



Investment Performance Analysis

Ohio Retirement Study Council

Period Ended: December 31, 2021



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.

NCREIF Timberland: The **NCREIF Timberland Index** is a quarterly time series composite return measure of investment performance of a large pool of individual U.S. timber properties acquired in the private market for investment purposes only.

NCREIF Farmland: The **NCREIF Farmland Index** is a quarterly time series composite return measure of investment performance of a large pool of individual farmland properties acquired in the private market for investment purposes only.

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.

3 Month LIBOR Rate: The **3 Month LIBOR Rate Index** is the rate of interest at which banks offer to lend money to one another in the wholesale money markets in London.

S&P Risk Parity Index – 8% Target Volatility: The **S&P Risk Parity Index – 8% Target Volatility Index** seeks to measure the performance of a multi-asset risk parity strategy that allocates risk equally among U.S. dollar-denominated equity, fixed income, and commodities futures contracts, while targeting a volatility level of 8%.

S&P GSCI Gold: The **S&P GSCI Gold Index** provides investors with a reliable and publicly available benchmark tracking the COMEX gold future.

FTSE Dev Core 50/50 Infrastructure: The **FTSE Dev Core 50/50 Infrastructure Index** is a market-capitalization-weighted index of worldwide infrastructure and infrastructure-related securities.

Capital Markets Review



Fourth Quarter Economic Environment

Inflation remained a top concern among investors as the year-over-year change in the CPI reached 7.0% according to the December reading, the highest level in 30 years. Nevertheless, consumer demand and the ability of companies to pass along increasing costs have buoyed corporate profits. Employment data has indicated mixed progress and has been complicated by releases missing expectations, only to be revised higher in subsequent reports. However, strong wage growth and a declining unemployment rate reflect incremental improvement in labor conditions. Headlines were dominated by the emergence of the omicron variant which early studies suggest spreads more quickly, but causes fewer hospitalizations. Continued vaccination efforts and the development of new treatments countered concerns regarding the increased spread of the virus. GDP growth estimates for 2022 were impacted with forecasts trending lower, but most continue to reflect healthy growth expected next year. For instance, the IMF released a 2022 GDP growth forecast of 4.9% in October representing a decline of 0.1% from its July estimate. In response to the current environment, the Federal Reserve has started to reduce measures taken during the pandemic. The tapering of bond purchases began in November and accelerated in December, a trend expected to continue in 2022. In response to these conditions, Treasury yields have trended upwards and credit spreads widened in the quarter.

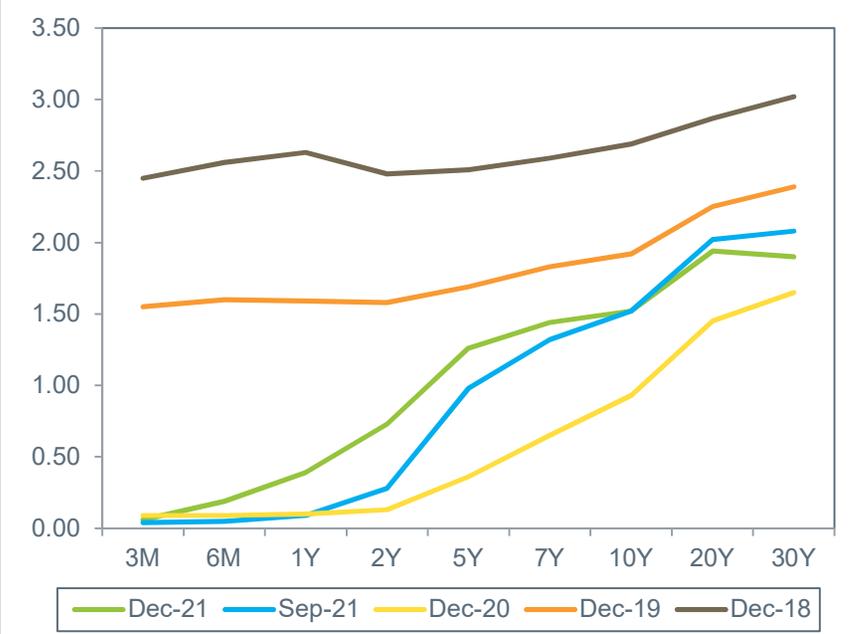
Key Economic Indicators



Economic Indicators	Dec-21	Sep-21	Dec-20	Dec-18	20 Yr
Federal Funds Rate (%)	0.07 ▲	0.06	0.09	2.40	1.30
Breakeven Infl. - 5 Yr (%)	2.91 ▲	2.53	1.97	1.49	1.86
Breakeven Infl. - 10 Yr (%)	2.59 ▲	2.38	1.99	1.71	2.04
CPI YoY (Headline) (%)	7.0 ▲	5.4	1.4	1.9	2.2
Unemployment Rate (%)	3.9 ▼	4.7	6.7	3.9	6.1
Real GDP YoY (%)	5.5 ▲	4.9	-2.3	2.3	1.9
PMI - Manufacturing	58.8 ▼	60.5	60.5	54.9	53.5
USD Total Wtd Idx	115.32 ▲	114.67	111.33	115.57	103.10
WTI Crude Oil per Barrel (\$)	75.2 ▲	75.0	48.5	45.4	64.4
Gold Spot per Oz (\$)	1,829 ▲	1,757	1,898	1,282	1,086

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	11.03	28.71	28.71	18.47	16.55
Russell 2000	2.14	14.82	14.82	12.02	13.23
MSCI EAFE (Net)	2.69	11.26	11.26	9.55	8.03
MSCI EAFE SC (Net)	0.07	10.10	10.10	11.04	10.80
MSCI Emg Mkts (Net)	-1.31	-2.54	-2.54	9.87	5.49
Bloomberg US Agg Bond	0.01	-1.55	-1.55	3.57	2.90
ICE BofAML 3 Mo US T-Bill	0.01	0.05	0.05	1.14	0.63
NCREIF ODCE (Gross)	7.97	22.17	22.17	8.71	10.45
FTSE NAREIT Eq REIT (TR)	16.31	43.24	43.24	10.75	11.38
HFRI FOF Comp	0.42	6.17	6.17	5.71	4.56
Bloomberg Cmdty (TR)	-1.56	27.11	27.11	3.66	-2.85

Treasury Yield Curve (%)



Fourth Quarter Review

Broad Market

US equity markets finished the year with a strong Q4, providing low double digit returns despite heightened volatility due to the spread of the Omicron variant, inflation fears, and global growth concerns. Volatility expectations, as measured by the CBOE Volatility Index, jumped above 30 in early December. However, investor uncertainty subsided shortly thereafter. The S&P 500 return of 28.7% in 2021 was its third highest calendar year return since 2000.

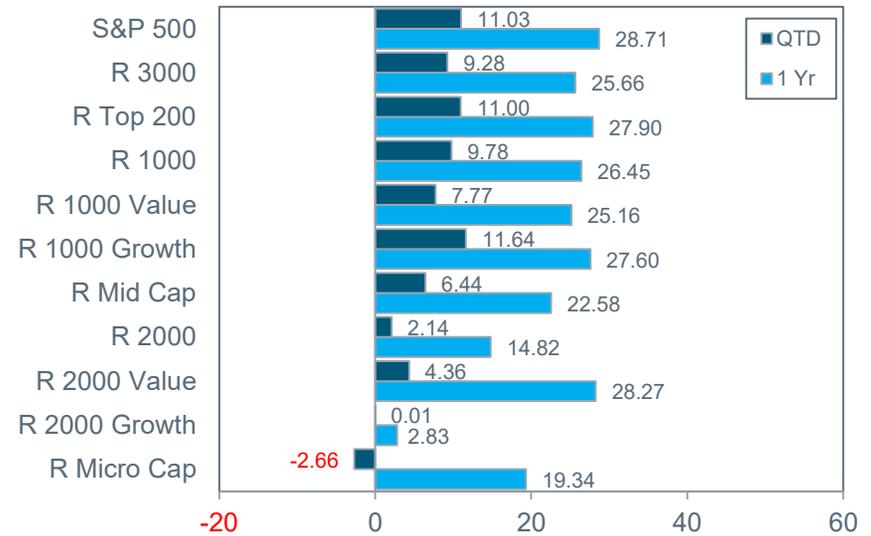
Market Cap

Large-cap stocks significantly outperformed their smaller-cap counterparts. The Russell 2000 Index returned 2.1% compared to 11.0% for the S&P 500.

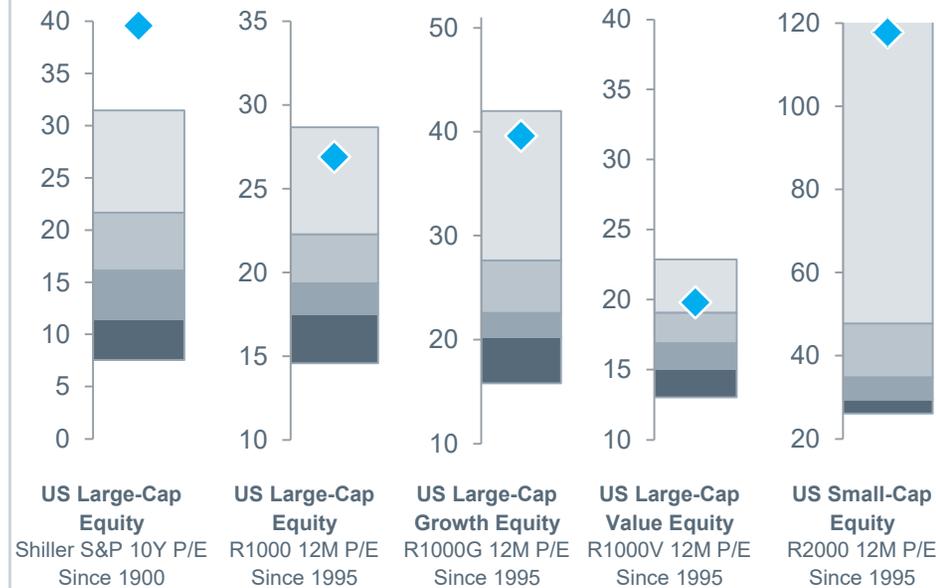
Style and Sector

At the beginning of Q4, growth stocks outperformed value stocks across all market capitalizations before a rotation into value stocks occurred later in the period. Active management performed well in Q4, except for large-cap growth managers, who struggled to keep up with their respective benchmarks.

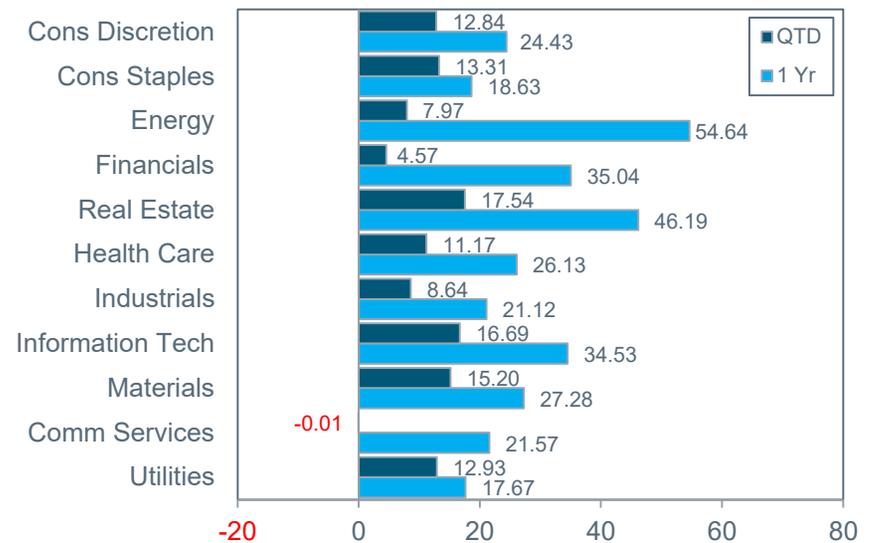
Style and Capitalization Market Performance (%)



Valuations



S&P 500 Index Sector Performance (%)



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

Fourth Quarter Review

Developed Markets

While international markets lagged behind the US equity market in Q4, developed international equities continued to participate in the recovery despite the COVID-19 surge led by the new Omicron variant. The MSCI EAFE Index saw a positive return of 2.7% for the quarter as growth stocks continued to outperform value from the prior quarter resulting in both growth and value performing in line for the calendar year. Large-cap stocks outperformed small-cap stocks.

