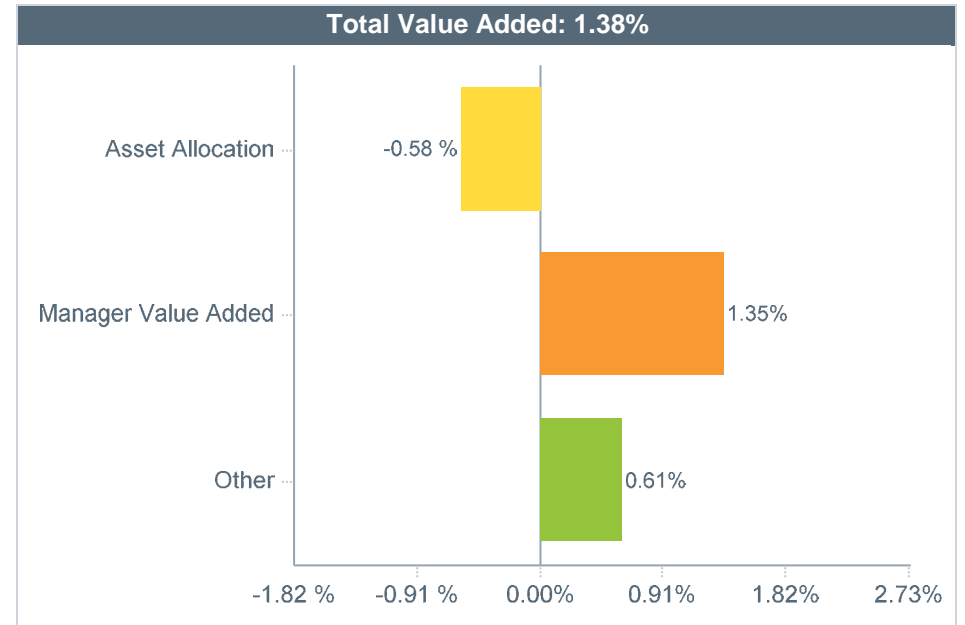
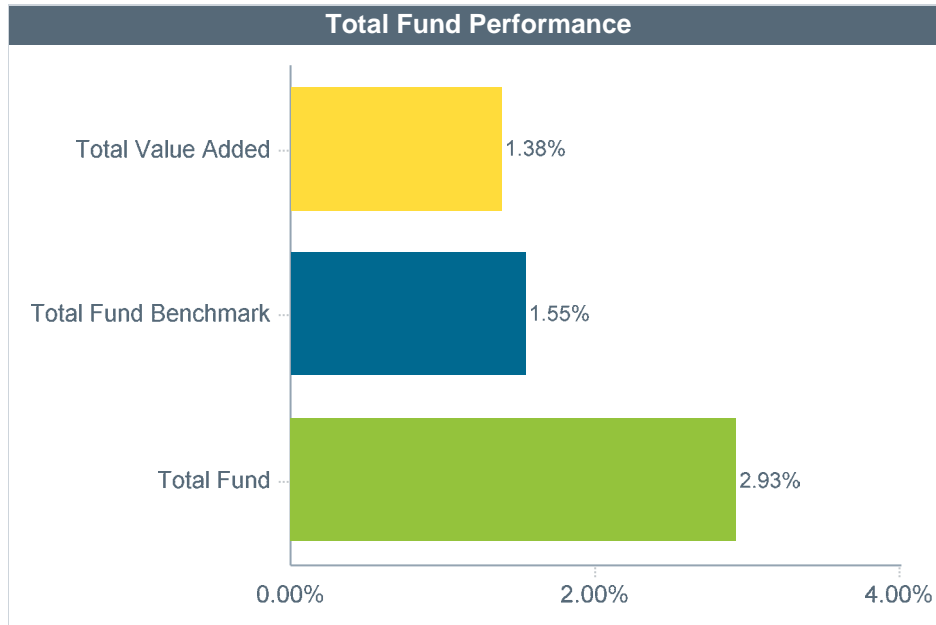
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	2,842,892,892	22.98	22.50
International Equity	2,764,775,482	22.35	22.50
Fixed Income	1,986,101,218	16.06	19.00
Real Estate	1,845,412,906	14.92	12.00
Hedge Funds	1,302,268,260	10.53	13.00
Opportunistic Investments	274,424,636	2.22	0.00
Private Equity	1,152,060,228	9.31	10.00
Cash Equivalents	200,576,078	1.62	1.00
Total Fund	12,368,511,700	100.00	100.00

