



Investment Performance Analysis

Ohio Retirement Study Council

Period Ended: December 31, 2017



RVK Honored to Receive *Greenwich Quality Leader Award*

- **Greenwich Associates*** conducted interviews with over 1,000 senior professionals of large plan sponsors and ranked opinions of their investment consulting relationships on a series of key metrics, including, but not limited to:
 - Understanding Clients' Goals and Objectives
 - Advice on Long-term Asset Allocation
 - Proactive Advice and Innovative Ideas
 - Credibility with the Board and/or Investment Committee
 - Knowledge of Investment Managers
 - Advice on DC Plan Structure and Design
 - Satisfaction with Manager Recommendations
 - Responsiveness to Client Requests and Needs
 - Competitive Fees
- **RVK is grateful to be 1 of 3 firms (among large US consultants) to receive this award for 2017**



As a valued client, we are humbled by your continued confidence and thankful for your support. From all of us here at RVK, thank you for the opportunity to serve you!

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 24 Emerging Markets (EM) countries. With 6,174 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 24 emerging market country indexes: *Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey* and United Arab Emirates*.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

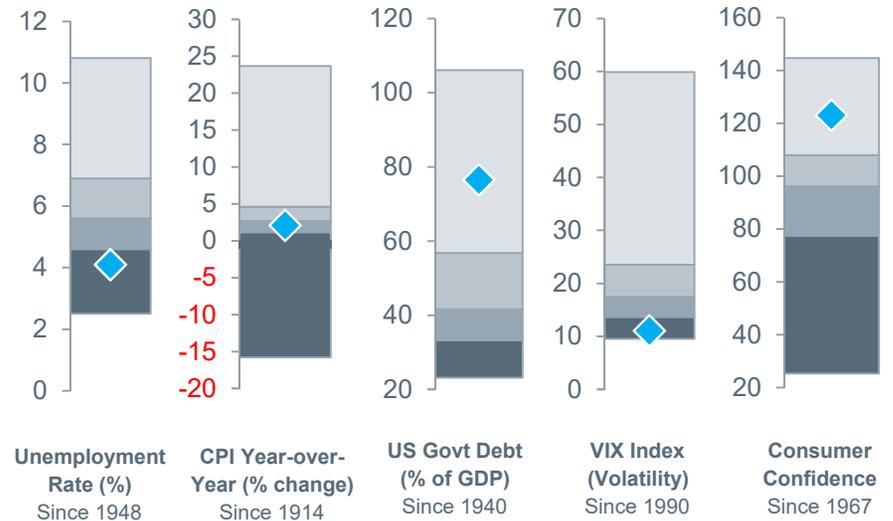
S&P Goldman Sachs Commodity: The **S&P Goldman Sachs Commodity Index** is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities. Components are weighted by their respective world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

Fourth Quarter Economic Environment

Key Economic Indicators

Price action across global financial markets continued to be driven by expectations of ongoing economic growth and generally accommodative central bank policies, with equity markets trading to record levels and global sovereign debt yields continuing to trade within recent ranges. The nominal Treasury curve continued to flatten over the quarter. Market participants suggest that recent and expected monetary policy actions, as well as expectations for increased Treasury issuance amidst fiscal stimulus policies, are driving short-maturity and mid-maturity yields higher. Comparatively, longer-dated yields proved stable, and reportedly continue to be heavily influenced by relatively modest expectations for sustained US economic growth and building inflation expectations. Finally, the US dollar continued to depreciate over the quarter, weakening by 1% against major currencies amidst continued economic improvements across developed international and emerging markets. The depreciation over the quarter contributed to a total dollar depreciation of nearly 10% for the year.

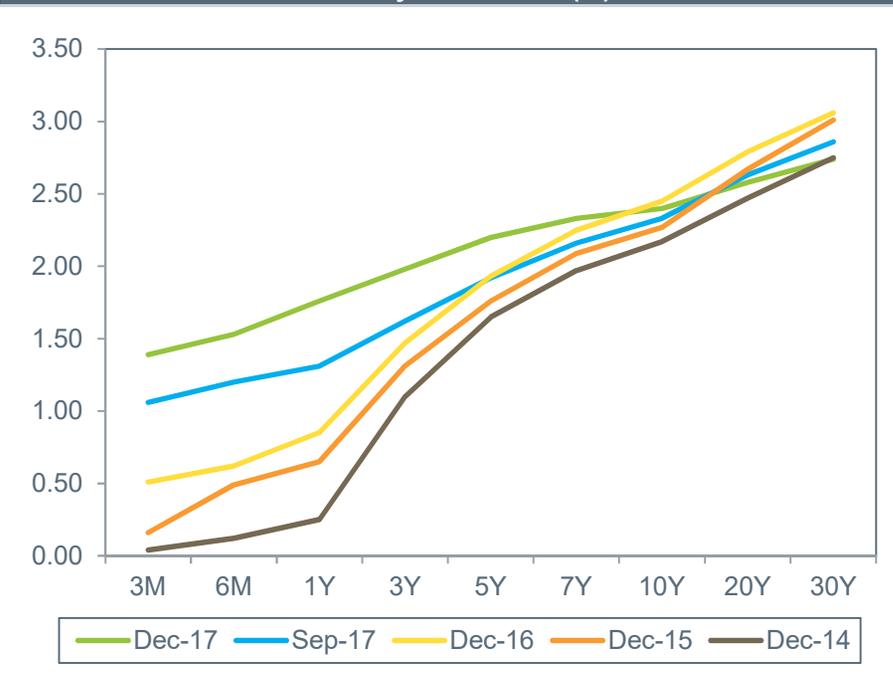
Key Economic Indicators



Economic Indicators

	Dec-17	Sep-17	Dec-16	Dec-14	20 Yr
Federal Funds Rate (%)	1.33 ▲	1.06	0.55	0.06	2.12
Breakeven Infl. - 1 Yr (%)	0.85 ▼	1.24	1.27	-0.21	N/A
Breakeven Infl. - 10 Yr (%)	1.98 ▲	1.85	1.97	1.68	N/A
CPI YoY (Headline) (%)	2.1 ▼	2.2	2.1	0.8	2.1
Unemployment Rate (%)	4.1 ▼	4.2	4.7	5.6	5.9
Real GDP YoY (%)	2.5 ▲	2.3	1.8	2.7	2.3
PMI - Manufacturing	59.3 ▼	60.2	54.3	54.7	52.4
USD Total Wtd Idx	87.47 ▼	88.10	95.72	85.07	86.73
WTI Crude Oil per Barrel (\$)	60.4 ▲	51.7	53.7	53.3	57.5
Gold Spot per Oz (\$)	1,303 ▲	1,280	1,152	1,185	831

Treasury Yield Curve (%)



Market Performance (%)

	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	6.64	21.83	21.83	15.79	8.50
Russell 2000	3.34	14.65	14.65	14.12	8.71
MSCI EAFE (Net)	4.23	25.03	25.03	7.90	1.94
MSCI EAFE SC (Net)	6.05	33.01	33.01	12.85	5.77
MSCI Emg Mkts (Net)	7.44	37.28	37.28	4.35	1.68
Bloomberg US Agg Bond	0.39	3.54	3.54	2.10	4.01
BofA ML 3 Mo US T-Bill	0.28	0.86	0.86	0.27	0.39
NCREIF ODCE (Gross)	2.07	7.62	7.62	11.53	5.03
Wilshire US REIT	1.70	4.18	4.18	9.35	7.28
HFRI FOF Comp	2.07	7.77	7.77	4.00	1.08
Bloomberg Comdty (TR)	4.71	1.70	1.70	-8.45	-6.83

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.

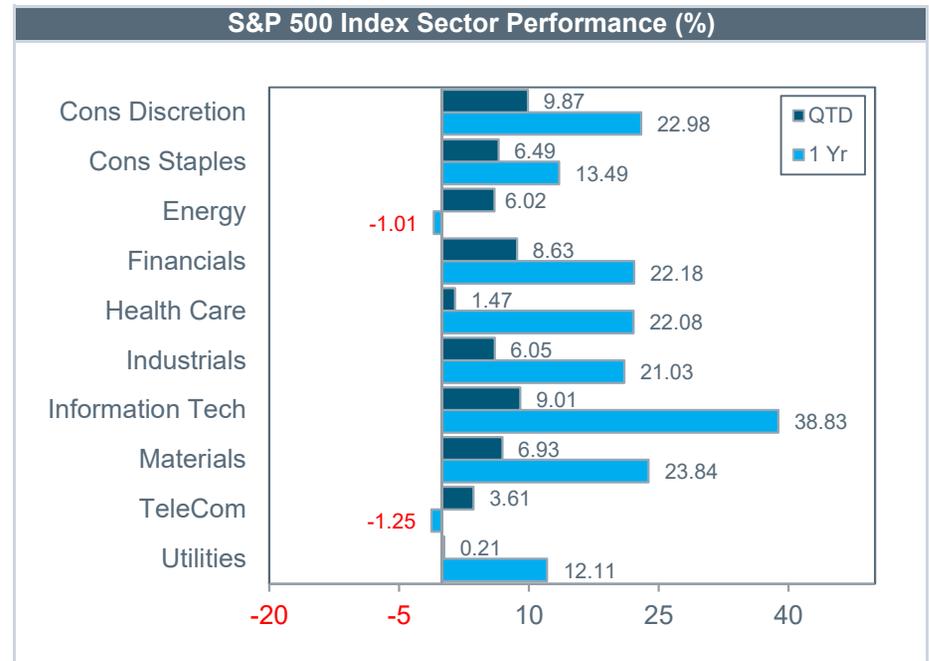
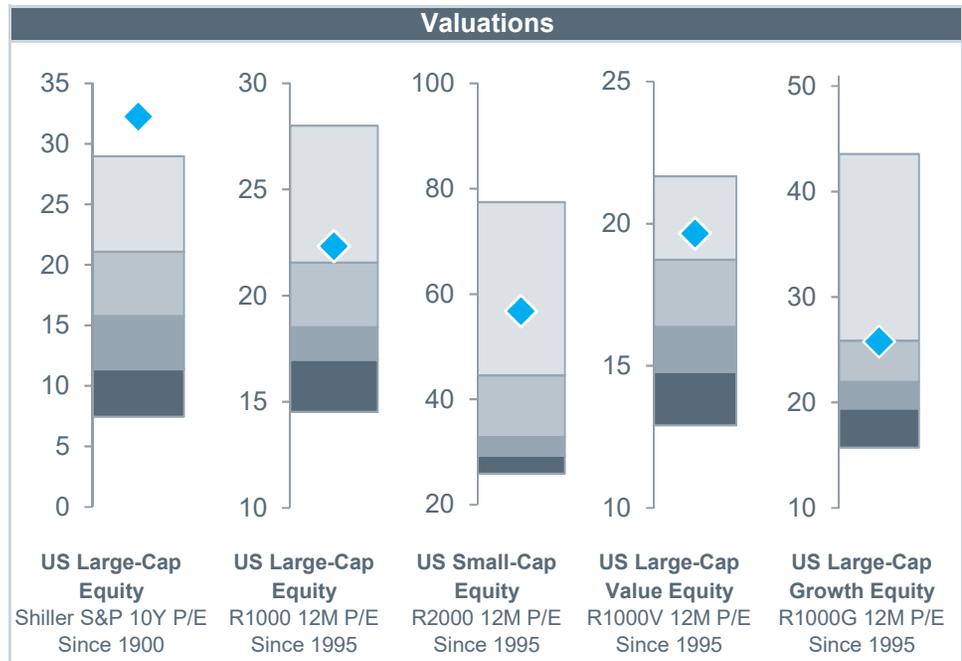


Fourth Quarter Review

Broad Market
 A small subset of companies particularly dominated broad market returns in 2017, with FAANG (Facebook, Amazon, Apple, Netflix, and Google), averaging returns of nearly 50% during 2017. As a result, many active managers with light or absent exposure to this lineup of companies experienced difficulty in keeping pace with their respective benchmarks.

Market Cap
 Large cap stocks outpaced small cap stocks for the quarter, with the Russell 1000 outperforming the Russell 2000 by 325 basis points.

Style and Sector
 Growth stocks led value stocks for the quarter, and the Russell 1000 Growth Index outperformed its value counterpart by 16.6% for the year. Consumer discretionary and tech stocks posted quarterly returns upwards of 9%, with tech stocks posting a 2017 return of nearly 39%.



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



Fourth Quarter Review

Developed Markets

Developed international markets had a strong quarter, though they lagged the US market. However, they outpaced the domestic market for 2017. In 2017, the EAFE Index returned 25.03% vs. 21.13% for the Russell 3000 Index.

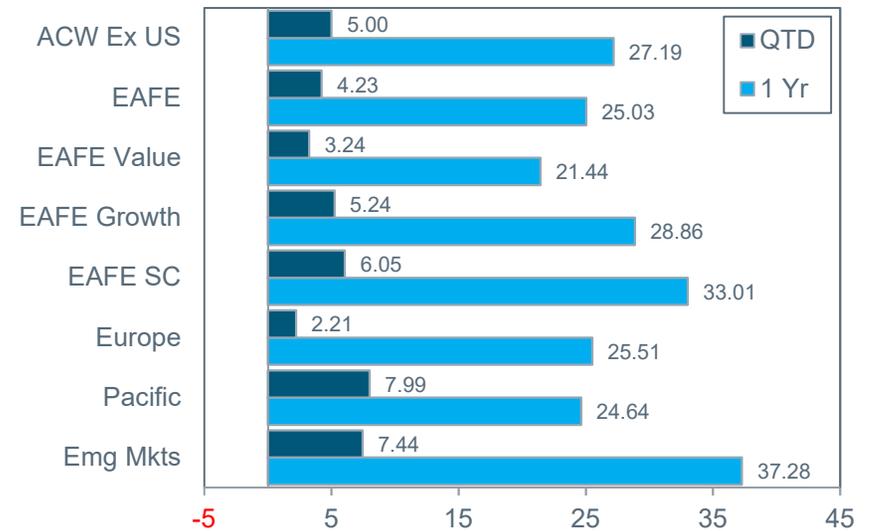
Emerging Markets

Emerging markets outperformed domestic and developed international markets for both the quarter and year, with the Emerging Markets Index outpacing the EAFE Index by 321 basis points for the quarter, and 1225 basis points for the year.

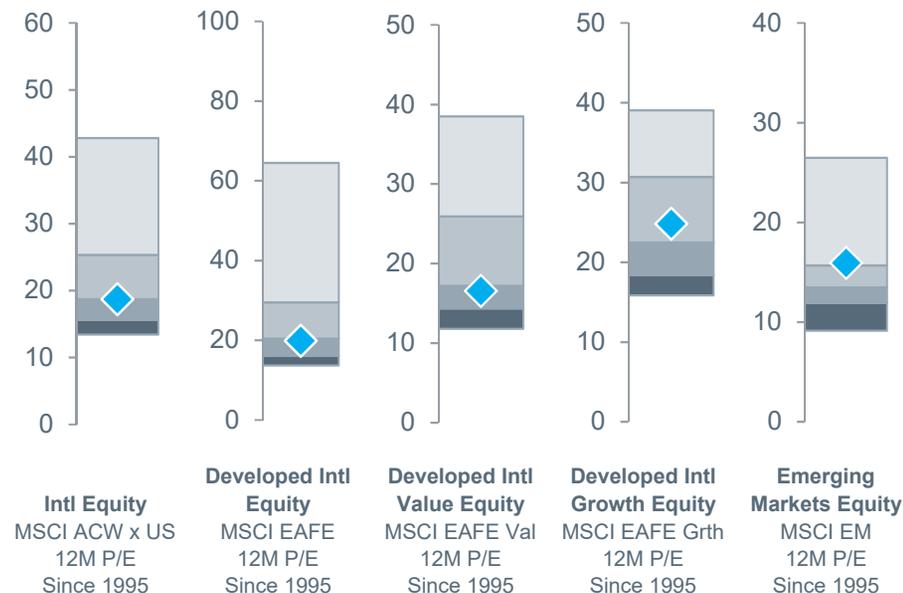
Market Cap & Style

The outperformance of value stocks last year did not persist, with growth stocks solidly outperforming for the quarter and year. Small cap also outperformed large cap for both Q4 and 2017.

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 flattening yield curve during the quarter and year detracted from the performance of short duration bonds, while contributing to the performance of long duration bonds. A flatter yield curve has caused some tactical investors and portfolio managers to shorten the duration of their portfolios as the perceived relative value of shorter-dated securities has increased.

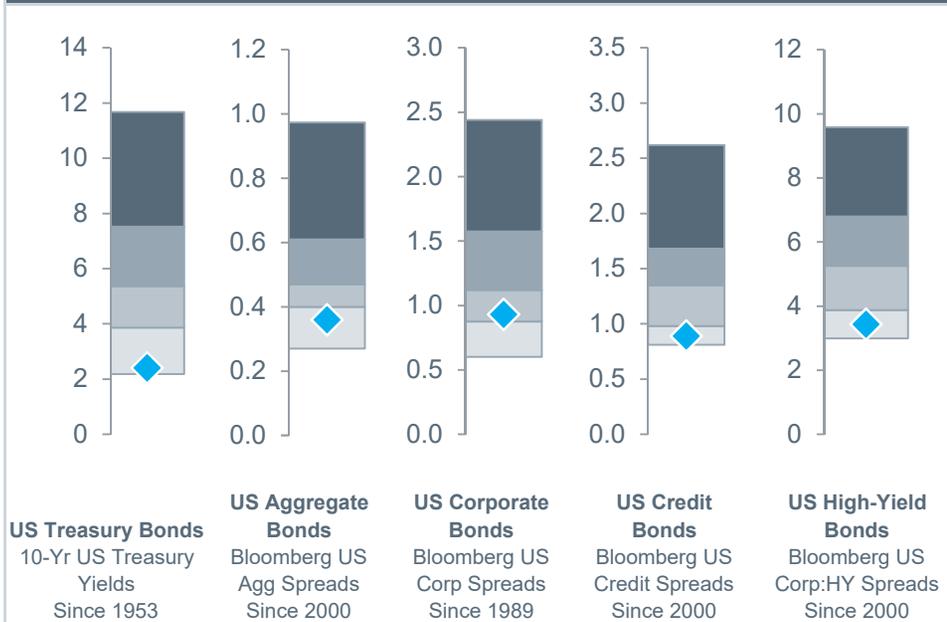
Credit Market

Investment grade and high yield credit spreads started the year below long-term averages and continued to grind tighter.

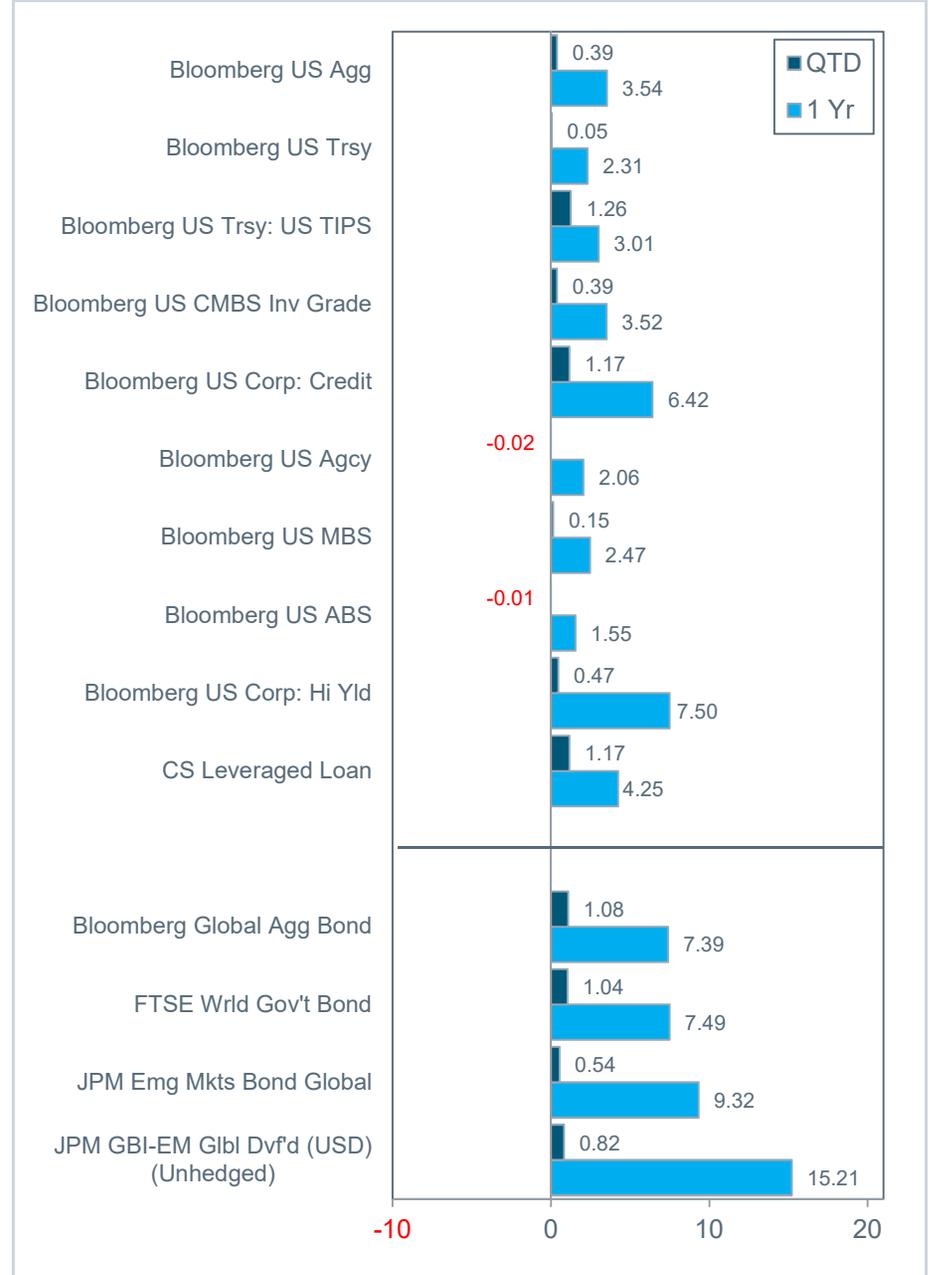
Emerging Market Debt

Non-US dollar denominated emerging market debt was the best performing sub-asset class within fixed income over the course of 2017, returning 15.21%. Important drivers of this performance included the improving fundamentals and stabilizing political environments experienced by many countries during the year.

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 largely provided positive performance, as most fundamentally oriented managers benefited from low inter-stock correlation and a positive return environment across most underlying global risk assets. Multi-Strategy manager returns were generally positive during the quarter, but suffered in November due to corporate merger scrutiny by the DoJ. The best performing broad hedge fund category for the year has been traditional Equity Long-Short (ELS).

General Market - Global Tactical Asset Allocation (GTAA)

GTAA managers provided strong performance in Q4 to finish an already successful 2017. Global equity and global fixed income markets were broadly supportive during the quarter, providing a welcome backdrop for most multi-asset strategies. Although GTAA managers performed well in absolute terms, most modestly underperformed relative to a static, undiversified blend of US 60/40. The modest underperformance of tactical managers relative to this static benchmark was generally pronounced for managers who adhere to value-oriented investment processes.