Emerging Markets

Emerging markets experienced moderately negative returns in Q4 with the MSCI EM Index returning -1.3% for the period. Value stocks continued their outperformance over growth while small-cap stocks outperformed large.

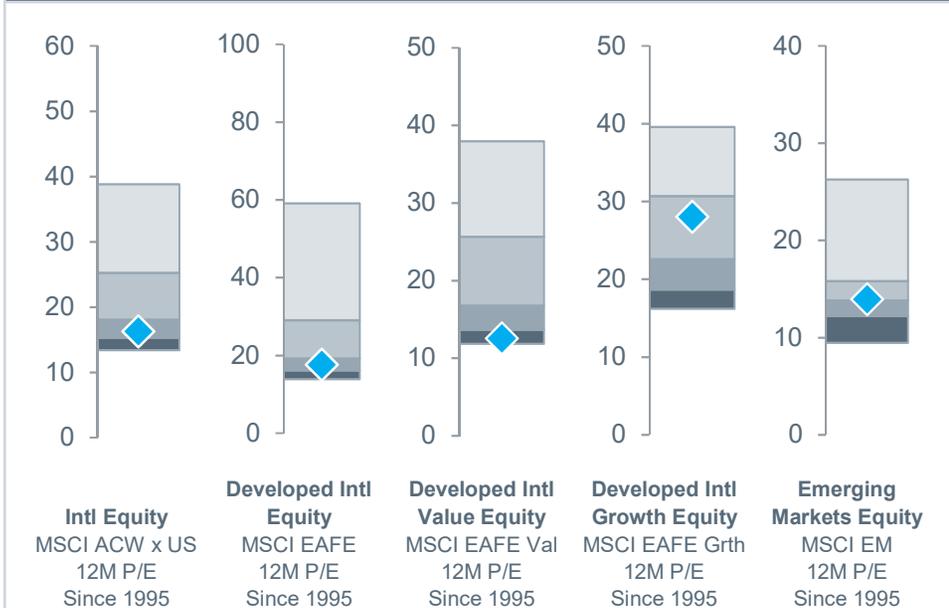
Market Cap & Style

In international markets, growth stocks outperformed value, while large-cap stocks outperformed small-cap. In emerging markets, value stocks outperformed growth, while small-cap stocks outperformed large-cap.

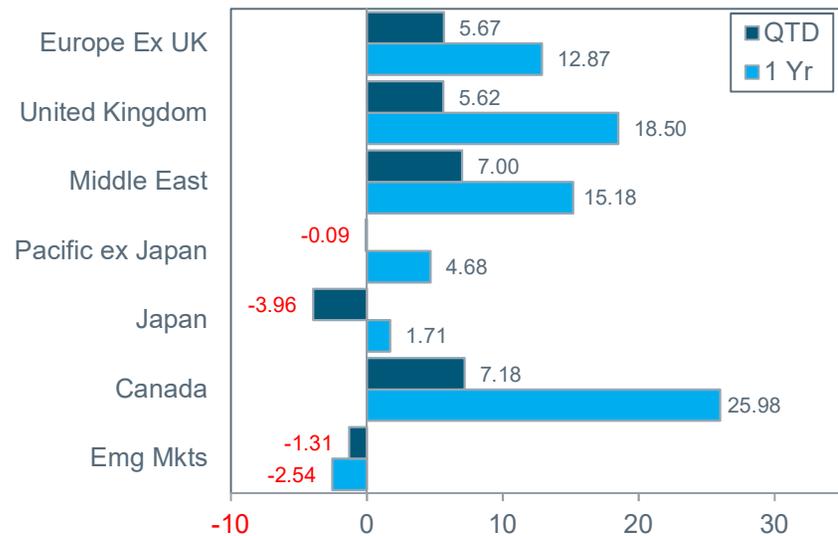
MSCI Style and Capitalization Market Performance (%)



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 Bloomberg US Aggregate Index ended the quarter flat, capping off the third most negative calendar year on record for the index with an overall annual return of -1.5%. An abrupt rise in interest rates at the start of the year due to inflation concerns and an uncertain outlook, followed by interest rate volatility and an ongoing uncertain outlook drove returns and yields.

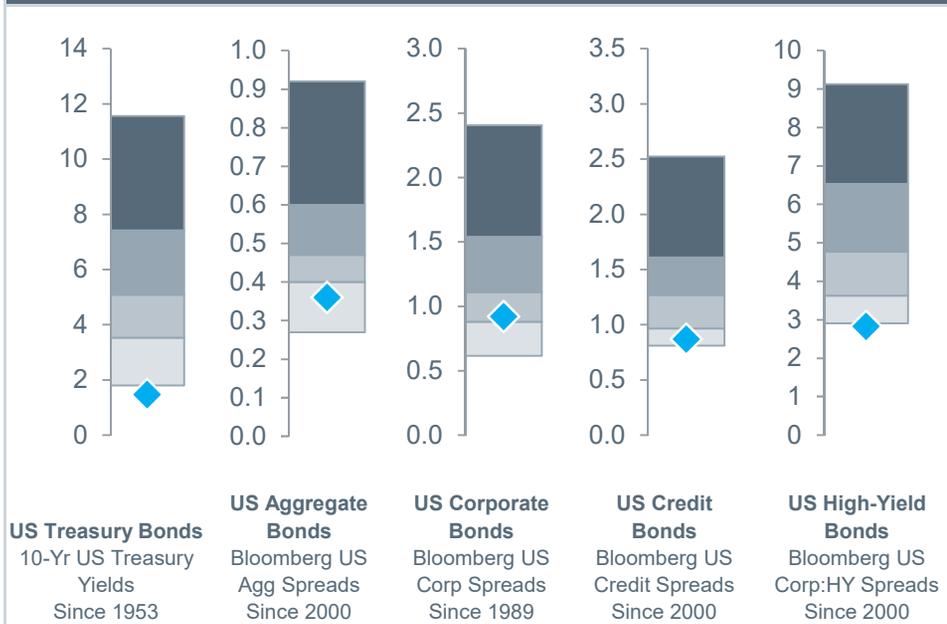
Credit Market

US investment grade credit detracted -1.1% YTD, while US High Yield returned 5.3%, as measured by the Bloomberg US Credit Index and Bloomberg US High Yield Index, respectively. The divergence in returns demonstrates low quality outperformance as investors sought yield in a low interest rate environment.

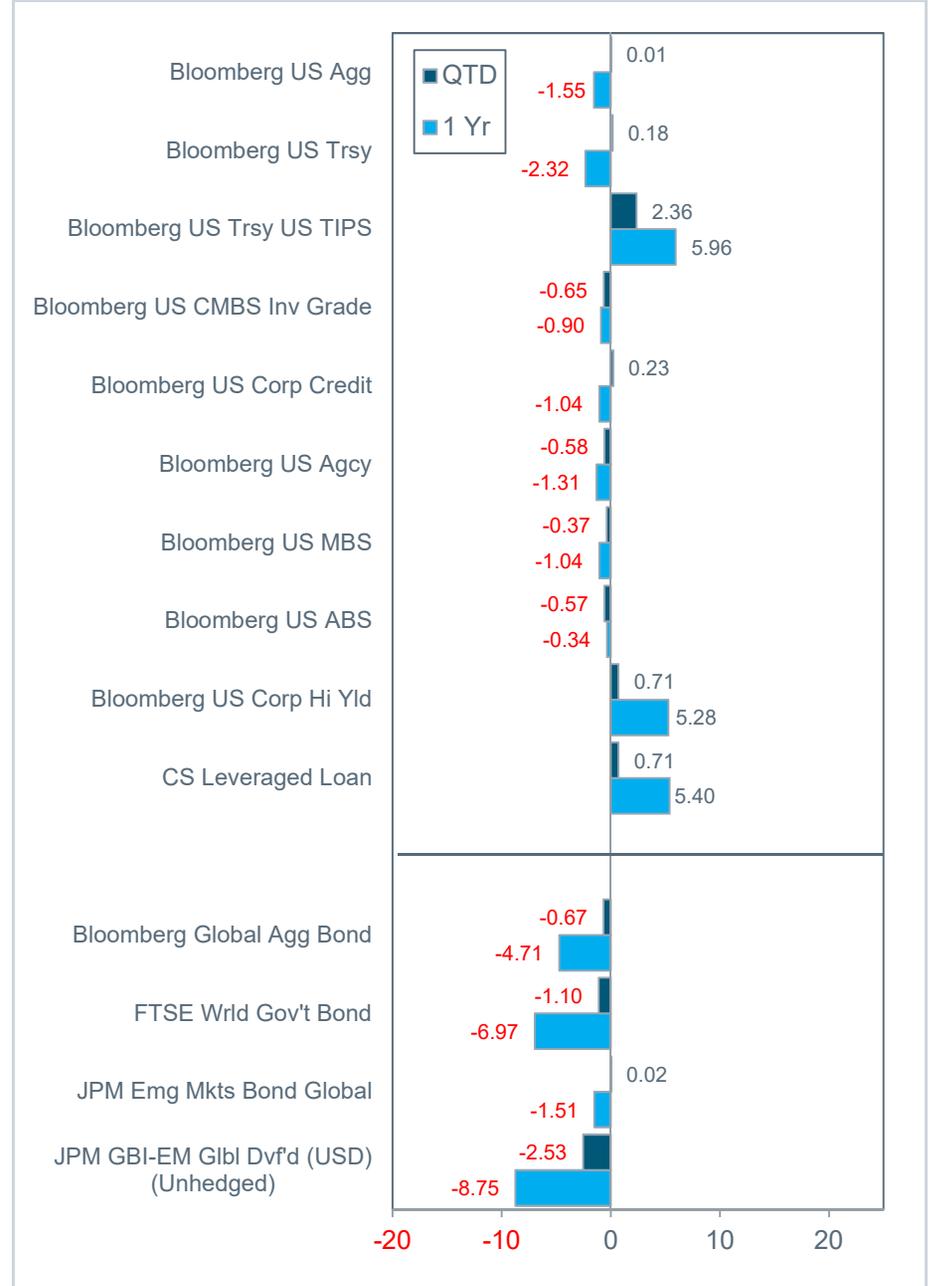
Emerging Market Debt

Despite a positive Q4, emerging market debt largely contracted over 2021, as each of the primary emerging market debt indices declined during the full year period.

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 fund results were mixed in Q4. Many high-profile macro and relative value trading firms struggled as the yield curve flattened in October and November, while equity long/short (“ELS”) funds faced headwinds from underperforming crowded trades on the long side of their portfolios amid significant factor rotations. The industry still returned 0.4% during Q4 according to the HFRI Fund Weighted Index, bringing YTD returns to 10.2%, the industry’s third straight year of double-digit returns.