Up/Down Markets - 10 Years



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

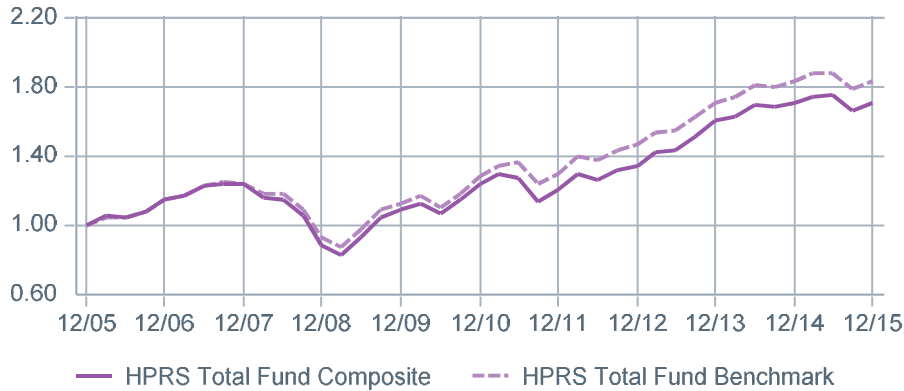


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- HPRS has earned a return of 0.8% for each unit of risk over the trailing 5-year period and 0.4% 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



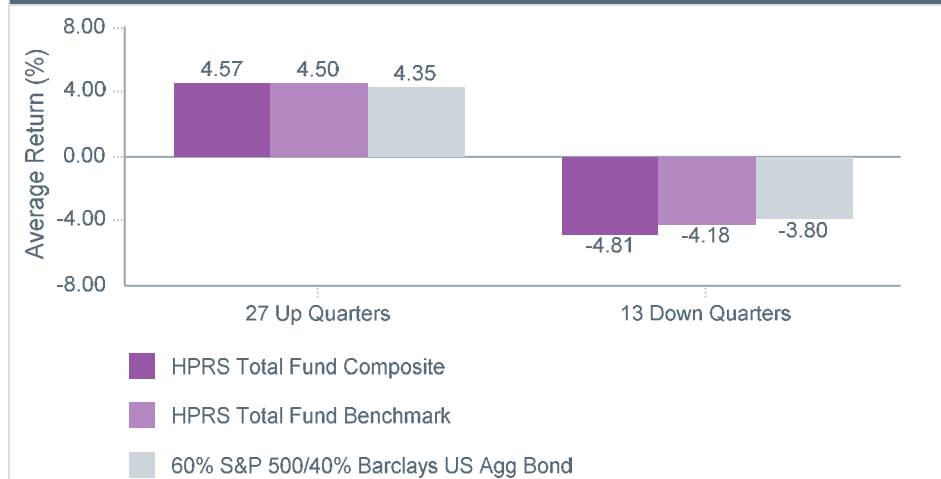
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	282,739,120	35.00	35.00
International Equity	155,187,521	19.21	20.00
Fixed Income	160,087,532	19.82	22.50
Real Estate	31,437,859	3.89	5.00
Hedge Funds	82,786,725	10.25	12.50
Private Equity	84,984,813	10.52	5.00
Cash Equivalents	10,605,902	1.31	0.00
Total Fund	807,829,472	100.00	100.00