Fourth Quarter Review - Real Assets

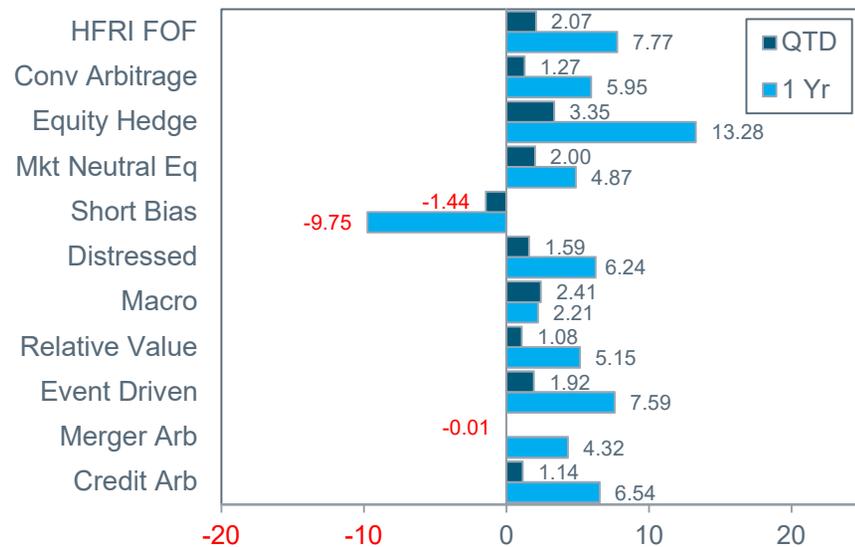
General Market - Diversified Inflation Strategies (DIS)

Performance for Diversified Inflation Strategies (“DIS”) in Q4 ranged widely, with managers providing positive performance in a quarter where market-based measures of future expected inflation increased. Market expectations increased from 1.85% to 1.98% based on the 10 year Treasury break-evens.

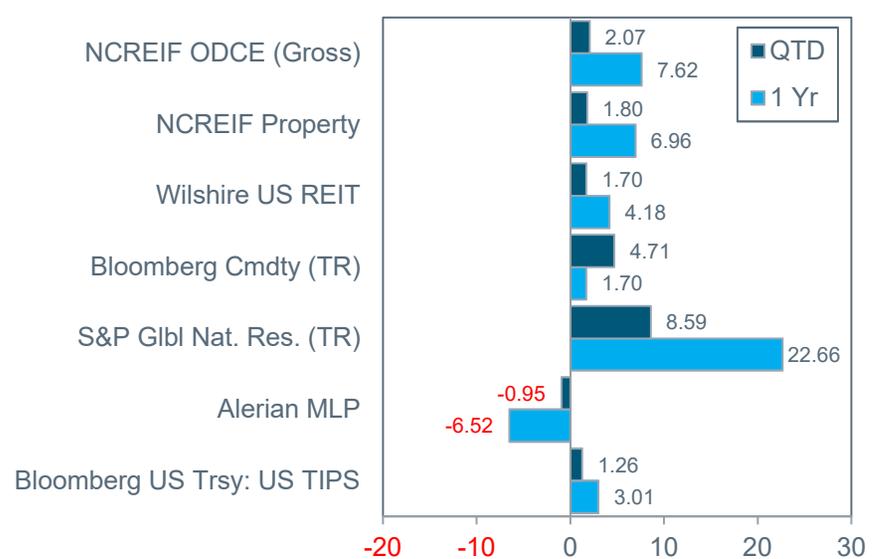
General Market - Real Estate

Real estate valuations remain healthy, supported by continuing strength in the overall economy. The core private real estate index, NCREIF-ODCE returned 2.1% during Q4, comprised of 1.1% income and 1.0% appreciation. Market participants characterized this as another quarter of normalizing returns reinforcing investor expectations of lower returns going forward as the market enters the later stages of the recovery. Investors in publicly traded real estate outperformed their private market counterparts during the quarter as measured by FTSE/NAREIT All REIT’s index return of 2.4%.

HFRI Hedge Fund Performance (%)



Real Asset Performance (%)



Annual Asset Class Performance

As of December 31, 2017

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Best	61.34	33.16	34.00	35.97	39.38	8.44	78.51	28.60	22.49	20.00	38.82	31.78	15.02	21.31	37.28
	55.81	31.45	26.19	32.18	16.23	5.24	58.21	26.85	15.99	18.23	32.39	19.31	9.59	17.13	33.01
	47.25	25.55	21.39	26.34	15.97	2.06	46.78	22.04	13.56	17.59	29.30	13.69	4.23	11.96	25.03
	38.59	20.25	21.36	19.31	11.63	-2.35	31.78	18.88	9.24	17.32	22.78	12.50	1.38	11.77	21.83
	36.18	18.33	13.82	18.37	11.17	-10.01	28.60	16.83	7.84	16.35	13.94	5.97	0.55	11.19	14.65
	28.96	13.06	13.54	16.32	10.25	-21.37	27.17	16.36	4.98	16.00	8.96	4.89	0.05	8.77	10.71
	28.68	11.14	7.49	15.79	6.97	-26.16	26.46	15.12	2.11	15.81	7.44	3.64	-0.27	7.24	7.77
	23.93	10.88	5.34	11.86	6.60	-33.79	18.91	15.06	0.10	10.94	1.86	3.37	-0.31	6.67	7.62
	11.61	9.15	4.91	10.39	5.49	-35.65	11.47	10.16	-4.18	8.78	0.07	2.45	-1.44	4.68	7.50
	9.28	8.56	4.55	4.85	5.00	-37.00	11.41	7.75	-5.72	6.98	-2.02	0.04	-3.30	2.65	4.18
	8.39	8.46	3.07	4.34	1.87	-39.20	5.93	6.54	-12.14	4.79	-2.60	-2.19	-4.41	2.18	3.54
	5.88	6.86	2.84	2.72	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.90	-4.47	1.00	3.01
	4.11	4.34	2.74	2.07	-1.57	-47.01	0.21	5.70	-15.94	0.11	-8.83	-4.95	-14.92	0.51	1.70
Worst	1.15	1.33	2.43	0.49	-17.55	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-24.66	0.33	0.86
	S&P 500 - US Large Cap	R 2000 - US Small Cap	MSCI EAFE (Net) - Int'l Dev.	MSCI EAFE SC (Net) - Int'l SC	MSCI EM (Net) - Int'l Emg Mkts	Bloomberg US Agg Bond - FI	Bloomberg US Corp: Hi Yield - FI	Bloomberg US Trsy: US TIPS - FI	Bloomberg US Gov/Credit: Lng - FI	NCREIF ODCE (Gross) - Real Estate	Wilshire US REIT - REITs	HFRI FOF Comp Index - ARS	Bloomberg Comdty (TR) - Commod.	ICE BofAML 3 Mo T-Bill - Cash Equiv	

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

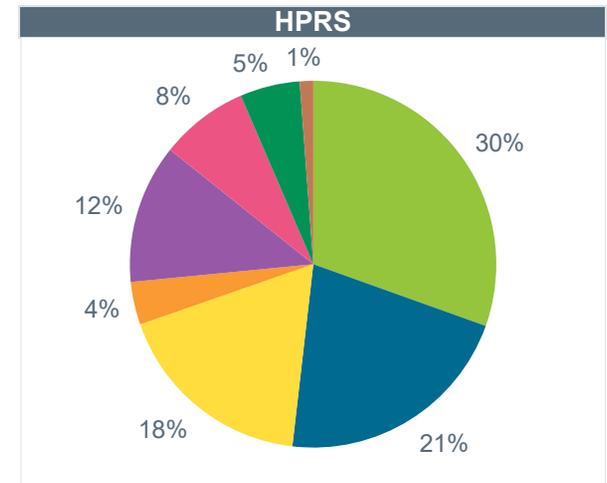
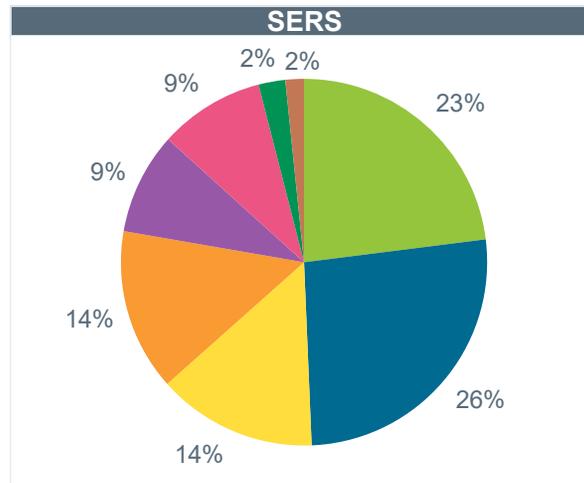
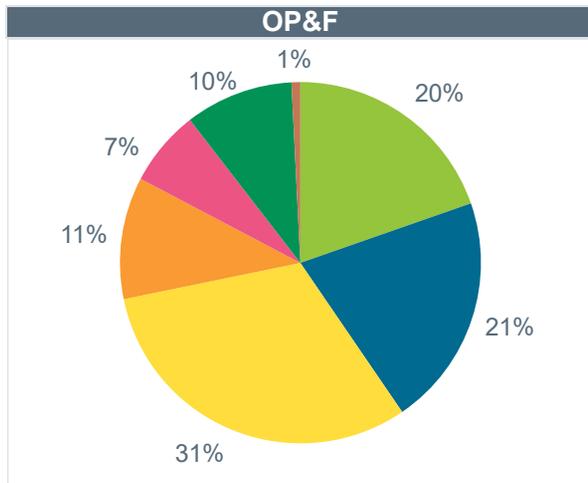
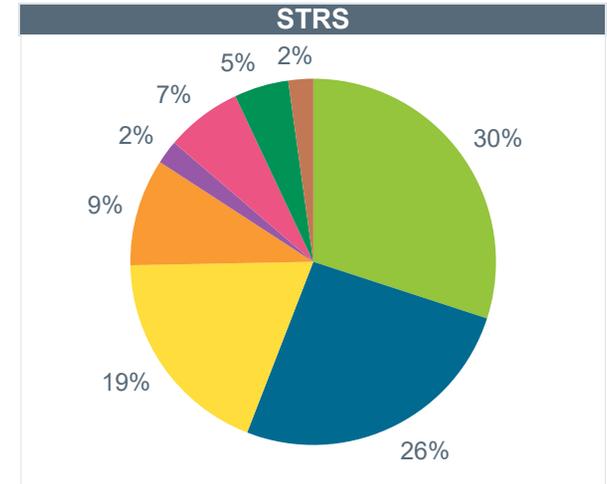
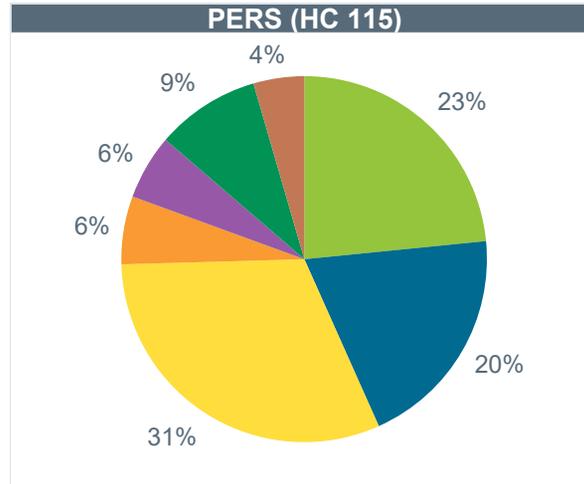
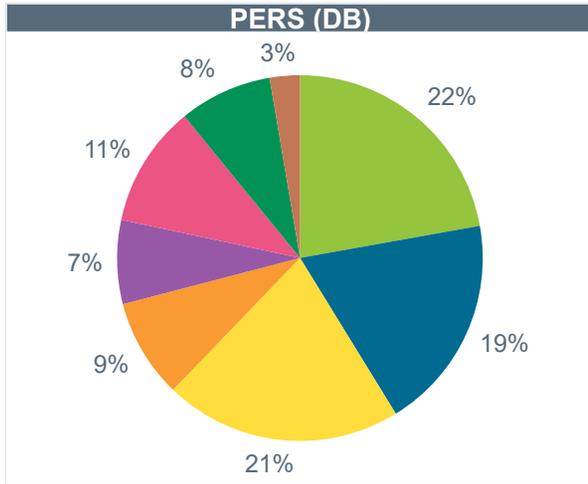


Asset Allocation & Performance											
	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
PERS (DB)	86,677,273	8.65	16.94	8.49	9.44	8.87	6.02	8.56	0.58	7.25	14.65
PERS (DB) Total Fund Benchmark		7.37	15.19	7.85	8.68	8.18	5.55	8.63	0.25	5.81	14.24
Difference		1.28	1.75	0.64	0.76	0.69	0.47	-0.07	0.33	1.44	0.41
Rank		6	25	16	38	33	42	23	42	30	57
PERS (HC 115)	12,888,306	7.44	15.25	6.70	7.40	7.16	5.53	7.67	-2.11	5.46	11.53
PERS (HC 115) Total Fund Benchmark		7.06	14.31	6.50	7.02	6.78	5.33	7.75	-1.93	5.01	10.70
Difference		0.38	0.94	0.20	0.38	0.38	0.20	-0.08	-0.18	0.45	0.83
Rank		58	64	88	89	94	77	59	97	74	79
STRS	78,304,456	7.54	15.90	8.71	10.24	9.41	6.04	8.18	2.46	7.95	17.39
STRS Total Fund Benchmark		7.41	15.35	8.21	10.13	9.28	6.10	8.00	1.70	8.26	18.09
Difference		0.13	0.55	0.50	0.11	0.13	-0.06	0.18	0.76	-0.31	-0.70
Rank		54	55	9	15	11	42	37	3	17	30
OP&F	15,755,197	6.78	14.30	8.66	9.88	9.57	6.67	11.52	0.65	6.87	16.83
OP&F Total Fund Benchmark		5.92	12.40	7.01	8.46	8.47	5.57	11.44	-2.18	6.87	14.61
Difference		0.86	1.90	1.65	1.42	1.10	1.10	0.08	2.83	0.00	2.22
Rank		82	81	10	29	8	13	1	37	37	36
SERS	14,335,616	8.03	17.36	9.30	10.28	9.31	5.83	8.08	2.93	6.92	16.86
SERS Total Fund Benchmark		6.96	14.37	7.49	8.85	8.18	5.35	7.02	1.48	6.66	15.34
Difference		1.07	2.99	1.81	1.43	1.13	0.48	1.06	1.45	0.26	1.52
Rank		28	16	1	14	12	61	39	1	33	36
HPRS	901,893	7.54	14.84	7.30	9.54	7.94	5.49	7.42	0.15	6.73	19.59
HPRS Total Fund Benchmark		6.86	14.33	7.15	8.99	8.41	6.13	7.40	0.19	7.03	16.79
Difference		0.68	0.51	0.15	0.55	-0.47	-0.64	0.02	-0.04	-0.30	2.80
Rank		54	70	69	35	71	79	64	59	43	16
<i>All Public Plans > \$1B-Total Fund Median</i>		7.66	16.03	7.88	9.00	8.33	5.94	7.90	0.33	6.46	15.48

OPERS health care plan is not a pension plan and therefore has significantly different characteristics including a shorter focus asset allocation with more liquidity than the pension plans. For purposes of this study, the OPERS health care plan has been included in the results. The results for OPERS health care plan is reflected in the PERS 115 trust subsequent to October 2014 and in the PERS HC results prior to October 2014.

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	2016	2015	2014	2013
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Difference		1.24	1.62	0.43	0.52	0.45	0.30	-0.32	0.08	1.15	0.14
PERS (HC 115)	12,888,306	7.44	15.25	6.61	7.28	7.04	5.44	7.55	-2.23	5.28	11.36
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Difference		0.38	0.94	0.11	0.26	0.26	0.11	-0.20	-0.30	0.27	0.66
STRS	78,304,456	7.46	15.74	8.56	10.10	9.28	5.91	8.03	2.33	7.82	17.25
STRS Total Fund Benchmark		7.41	15.35	8.21	10.13	9.28	6.10	8.00	1.70	8.26	18.09
Difference		0.05	0.39	0.35	-0.03	0.00	-0.19	0.03	0.63	-0.44	-0.84
OP&F	15,755,197	6.47	13.68	8.05	9.31	9.04	6.22	10.90	0.07	6.27	16.40
OP&F Total Fund Benchmark		5.92	12.40	7.01	8.46	8.47	5.57	11.44	-2.18	6.87	14.61
Difference		0.55	1.28	1.04	0.85	0.57	0.65	-0.54	2.25	-0.60	1.79
SERS	14,335,616	7.71	16.65	8.61	9.59	8.58	5.11	7.37	2.31	6.25	16.09
SERS Total Fund Benchmark		6.96	14.37	7.49	8.85	8.18	5.35	7.02	1.48	6.66	15.34
Difference		0.75	2.28	1.12	0.74	0.40	-0.24	0.35	0.83	-0.41	0.75
HPRS	901,893	7.33	14.35	6.81	9.10	7.53	5.13	7.03	-0.43	6.30	19.35
HPRS Total Fund Benchmark		6.86	14.33	7.15	8.99	8.41	6.13	7.40	0.19	7.03	16.79
Difference		0.47	0.02	-0.34	0.11	-0.88	-1.00	-0.37	-0.62	-0.73	2.56

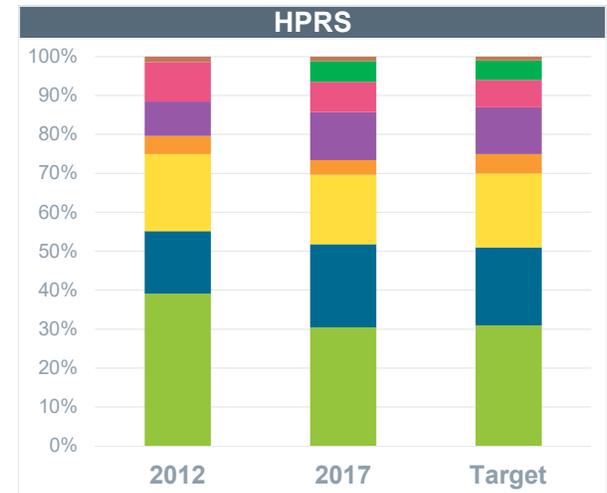
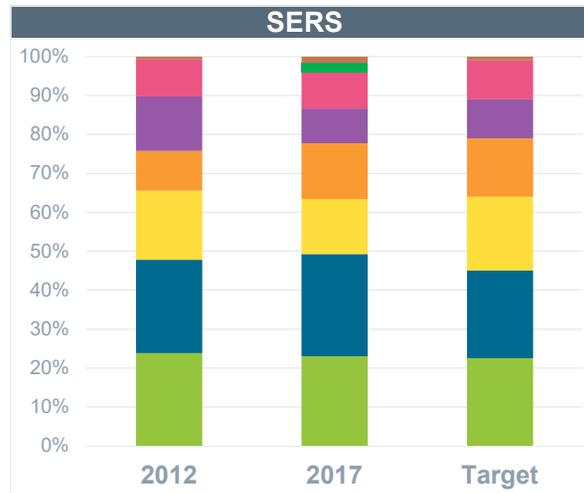
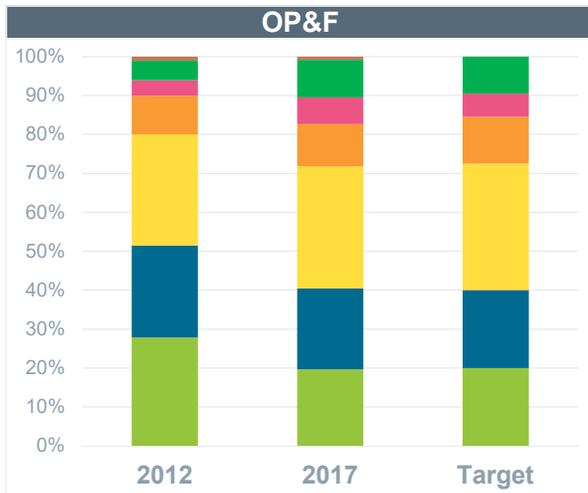
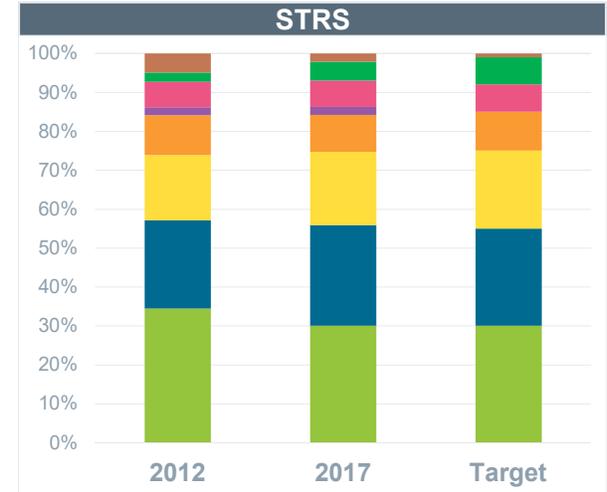
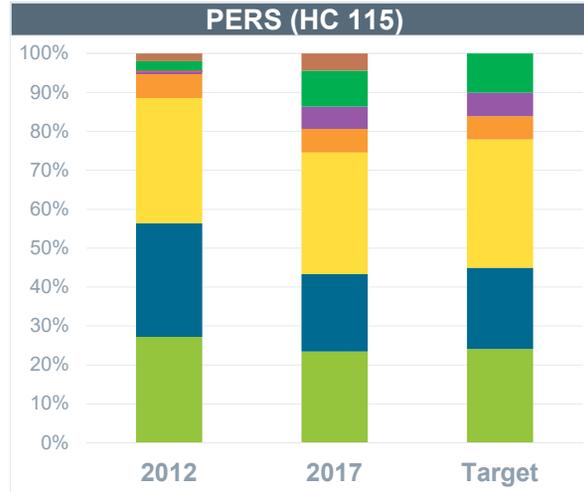
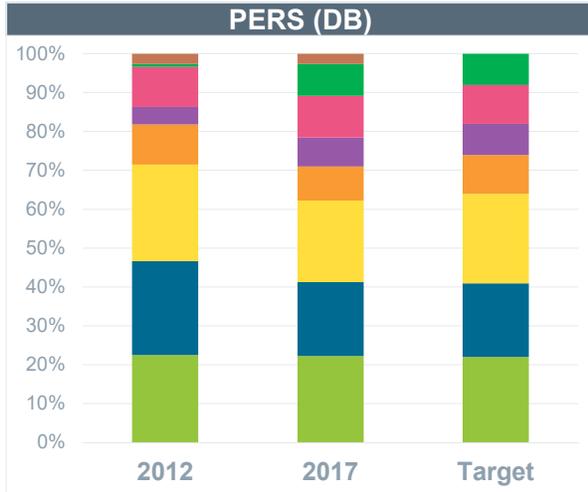
Performance shown is net of all investment management costs.