General Market - Global Tactical Asset Allocation (GTAA)

Global Tactical Asset Allocation strategies that RVK follows closely generated disparate performance in Q4. The top performing long-biased GTAA strategies either exclusively held US equity exposure or tended to hold larger proportion of US equities. In contrast, those who underperformed peers tended to hold larger foreign allocations, particularly within Japanese equity and emerging markets equity. Multi-asset managers who target lower correlations, volatility, and market sensitivity also produced disparate absolute returns, though generally with a narrower relative range compared to long-biased peers.

Fourth Quarter Review - Real Assets

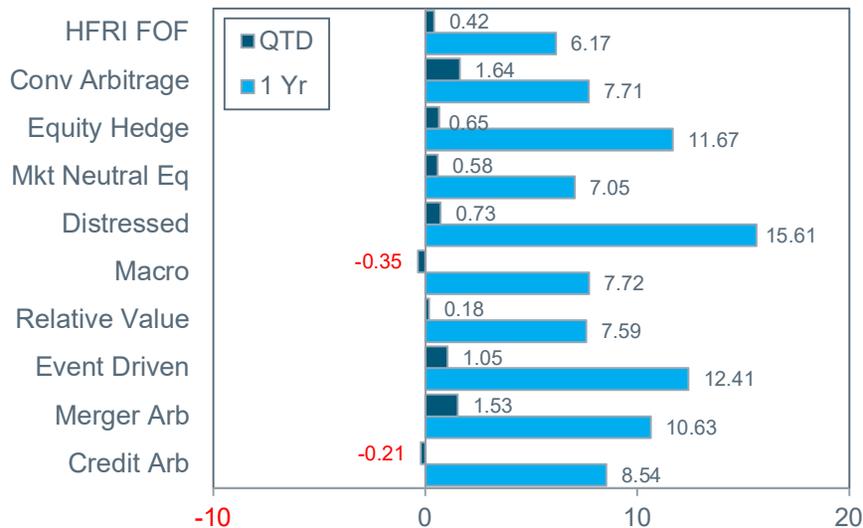
General Market - Diversified Inflation Strategies (DIS)

Diversified Inflation Strategies that RVK follows closely responded to increased inflationary measures with strong positive absolute performance. Managers with larger global listed infrastructure, natural resource equities and REIT exposures posted the strongest positive absolute returns. Whereas on a relative basis, those with larger commodities and TIPS allocations underperformed a strong peer group for the quarter. Inflation, as measured by the year-over-year change in Headline CPI, was reported as 7.0% for December.

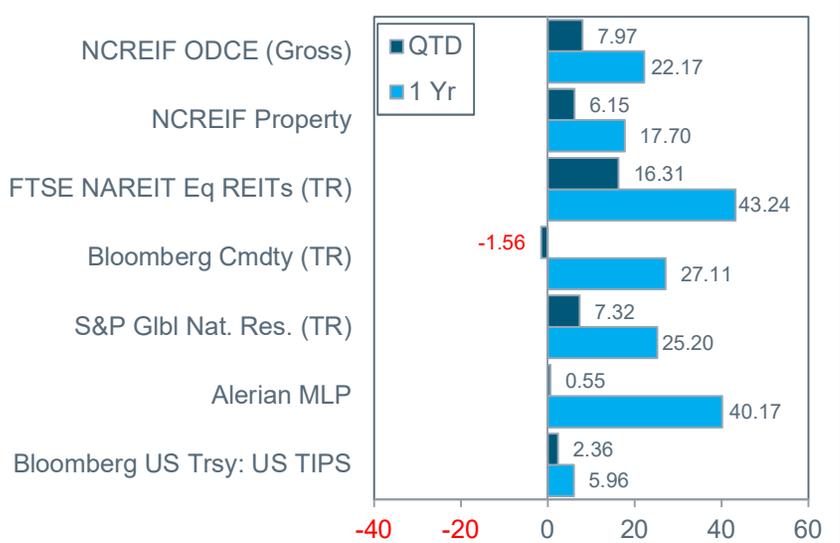
General Market - Real Estate

Core private real estate generated a positive 8.0% return in Q4, as reported by the NFI-ODCE Index, with the total return comprising of 1.0% income and 7.0% price appreciation. While the income return continues to trend in line with historical levels, price appreciation remains elevated. Investors of publicly traded real estate outperformed their private market counterparts by a meaningful margin.

HFRI Hedge Fund Performance (%)



Real Asset Performance (%)



Annual Asset Class Performance

As of December 31, 2021

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	CYTD
Best	39.38	8.44	78.51	27.94	22.49	20.00	38.82	30.14	15.02	21.31	37.28	8.35	31.49	19.96	43.24
	16.23	5.24	58.21	26.85	15.99	18.23	32.39	19.31	9.59	17.13	33.01	1.87	26.00	18.40	28.71
	15.97	2.06	46.78	22.04	13.56	18.06	29.30	13.69	3.20	11.96	25.03	0.01	25.53	18.31	27.11
	11.63	-2.35	31.78	18.88	8.29	17.32	22.78	12.50	1.38	11.77	21.83	-1.26	24.96	16.12	22.17
	11.17	-10.01	28.01	16.83	7.84	16.35	13.94	5.97	0.55	11.19	14.65	-2.08	22.01	12.34	14.82
	10.25	-21.37	27.17	16.36	4.98	16.00	8.96	4.89	0.05	8.77	10.71	-4.02	19.59	10.99	11.26
	6.97	-26.16	26.46	15.12	2.11	15.81	7.44	3.64	-0.27	8.52	7.77	-4.38	18.44	10.88	10.10
	6.60	-33.79	18.91	15.06	0.10	10.94	2.47	3.37	-0.81	6.67	7.62	-4.62	14.32	7.82	6.17
	5.49	-35.65	11.47	10.16	-4.18	8.78	0.07	2.45	-1.44	4.68	7.50	-4.68	8.72	7.51	5.96
	5.00	-37.00	11.41	7.75	-5.72	6.98	-2.02	0.04	-3.30	2.65	5.23	-11.01	8.43	7.11	5.28
	1.87	-37.74	5.93	6.54	-12.14	4.79	-2.60	-2.19	-4.41	2.18	3.54	-11.25	8.39	1.19	0.05
	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.30	-4.47	1.00	3.01	-13.79	7.69	0.67	-1.55
	-1.57	-47.01	0.21	5.70	-15.94	0.11	-8.83	-4.95	-14.92	0.51	1.70	-14.58	5.34	-3.12	-2.52
Worst	-15.70	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-24.66	0.33	0.86	-17.89	2.28	-8.00	-2.54
	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	Bloombrg US Agg Bond - FI	Bloombrg US Corp Hi Yield - FI	Bloombrg US Trsy US TIPS - FI	Bloombrg US Gov Credit Lng - FI	NCREIF ODCE (Gross) - Real Estate	FTSE NAREIT Eq REITs Index (TR)	HFRI FOF Comp Index - ARS	Bloombrg Cmdty (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.



Performance Report - All Systems



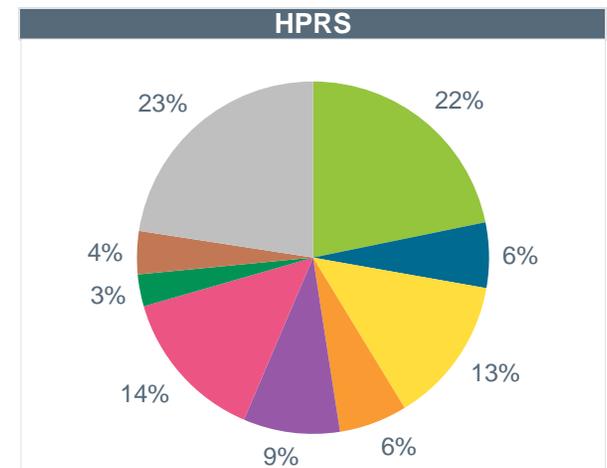
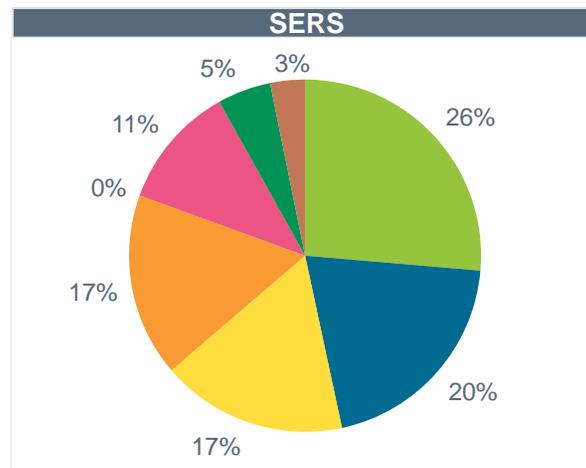
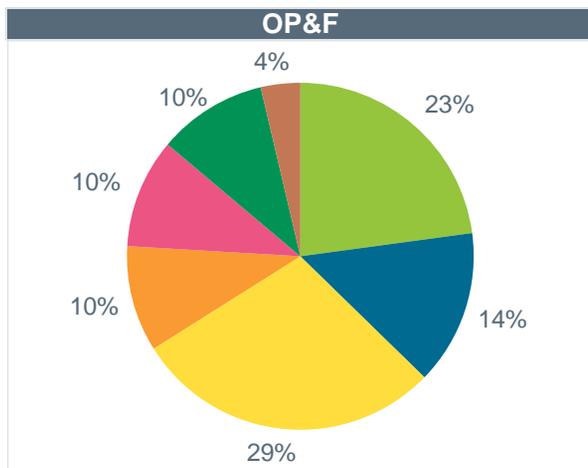
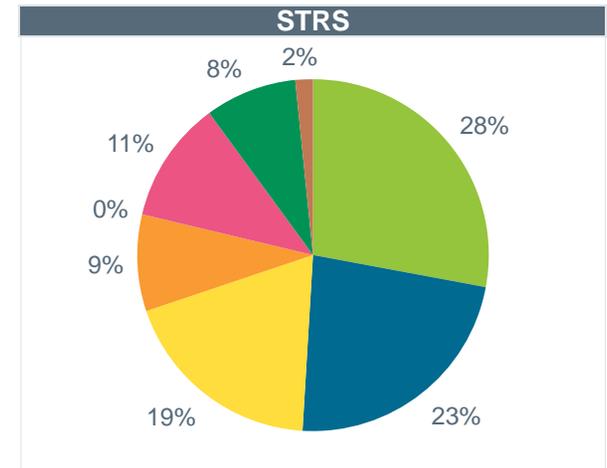
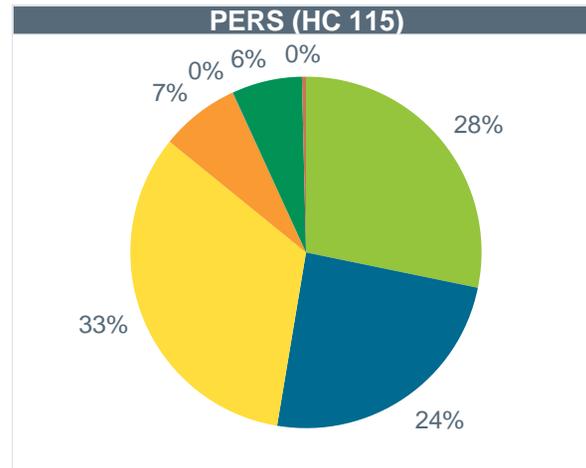
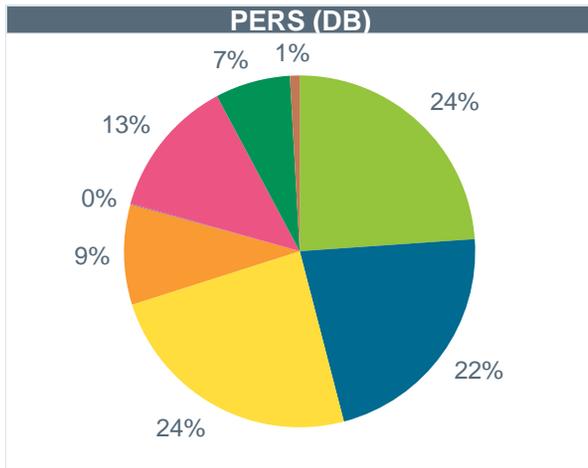
Asset Allocation & Performance - Gross of Fees											
	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
PERS (DB)	109,334,293	6.10	15.43	14.93	11.51	9.46	10.26	12.11	17.31	-2.90	16.94
PERS (DB) Total Fund Benchmark		5.33	15.28	14.64	10.96	9.03	9.83	11.65	17.06	-3.08	15.19
Difference		0.77	0.15	0.29	0.55	0.43	0.43	0.46	0.25	0.18	1.75
Rank		28	53	55	45	40	37	49	49	45	25
PERS (HC 115)	14,469,504	4.36	14.34	14.91	10.51	8.21	8.81	10.96	19.59	-5.76	15.25
PERS (HC 115) Total Fund Benchmark		4.03	13.76	14.30	9.93	7.84	8.39	10.13	19.20	-5.97	14.31
Difference		0.33	0.58	0.61	0.58	0.37	0.42	0.83	0.39	0.21	0.94
Rank		68	64	56	77	86	86	64	17	91	60
STRS	99,321,224	7.08	19.36	16.63	12.55	10.43	11.17	12.26	18.39	-1.75	15.90
STRS Total Fund Benchmark		6.01	17.36	15.81	11.91	9.83	10.88	11.92	18.27	-2.04	15.35
Difference		1.07	2.00	0.82	0.64	0.60	0.29	0.34	0.12	0.29	0.55
Rank		18	12	21	14	8	11	46	29	28	53
OP&F	19,618,448	8.40	20.48	15.55	11.62	9.91	10.81	9.09	17.39	-1.52	14.01
OP&F Total Fund Benchmark		6.38	16.20	14.29	10.18	8.50	9.44	9.84	16.95	-3.09	12.27
Difference		2.02	4.28	1.26	1.44	1.41	1.37	-0.75	0.44	1.57	1.74
Rank		2	9	43	41	19	18	84	47	23	81
SERS	18,717,524	7.42	17.88	16.16	12.67	10.57	11.19	12.99	17.69	-1.28	17.36
SERS Total Fund Benchmark		5.25	14.66	14.07	10.71	8.81	9.70	11.55	16.04	-2.03	14.37
Difference		2.17	3.22	2.09	1.96	1.76	1.49	1.44	1.65	0.75	2.99
Rank		10	23	27	12	6	9	36	40	20	14
HPRS	1,137,661	4.15	16.91	17.53	12.25	9.74	10.55	16.86	18.85	-4.57	15.01
HPRS Total Fund Benchmark		5.23	16.61	15.86	11.47	9.20	10.10	13.16	17.85	-3.38	14.55
Difference		-1.08	0.30	1.67	0.78	0.54	0.45	3.70	1.00	-1.19	0.46
Rank		71	37	10	20	29	27	3	23	76	62
<i>All Public Plans > \$1B-Total Fund Median</i>		<i>5.09</i>	<i>15.55</i>	<i>15.05</i>	<i>11.26</i>	<i>9.22</i>	<i>9.98</i>	<i>12.05</i>	<i>17.29</i>	<i>-3.13</i>	<i>16.00</i>