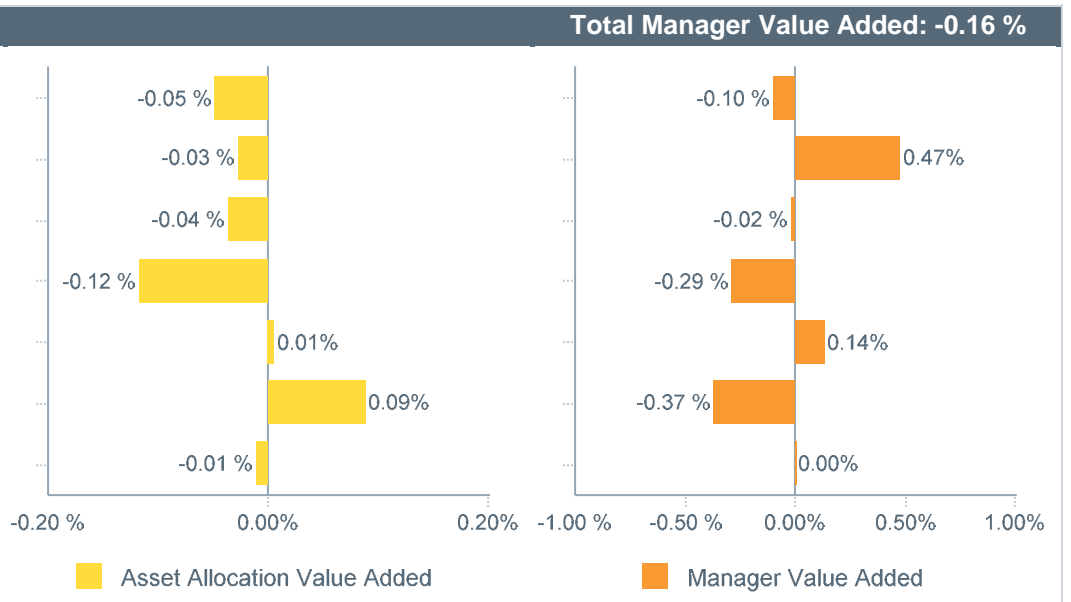
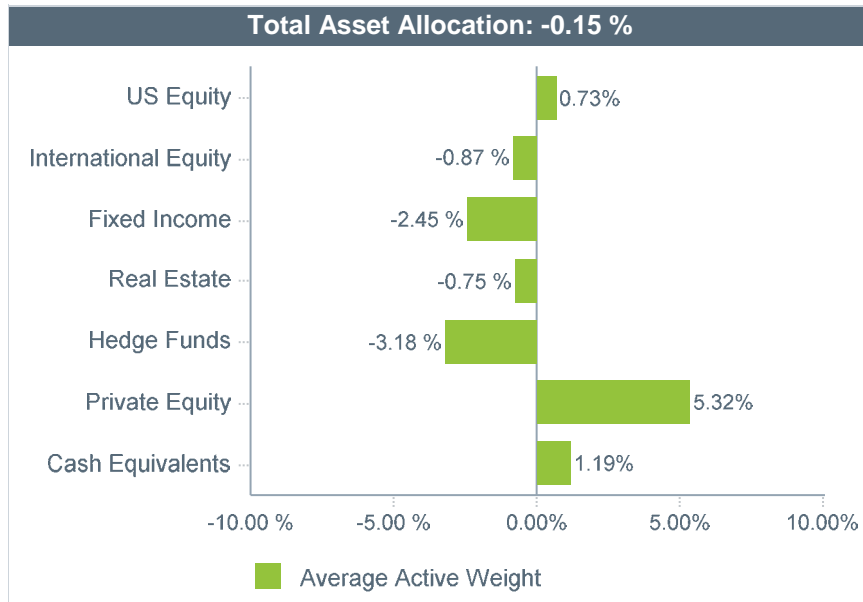