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



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

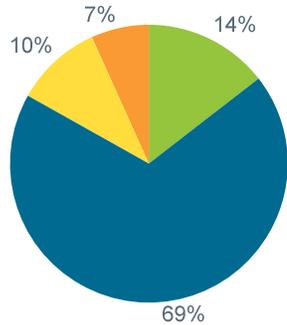


- US Equity
- International Equity
- Fixed Income
- Real Estate
- Hedge Funds
- Private Equity
- Other Alternatives
- Cash Equivalents

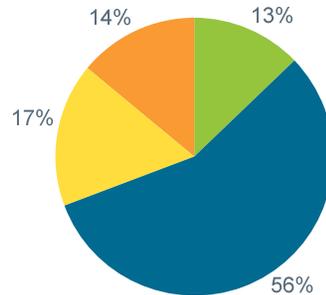
Summary

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

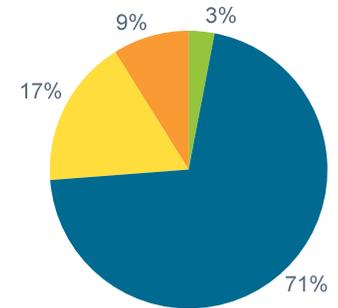
PERS (DB)



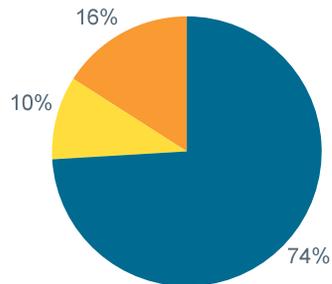
PERS (HC 115)



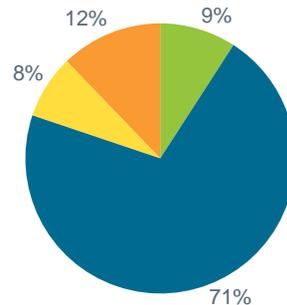
STRS



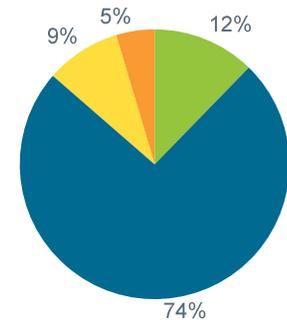
OP&F



SERS



HPRS



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

Summary

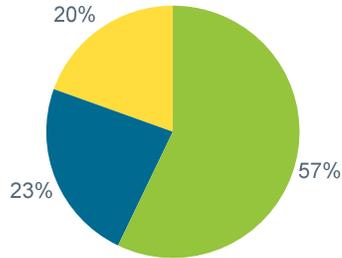
RVK Liquidity Rating - A qualitative method developed and calculated by RVK for determining the relative amount of liquidity in a portfolio.

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

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

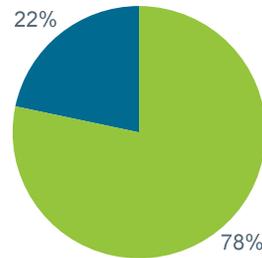
Not Liquid Investments: Private appraisal-based transactions, vehicle-based liquidity constraints, or privately held assets. Extreme discount to raise cash or 6-12+ months required to receive cash.

PERS (DB)



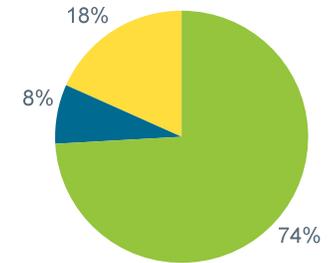
PERS (DB) Liquidity Rating 65

PERS (HC 115)



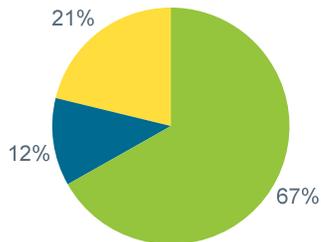
PERS (HC 115) Liquidity Rating 84

STRS



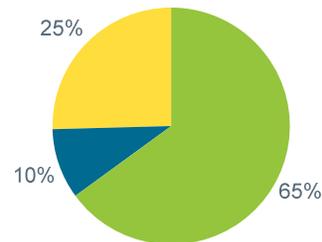
STRS Liquidity Rating 72

OP&F



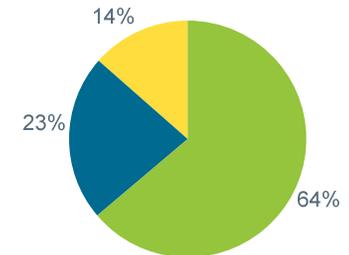
OP&F Liquidity Rating 69

SERS



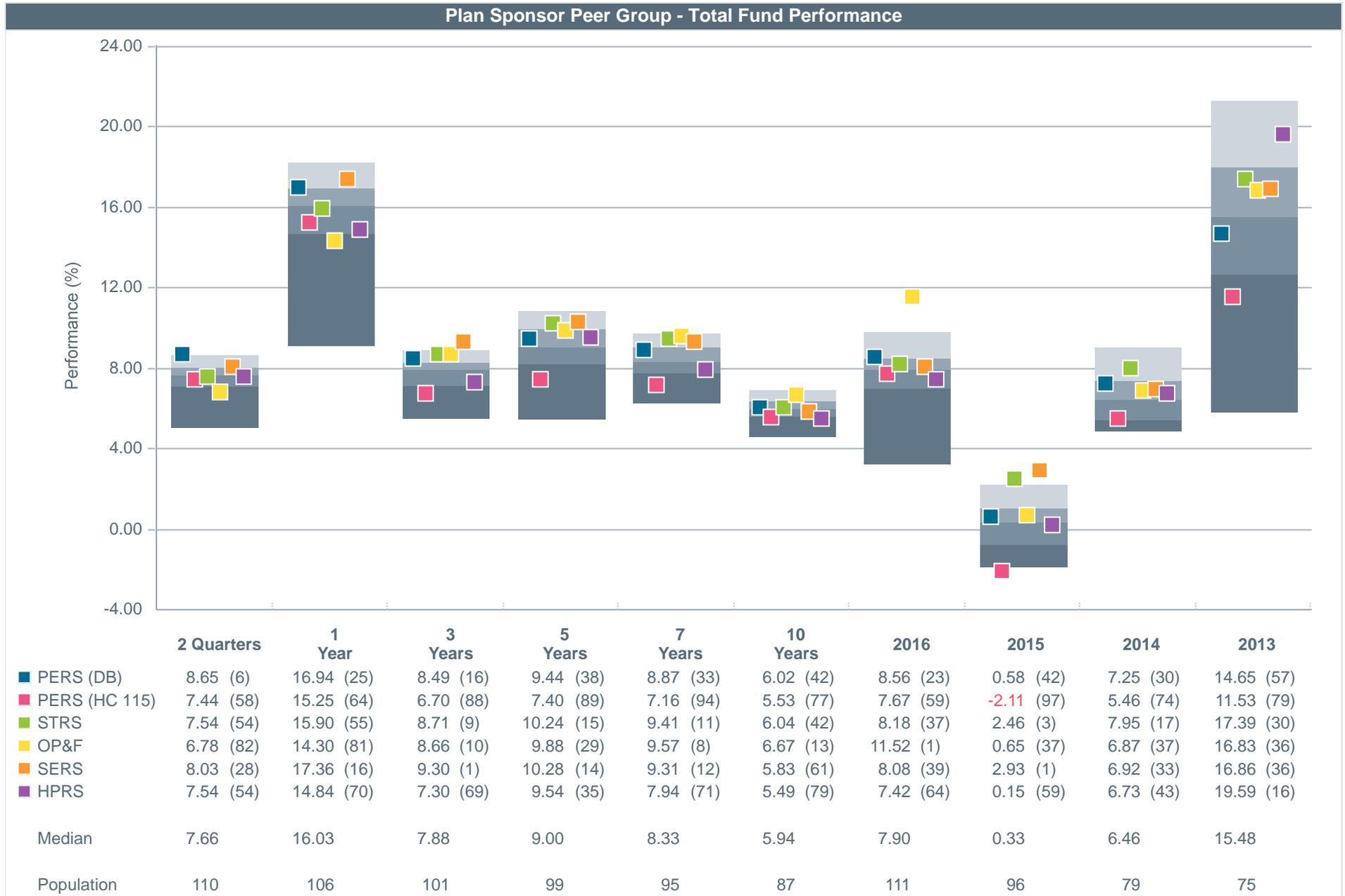
SERS Liquidity Rating 65

HPRS



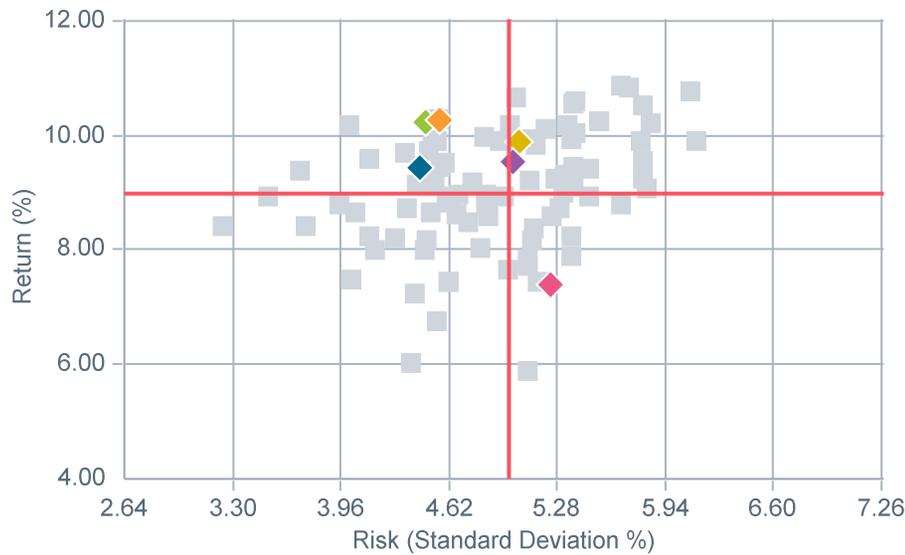
HPRS Liquidity Rating 68

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



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

Plan Sponsor Peer Group Scattergram - 5 Years

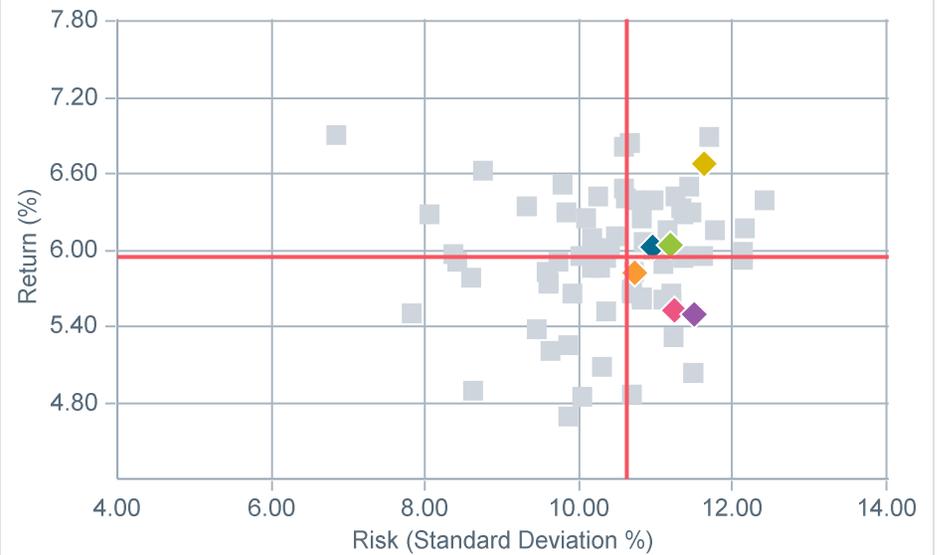


	Return	Standard Deviation
◆ PERS (DB)	9.44	4.44
◆ PERS (HC 115)	7.40	5.24
◆ STRS	10.24	4.48
◆ OP&F	9.88	5.04
◆ SERS	10.28	4.56
◆ HPRS	9.54	5.01
— Median	9.00	4.98

Sharpe Ratio - 5 Year

PERS (DB)	2.04
PERS (HC 115)	1.36
STRS	2.18
OP&F	1.87
SERS	2.16
HPRS	1.82
<i>All Public Plans > \$1B-Total Fund Median</i>	1.77

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	6.02	10.96
◆ PERS (HC 115)	5.53	11.25
◆ STRS	6.04	11.20
◆ OP&F	6.67	11.64
◆ SERS	5.83	10.72
◆ HPRS	5.49	11.51
— Median	5.94	10.62

Sharpe Ratio - 10 Year

PERS (DB)	0.55
PERS (HC 115)	0.50
STRS	0.54
OP&F	0.58
SERS	0.54
HPRS	0.49
<i>All Public Plans > \$1B-Total Fund Median</i>	0.56

Performance shown is gross of fees.

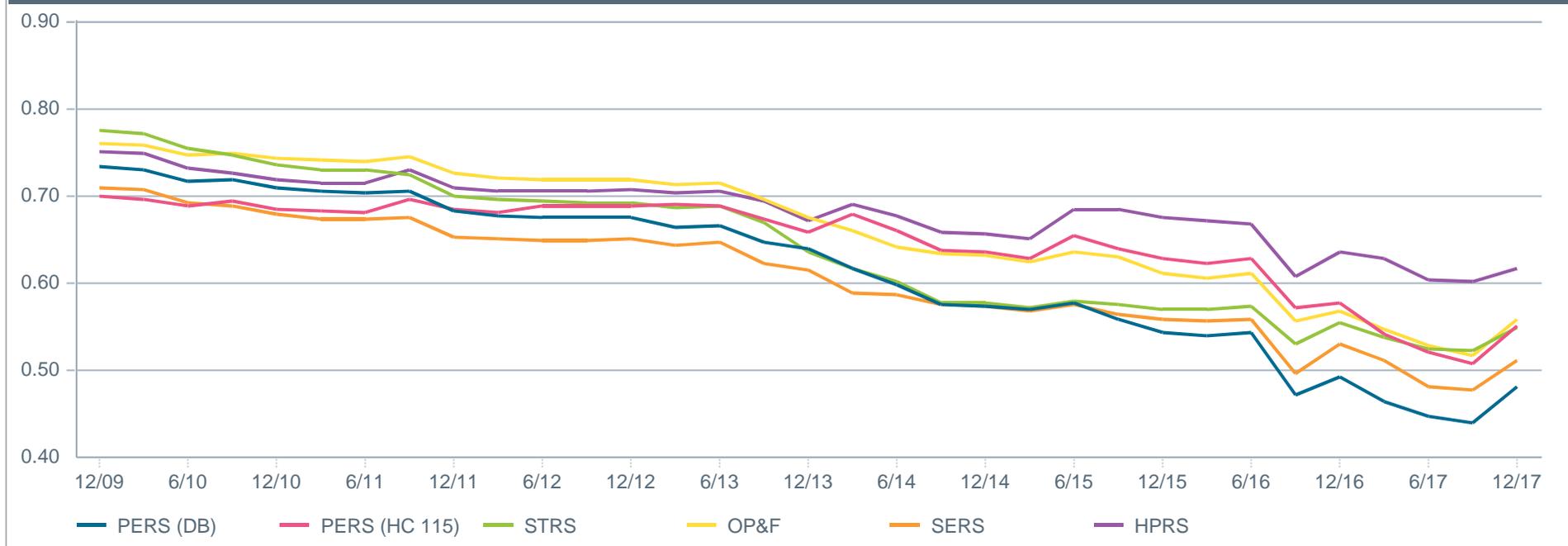
Summary

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)	0.55	0.48	0.55	0.65
PERS (HC 115)	0.64	0.55	0.63	0.66
STRS	0.61	0.55	0.57	0.68
OP&F	0.62	0.56	0.61	0.69
SERS	0.55	0.51	0.56	0.64
HPRS	0.64	0.62	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.

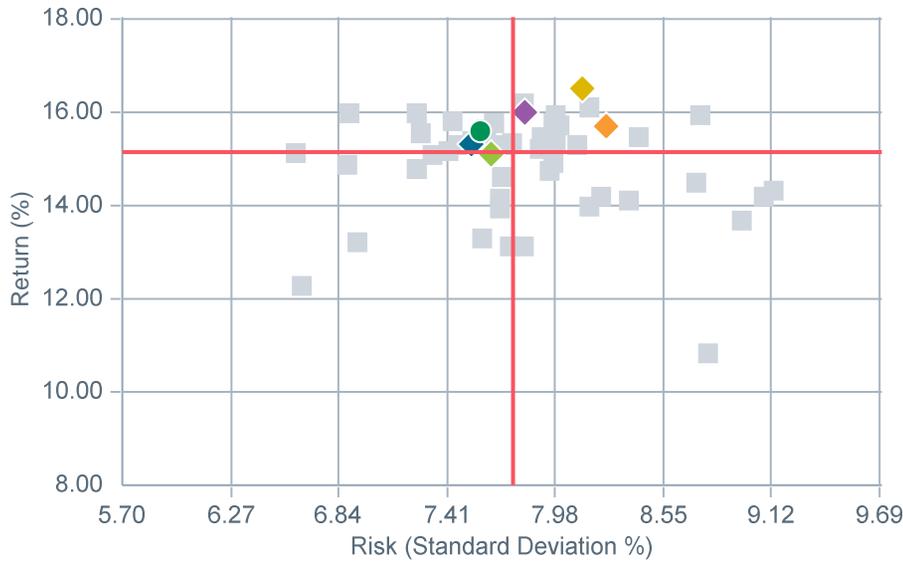
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
US Equity										
PERS (DB)	11.31	21.30	11.03	15.32	13.36	8.42	12.09	0.68	11.29	33.86
Russell 3000 Index	11.20	21.13	11.12	15.58	13.50	8.60	12.74	0.48	12.56	33.55
Difference	0.11	0.17	-0.09	-0.26	-0.14	-0.18	-0.65	0.20	-1.27	0.31
Rank	32	33	37	41	26	45	66	31	52	52
PERS (HC 115)	11.31	21.30	11.03	N/A	N/A	N/A	12.09	0.68	N/A	N/A
Russell 3000 Index	11.20	21.13	11.12	N/A	N/A	N/A	12.74	0.48	N/A	N/A
Difference	0.11	0.17	-0.09	N/A	N/A	N/A	-0.65	0.20	N/A	N/A
Rank	32	33	37	N/A	N/A	N/A	66	31	N/A	N/A
STRS	11.35	22.01	11.05	15.11	13.13	8.23	11.32	0.83	11.70	32.14
Russell 3000 Index	11.20	21.13	11.12	15.58	13.50	8.60	12.74	0.48	12.56	33.55
Difference	0.15	0.88	-0.07	-0.47	-0.37	-0.37	-1.42	0.35	-0.86	-1.41
Rank	29	22	36	53	42	63	80	28	43	81
OP&F	12.11	22.41	12.52	16.52	13.84	9.60	15.60	0.66	11.27	35.53
Wilshire 5000 Index	11.28	20.99	11.36	15.67	13.50	8.62	13.37	0.67	12.71	33.07
Difference	0.83	1.42	1.16	0.85	0.34	0.98	2.23	-0.01	-1.44	2.46
Rank	5	14	1	2	10	5	9	31	52	18
SERS	11.40	22.27	11.26	15.72	13.55	8.71	11.27	1.24	10.99	35.76
Russell 3000 Index	11.20	21.13	11.12	15.58	13.50	8.60	12.74	0.48	12.56	33.55
Difference	0.20	1.14	0.14	0.14	0.05	0.11	-1.47	0.76	-1.57	2.21
Rank	27	16	21	23	20	27	80	21	59	12
HPRS	11.65	21.53	11.46	16.01	13.41	9.13	13.73	0.18	11.97	35.56
Russell 3000 Index	11.20	21.13	11.12	15.58	13.50	8.60	12.74	0.48	12.56	33.55
Difference	0.45	0.40	0.34	0.43	-0.09	0.53	0.99	-0.30	-0.59	2.01
Rank	17	25	12	9	24	13	27	44	33	17
<i>All Public Plans > \$1B-US Equity Segment Median</i>	<i>10.87</i>	<i>20.24</i>	<i>10.72</i>	<i>15.14</i>	<i>12.96</i>	<i>8.40</i>	<i>12.90</i>	<i>-0.11</i>	<i>11.41</i>	<i>34.33</i>

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

Risk & Return - US Equity

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

Plan Sponsor Peer Group Scattergram - 5 Years

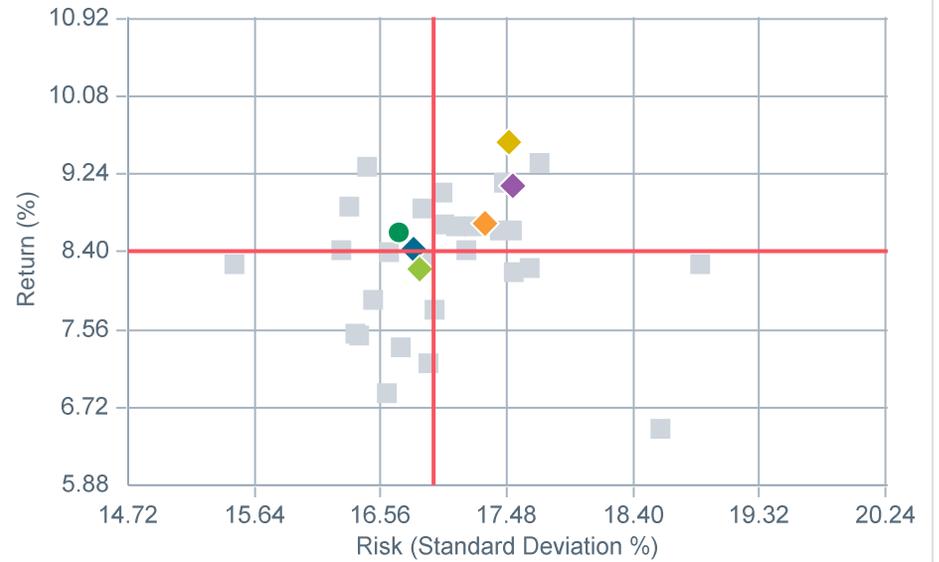


	Return	Standard Deviation
◆ PERS (DB)	15.32	7.54
◆ PERS (HC 115)	N/A	N/A
◆ STRS	15.11	7.64
◆ OP&F	16.52	8.13
◆ SERS	15.72	8.25
◆ HPRS	16.01	7.82
● Russell 3000 Index	15.58	7.59
— Median	15.14	7.76

Sharpe Ratio - 5 Years

PERS (DB)	1.93
PERS (HC 115)	N/A
STRS	1.88
OP&F	1.93
SERS	1.82
HPRS	1.94
Russell 3000 Index	1.95
All Public Plans > \$1B-US Equity Segment Median	1.83

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	8.42	16.81
◆ PERS (HC 115)	N/A	N/A
◆ STRS	8.23	16.84
◆ OP&F	9.60	17.49
◆ SERS	8.71	17.32
◆ HPRS	9.13	17.53
● Russell 3000 Index	8.60	16.69
— Median	8.40	16.94