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	2020	2019	2018	2017
PERS (DB)	109,334,293	6.07	15.34	14.84	11.41	9.32	10.08	12.02	17.23	-2.99	16.81
PERS (DB) Total Fund Benchmark		5.33	15.28	14.64	10.96	9.03	9.83	11.65	17.06	-3.08	15.19
Difference		0.74	0.06	0.20	0.45	0.29	0.25	0.37	0.17	0.09	1.62
PERS (HC 115)	14,469,504	4.36	14.34	14.91	10.51	8.17	8.74	10.96	19.59	-5.76	15.25
PERS (HC 115) Total Fund Benchmark		4.03	13.76	14.30	9.93	7.84	8.39	10.13	19.20	-5.97	14.31
Difference		0.33	0.58	0.61	0.58	0.33	0.35	0.83	0.39	0.21	0.94
STRS	99,321,224	7.02	19.24	16.51	12.42	10.30	11.04	12.14	18.27	-1.89	15.74
STRS Total Fund Benchmark		6.01	17.36	15.81	11.91	9.83	10.88	11.92	18.27	-2.04	15.35
Difference		1.01	1.88	0.70	0.51	0.47	0.16	0.22	0.00	0.15	0.39
OP&F	19,618,448	7.98	19.63	14.85	10.95	9.26	10.21	8.51	16.71	-2.14	13.39
OP&F Total Fund Benchmark		6.38	16.20	14.29	10.18	8.50	9.44	9.84	16.95	-3.09	12.27
Difference		1.60	3.43	0.56	0.77	0.76	0.77	-1.33	-0.24	0.95	1.12
SERS	18,717,524	7.07	17.13	15.48	11.99	9.89	10.48	12.40	16.96	-1.94	16.65
SERS Total Fund Benchmark		5.25	14.66	14.07	10.71	8.81	9.70	11.55	16.04	-2.03	14.37
Difference		1.82	2.47	1.41	1.28	1.08	0.78	0.85	0.92	0.09	2.28
HPRS	1,137,661	3.87	15.37	16.72	11.53	9.10	10.00	16.38	18.43	-5.02	14.29
HPRS Total Fund Benchmark		5.23	16.61	15.86	11.47	9.20	10.10	13.16	17.85	-3.38	14.55
Difference		-1.36	-1.24	0.86	0.06	-0.10	-0.10	3.22	0.58	-1.64	-0.26

Performance shown is net of all investment management costs.

Ohio Retirement Study Council
Current Asset Allocation by Asset Class



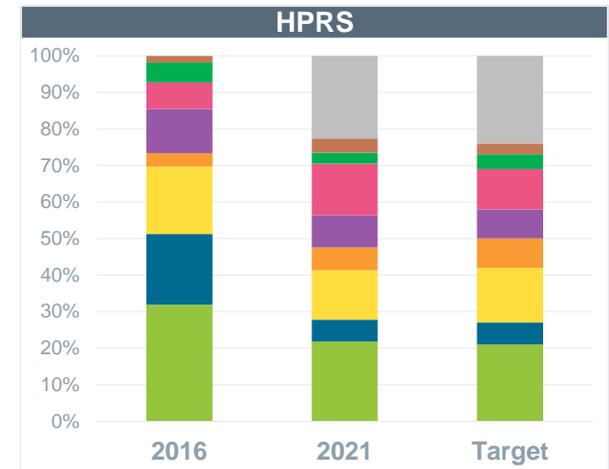
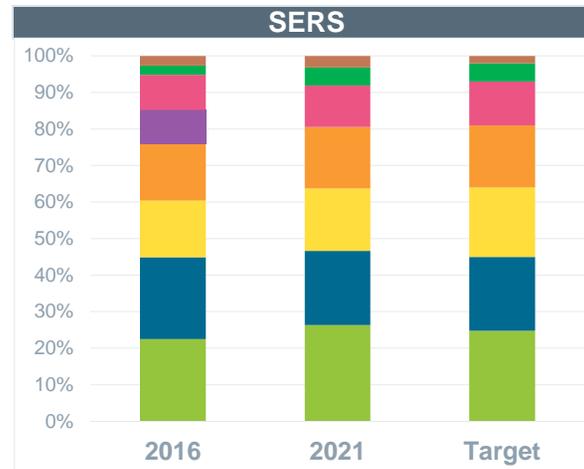
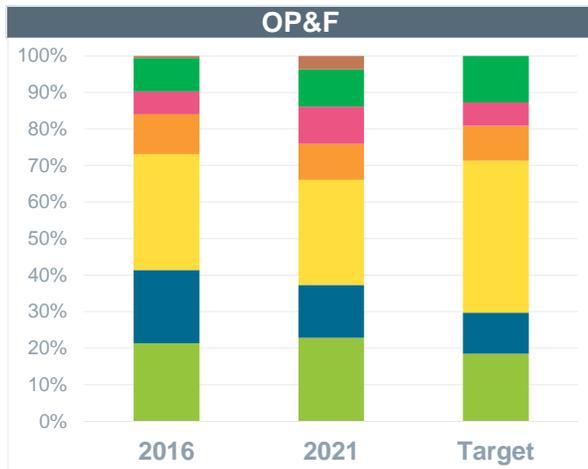
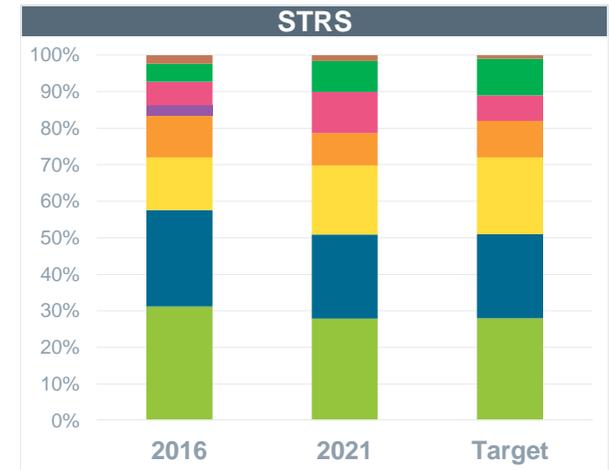
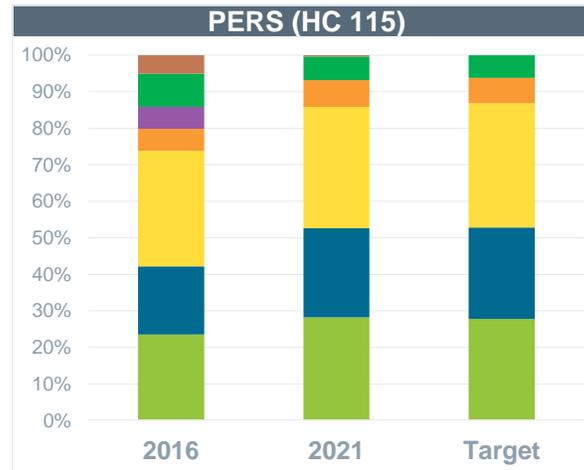
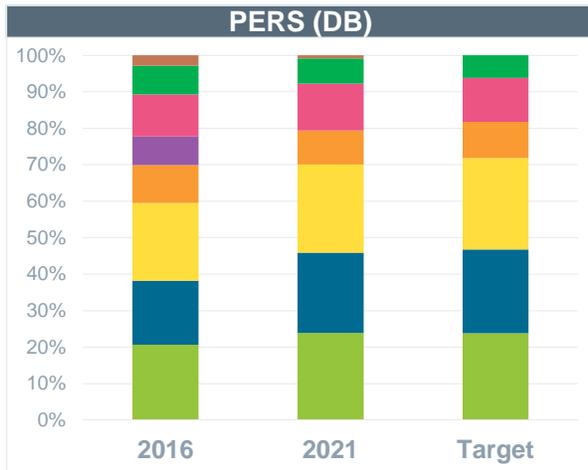
- US Equity
- International Equity
- Fixed Income
- Real Estate
- Global Equity
- Hedge Funds
- Private Equity
- Other Alternatives
- Cash Equivalents