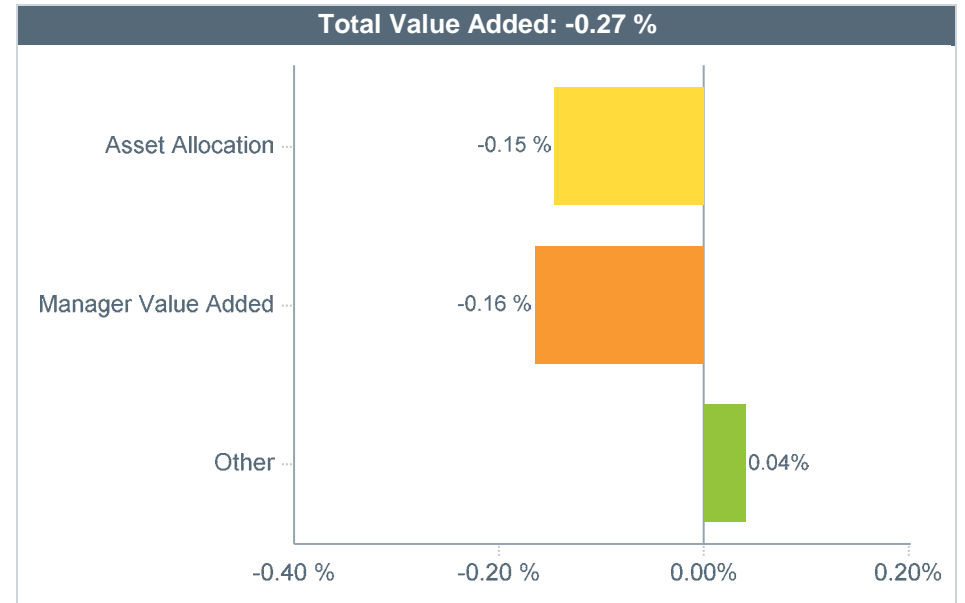
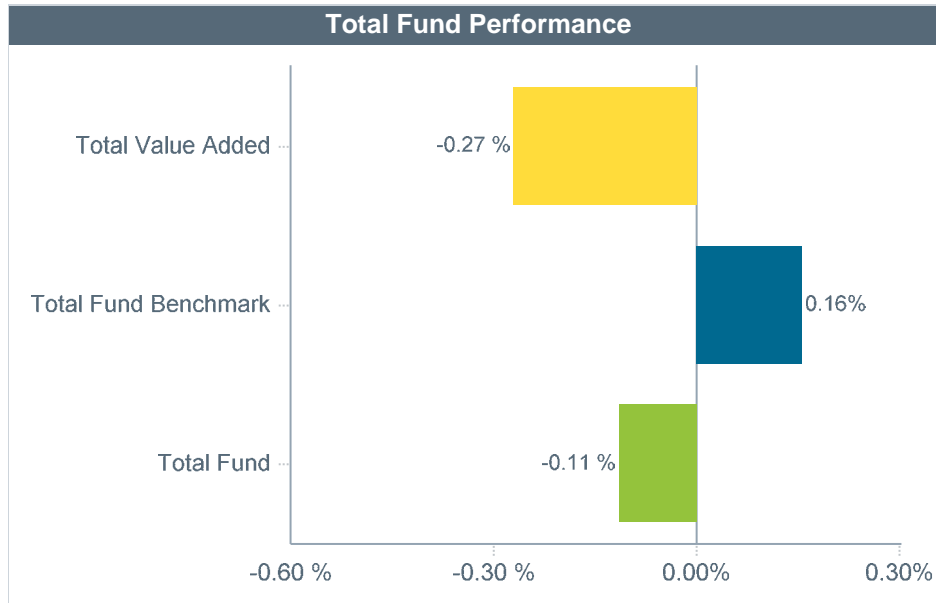
MPT Stats