Sharpe Ratio - 10 Years

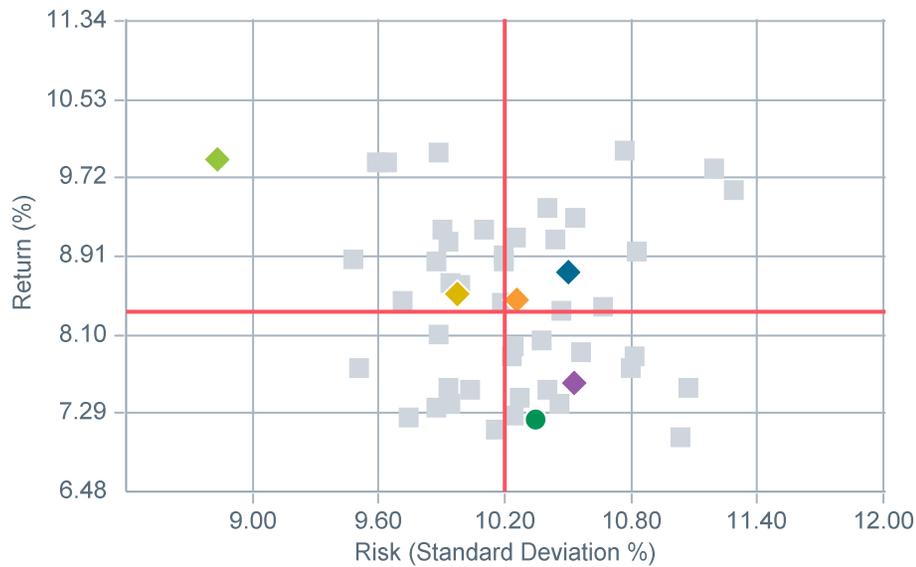
PERS (DB)	0.55
PERS (HC 115)	N/A
STRS	0.53
OP&F	0.59
SERS	0.55
HPRS	0.57
Russell 3000 Index	0.56
All Public Plans > \$1B-US Equity Segment Median	0.54

Performance shown is gross of fees.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
International Equity										
PERS (DB)	12.80	31.64	10.13	8.76	6.53	2.93	5.72	-4.01	-1.48	15.61
PERS (DB) International Equity Custom Benchmark	12.46	29.24	8.60	6.91	4.97	1.87	5.54	-6.09	-3.42	12.92
Difference	0.34	2.40	1.53	1.85	1.56	1.06	0.18	2.08	1.94	2.69
Rank	17	11	26	40	50	52	22	76	27	81
PERS (HC 115)	12.80	31.64	10.13	N/A	N/A	N/A	5.72	-4.01	N/A	N/A
PERS (HC 115) International Equity Custom Benchmark	12.46	29.24	8.60	N/A	N/A	N/A	5.54	-6.09	N/A	N/A
Difference	0.34	2.40	1.53	N/A	N/A	N/A	0.18	2.08	N/A	N/A
Rank	17	11	26	N/A	N/A	N/A	22	76	N/A	N/A
STRS	10.15	24.16	10.07	9.90	7.32	3.78	7.09	0.30	0.83	19.23
STRS International Equity Custom Benchmark	10.42	23.43	8.48	8.52	6.26	2.78	6.39	-2.78	0.24	17.63
Difference	-0.27	0.73	1.59	1.38	1.06	1.00	0.70	3.08	0.59	1.60
Rank	88	93	27	10	19	18	12	12	6	35
OP&F	11.53	29.12	9.60	8.51	6.78	3.28	2.75	-0.77	-5.58	21.01
MSCI ACW Ex US IM Index (USD) (Net)	11.82	27.81	8.38	7.22	5.15	2.20	4.41	-4.60	-3.89	15.82
Difference	-0.29	1.31	1.22	1.29	1.63	1.08	-1.66	3.83	-1.67	5.19
Rank	51	51	39	44	32	39	76	23	99	17
SERS	11.77	29.11	10.08	8.45	6.49	3.20	5.81	-2.37	-4.10	17.29
SERS International Equity Custom Benchmark	11.48	27.19	7.83	7.14	5.35	2.32	4.50	-5.66	-3.87	17.15
Difference	0.29	1.92	2.25	1.31	1.14	0.88	1.31	3.29	-0.23	0.14
Rank	42	51	27	44	51	43	22	45	88	70
HPRS	11.87	28.72	8.32	7.61	5.52	2.15	1.69	-2.91	-4.65	19.05
MSCI ACW Ex US Index (USD) (Net)	11.48	27.19	7.83	6.80	4.93	1.84	4.50	-5.66	-3.87	15.29
Difference	0.39	1.53	0.49	0.81	0.59	0.31	-2.81	2.75	-0.78	3.76
Rank	39	57	76	71	87	88	83	52	93	36
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	<i>11.54</i>	<i>29.14</i>	<i>9.21</i>	<i>8.34</i>	<i>6.51</i>	<i>2.96</i>	<i>3.93</i>	<i>-2.54</i>	<i>-2.94</i>	<i>17.97</i>

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

Plan Sponsor Peer Group Scattergram - 5 Years

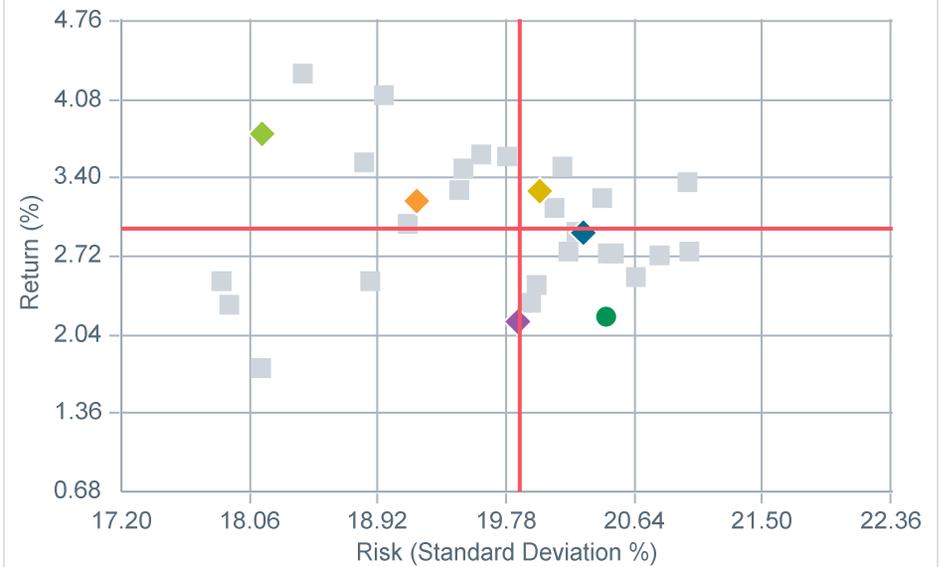


	Return	Standard Deviation
◆ PERS (DB)	8.76	10.50
◆ PERS (HC 115)	N/A	N/A
◆ STRS	9.90	8.84
◆ OP&F	8.51	9.97
◆ SERS	8.45	10.25
◆ HPRS	7.61	10.53
● MSCI ACW Ex US IMI (Net)	7.22	10.35
— Median	8.34	10.20

Sharpe Ratio - 5 Years

PERS (DB)	0.84
PERS (HC 115)	N/A
STRS	1.10
OP&F	0.86
SERS	0.83
HPRS	0.73
MSCI ACW Ex US IMI (Net)	0.71
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	0.82

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	2.93	20.30
◆ PERS (HC 115)	N/A	N/A
◆ STRS	3.78	18.14
◆ OP&F	3.28	20.00
◆ SERS	3.20	19.18
◆ HPRS	2.15	19.86
● MSCI ACW Ex US IMI (Net)	2.20	20.45
— Median	2.96	19.87

Sharpe Ratio - 10 Years

PERS (DB)	0.23
PERS (HC 115)	N/A
STRS	0.27
OP&F	0.24
SERS	0.24
HPRS	0.19
MSCI ACW Ex US IMI (Net)	0.19
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	0.23

Performance shown is gross of fees.

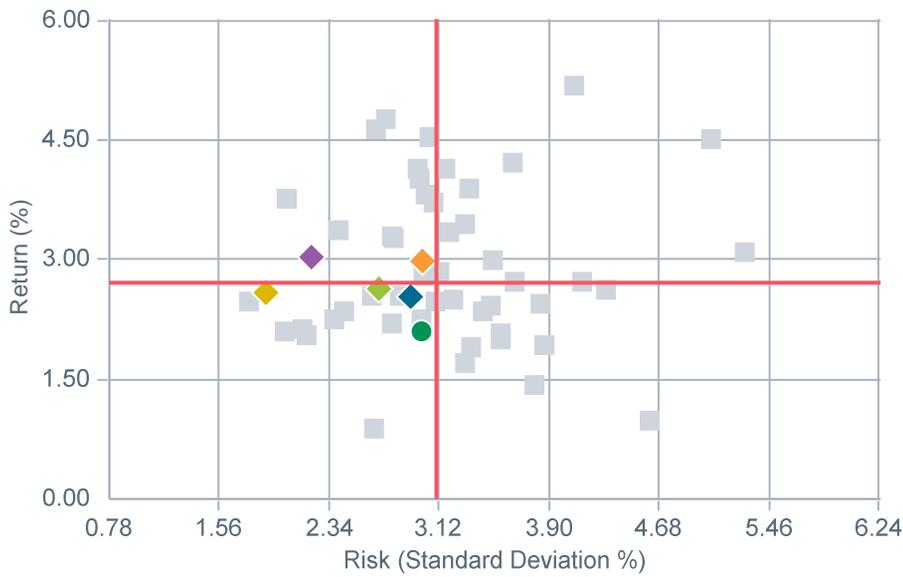
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Fixed Income										
PERS (DB) Core Fixed Income	1.27	3.75	2.45	2.53	3.58	3.88	2.66	0.96	6.47	-1.04
PERS (DB) Core Fixed Income Custom Benchmark	1.24	3.54	2.24	2.10	3.20	4.01	2.65	0.55	5.97	-2.02
Difference	0.03	0.21	0.21	0.43	0.38	-0.13	0.01	0.41	0.50	0.98
Rank	86	80	80	57	72	81	88	19	40	46
PERS (HC 115) Core Fixed Income	1.27	3.75	2.45	N/A	N/A	N/A	2.66	0.96	N/A	N/A
PERS (HC 115) Core Fixed Income Benchmark	1.24	3.54	2.24	N/A	N/A	N/A	2.65	0.56	N/A	N/A
Difference	0.03	0.21	0.21	N/A	N/A	N/A	0.01	0.40	N/A	N/A
Rank	86	80	80	N/A	N/A	N/A	88	19	N/A	N/A
STRS	1.25	3.98	3.10	2.64	3.79	4.79	4.77	0.60	5.02	-1.02
STRS Fixed Income Blended Benchmark	1.19	3.86	2.72	2.45	3.58	4.31	3.91	0.43	5.56	-1.34
Difference	0.06	0.12	0.38	0.19	0.21	0.48	0.86	0.17	-0.54	0.32
Rank	86	75	49	52	63	45	52	29	81	46
OP&F Core Fixed Income	1.61	4.26	3.27	2.60	3.66	4.70	4.14	1.45	4.31	-1.08
Bloomberg US Agg Bond Index	1.24	3.54	2.24	2.10	3.20	4.01	2.65	0.55	5.97	-2.02
Difference	0.37	0.72	1.03	0.50	0.46	0.69	1.49	0.90	-1.66	0.96
Rank	63	67	46	54	69	51	66	9	87	46
SERS	1.79	5.09	3.18	2.98	4.38	5.46	4.67	-0.14	5.84	-0.37
Bloomberg US Agg Bond Index	1.24	3.54	2.24	2.10	3.20	4.01	2.65	0.55	5.97	-2.02
Difference	0.55	1.55	0.94	0.88	1.18	1.45	2.02	-0.69	-0.13	1.65
Rank	49	41	48	42	42	25	54	57	60	31
HPRS	2.08	5.29	4.03	3.04	4.16	4.83	6.36	0.54	4.00	-0.81
Bloomberg US Agg Bond Index	1.24	3.54	2.24	2.10	3.20	4.01	2.65	0.55	5.97	-2.02
Difference	0.84	1.75	1.79	0.94	0.96	0.82	3.71	-0.01	-1.97	1.21
Rank	33	38	31	41	49	44	28	29	91	43
<i>All Public Plans > \$1B-US Fixed Income Segment Median</i>	<i>1.71</i>	<i>4.81</i>	<i>3.08</i>	<i>2.70</i>	<i>4.15</i>	<i>4.70</i>	<i>4.80</i>	<i>0.06</i>	<i>6.12</i>	<i>-1.30</i>

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

Risk & Return - Fixed Income

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

Plan Sponsor Peer Group Scattergram - 5 Years

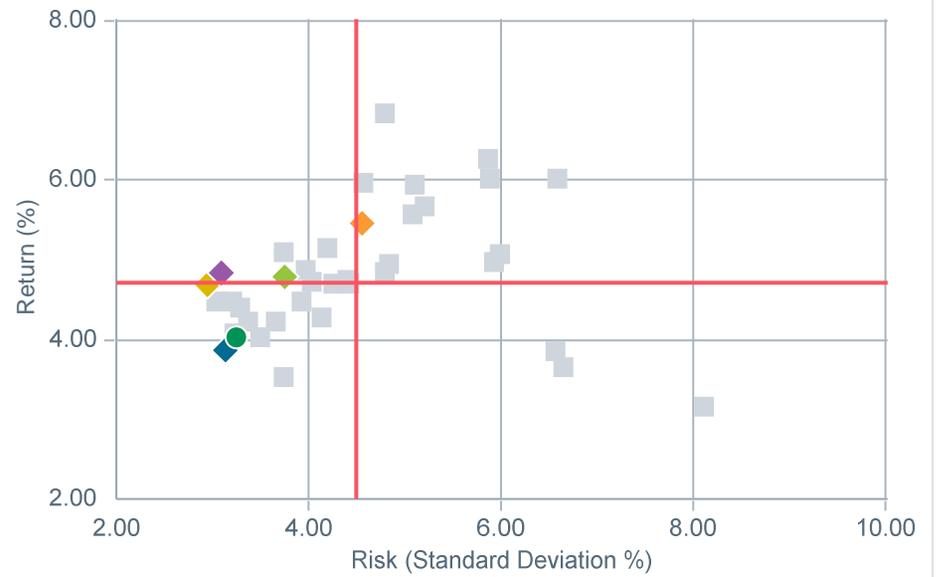


	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	2.53	2.92
◆ PERS (HC 115) Core Fixed Income	N/A	N/A
◆ STRS	2.64	2.69
◆ OP&F Core Fixed Income	2.60	1.89
◆ SERS	2.98	3.00
◆ HPRS	3.04	2.22
● Bloomberg US Agg Bond Index	2.10	3.00
— Median	2.70	3.10

Sharpe Ratio - 5 Years

PERS (DB) Core Fixed Income	0.78
PERS (HC 115) Core Fixed Income	N/A
STRS	0.89
OP&F Core Fixed Income	1.25
SERS	0.91
HPRS	1.27
Bloomberg US Agg Bond Index	0.62
All Public Plans > \$1B-US Fixed Income Segment Median	0.85

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	3.88	3.13
◆ PERS (HC 115) Core Fixed Income	N/A	N/A
◆ STRS	4.79	3.75
◆ OP&F Core Fixed Income	4.70	2.95
◆ SERS	5.46	4.57
◆ HPRS	4.83	3.08
● Bloomberg US Agg Bond Index	4.01	3.26
— Median	4.70	4.48

Sharpe Ratio - 10 Years

PERS (DB) Core Fixed Income	1.07
PERS (HC 115) Core Fixed Income	N/A
STRS	1.14
OP&F Core Fixed Income	1.40
SERS	1.08
HPRS	1.38
Bloomberg US Agg Bond Index	1.10
All Public Plans > \$1B-US Fixed Income Segment Median	1.00

Performance shown is gross of fees.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Additional Fixed Income										
PERS (DB) U.S. Treasury	0.45	2.33	N/A	N/A	N/A	N/A	0.99	N/A	N/A	N/A
Bloomberg US Trsy Index	0.43	2.31	N/A	N/A	N/A	N/A	1.04	N/A	N/A	N/A
Difference	0.02	0.02	N/A	N/A	N/A	N/A	-0.05	N/A	N/A	N/A
PERS (DB) EMD	4.43	13.52	5.48	1.57	N/A	N/A	10.94	-6.82	-1.64	-6.35
PERS (DB) EMD Custom Benchmark	3.69	12.26	4.73	1.12	N/A	N/A	10.18	-7.12	-0.20	-7.76
Difference	0.74	1.26	0.75	0.45	N/A	N/A	0.76	0.30	-1.44	1.41
PERS (DB) High Yield	2.36	7.23	6.08	5.76	N/A	N/A	14.44	-2.74	2.73	7.92
Bloomberg U.S. High Yield Index	2.45	7.50	6.35	5.78	N/A	N/A	17.13	-4.47	2.45	7.44
Difference	-0.09	-0.27	-0.27	-0.02	N/A	N/A	-2.69	1.73	0.28	0.48
PERS (DB) Floating Rate Debt	9.48	6.41	3.34	4.22	N/A	N/A	0.86	2.83	4.43	6.69
CS Lvg'd Loan Index	2.24	4.25	4.50	4.33	N/A	N/A	9.88	-0.38	2.06	6.15
Difference	7.24	2.16	-1.16	-0.11	N/A	N/A	-9.02	3.21	2.37	0.54
PERS (DB) Securitized Debt	2.18	7.52	3.82	9.87	N/A	N/A	-0.80	4.93	17.98	21.25
Bloomberg CMBS Index + 2%	2.58	5.76	4.73	4.43	N/A	N/A	5.87	2.59	5.76	2.23
Difference	-0.40	1.76	-0.91	5.44	N/A	N/A	-6.67	2.34	12.22	19.02
PERS (DB) TIPS	2.14	2.88	2.02	N/A	N/A	N/A	4.69	-1.43	3.66	N/A
Bloomberg U.S. TIPS Index	2.14	3.01	2.05	N/A	N/A	N/A	4.68	-1.44	3.64	N/A
Difference	0.00	-0.13	-0.03	N/A	N/A	N/A	0.01	0.01	0.02	N/A
PERS (HC 115) EMD	4.43	13.52	5.48	N/A	N/A	N/A	10.94	-6.82	N/A	N/A
PERS (HC 115) EMD Custom Benchmark	3.69	12.26	4.73	N/A	N/A	N/A	10.18	-7.12	N/A	N/A
Difference	0.74	1.26	0.75	N/A	N/A	N/A	0.76	0.30	N/A	N/A

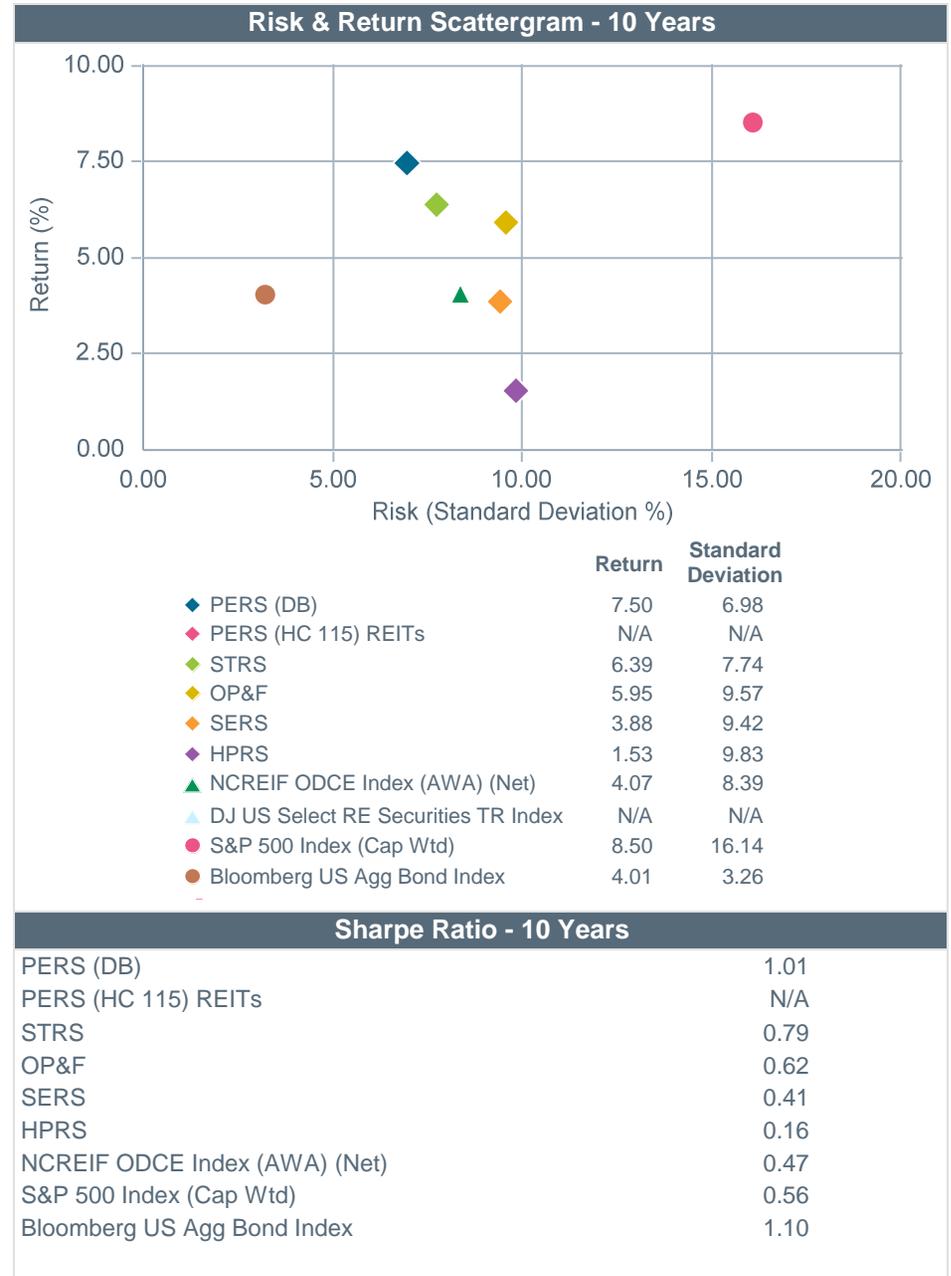
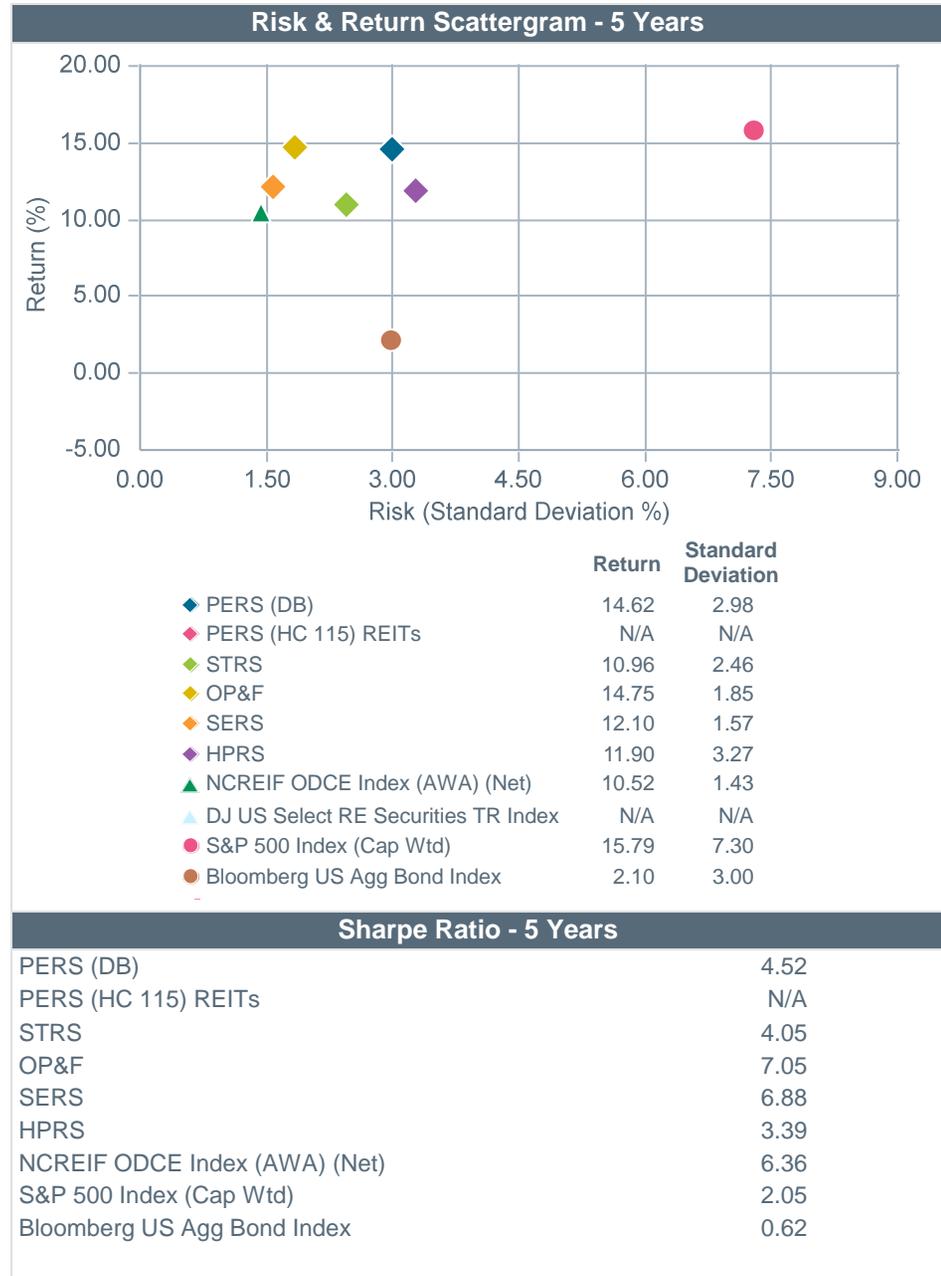
Performance shown is gross of fees.