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





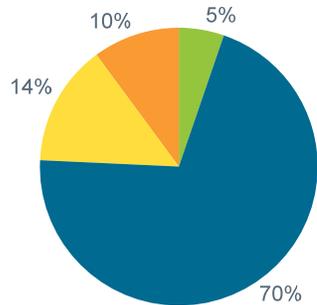
Allocations shown may not add up to 100% due to rounding. US Fixed Income may include allocations to Intl. Fixed Income not explicitly broken out by the plans. Parentheses contain percentile ranks. Cash Equivalents for PERS (DB) consists of cash, rebalancing, and additional annuity. Cash Equivalents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



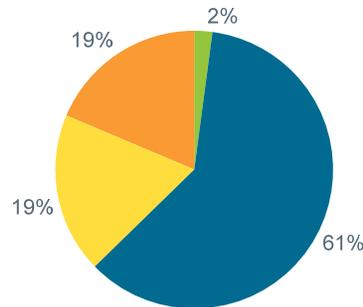
Summary

- **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)

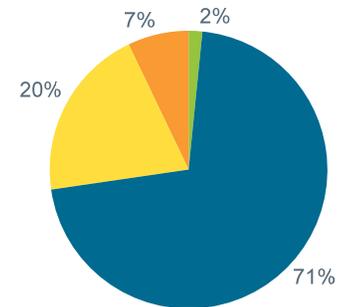
PERS (DB)



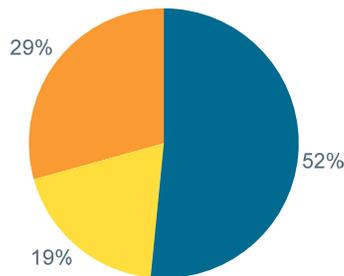
PERS (HC 115)



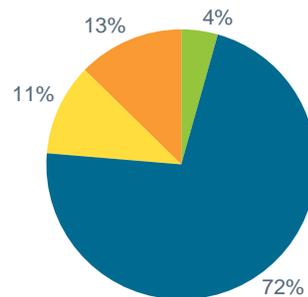
STRS



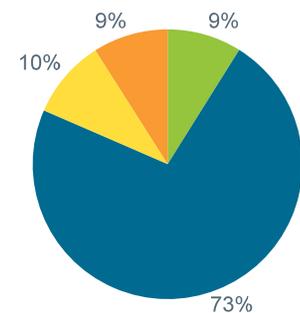
OP&F



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.

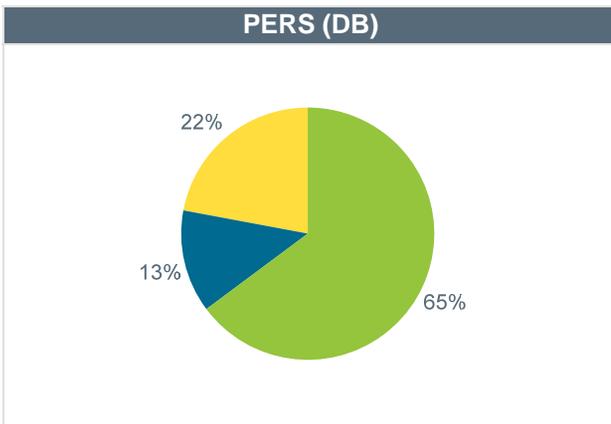
Summary

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

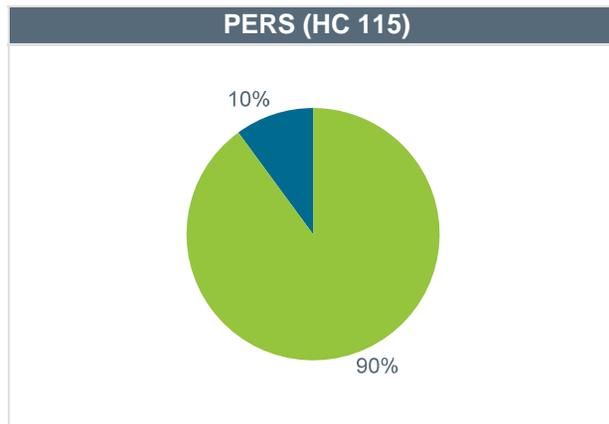
Liquid Investments: Publicly traded assets, largely exchanged traded with significant trading volume for the overall asset classes. Takes a relatively small discount or time required to raise cash, but generally expected to clear at quoted bid prices within several trading days.

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.

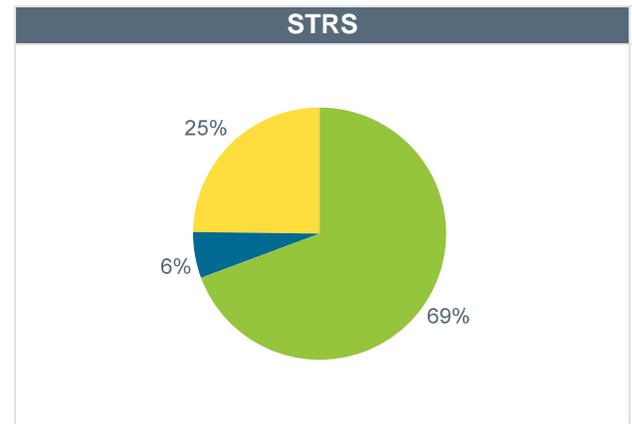
Not Liquid Investments: Private appraisal-based transactions, vehicle-based liquidity constraints, or privately held assets. Extreme discount to raise cash or 6-12+ months required to receive cash.