	5 Years	10 Years
Maximum Return	8.19	12.56
Minimum Return	-11.24	-16.16
Standard Deviation	8.76	11.70
vs. HPRS Total Fund Benchmark		
Info Ratio	-0.38	-0.38
Tracking Error	1.78	1.67
Alpha	-1.70	-1.19
vs. S&P 500 Index (Cap Wtd)		
Beta	0.67	0.70
vs. BofA ML 3 Mo US T-Bill Index		
Sharpe Ratio	0.78	0.41

Up/Down Markets - 10 Years



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



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

Ohio Retirement Study Council
HPRS Total Fund Performance vs. Peers

As of December 31, 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
HPRS	807,829	-2.91	-0.11	8.43	6.66	9.90	5.49	6.73	19.59	11.45	-2.85
HPRS Total Fund Benchmark		-2.45	0.21	7.80	7.47	10.14	6.27	7.03	16.79	13.07	1.20
Difference		-0.46	-0.32	0.63	-0.81	-0.24	-0.78	-0.30	2.80	-1.62	-4.05
<i>All Public Plans > \$1B-TF Median</i>		-2.70	0.07	6.80	6.84	9.76	5.87	6.61	15.76	13.36	0.80
Rank		58	55	18	56	40	70	48	8	89	99
Population		85	82	81	81	78	73	89	85	87	91
<i>All Public Plans \$250M to \$1B-TF Median</i>		-2.37	0.12	7.31	7.16	9.82	5.66	6.35	16.37	12.91	1.09
Rank		80	63	29	70	48	60	39	19	84	100
Population		42	42	42	41	40	39	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) adopted a new asset allocation policy during Q4 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
PERS (HC 115) Total Fund	705,653	-4.70	-3.13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Total Fund Benchmark		-4.49	-3.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-0.21	-0.03	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>		-2.37	0.12	7.31	7.16	9.82	5.66	6.35	16.37	12.91	1.09
Rank		100	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Population		42	42	42	41	40	39	52	57	55	55
PERS (HC 115) US Equity	68,440	-1.52	0.68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Russell 3000 Index		-1.43	0.48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-0.09	0.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) International Equity	56,783	-8.36	-4.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) International Equity Custom Benchmark		-10.11	-6.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		1.75	2.08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Core Fixed Income	49,133	0.86	0.96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Core Fixed Income Custom Benchmark		0.65	0.56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.21	0.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) EMD	14,017	-5.92	-6.82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) EMD Custom Benchmark		-5.63	-7.12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-0.29	0.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) High Yield	7,049	-5.70	-2.74	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays U.S. High Yield Index		-6.82	-4.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		1.12	1.73	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) TIPS	14,055	-1.76	-1.43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barclays U.S. TIPS Index		-1.78	-1.44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.02	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) REITs	21,058	10.68	4.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DJ US Select Real Estate Securities TR Index		10.77	4.46	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-0.09	-0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Hedge Funds	20,826	-3.50	-1.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Hedge Funds Custom Benchmark		-3.63	-1.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.13	0.21	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 December 31, 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
PERS (HC 115) Opportunistic	701	1.00	1.12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Opportunistic Custom Benchmark		0.81	0.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.19	0.28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Commodities	7,048	-32.47	-32.44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S&P Goldman Sachs Commodity Index		-32.72	-32.86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.25	0.42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Risk Parity	20,380	-10.81	-10.42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Risk Parity Custom Benchmark		1.29	3.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		-12.10	-13.72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) GTAA	6,913	-1.47	0.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) GTAA Custom Benchmark		-1.76	-0.69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference		0.29	1.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Short Term Liquidity	418,721	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BofA ML 3 Mo US T-Bill Index		0.04	0.05	0.05	0.07	0.10	1.24	0.04	0.07	0.11	0.10
Difference		N/A	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 December 31, 2015

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	68,440,311	9.70	9.80
International Equity	56,783,200	8.05	8.10
Core Fixed Income	49,132,692	6.96	7.00
High Yield	7,049,483	1.00	1.00
EMD	14,017,338	1.99	2.00
TIPS	14,054,760	1.99	2.00
REITs	21,058,074	2.98	3.00
Hedge Funds	20,826,476	2.95	3.00
Opportunistic	701,201	0.10	0.10
Commodities	7,047,983	1.00	1.00
Risk Parity	20,379,537	2.89	3.00
GTAA	6,912,682	0.98	1.00
Cash Equivalents	527,666	0.07	0.00
Short Term Liquidity	418,721,413	59.34	59.00
Total Fund	705,652,815	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 12/31/2015