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Additional Fixed Income										
PERS (HC 115) High Yield	2.36	7.23	6.08	N/A	N/A	N/A	14.44	-2.74	N/A	N/A
Bloomberg Barclays U.S. High Yield Index	2.45	7.50	6.35	N/A	N/A	N/A	17.13	-4.47	N/A	N/A
Difference	-0.09	-0.27	-0.27	N/A	N/A	N/A	-2.69	1.73	N/A	N/A
PERS (HC 115) Floating Rate Debt	9.48	6.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CS Lvg'd Loan Index	2.24	4.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	7.24	2.16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Securitized Debt	2.18	7.52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bloomberg Barclays CMBS Index + 2%	2.58	5.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	-0.40	1.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) TIPS	2.14	2.88	2.02	N/A	N/A	N/A	4.69	-1.43	N/A	N/A
Bloomberg Barclays U.S. Tips Index	2.14	3.01	2.05	N/A	N/A	N/A	4.68	-1.44	N/A	N/A
Difference	0.00	-0.13	-0.03	N/A	N/A	N/A	0.01	0.01	N/A	N/A
OP&F Mortgages	2.75	2.87	3.90	5.38	5.31	5.30	5.63	3.21	8.56	6.72
Bloomberg Mortgage Index (1 Qtr Lag)	1.84	0.30	2.44	1.97	2.72	4.13	3.63	3.43	3.78	-1.20
Difference	0.91	2.57	1.46	3.41	2.59	1.17	2.00	-0.22	4.78	7.92
OP&F High Yield	2.86	7.05	6.16	5.48	6.95	8.01	12.80	-0.92	2.81	6.13
CS Developed Countries High Yield	2.45	7.48	6.46	5.73	6.94	7.62	17.95	-4.83	1.85	7.52
Difference	0.41	-0.43	-0.30	-0.25	0.01	0.39	-5.15	3.91	0.96	-1.39
OP&F U.S. TIPS	3.56	2.89	7.00	5.52	10.70	10.16	18.76	0.26	19.43	-10.62
Bridgewater Custom GIPS Index	2.18	1.90	5.13	3.70	7.81	7.08	16.77	-2.36	18.76	-13.10
Difference	1.38	0.99	1.87	1.82	2.89	3.08	1.99	2.62	0.67	2.48

Performance shown is gross of fees.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Real Estate										
PERS (DB)	8.98	9.61	12.95	14.62	14.13	7.50	12.08	17.28	18.92	15.43
PERS (DB) Real Estate Custom Benchmark	3.51	7.55	10.69	11.42	12.01	6.41	9.93	14.71	12.21	12.82
Difference	5.47	2.06	2.26	3.20	2.12	1.09	2.15	2.57	6.71	2.61
PERS (HC 115) REITs	2.41	3.81	4.97	N/A	N/A	N/A	6.70	4.41	N/A	N/A
DJ US Select Real Estate Securities TR Index	2.37	3.76	4.95	N/A	N/A	N/A	6.65	4.46	N/A	N/A
Difference	0.04	0.05	0.02	N/A	N/A	N/A	0.05	-0.05	N/A	N/A
STRS	4.05	6.14	9.04	10.96	12.71	6.39	9.68	11.36	17.57	10.36
STRS Real Estate Custom Benchmark	3.36	6.70	8.87	10.16	10.89	6.72	8.10	11.89	14.54	9.72
Difference	0.69	-0.56	0.17	0.80	1.82	-0.33	1.58	-0.53	3.03	0.64
OP&F	5.51	10.30	13.39	14.75	14.97	5.95	13.14	16.83	18.57	15.11
NCREIF ODCE Index (AWA) (Net) (1 Qtr Lag)	3.14	6.70	9.84	10.57	11.47	4.08	9.08	13.86	11.36	11.97
Difference	2.37	3.60	3.55	4.18	3.50	1.87	4.06	2.97	7.21	3.14
SERS	4.75	10.24	11.43	12.10	12.05	3.88	10.27	13.81	14.22	12.00
SERS Global Real Assets Benchmark	3.47	6.89	9.84	10.35	11.25	6.57	9.26	13.48	11.26	11.00
Difference	1.28	3.35	1.59	1.75	0.80	-2.69	1.01	0.33	2.96	1.00
HPRS	6.01	10.30	8.12	11.90	8.77	1.53	7.75	6.34	22.02	13.78
NCREIF Property Index (1 Qtr Lag)	3.47	6.89	9.83	10.35	11.25	6.23	9.22	13.48	11.26	11.00
Difference	2.54	3.41	-1.71	1.55	-2.48	-4.70	-1.47	-7.14	10.76	2.78

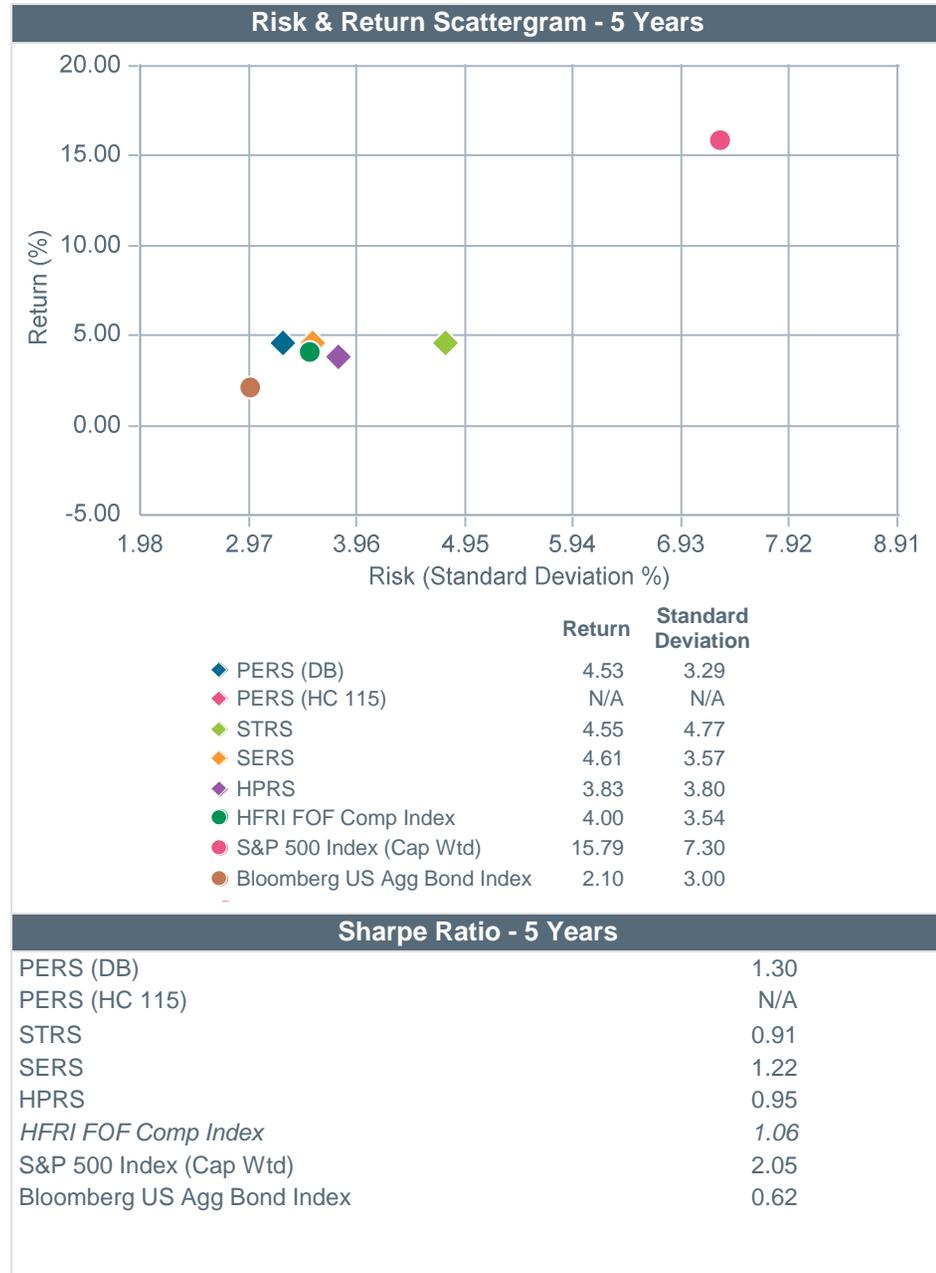
Performance shown may be net or gross of fees depending on underlying investments. Prior to 2008, HPRS's real estate portfolio consisted of two buildings. Since then, HPRS has shifted its focus to externally managed funds.



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

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Hedge Funds										
PERS (DB)	3.58	7.25	3.08	4.53	3.76	1.96	3.38	-1.20	3.93	9.63
PERS (DB) Hedge Funds Custom Benchmark	4.10	7.38	3.96	4.28	5.05	5.18	6.44	-1.70	2.59	7.00
Difference	-0.52	-0.13	-0.88	0.25	-1.29	-3.22	-3.06	0.50	1.34	2.63
PERS (HC 115)	3.58	7.25	3.08	N/A	N/A	N/A	3.38	-1.20	N/A	N/A
Hedge Funds Custom Benchmark	4.10	7.38	3.96	N/A	N/A	N/A	6.44	-1.70	N/A	N/A
Difference	-0.52	-0.13	-0.88	N/A	N/A	N/A	-3.06	0.50	N/A	N/A
STRS	3.03	5.59	2.77	4.55	4.09	2.71	3.38	-0.55	3.27	11.44
HFRI FOF Comp Index	4.42	7.77	2.61	4.00	2.66	1.08	0.51	-0.27	3.37	8.96
Difference	-1.39	-2.18	0.16	0.55	1.43	1.63	2.87	-0.28	-0.10	2.48
SERS	2.87	7.27	3.10	4.61	4.23	N/A	2.20	-0.05	4.10	9.80
HFRI FOF Comp Index + 1%	4.94	8.85	3.64	5.04	3.69	N/A	1.52	0.73	4.40	10.04
Difference	-2.07	-1.58	-0.54	-0.43	0.54	N/A	0.68	-0.78	-0.30	-0.24
HPRS	4.53	5.70	2.18	3.83	2.93	2.52	-0.27	1.21	3.34	9.47
HFRI FOF Comp Index	4.42	7.77	2.61	4.00	2.66	1.08	0.51	-0.27	3.37	8.96
Difference	0.11	-2.07	-0.43	-0.17	0.27	1.44	-0.78	1.48	-0.03	0.51

Performance shown is net of fees.



Performance shown is net of fees.

Performance										
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Private Equity										
PERS (DB)	10.37	19.60	10.63	13.18	14.32	10.04	6.72	6.09	17.94	16.29
PERS (DB) Private Equity Custom Benchmark	7.97	15.13	9.82	13.42	14.56	8.71	8.48	6.04	15.41	22.81
Difference	2.40	4.47	0.81	-0.24	-0.24	1.33	-1.76	0.05	2.53	-6.52
STRS	9.15	19.35	11.87	14.84	14.56	9.77	6.76	9.89	18.90	20.00
STRS Private Equity Custom Benchmark	11.75	22.32	12.22	16.72	15.11	10.67	13.85	1.48	13.67	34.86
Difference	-2.60	-2.97	-0.35	-1.88	-0.55	-0.90	-7.09	8.41	5.23	-14.86
OP&F	9.89	21.80	16.00	15.55	14.97	9.95	14.37	12.06	18.34	11.50
OP&F Private Equity Custom Benchmark	9.29	22.48	14.32	17.72	17.72	10.88	18.82	2.65	21.45	24.59
Difference	0.60	-0.68	1.68	-2.17	-2.75	-0.93	-4.45	9.41	-3.11	-13.09
SERS	10.80	21.56	15.84	17.49	16.37	11.17	12.37	13.81	22.77	17.32
Burgiss All Private Equity Benchmark	6.52	12.10	9.50	13.20	14.53	8.58	9.07	7.37	15.75	22.34
Difference	4.28	9.46	6.34	4.29	1.84	2.59	3.30	6.44	7.02	-5.02
HPRS	3.33	9.81	8.12	10.42	6.49	4.94	14.14	0.85	12.41	15.54
HPRS Private Equity Custom Benchmark	3.33	9.81	11.18	15.90	15.88	12.72	14.14	9.64	21.15	25.63
Difference	0.00	0.00	-3.06	-5.48	-9.39	-7.78	0.00	-8.79	-8.74	-10.09

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

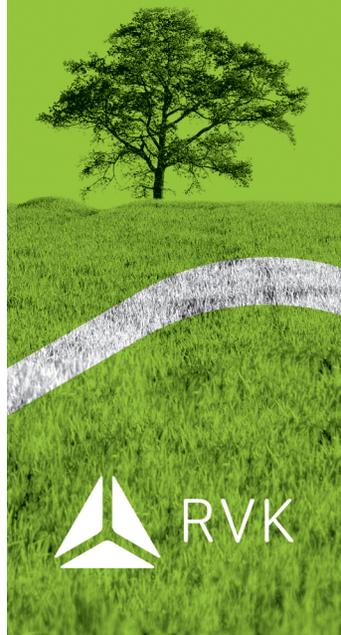
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Other Alternatives										
PERS (DB) Opportunistic Investments	0.51	2.50	1.50	N/A	N/A	N/A	0.89	1.12	N/A	-3.06
PERS (DB) Opportunistic Custom Benchmark	0.43	2.31	1.40	N/A	N/A	N/A	1.04	0.84	N/A	-1.34
Difference	0.08	0.19	0.10	N/A	N/A	N/A	-0.15	0.28	N/A	-1.72
PERS (DB) Commodities	18.08	6.40	-7.00	N/A	N/A	N/A	11.92	-32.44	-32.12	N/A
S&P Goldman Sachs Commodity Index (TR)	17.83	5.77	-7.52	N/A	N/A	N/A	11.37	-32.86	-33.06	N/A
Difference	0.25	0.63	0.52	N/A	N/A	N/A	0.55	0.42	0.94	N/A
PERS (DB) Risk Parity	11.10	18.51	7.04	N/A	N/A	N/A	15.51	-10.42	9.73	N/A
PERS (DB) Risk Parity Custom Benchmark	5.69	11.50	7.22	N/A	N/A	N/A	7.00	3.30	7.64	N/A
Difference	5.41	7.01	-0.18	N/A	N/A	N/A	8.51	-13.72	2.09	N/A
PERS (DB) GTAA	8.17	17.03	7.98	N/A	N/A	N/A	6.58	0.94	4.44	N/A
PERS (DB) GTAA Custom Benchmark	7.11	15.16	6.55	N/A	N/A	N/A	5.77	-0.69	3.61	N/A
Difference	1.06	1.87	1.43	N/A	N/A	N/A	0.81	1.63	0.83	N/A
PERS (HC 115) Opportunistic	0.51	2.50	1.50	N/A	N/A	N/A	0.89	1.12	N/A	N/A
PERS (HC 115) Opportunistic Custom Benchmark	0.43	2.31	1.40	N/A	N/A	N/A	1.04	0.84	N/A	N/A
Difference	0.08	0.19	0.10	N/A	N/A	N/A	-0.15	0.28	N/A	N/A
PERS (HC 115) Commodities	18.08	6.40	-7.00	N/A	N/A	N/A	11.92	-32.44	N/A	N/A
S&P Goldman Sachs Commodity Index (TR)	17.83	5.77	-7.52	N/A	N/A	N/A	11.37	-32.86	N/A	N/A
Difference	0.25	0.63	0.52	N/A	N/A	N/A	0.55	0.42	N/A	N/A
PERS (HC 115) Risk Parity	11.10	18.51	7.04	N/A	N/A	N/A	15.51	-10.42	N/A	N/A
PERS (HC 115) Risk Parity Custom Benchmark	5.69	11.50	7.22	N/A	N/A	N/A	7.00	3.30	N/A	N/A
Difference	5.41	7.01	-0.18	N/A	N/A	N/A	8.51	-13.72	N/A	N/A
PERS (HC 115) GTAA	8.17	17.03	7.98	N/A	N/A	N/A	6.58	0.94	N/A	N/A
PERS (HC 115) GTAA Custom Benchmark	7.11	15.16	6.55	N/A	N/A	N/A	5.77	-0.69	N/A	N/A
Difference	1.06	1.87	1.43	N/A	N/A	N/A	0.81	1.63	N/A	N/A

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

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
Other Alternatives										
STRS Opportunistic Investments ex HF	3.43	6.07	4.99	7.65	8.84	N/A	4.32	4.57	11.66	11.91
STRS Opportunistic Custom Benchmark	10.66	19.95	10.03	14.45	12.38	N/A	11.63	-0.52	11.45	32.26
Difference	-7.23	-13.88	-5.04	-6.80	-3.54	N/A	-7.31	5.09	0.21	-20.35
OP&F Real Assets	-0.03	4.65	2.88	4.11	N/A	N/A	2.99	1.03	8.99	3.07
Consumer Price Index + 5%	3.13	7.21	6.72	6.50	N/A	N/A	7.18	5.77	5.79	6.58
Difference	-3.16	-2.56	-3.84	-2.39	N/A	N/A	-4.19	-4.74	3.20	-3.51
OP&F MLPs	-2.25	-4.08	-6.54	4.77	N/A	N/A	20.42	-20.31	16.91	32.25
Alerian MLP Index	-3.97	-6.52	-9.33	-0.06	N/A	N/A	18.30	-32.59	4.80	27.58
Difference	1.72	2.44	2.79	4.83	N/A	N/A	2.12	3.28	12.11	4.67
SERS Opportunistic Investments	6.53	14.55	6.31	N/A	N/A	N/A	11.17	-5.64	7.96	N/A
SERS Opportunistic Custom Benchmark	6.96	14.37	7.49	N/A	N/A	N/A	7.02	1.48	6.66	N/A
Difference	-0.43	0.18	-1.18	N/A	N/A	N/A	4.15	-7.12	1.30	N/A
HPRS Real Assets	1.46	-4.27	N/A	N/A	N/A	N/A	4.28	N/A	N/A	N/A
HPRS Real Assets Custom Benchmark	-0.29	-0.43	N/A	N/A	N/A	N/A	9.17	N/A	N/A	N/A
Difference	1.75	-3.84	N/A	N/A	N/A	N/A	-4.89	N/A	N/A	N/A

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

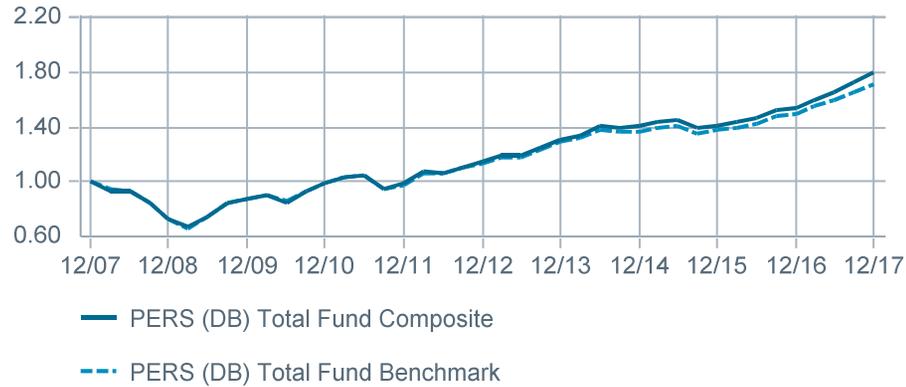
Plan Specific Pages



Summary

- PERS (DB) has generated an annualized 0.56% of alpha over the trailing 5-year period and 0.51% over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

Growth of \$1 - 10 Years



MPT Stats

	5 Years	10 Years
Maximum Return	4.87	12.34
Minimum Return	-4.18	-13.81
Standard Deviation	4.44	10.96
vs. PERS (DB) Total Fund Benchmark		
Info Ratio	1.13	0.48
Tracking Error	0.64	0.92
Alpha	0.56	0.51
vs. S&P 500 Index (Cap Wtd)		
Beta	0.48	0.65
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	2.04	0.55