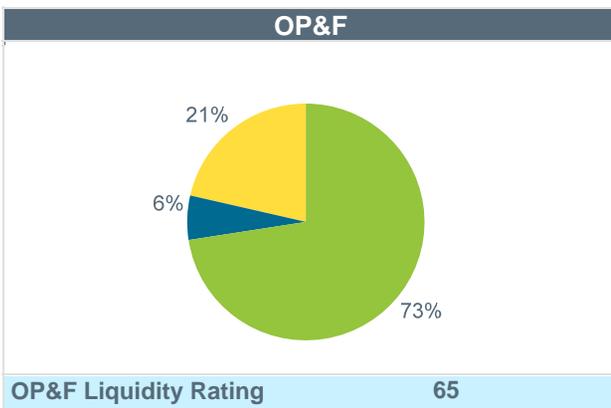
PERS (DB) Liquidity Rating 69



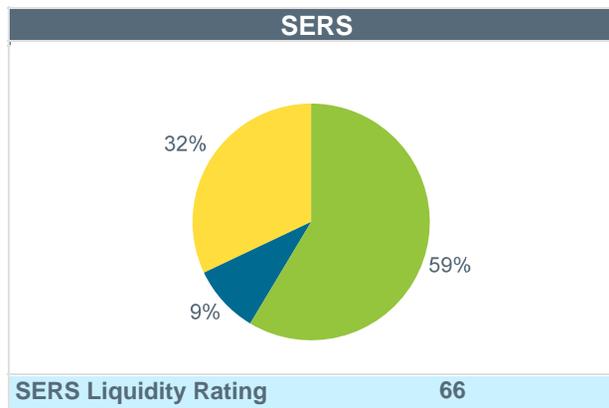
PERS (HC 115) Liquidity Rating 89



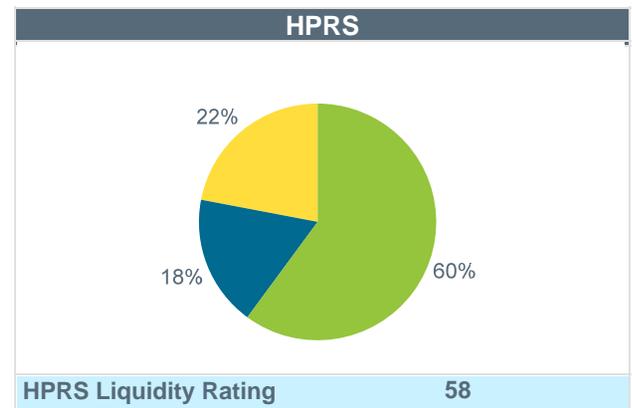
STRS Liquidity Rating 68



OP&F Liquidity Rating 65

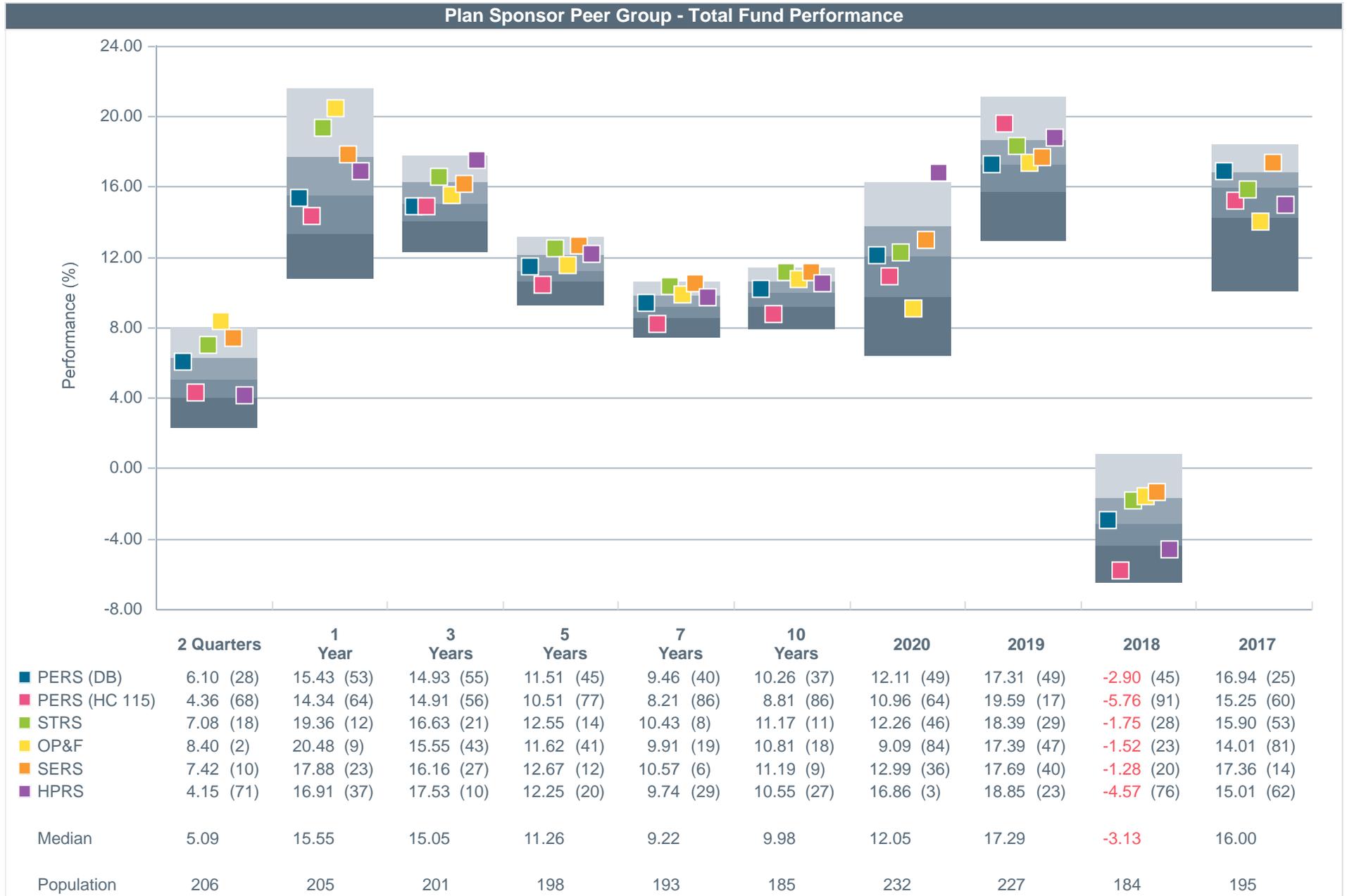


SERS Liquidity Rating 66



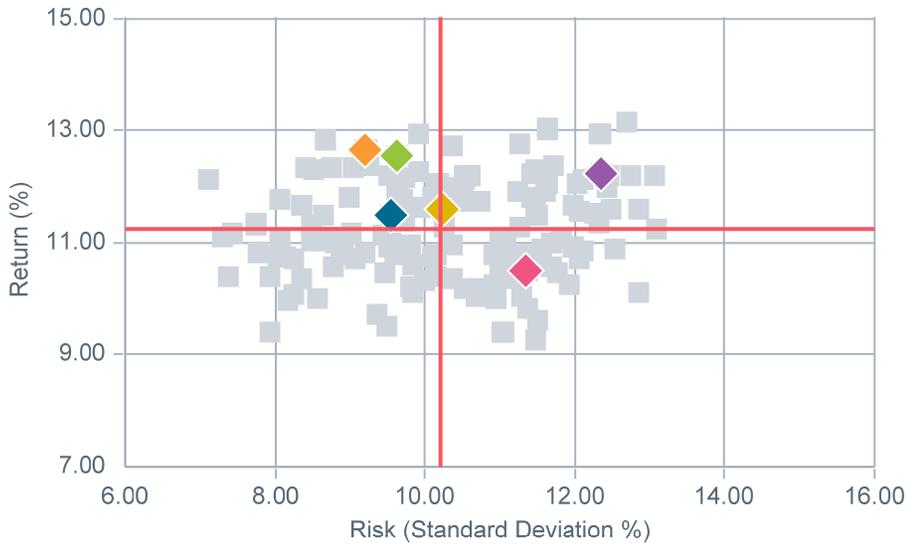
HPRS Liquidity Rating 58

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

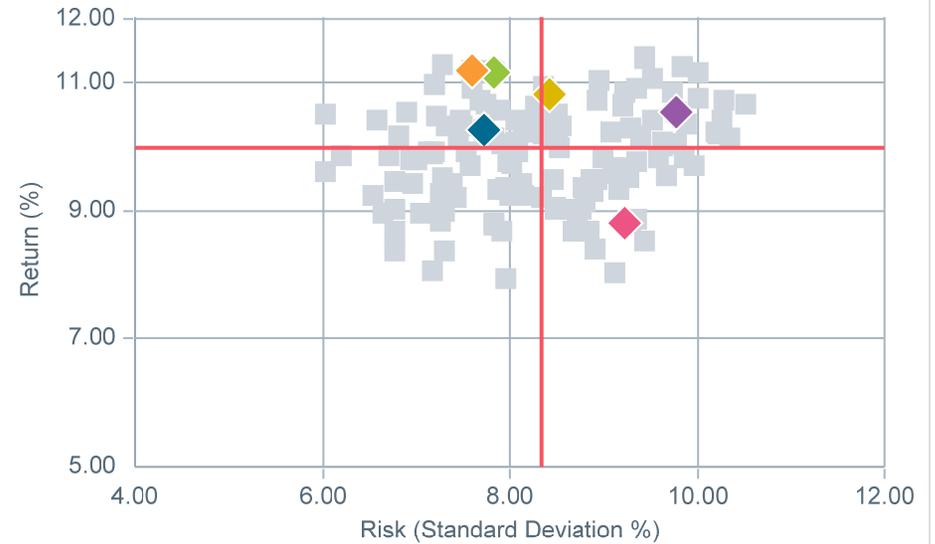


	Return	Standard Deviation
◆ PERS (DB)	11.51	9.54
◆ PERS (HC 115)	10.51	11.36
◆ STRS	12.55	9.63
◆ OP&F	11.62	10.23
◆ SERS	12.67	9.20
◆ HPRS	12.25	12.36
— Median	11.26	10.20

Sharpe Ratio - 5 Year

PERS (DB)	1.06
PERS (HC 115)	0.83
STRS	1.15
OP&F	1.01
SERS	1.21
HPRS	0.90
<i>All Public Plans > \$1B-Total Fund Median</i>	<i>0.99</i>

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB)	10.26	7.73
◆ PERS (HC 115)	8.81	9.22
◆ STRS	11.17	7.83
◆ OP&F	10.81	8.41
◆ SERS	11.19	7.61
◆ HPRS	10.55	9.79
— Median	9.98	8.35

Sharpe Ratio - 10 Year

PERS (DB)	1.22
PERS (HC 115)	0.89
STRS	1.31
OP&F	1.18
SERS	1.34
HPRS	1.01
<i>All Public Plans > \$1B-Total Fund Median</i>	<i>1.11</i>

Performance shown is gross of fees.

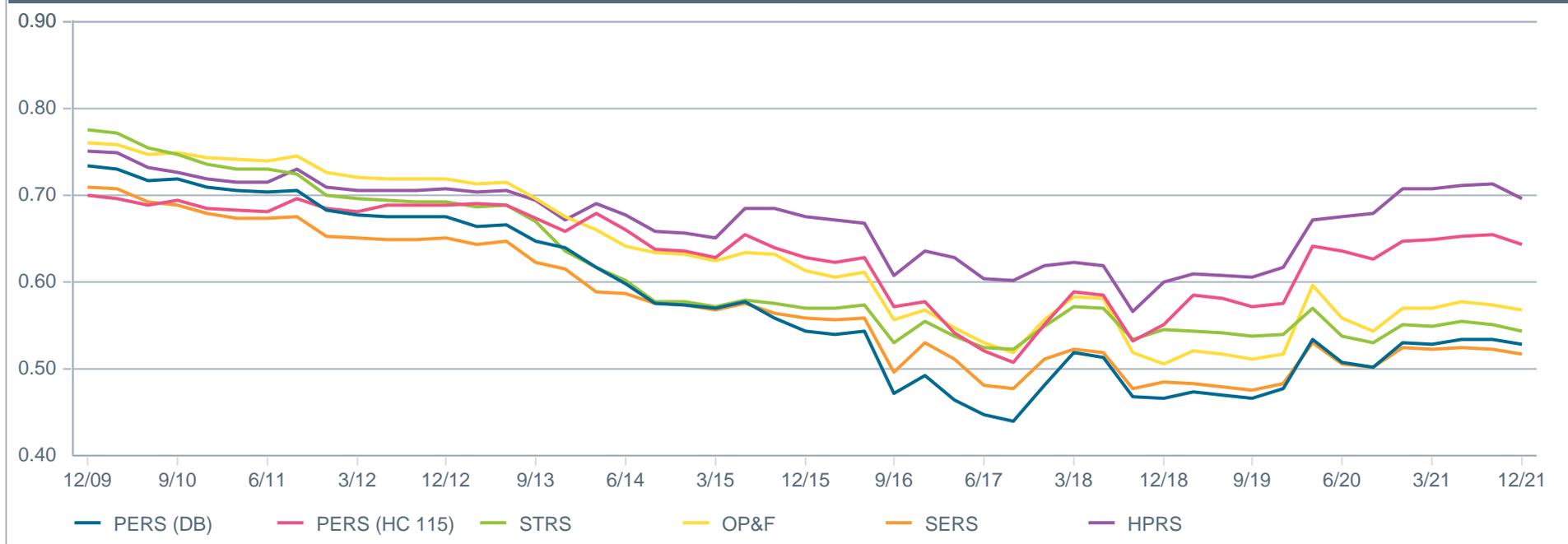
Summary

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	0.53	0.53	0.52
PERS (HC 115)	0.68	0.64	0.64	0.63
STRS	0.55	0.54	0.55	0.55
OP&F	0.60	0.57	0.57	0.57
SERS	0.53	0.52	0.52	0.52
HPRS	0.73	0.70	0.69	0.68
S&P 500 Index (Cap Wtd)	1.00	1.00	1.00	1.00