(annualized fees shown in basis points)							
	US Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	8	27	13	63	45	111	158
■ PERS (HC)	1	4	3	0	7	-	17
■ PERS (HC 115)	0	0.1	0.1	0	0.2	-	0.6
■ STRS	10	19	8	47	84	69	180
■ OP&F	34	29	49	219	74	200	-
■ SERS	27	32	22	111	179	141	136
■ HPRS	31	63	43	152	97	97	97

- Fees for Private Equity are based on committed capital, with the exception of OP&F, which is based on AUM.
- 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).
- OP&F Alternatives include Timber and MLPs.
- 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 12/31/2015

	Total Fund	US Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	66%	21%	76%	46%	100%	88%	100%	100%
■ PERS (HC)	44%	21%	76%	31%	0%	79%	-	100%
■ PERS (HC 115)	18%	21%	76%	26%	0%	78%	-	100%
■ STRS	29%	10%	43%	15%	13%	84%	96%	100%
■ OP&F	100%	100%	100%	100%	100%	100%	100%	-
■ SERS	99%	100%	100%	100%	100%	89%	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.
- SERS Alternatives include Opportunistic Investments.
- HPRS Alternatives include Private Equity and Hedge Funds.

Percentage of Actively Managed Assets – as of 12/31/2015

	Total Fund	US Equity	International Equity	Fixed Income	Real Estate	Alternatives	Private Equity	Hedge Funds
■ PERS (DB)	83%	32%	76%	100%	100%	100%	100%	100%
■ PERS (HC)	73%	32%	76%	100%	0%	100%	-	100%
■ PERS (HC 115)	89%	32%	76%	100%	0%	100%	-	100%
■ STRS	86%	60%	98%	100%	85%	100%	100%	100%
■ OP&F	87%	55%	100%	100%	100%	100%	100%	-
■ SERS	78%	48%	58%	100%	97%	100%	100%	100%
■ HPRS	76%	47%	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.
- SERS Alternatives include Opportunistic Investments.
- HPRS Alternatives include Private Equity and Hedge Funds.

Custom Benchmark Glossary

PERS (DB) Total Fund Custom Benchmark:

- 22.3% Russell 3000 Index
- 18.6% PERS (DB) International Equity Custom Benchmark
- 9.5% PERS (DB) Core Fixed Income Custom Benchmark
- 1.0% Barclays U.S. Treasury Index
- 3.0% Barclays U.S. High Yield Index
- 1.0% Barclays Global High Yield Index
- 6.0% PERS (DB) EMD Custom Benchmark
- 0.5% CS Leveraged Loan Index
- 1.0% Barclays CMBS + 2%
- 1.0% Barclays U.S. TIPS Index
- 10.0% PERS (DB) Real Estate Custom Benchmark
- 8.0% PERS (DB) Hedge Funds Custom Benchmark
- 10.0% PERS (DB) Private Equity Custom Benchmark
- 0.1% PERS (DB) Opportunistic Custom Benchmark
- 1.0% S&P Goldman Sachs Commodity Index (TR)
- 5.0% PERS (DB) Risk Parity Custom Benchmark
- 2.0% PERS (DB) GTAA Custom Benchmark

PERS (HC) Total Fund Custom Benchmark:

- 24.4% Russell 3000 Index
- 20.5% PERS (HC) International Equity Custom Benchmark
- 16.5% PERS (HC) Core Fixed Income Custom Benchmark
- 1.0% Barclays U.S. Treasury Index
- 2.5% Barclays U.S. High Yield Index
- 1.5% Barclays Global High Yield Index
- 6.0% PERS (HC) EMD Custom Benchmark
- 0.5% CS Leveraged Loan Index
- 1.0% Barclays CMBS + 2%
- 5.0% Barclays U.S. TIPS Index
- 6.0% Dow Jones U.S. Select Real Estate Securities TR Index
- 6.0% PERS (HC) Hedge Funds Custom Benchmark
- 0.1% PERS (HC) Opportunistic Custom Benchmark
- 2.0% S&P Goldman Sachs Commodity Index (TR)
- 5.0% PERS (HC) Risk Parity Custom Benchmark
- 2.0% PERS (HC) GTAA Custom Benchmark