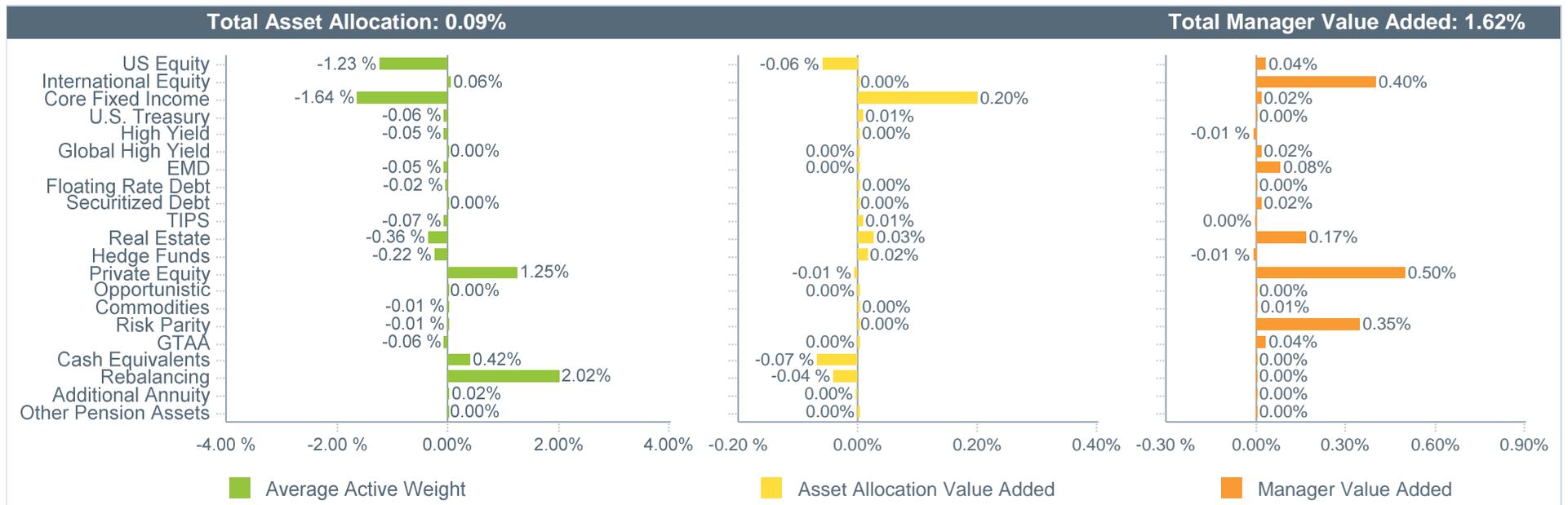
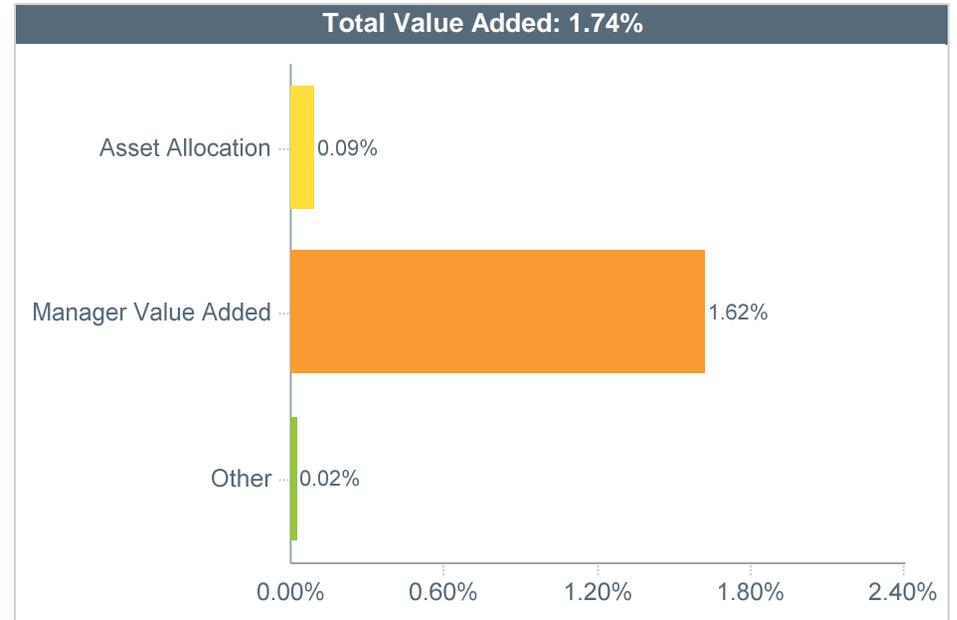
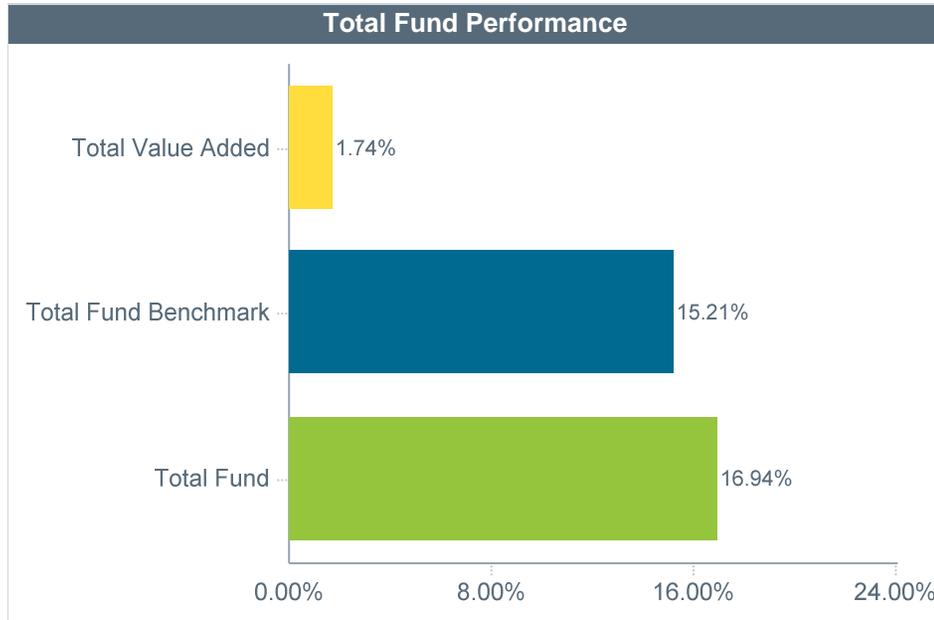
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	19,219,927,774	22.17	22.00
International Equity	16,497,608,161	19.03	18.90
Core Fixed Income	6,261,529,445	7.22	8.90
U.S. Treasury	856,516,912	0.99	1.00
High Yield	2,479,167,308	2.86	3.00
Global High Yield	10,620	0.00	0.00
EMD	6,039,357,732	6.97	7.00
Floating Rate Debt	53,090,347	0.06	0.10
Securitized Debt	830,954,926	0.96	1.00
TIPS	1,685,059,861	1.94	2.00
Real Estate	7,586,252,191	8.75	10.00
Hedge Funds	6,414,633,049	7.40	8.00
Private Equity	9,317,745,486	10.75	10.00
Opportunistic	84,750,287	0.10	0.10
Commodities	899,751,384	1.04	1.00
Risk Parity	4,348,278,304	5.02	5.00
GTAA	1,786,946,005	2.06	2.00
Cash Equivalents	583,383,102	0.67	0.00
Rebalancing	1,715,037,722	1.98	0.00
Additional Annuity	17,272,048	0.02	0.00
Other Pension Assets	265	0.00	0.00
Total Fund	86,677,272,931	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.

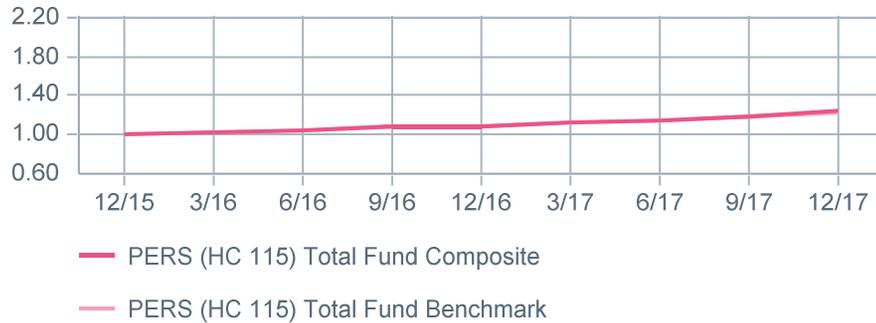


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- PERS HC was formed in 2005, segregating HC from the DB assets. PERS HC 115 was formed October 2014 to hold all HC assets of PERS, and has a performance inception date of January 2015.
- OPERS health care plan is not a pension plan and therefore has significantly different characteristics including a shorter focus asset allocation with more liquidity than the pension plans. For purposes of this study, the OPERS health care plan has been included in the results. The results for OPERS HC plan were reflected in the PERS HC since 2005 through October 2014, and then transferred to and renamed PERS HC 115 at that time.

Growth of \$1 - 2 Years



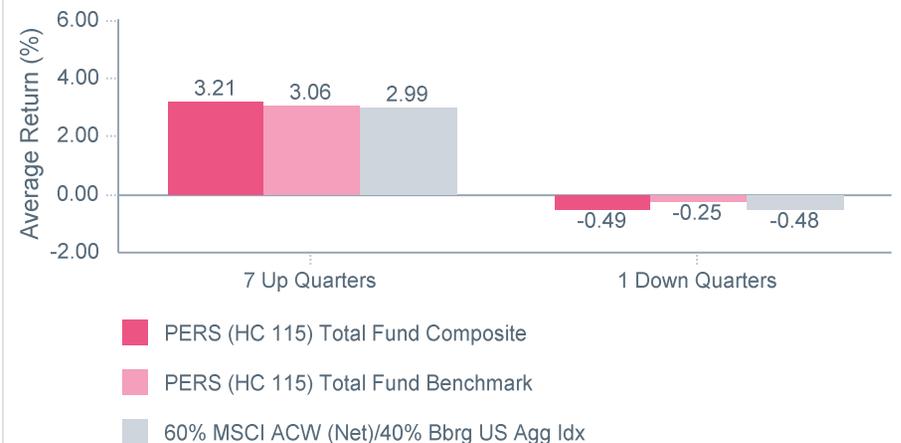
MPT Stats

	1 Year
Maximum Return	4.38
Standard Deviation	1.14
Minimum Return	2.77
vs. PERS (HC 115) Total Fund Benchmark	
Info Ratio	3.85
Tracking Error	0.22
Alpha	-1.37
vs. S&P 500 Index (Cap Wtd)	
Beta	0.32
vs. ICE BofAML 3 Mo US T-Bill Index	
Sharpe Ratio	11.22

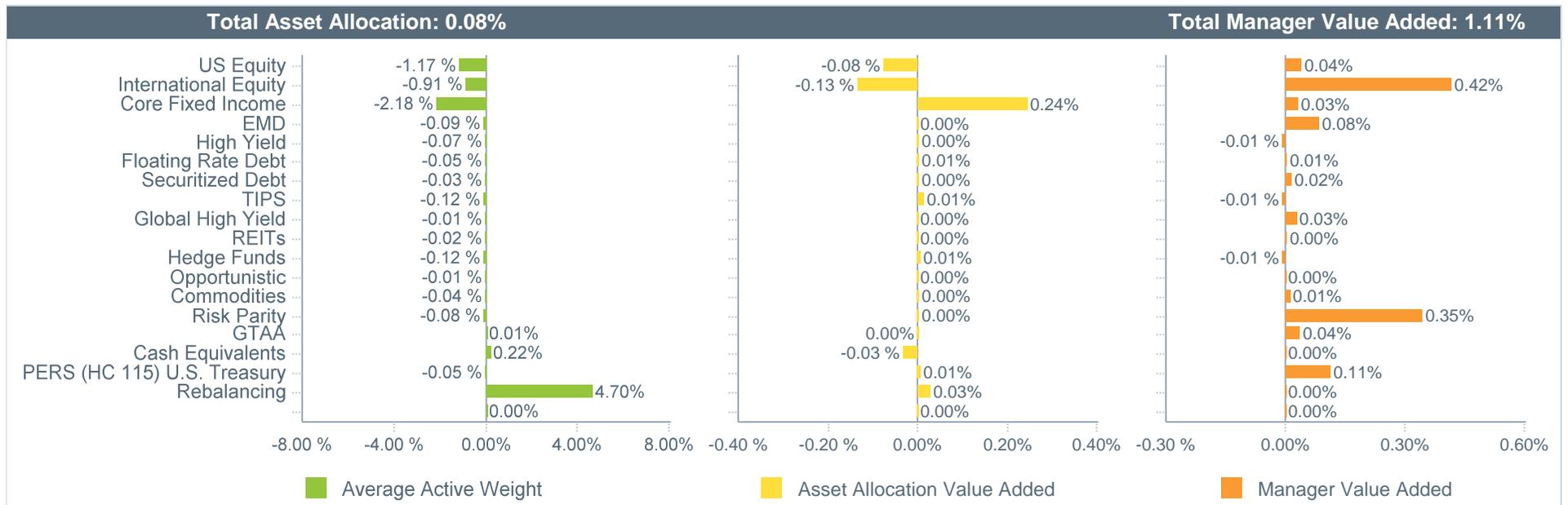
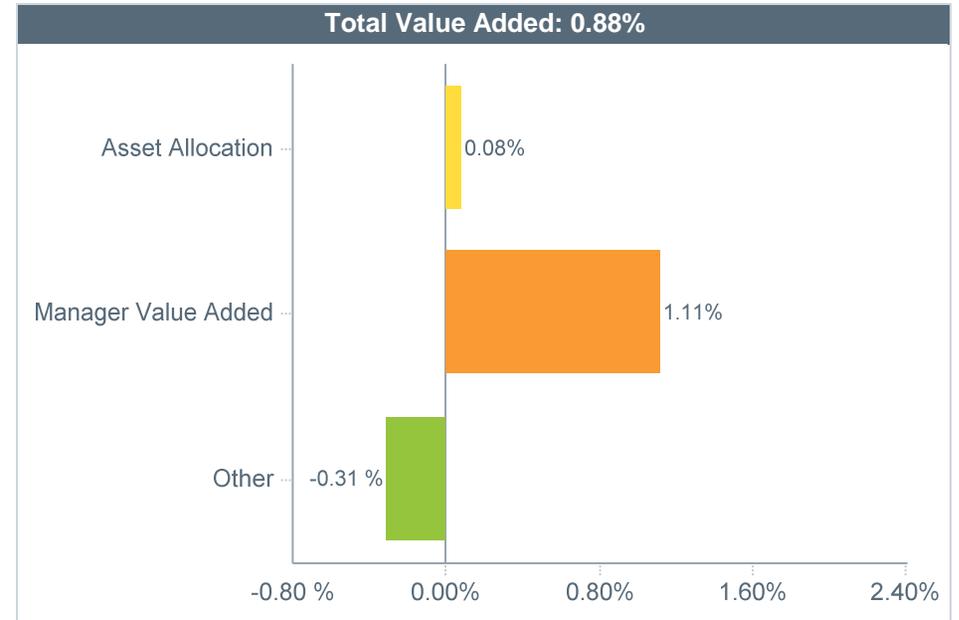
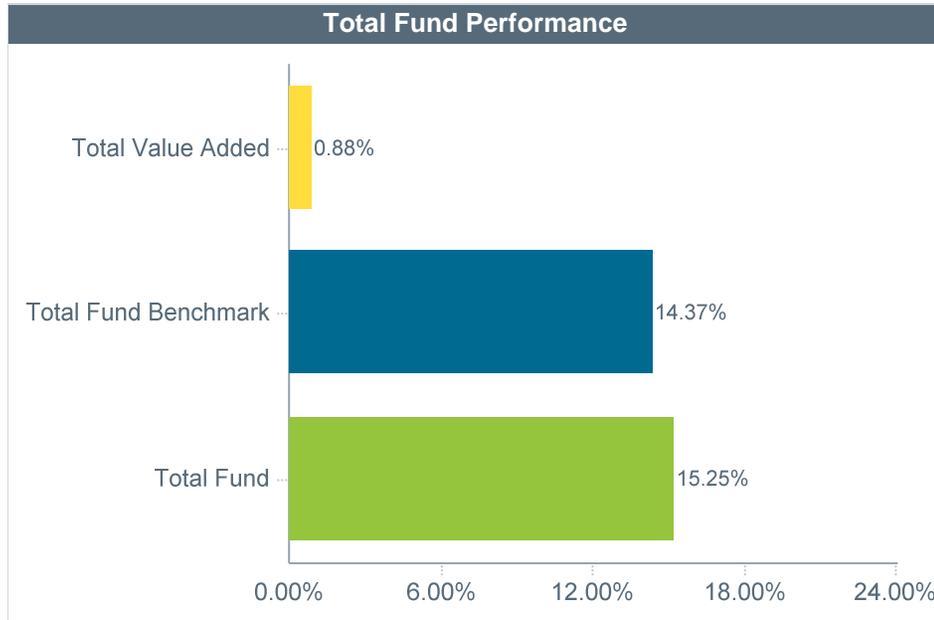
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	3,020,284,799	23.43	24.10
International Equity	2,562,052,184	19.88	20.80
Core Fixed Income	1,748,350,383	13.57	15.90
EMD	891,885,843	6.92	7.00
High Yield	375,121,869	2.91	3.00
Floating Rate Debt	4,115,214	0.03	0.10
Securitized Debt	122,621,392	0.95	1.00
TIPS	757,844,418	5.88	6.00
Global High Yield	72,273	0.00	0.00
REITs	775,186,888	6.01	6.00
Hedge Funds	741,185,296	5.75	6.00
Opportunistic	11,690,285	0.09	0.10
Commodities	264,653,185	2.05	2.00
Risk Parity	650,603,877	5.05	5.00
GTAA	259,346,145	2.01	2.00
Cash Equivalents	19,544,419	0.15	0.00
PERS (HC 115) U.S. Treasury	126,585,002	0.98	1.00
Rebalancing	557,162,494	4.32	0.00
Total Fund	12,888,305,967	100.00	100.00

Up/Down Markets - 2 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.

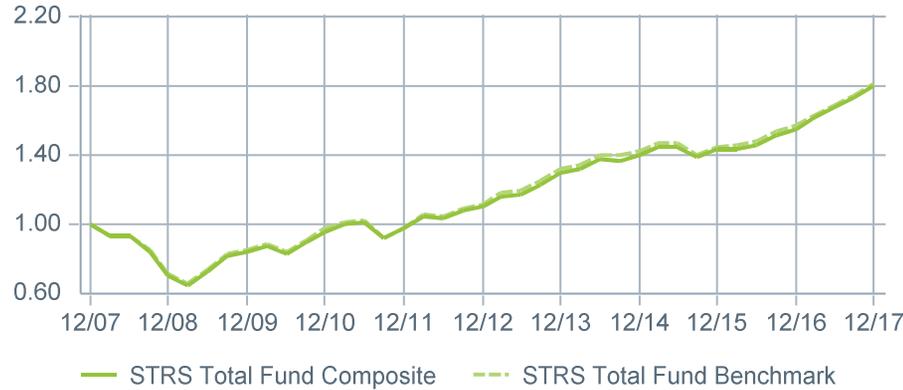


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- STRS has generated 0.37% of alpha over the trailing 5-year period and 0.01% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

Growth of \$1 - 10 Years



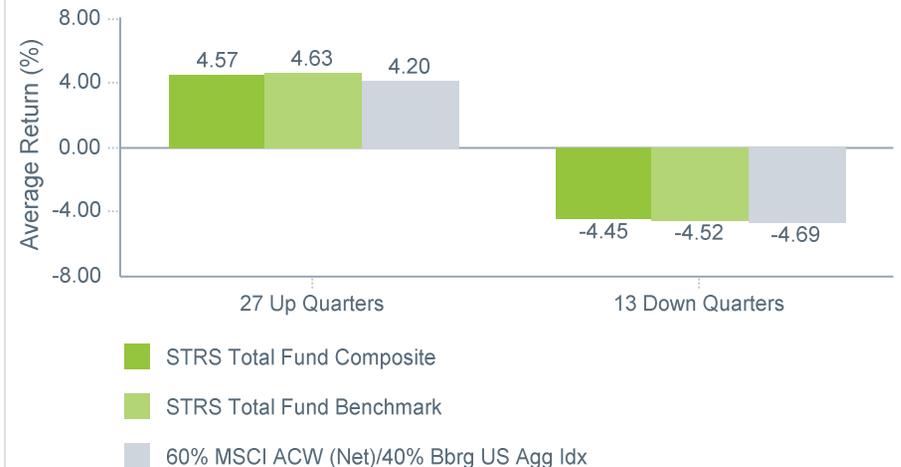
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	23,492,674,284	30.00	30.00
International Equity	20,254,362,639	25.87	25.00
Fixed Income	14,744,227,557	18.83	20.00
Real Estate	7,420,132,333	9.48	10.00
STRS Opportunistic Investments ex HF	3,771,190,874	4.82	7.00
Private Equity	5,283,074,770	6.75	7.00
Cash Equivalents	1,699,904,189	2.17	1.00
Total Fund	76,665,566,646	97.91	100.00