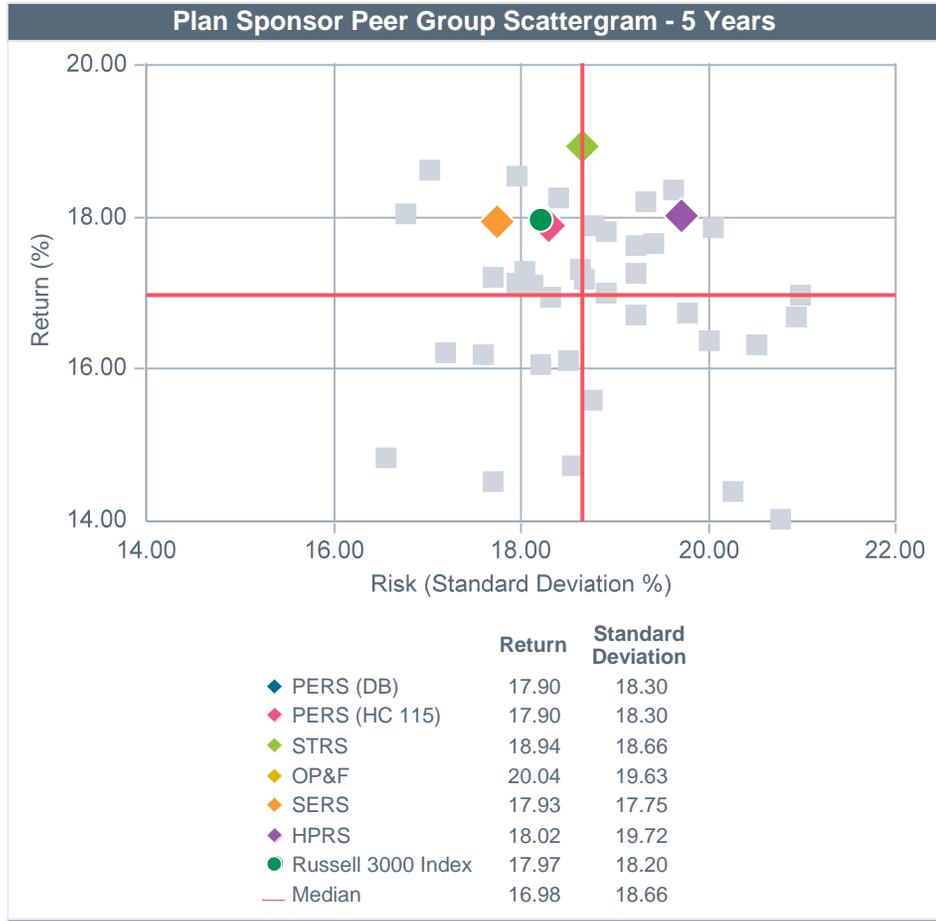
5 Year Rolling Equity Beta



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

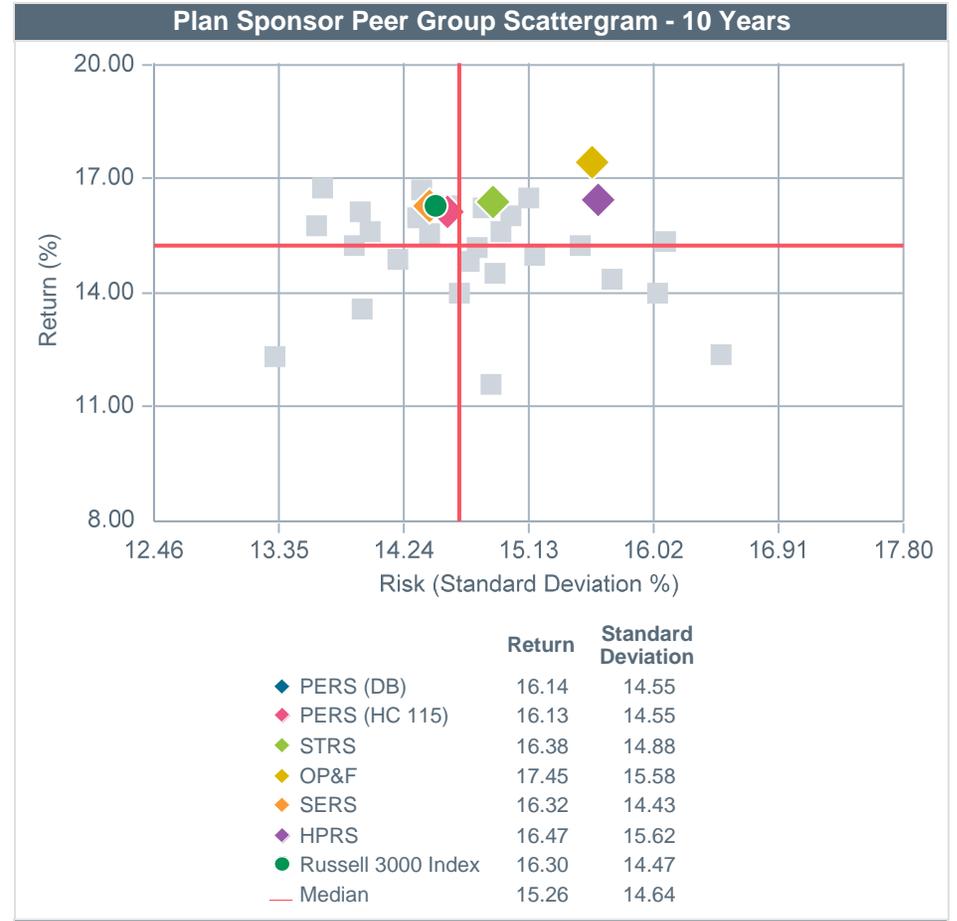
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
US Equity										
PERS (DB)	9.52	26.30	25.50	17.90	14.44	16.14	19.69	30.76	-5.00	21.30
Russell 3000 Index	9.17	25.66	25.79	17.97	14.55	16.30	20.89	31.02	-5.24	21.13
Difference	0.35	0.64	-0.29	-0.07	-0.11	-0.16	-1.20	-0.26	0.24	0.17
Rank	24	34	28	20	24	22	43	33	25	29
PERS (HC 115)	9.52	26.30	25.50	17.90	14.44	16.13	19.69	30.76	-5.00	21.30
Russell 3000 Index	9.17	25.66	25.79	17.97	14.55	16.30	20.89	31.02	-5.24	21.13
Difference	0.35	0.64	-0.29	-0.07	-0.11	-0.17	-1.20	-0.26	0.24	0.17
Rank	24	34	28	20	24	23	43	33	25	29
STRS	8.95	26.53	27.26	18.94	15.07	16.38	23.00	32.43	-5.33	22.01
Russell 3000 Index	9.17	25.66	25.79	17.97	14.55	16.30	20.89	31.02	-5.24	21.13
Difference	-0.22	0.87	1.47	0.97	0.52	0.08	2.11	1.41	-0.09	0.88
Rank	41	32	5	3	8	15	16	4	39	18
OP&F	12.12	30.14	28.17	20.04	16.42	17.45	22.79	31.77	-3.30	22.40
Wilshire 5000 Index	9.74	26.70	26.11	18.11	14.77	16.40	20.82	31.02	-5.27	20.99
Difference	2.38	3.44	2.06	1.93	1.65	1.05	1.97	0.75	1.97	1.41
Rank	4	5	3	1	1	1	17	16	7	13
SERS	9.62	24.90	25.74	17.93	14.44	16.32	21.87	30.60	-6.15	22.27
Russell 3000 Index	9.17	25.66	25.79	17.97	14.55	16.30	20.89	31.02	-5.24	21.13
Difference	0.45	-0.76	-0.05	-0.04	-0.11	0.02	0.98	-0.42	-0.91	1.14
Rank	24	43	22	20	24	16	22	35	64	14
HPRS	10.57	27.38	26.97	18.02	14.68	16.47	23.28	30.36	-7.97	21.53
Russell 3000 Index	9.17	25.66	25.79	17.97	14.55	16.30	20.89	31.02	-5.24	21.13
Difference	1.40	1.72	1.18	0.05	0.13	0.17	2.39	-0.66	-2.73	0.40
Rank	14	26	7	19	14	13	11	39	88	21
<i>All Public Plans > \$1B-US Equity Segment Median</i>	8.33	24.35	24.70	16.98	13.59	15.26	18.92	30.06	-5.86	20.23

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



Sharpe Ratio - 5 Years

PERS (DB)	0.94
PERS (HC 115)	0.94
STRS	0.97
OP&F	0.98
SERS	0.96
HPRS	0.89
Russell 3000 Index	0.95
<i>All Public Plans > \$1B-US Equity Segment Median</i>	<i>0.88</i>



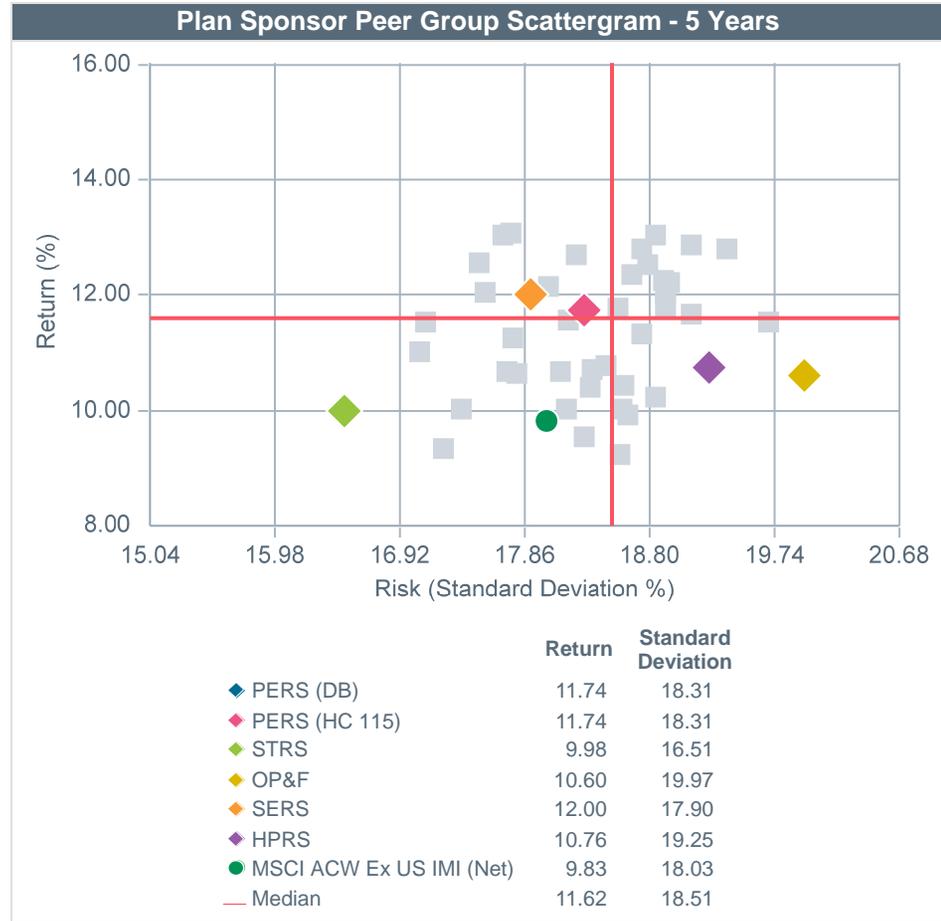
Sharpe Ratio - 10 Years

PERS (DB)	1.07
PERS (HC 115)	1.07
STRS	1.06
OP&F	1.08
SERS	1.09
HPRS	1.03
Russell 3000 Index	1.08
<i>All Public Plans > \$1B-US Equity Segment Median</i>	<i>1.01</i>

Performance shown is gross of fees.