PERS (HC 115) Total Fund Custom Benchmark:

- 9.8% Russell 3000 Index
- 8.1% PERS (HC 115) International Equity Custom Benchmark
- 7.0% PERS (HC 115) Core Fixed Income Custom Benchmark
- 1.0% Barclays U.S. High Yield Index
- 2.0% PERS (HC 115) EMD Custom Benchmark
- 2.0% Barclays U.S. TIPS Index
- 3.0% Dow Jones U.S. Select Real Estate Securities TR Index

- 3.0% PERS (HC 115) Hedge Funds Custom Benchmark
- 0.1% PERS (HC 115) Opportunistic Custom Benchmark
- 1.0% S&P Goldman Sachs Commodity Index (TR)
- 3.0% PERS (HC 115) Risk Parity Custom Benchmark
- 1.0% PERS (HC 115) GTAA Custom Benchmark
- 59.0% BofA ML 3 Mo US T-Bill Index

STRS Total Fund Custom Benchmark:

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

OP&F Total Fund Custom Benchmark:

- 22.7% Wilshire 5000 Index
- 21.1% MSCI ACW Ex US IMI Index (Net)
- 10.1% Barclays US Aggregate Bond Index
- 13.2% CS High Yield Dev. Countries Only Index
- 10.5% NCREIF ODCE (Net) (1 Quarter Lag)
- 5.25% Wilshire 5000 + 3% (1 Quarter Lag)
- 2.1% CPI + 5%
- 6.85% Alerian MLP Index
- 8.2% Bridgewater Custom GIPS Index

SERS Total Fund Custom Benchmark:

- 22.5% Russell 3000 Index
- 22.5% MSCI ACWI Ex US (Net) Index
- 19.0% Barclays US Aggregate Bond Index
- 12.0% NCREIF Property Index (1 Quarter Lag)
- 13.0% HFRI FOF Composite Index + 1%
- 10.0% Burgiss All Private Equity (1 Quarter Lag)
- 1.0% Citigroup 30 Day T-Bill Index

HPRS Total Fund Custom Benchmark:

- 35.0% Russell 3000 Index
- 20.0% MSCI ACWI Ex US Index
- 22.5% Barclays US Aggregate Bond Index
- 5.0% NCREIF Index
- 12.5% HFRI FOF Composite Index
- 5.0% 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) Real Estate Custom Benchmark:

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

PERS (DB) Private Equity Custom Benchmark:

- State Street Private Equity Index
- Prior to 2015: 60% Russell 3000 Index, 40% MSCI ACWI Ex US IMI plus 300 basis points

PERS (DB) Hedge Funds Custom Benchmark:

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

PERS (DB) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (DB) Risk Parity Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (DB) GTAA Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC) 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:

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

PERS (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

PERS (HC 115) International Equity Custom Benchmark:

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

PERS (HC 115) Core Fixed Income Custom Benchmark:

- 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

Custom Benchmark Glossary

PERS (HC 115) EMD Custom Benchmark:

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

PERS (HC 115) Hedge Funds Custom Benchmark:

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

PERS (HC 115) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) Risk Parity Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) GTAA Custom Benchmark:

- The market weight of underlying portfolio benchmarks

STRS International Equity Custom Benchmark:

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

STRS Real Estate Custom Benchmark:

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

STRS Private Equity Custom Benchmark:

- Russell 3000 + 100 basis points

STRS Opportunistic Custom Benchmark:

- Russell 3000 - 100 basis points

OP&F Private Equity Custom Benchmark:

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

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.

PORTLAND

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NEW YORK

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