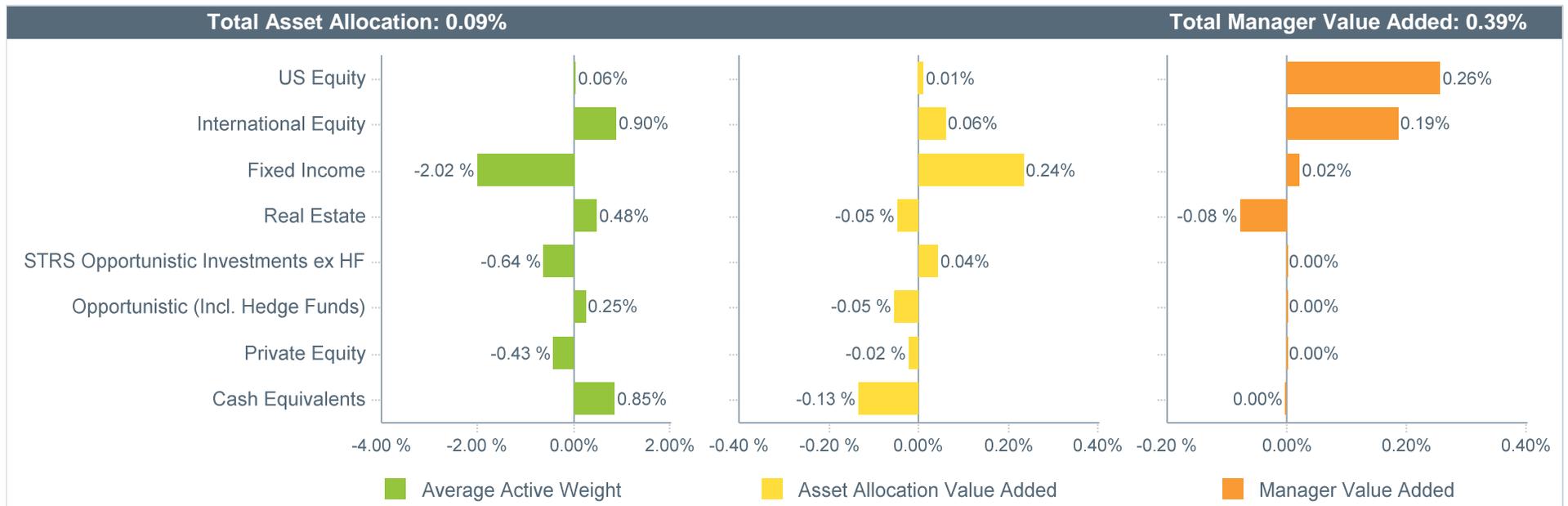
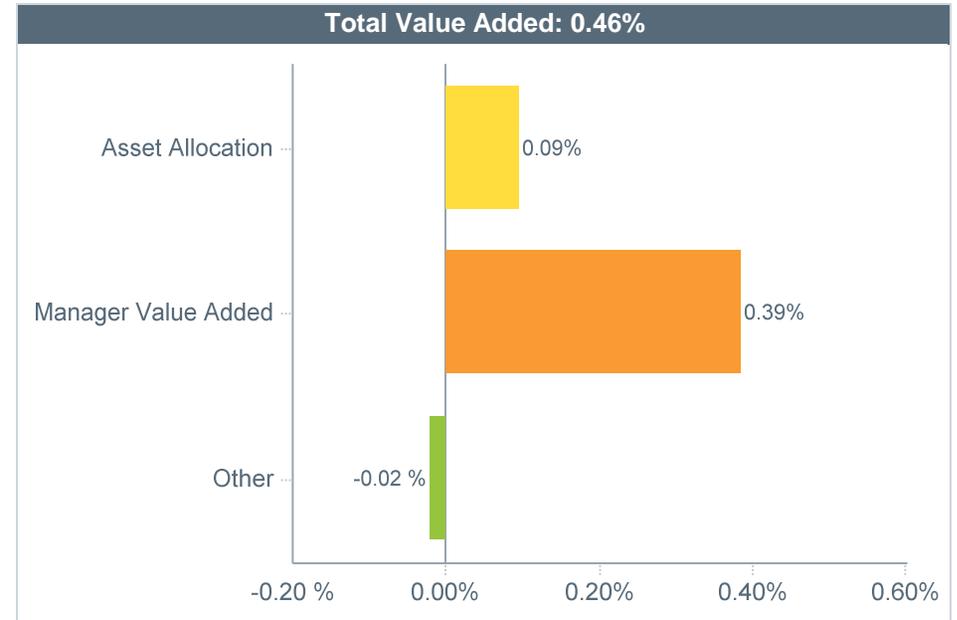
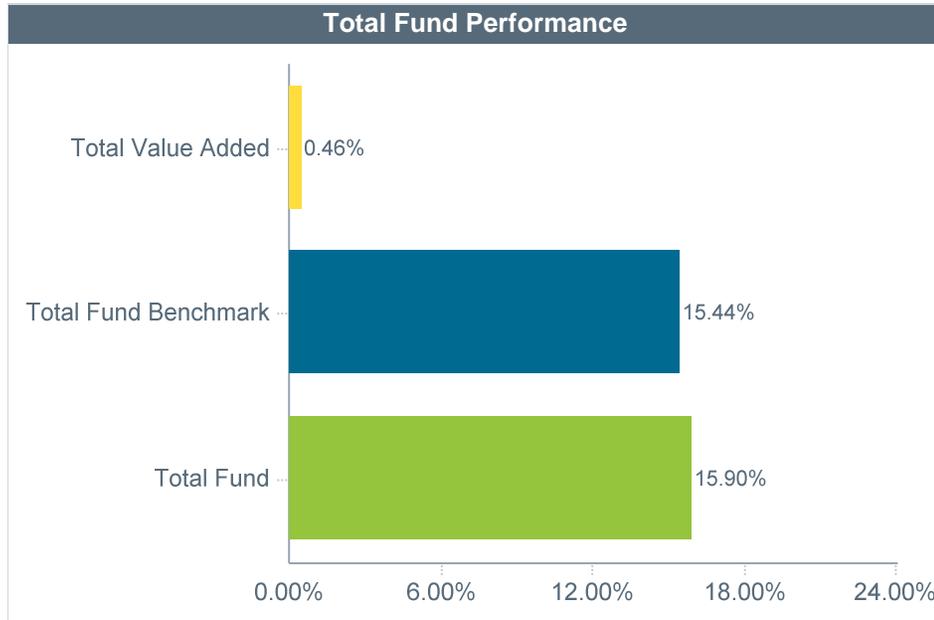
MPT Stats

	5 Years	10 Years
Maximum Return	5.45	12.25
Minimum Return	-4.44	-15.99
Standard Deviation	4.48	11.20
vs. STRS Total Fund Benchmark		
Info Ratio	0.27	-0.12
Tracking Error	0.37	0.60
Alpha	0.37	0.01
vs. S&P 500 Index (Cap Wtd)		
Beta	0.55	0.68
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	2.18	0.54

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.

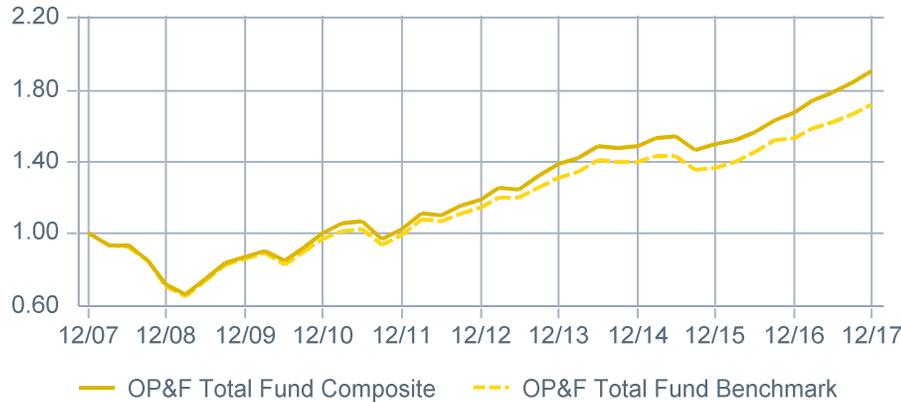


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- OP&F has generated 1.42% of alpha over the trailing 5-year period and 0.99% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the plan has exhibited larger up-market and smaller down-market capture characteristics over the past 10 years.

Growth of \$1 - 10 Years



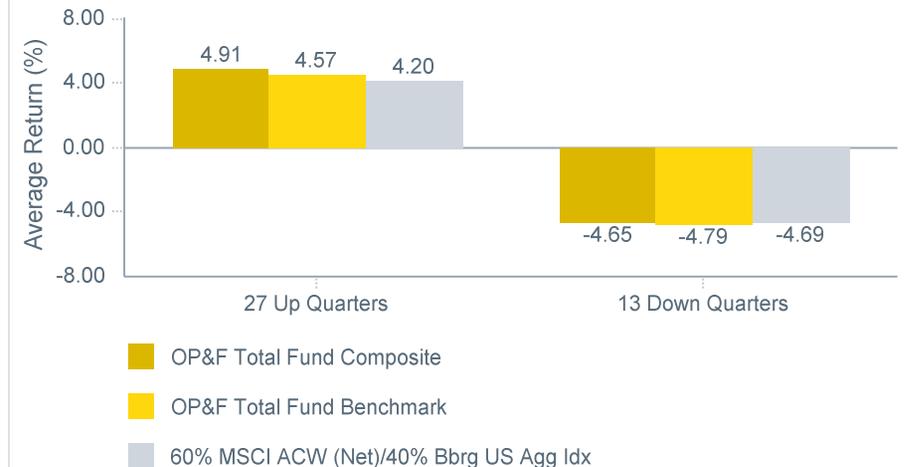
MPT Stats

	5 Years	10 Years
Maximum Return	5.71	13.00
Minimum Return	-5.33	-15.45
Standard Deviation	5.04	11.64
vs. OP&F Total Fund Benchmark		
Info Ratio	1.26	1.03
Tracking Error	1.06	1.06
Alpha	1.42	0.99
vs. S&P 500 Index (Cap Wtd)		
Beta	0.56	0.69
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.87	0.58

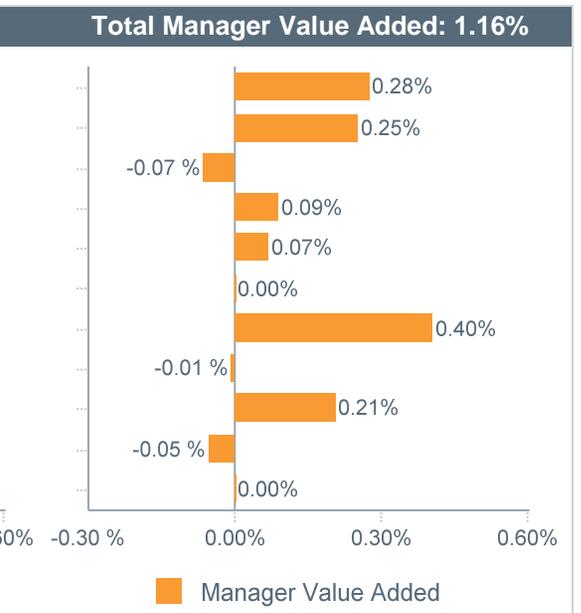
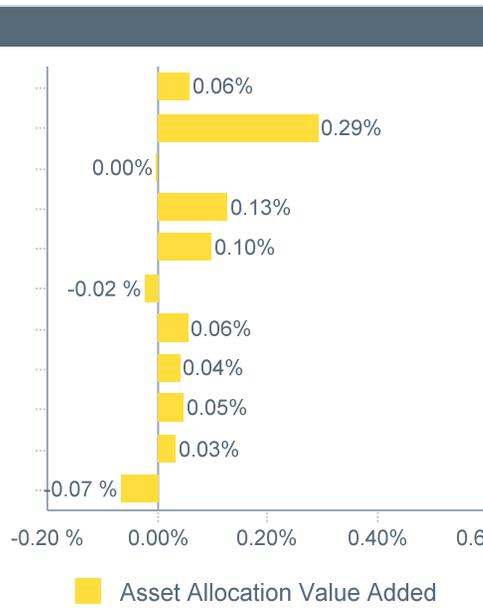
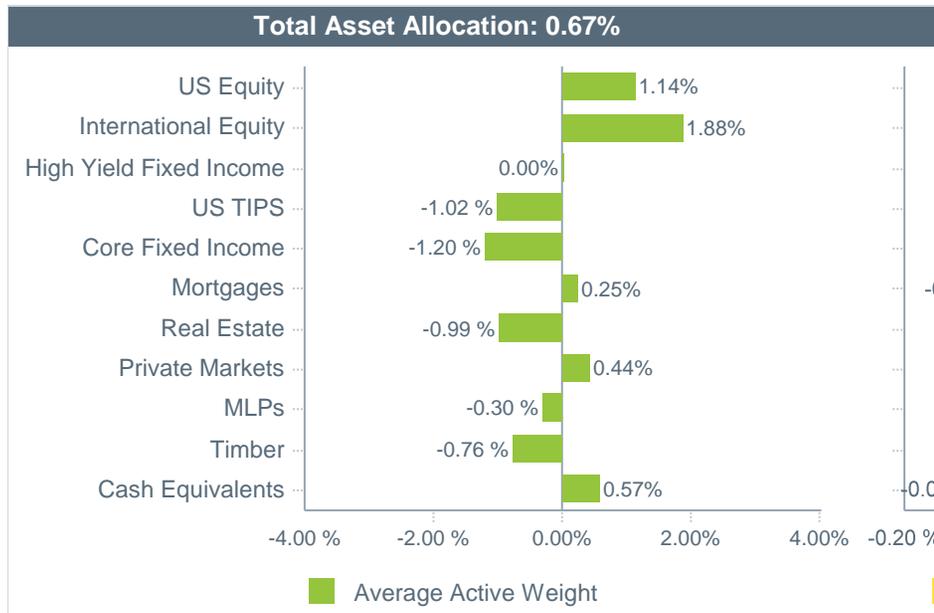
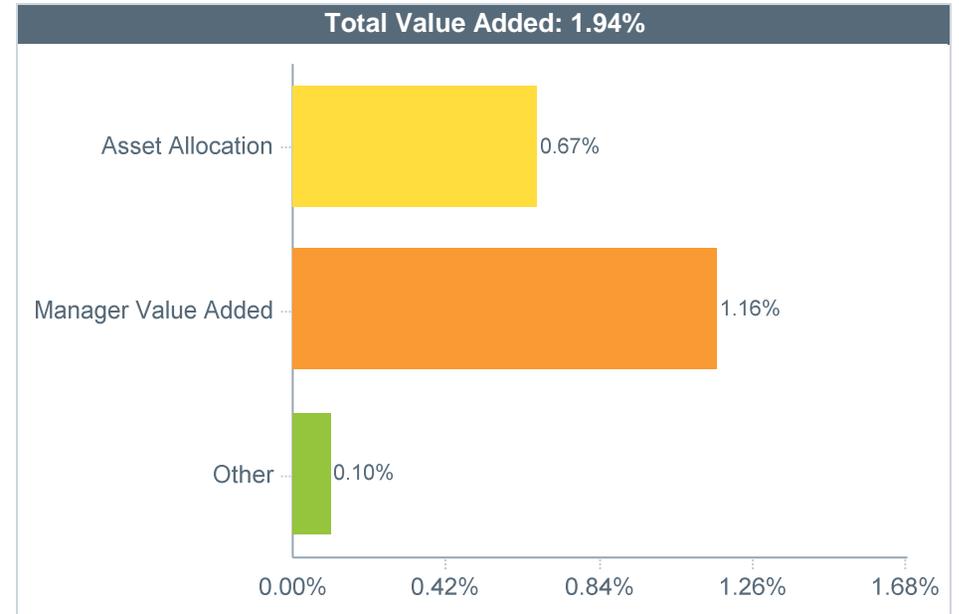
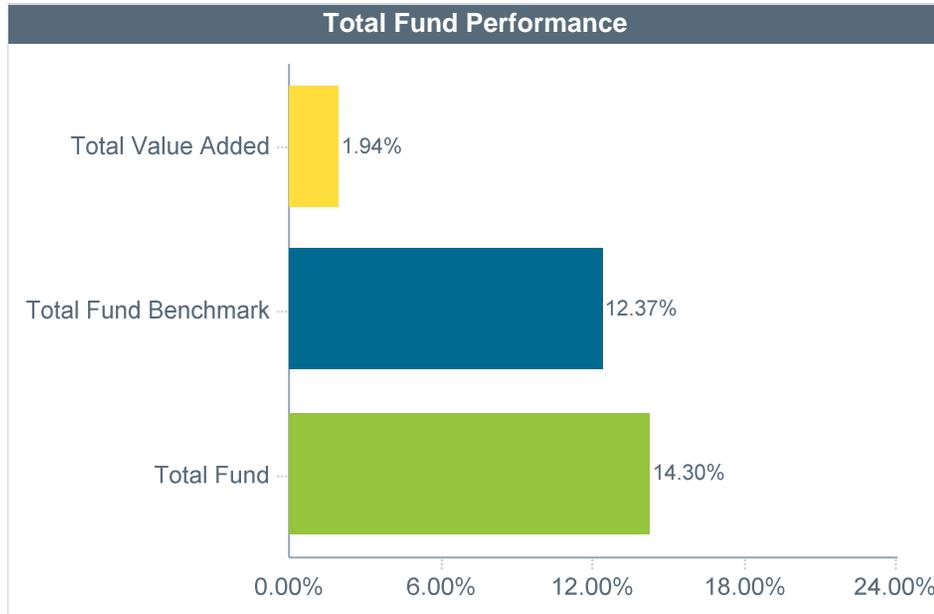
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	3,096,153,124	19.65	20.00
International Equity	3,277,395,621	20.80	20.00
High Yield Fixed Income	2,152,955,620	13.67	14.00
US TIPS	1,324,730,810	8.41	8.50
Core Fixed Income	1,416,616,219	8.99	10.00
Mortgages	36,733,148	0.23	0.00
Real Estate	1,722,263,668	10.93	12.00
Private Markets	1,076,443,008	6.83	6.00
MLPs	1,205,609,173	7.65	7.50
Timber	322,121,722	2.04	2.00
Cash Equivalents	124,174,474	0.79	0.00
Total Fund	15,755,196,587	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.

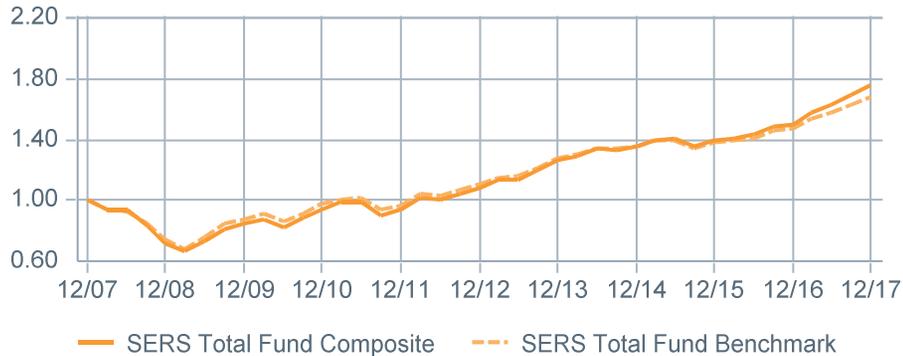


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- SERS has generated 0.10% of alpha over the trailing 5-year period and lost 0.11% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, SERS has exhibited larger up-market capture and smaller down-market capture characteristics over the past 10 years.

Growth of \$1 - 10 Years



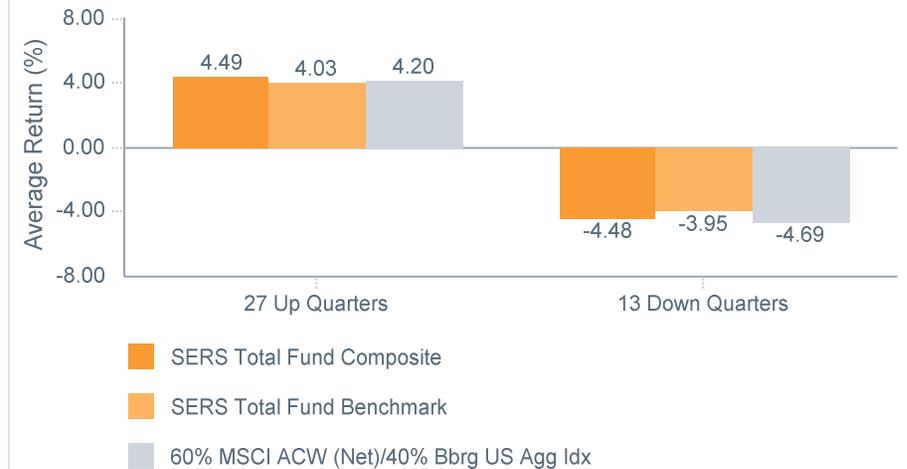
MPT Stats

	5 Years	10 Years
Maximum Return	5.41	11.01
Minimum Return	-3.77	-13.65
Standard Deviation	4.56	10.72
vs. SERS Total Fund Benchmark		
Info Ratio	1.43	0.32
Tracking Error	0.96	1.76
Alpha	0.10	0.11
vs. S&P 500 Index (Cap Wtd)		
Beta	0.51	0.64
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	2.16	0.54

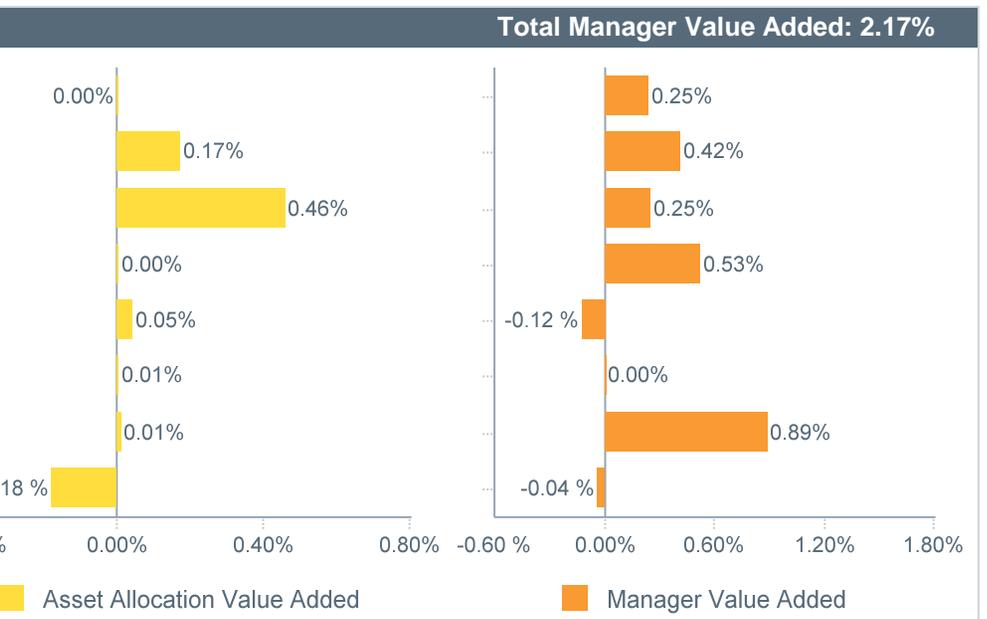
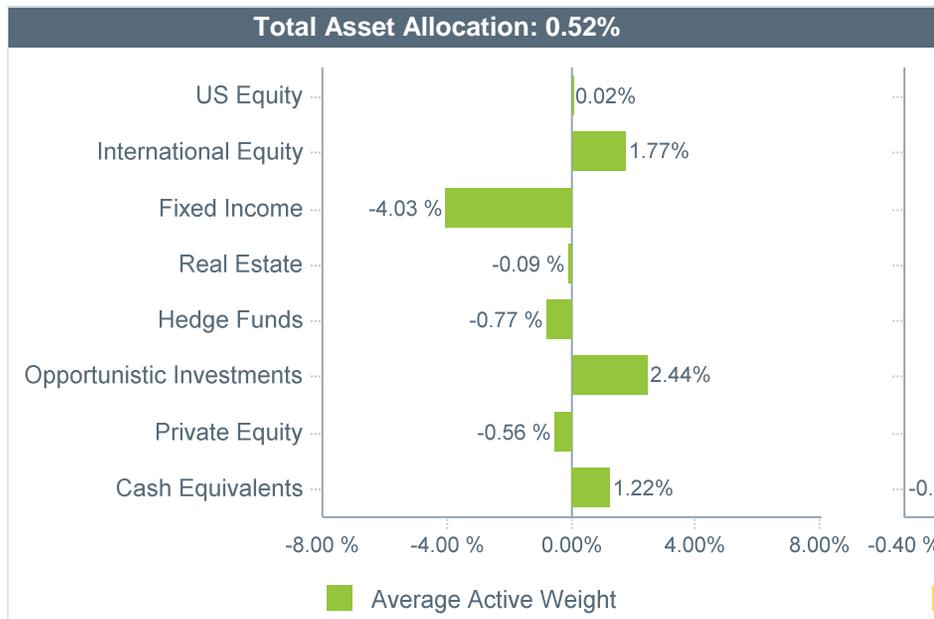
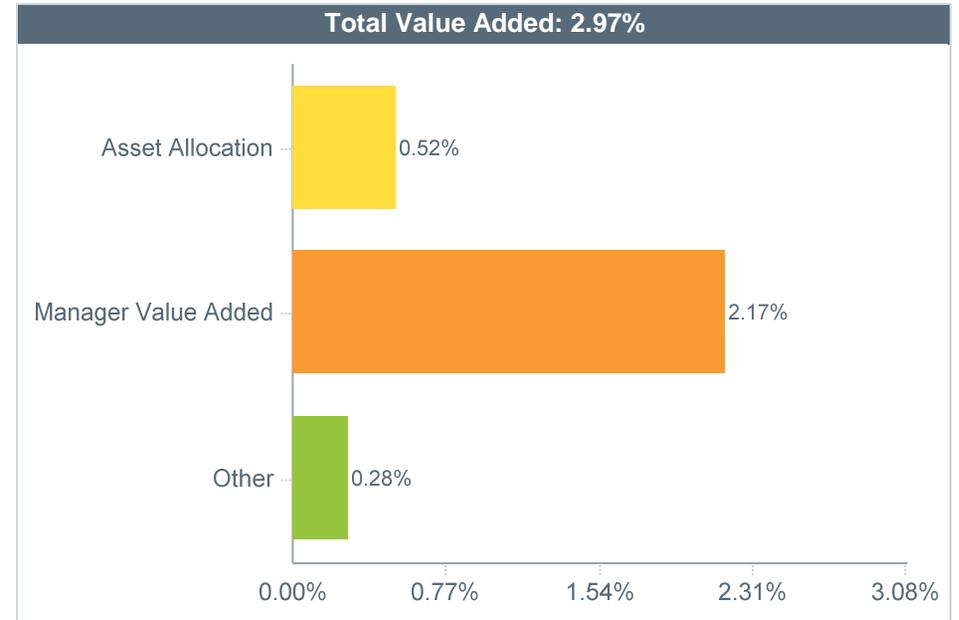
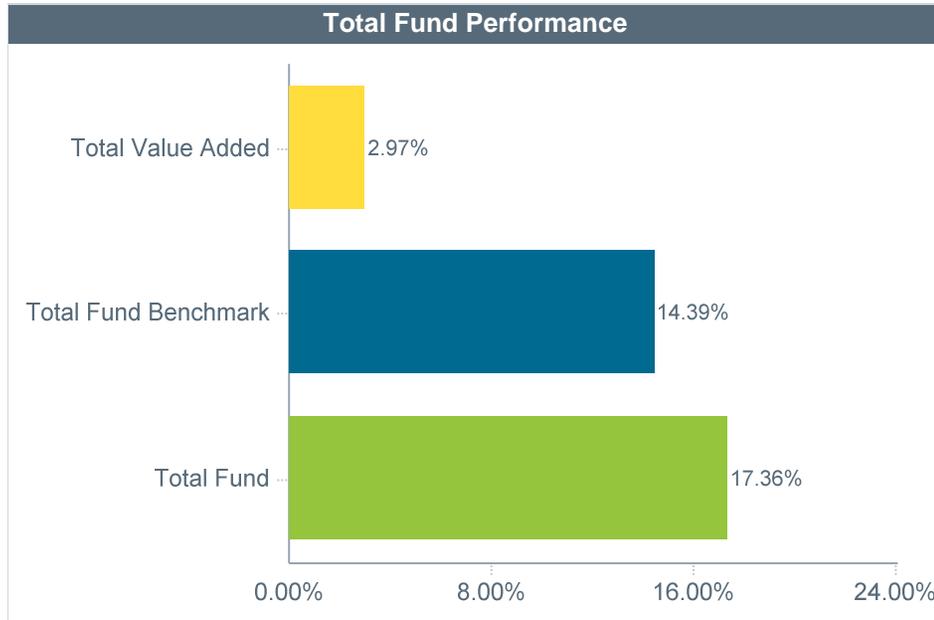
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	3,299,664,878	23.02	22.50
International Equity	3,771,023,474	26.31	22.50
Fixed Income	2,024,763,565	14.12	19.00
Real Estate	2,046,986,542	14.28	15.00
Hedge Funds	1,285,346,216	8.97	10.00
Opportunistic Investments	338,619,229	2.36	0.00
Private Equity	1,335,882,964	9.32	10.00
Cash Equivalents	233,328,940	1.63	1.00
Total Fund	14,335,615,807	100.00	100.00

Up/Down Markets - 10 Years



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

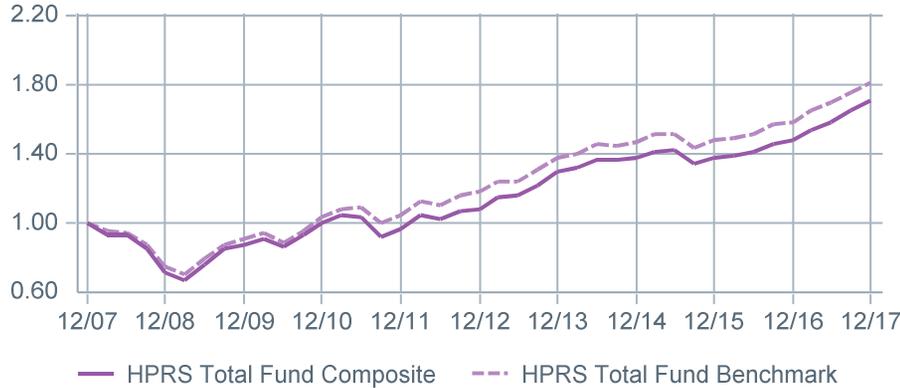


Performance shown is gross of fees. Calculation is based on monthly periodicity. See Glossary for additional information regarding the Total Fund Attribution calculation. Total Fund Benchmark return is calculated by RVK and may differ from Plan provided return due to rounding.

Summary

- HPRS has lost 0.11% of alpha over the trailing 5-year period and lost 1.04% of alpha over the trailing 10-year period.
- Relative to a 60 Equity/40 Bond portfolio, the total portfolio has exhibited larger up-market and smaller down-market capture characteristics over the past 10 years.

Growth of \$1 - 10 Years



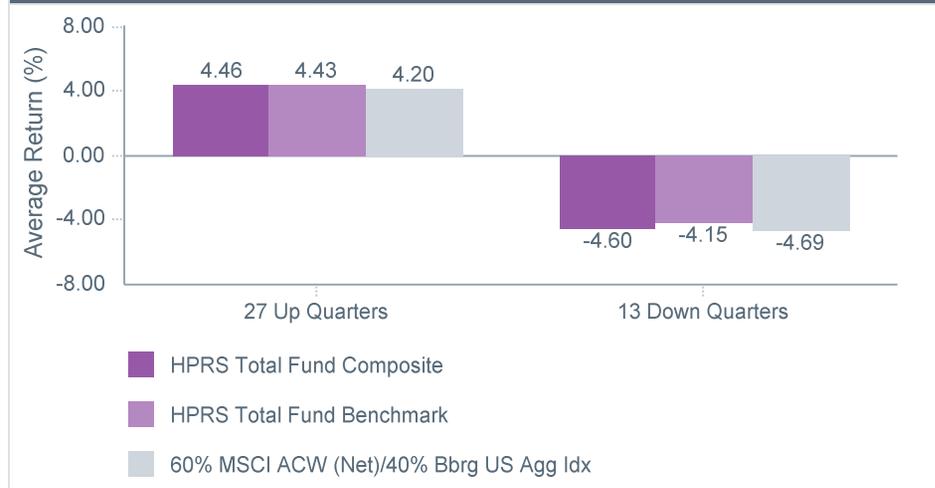
Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	274,821,419	30.47	31.00
International Equity	192,624,581	21.36	20.00
Fixed Income	160,970,183	17.85	19.00
Real Estate	34,011,456	3.77	5.00
Hedge Funds	110,875,145	12.29	12.00
Private Equity	70,348,167	7.80	7.00
Real Assets	47,744,687	5.29	5.00
Cash Equivalents	10,497,774	1.16	1.00
Total Fund	901,893,412	100.00	100.00

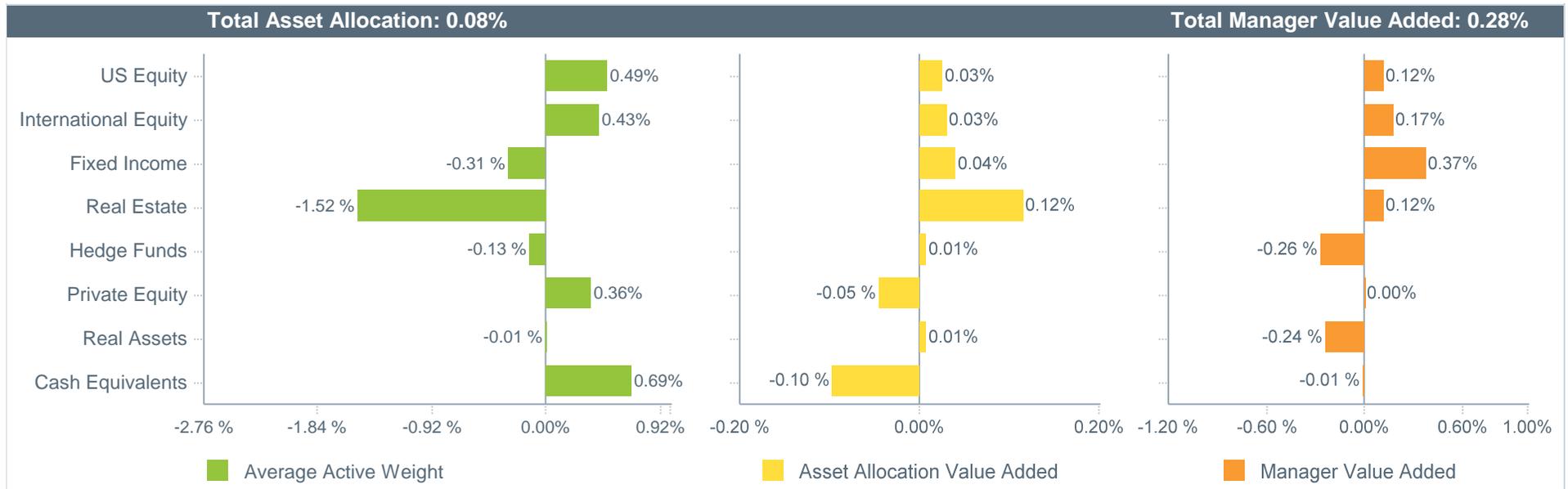
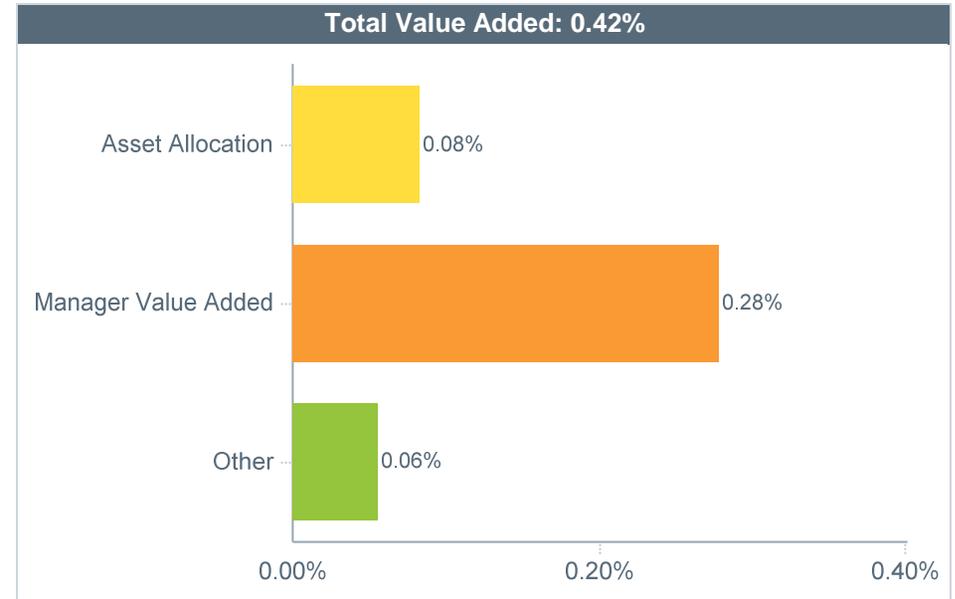
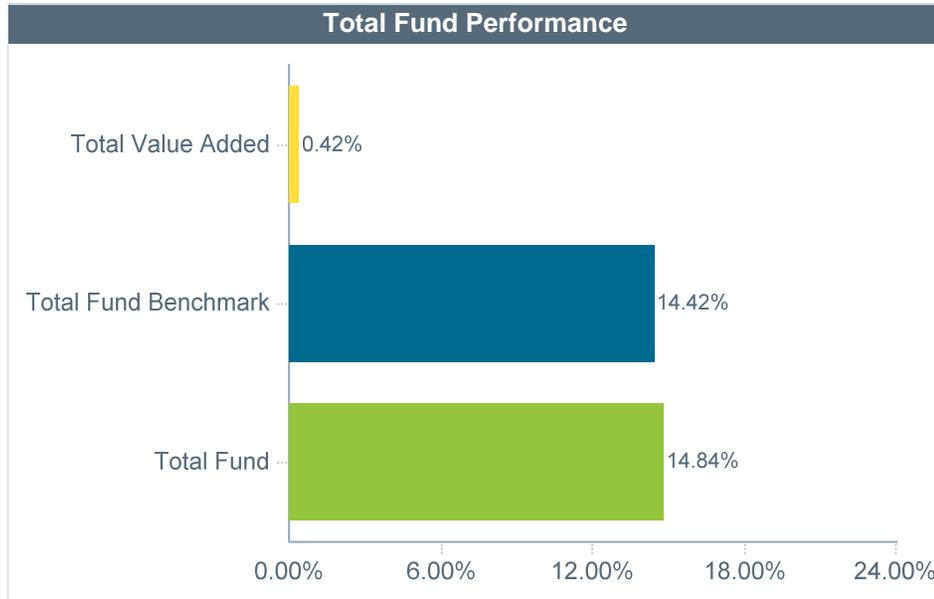
MPT Stats

	5 Years	10 Years
Maximum Return	6.04	12.56
Minimum Return	-5.33	-16.16
Standard Deviation	5.01	11.51
vs. HPRS Total Fund Benchmark		
Info Ratio	0.62	-0.30
Tracking Error	0.85	1.65
Alpha	-0.11	-1.04
vs. S&P 500 Index (Cap Wtd)		
Beta	0.62	0.70
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.82	0.49

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, 2017

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2016	2015	2014	2013
HPRS	901,893	7.54	14.84	7.30	9.54	7.94	5.49	7.42	0.15	6.73	19.59
HPRS Total Fund Benchmark		6.86	14.33	7.15	8.99	8.41	6.13	7.40	0.19	7.03	16.79
Difference		0.68	0.51	0.15	0.55	-0.47	-0.64	0.02	-0.04	-0.30	2.80
<i>All Public Plans > \$1B-TF Median</i>		7.66	16.03	7.88	9.00	8.33	5.94	7.90	0.33	6.46	15.48
Rank		54	70	69	35	71	79	64	59	43	16
Population		110	106	101	99	95	87	111	96	79	75
<i>All Public Plans \$250M to \$1B-TF Median</i>		7.39	15.44	7.77	9.49	8.72	6.24	8.21	0.33	6.46	16.38
Rank		44	65	72	48	82	83	67	59	41	21
Population		64	62	58	58	55	49	68	60	55	57

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

Appendix

Performance Related Comments

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

Asset Class Fee Comparison – as of 12/31/2017

(annualized fees shown in basis points)							
	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
 PERS (DB)	7	27	12	73	60	120	38
 PERS (HC 115)	1	4	3	7	-	14	6
 STRS	10	20	9	43	71	158	60
 OP&F	44	34	53	155	250	-	76
 SERS	29	40	21	-	136	141	109
 HPRS	35	77	49	143	104	102	98

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

Appendix

Percentage of Assets Managed by External Managers – as of 12/31/2017

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
■ PERS (DB)	62%	18%	78%	45%	100%	100%	100%	86%
■ PERS (HC 115)	42%	18%	78%	31%	-	-	100%	77%
■ STRS	29%	11%	43%	11%	13%	96%	100%	71%
■ OP&F	100%	100%	100%	100%	100%	100%	-	100%
■ SERS	98%	100%	100%	100%	100%	100%	100%	100%
■ HPRS	100%	100%	100%	100%	100%	100%	100%	100%

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

Percentage of Actively Managed Assets – as of 12/31/2017

	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
■ PERS (DB)	78%	41%	78%	84%	100%	100%	100%	87%
■ PERS (HC 115)	66%	41%	78%	77%	-	-	100%	78%
■ STRS	86%	59%	100%	100%	85%	100%	100%	100%
■ OP&F	93%	55%	100%	100%	100%	100%	-	100%
■ SERS	82%	59%	70%	100%	96%	100%	100%	100%
■ HPRS	85%	52%	100%	100%	100%	100%	100%	100%

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

Custom Benchmark Glossary

PERS (DB) Total Fund Custom Benchmark:

- 22.0% Russell 3000 Index
- 18.9% PERS (DB) International Equity Custom Benchmark
- 8.9% PERS (DB) Core Fixed Income Custom Benchmark
- 1.0% Bloomberg Barclays U.S. Treasury Index
- 3.0% Bloomberg Barclays U.S. High Yield Index
- 7.0% PERS (DB) EMD Custom Benchmark
- 0.1% CS Leveraged Loan Index
- 1.0% Bloomberg Barclays Non-Agency CMBS + 2%
- 2.0% Bloomberg 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 115) Total Fund Custom Benchmark:

- 24.1% Russell 3000 Index
- 20.8% PERS (HC 115) International Equity Custom Benchmark
- 15.9% PERS (HC 115) Core Fixed Income Custom Benchmark
- 7.0% PERS (HC 115) EMD Custom Benchmark
- 3.0% Bloomberg Barclays U.S. High Yield Index
- 0.1% CS Leveraged Loan Index
- 1.0% Bloomberg Barclays Non-Agency CMBS + 2%
- 6.0% Bloomberg Barclays U.S. TIPS Index
- 6.0% Dow Jones U.S. Select Real Estate Securities TR Index
- 6.0% PERS (HC 115) Hedge Funds Custom Benchmark
- 0.1% PERS (HC 115) Opportunistic Custom Benchmark
- 2.0% S&P Goldman Sachs Commodity Index (TR)
- 5.0% PERS (HC 115) Risk Parity Custom Benchmark
- 2.0% PERS (HC 115) GTAA Custom Benchmark
- 1.0% Bloomberg Barclays U.S. Treasury Index

STRS Total Fund Custom Benchmark:

- 30.0% Russell 3000 Index
- 25.0% MSCI World Ex US Index (50% Hedged)/ MSCI Emg Mkts Index
- 20.0% STRS Fixed Income Blended Benchmark
- 10.0% STRS Real Estate Custom Benchmark
- 7.0% Opportunistic Composite Performance
- 7.0% Private Equity Composite Performance
- 1.0% BofA ML 3 Mo US T-Bill Index

OP&F Total Fund Custom Benchmark:

- 20.0% Wilshire 5000 Index
- 20.0% MSCI ACW Ex US IMI Index (Net)
- 10.0% Bloomberg US Aggregate Bond Index
- 14.0% CS High Yield Dev. Countries Only Index
- 8.5% Bridgewater Custom GIPS Index
- 12.0% NCREIF ODCE (Net) (1 Quarter Lag)
- 2.0% CPI + 5%
- 7.5% Alerian MLP Index
- 6.0% OP&F Private Equity Custom Benchmark

SERS Total Fund Custom Benchmark:

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

HPRS Total Fund Custom Benchmark:

- 31.0% Russell 3000 Index
- 20.0% MSCI ACW Ex US IM Index (USD) (Net)
- 19.0% HPRS Fixed Income Custom Benchmark
- 5.0% NCREIF Property Index
- 12.0% HFRI FOF Composite Index
- 7.0% HPRS Total Private Equity Custom Composite
- 5.0% HPRS Real Assets Custom Index
- 1.0% BofA Merrill Lynch 91-Day T-Bill

Custom Benchmark Glossary

PERS (DB) International Equity Custom Benchmark:

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

PERS (DB) Core Fixed Income Custom Benchmark:

- Bloomberg Barclays US Aggregate Bond Index

PERS (DB) EMD Custom Benchmark:

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

PERS (DB) Real Estate Custom Benchmark:

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

PERS (DB) Private Equity Custom Benchmark:

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

PERS (DB) Hedge Funds Custom Benchmark:

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

PERS (DB) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (DB) Risk Parity Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (DB) GTAA Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) International Equity Custom Benchmark:

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

PERS (HC 115) Core Fixed Income Custom Benchmark:

- Bloomberg Barclays US Aggregate Bond Index

PERS (HC 115) EMD Custom Benchmark:

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

PERS (HC 115) Hedge Funds Custom Benchmark:

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

PERS (HC 115) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) Risk Parity Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) GTAA Custom Benchmark:

- The market weight of underlying portfolio benchmarks

STRS International Equity Custom Benchmark:

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

STRS Fixed Income Blended Benchmark:

- Effective July 1, 2017, the Fixed Income Blended Benchmark is calculated using the actual daily beginning weight of Core Fixed Income multiplied by the Bloomberg Barclays U.S. Universal Index return combined with the actual daily beginning weight of the Liquid Treasury Portfolio multiplied by the Bloomberg Barclays US Intermediate Treasury Index return. Prior to July 1, 2017, the Fixed Income Blended Benchmark consisted of the Bloomberg Barclays U.S. Universal 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

Custom Benchmark Glossary

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

SERS Opportunistic Custom Benchmark:

- SERS Total Fund Custom Benchmark

HPRS Fixed Income Custom Benchmark:

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

HPRS Total Private Equity Custom Benchmark:

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

HPRS Real Assets Custom Benchmark:

- 60% NCREIF Timberland
- 40% Alerian MLP

Glossary

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

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

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

Capital Markets Review -

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Glossary

Peer Groups -

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

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

1 - Highest Statistical Value 100 - Lowest Statistical Value

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

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

Return - Compounded rate of return for the period.

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

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

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

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

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

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

Glossary

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

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

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

Total Fund Performance -

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

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

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

Total Value Added -

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

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

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

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

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

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

PORTLAND

CHICAGO

NEW YORK

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