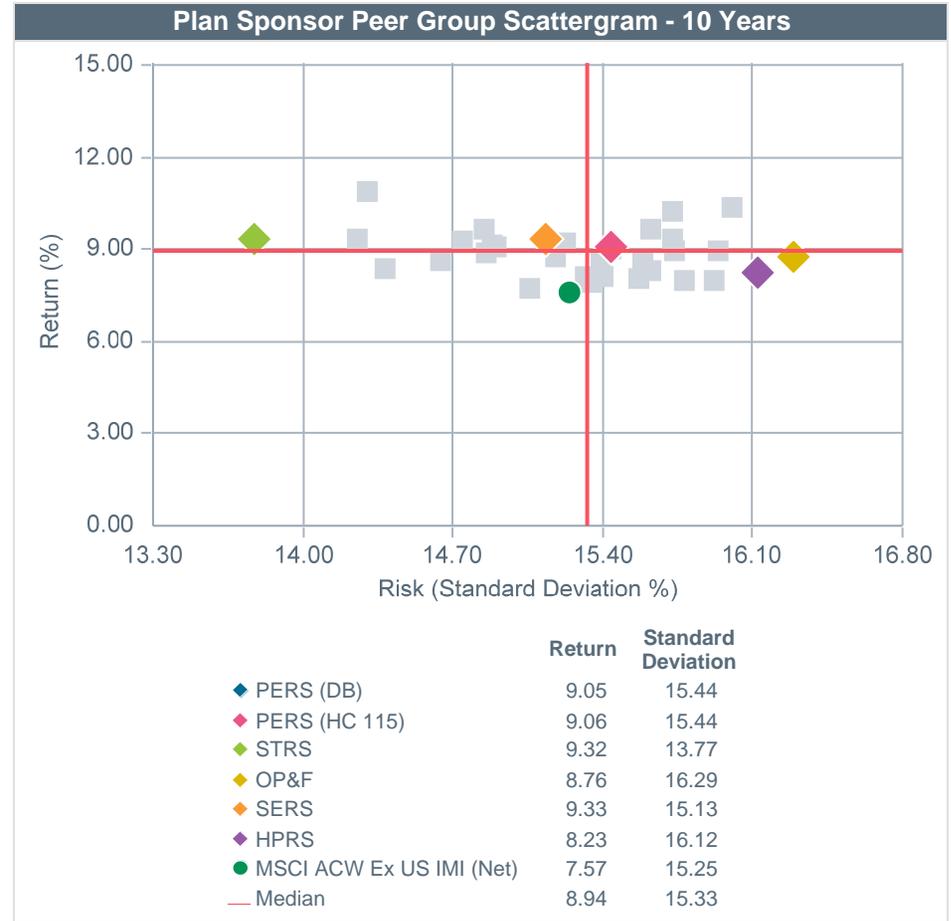
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
International Equity										
PERS (DB)	-0.70	9.00	15.53	11.74	8.48	9.05	14.81	23.21	-14.17	31.64
PERS (DB) International Equity Custom Benchmark	-1.57	7.89	13.50	10.01	6.91	7.39	11.90	21.09	-14.74	29.24
Difference	0.87	1.11	2.03	1.73	1.57	1.66	2.91	2.12	0.57	2.40
Rank	57	62	59	48	44	41	39	61	66	11
PERS (HC 115)	-0.70	9.00	15.53	11.74	8.48	9.06	14.81	23.21	-14.17	31.64
PERS (HC 115) International Equity Custom Benchmark	-1.57	7.89	13.50	10.01	6.91	7.39	11.90	21.09	-14.74	29.24
Difference	0.87	1.11	2.03	1.73	1.57	1.67	2.91	2.12	0.57	2.40
Rank	57	62	59	48	44	40	39	61	66	11
STRS	1.62	13.20	13.68	9.98	8.13	9.32	6.78	21.54	-11.80	24.16
STRS International Equity Custom Benchmark	1.37	12.36	14.09	10.02	7.57	8.68	7.88	22.51	-12.08	23.43
Difference	0.25	0.84	-0.41	-0.04	0.56	0.64	-1.10	-0.97	0.28	0.73
Rank	29	19	83	87	55	28	97	85	9	99
OP&F	0.39	11.79	15.74	10.60	7.76	8.76	12.43	23.37	-17.32	29.12
MSCI ACW Ex US IM Index (USD) (Net)	-0.96	8.53	13.62	9.83	6.87	7.57	11.12	21.63	-14.76	27.81
Difference	1.35	3.26	2.12	0.77	0.89	1.19	1.31	1.74	-2.56	1.31
Rank	40	31	57	74	68	58	54	59	100	53
SERS	-0.23	10.76	16.67	12.00	8.94	9.33	15.29	24.36	-14.03	29.11
SERS International Equity Custom Benchmark	-1.54	7.46	13.05	9.54	6.50	7.47	10.65	21.51	-14.20	27.19
Difference	1.31	3.30	3.62	2.46	2.44	1.86	4.64	2.85	0.17	1.92
Rank	51	45	42	43	30	25	34	42	61	53
HPRS International Equity	-8.22	1.89	15.02	10.76	7.38	8.23	19.02	25.47	-14.88	28.72
HPRS International Equity Custom Benchmark	-5.94	1.59	11.15	8.39	5.76	6.86	11.12	21.63	-14.76	27.81
Difference	-2.28	0.30	3.87	2.37	1.62	1.37	7.90	3.84	-0.12	0.91
Rank	100	100	65	66	77	74	12	26	83	60
HPRS Global Equity	-0.12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HPRS Global Equity Custom Benchmark	5.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	-5.67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	<i>-0.23</i>	<i>9.61</i>	<i>16.23</i>	<i>11.62</i>	<i>8.42</i>	<i>8.94</i>	<i>12.76</i>	<i>23.71</i>	<i>-13.59</i>	<i>29.22</i>

Performance shown is gross of fees. Ranks are shown against All Public Plans >\$1B-Intl. Equity Segment. In Q1 2021 HPRS added an allocation to Global Equity. HPRS International Equity Portfolio consists of emerging markets and international small cap holdings. HPRS Global Equity consists of domestic equity and broad international equity holdings.



Sharpe Ratio - 5 Years

PERS (DB)	0.64
PERS (HC 115)	0.64
STRS	0.59
OP&F	0.55
SERS	0.66
HPRS	0.57
MSCI ACW Ex US IMI (Net)	0.55
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	<i>0.63</i>



Sharpe Ratio - 10 Years

PERS (DB)	0.60
PERS (HC 115)	0.60
STRS	0.67
OP&F	0.56
SERS	0.63
HPRS	0.54
MSCI ACW Ex US IMI (Net)	0.52
<i>All Public Plans > \$1B-Intl. Equity Segment Median</i>	<i>0.59</i>

Performance shown is gross of fees.

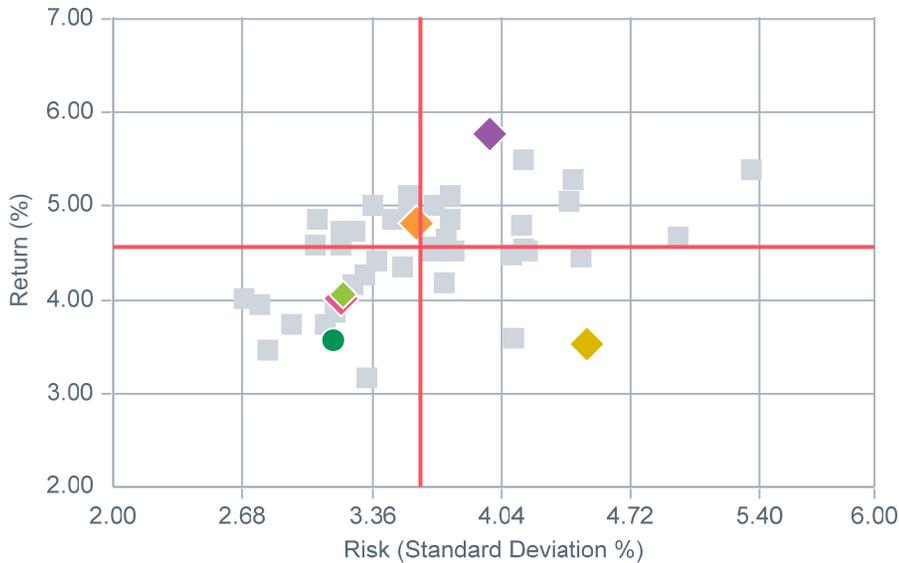
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Fixed Income										
PERS (DB) Core Fixed Income	0.21	-0.98	5.51	4.02	3.38	3.39	9.09	8.72	-0.06	3.75
PERS (DB) Core Fixed Income Custom Benchmark	0.06	-1.54	4.79	3.57	3.00	2.90	7.51	8.72	0.01	3.54
Difference	0.15	0.56	0.72	0.45	0.38	0.49	1.58	0.00	-0.07	0.21
Rank	66	86	71	77	80	79	41	68	39	79
PERS (HC 115) Core Fixed Income	0.21	-0.98	5.51	4.02	3.38	3.39	9.09	8.72	-0.06	3.75
PERS (HC 115) Core Fixed Income Custom Benchmark	0.06	-1.54	4.79	3.57	3.00	2.93	7.51	8.72	0.01	3.54
Difference	0.15	0.56	0.72	0.45	0.38	0.46	1.58	0.00	-0.07	0.21
Rank	66	86	71	77	80	79	41	68	39	79
STRS Core Fixed Income	0.14	-0.76	5.45	4.06	3.66	3.56	8.12	9.28	-0.17	4.25
Bloomberg US Universal index	0.05	-1.10	5.15	3.84	3.35	3.31	7.58	9.29	-0.26	4.09
Difference	0.09	0.34	0.30	0.22	0.31	0.25	0.54	-0.01	0.09	0.16
Rank	69	82	73	76	69	73	63	52	43	67
OP&F Core Fixed Income	0.41	-2.97	4.04	3.52	3.31	3.26	7.35	8.13	1.24	4.26
Bloomberg US Agg Bond Index + Leverage Factor	-0.03	-3.40	4.28	3.27	2.79	2.75	8.00	8.71	0.02	3.55
Difference	0.44	0.43	-0.24	0.25	0.52	0.51	-0.65	-0.58	1.22	0.71
Rank	50	97	94	89	82	83	80	78	9	67
SERS	0.01	-0.56	6.53	4.83	4.08	4.30	10.59	9.95	-0.38	5.09
Bloomberg US Agg Bond Index	0.06	-1.55	4.79	3.57	3.00	2.90	7.51	8.72	0.01	3.54
Difference	-0.05	0.99	1.74	1.26	1.08	1.40	3.08	1.23	-0.39	1.55
Rank	84	75	26	34	43	33	18	29	57	41
HPRS	1.47	3.59	7.04	5.78	5.10	4.53	8.30	9.33	2.56	5.29
HPRS Fixed Income Custom Benchmark	0.70	1.51	5.10	3.87	3.30	3.11	5.95	7.94	0.68	3.43
Difference	0.77	2.08	1.94	1.91	1.80	1.42	2.35	1.39	1.88	1.86
Rank	22	4	10	2	3	25	59	48	4	38
<i>All Public Plans > \$1B-US Fixed Income Segment Median</i>	<i>0.41</i>	<i>0.15</i>	<i>5.82</i>	<i>4.56</i>	<i>3.96</i>	<i>3.96</i>	<i>8.58</i>	<i>9.30</i>	<i>-0.27</i>	<i>4.81</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.

Risk & Return - Fixed Income

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

Plan Sponsor Peer Group Scattergram - 5 Years

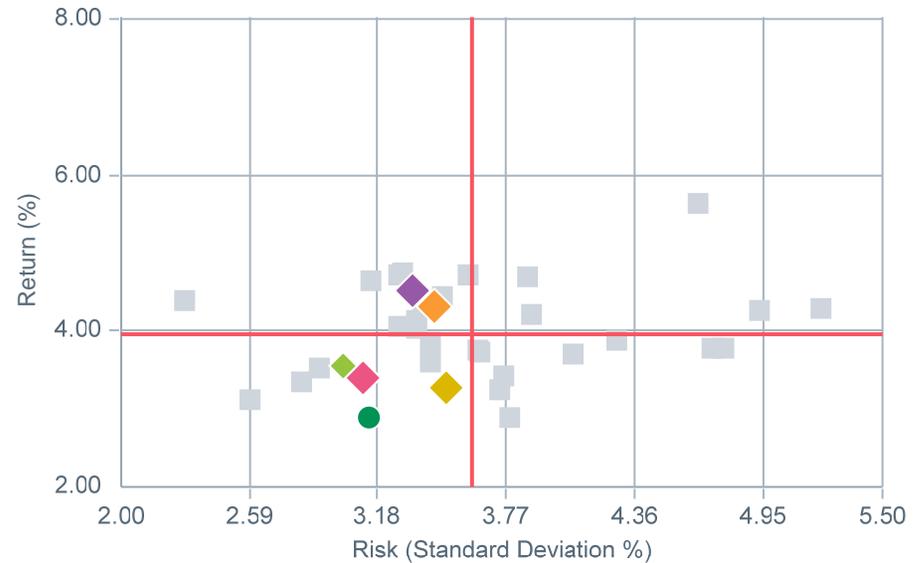


	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	4.02	3.20
◆ PERS (HC 115) Core Fixed Income	4.02	3.20
◆ STRS Core Fixed Income	4.06	3.21
◆ OP&F Core Fixed Income	3.52	4.49
◆ SERS	4.83	3.59
◆ HPRS	5.78	3.98
● Bloomberg US Agg Bond Index	3.57	3.15
— Median	4.56	3.61

Sharpe Ratio - 5 Years

PERS (DB) Core Fixed Income	0.93
PERS (HC 115) Core Fixed Income	0.93
STRS Core Fixed Income	0.91
OP&F Core Fixed Income	0.55
SERS	1.02
HPRS	1.11
Bloomberg US Agg Bond Index	0.81
All Public Plans > \$1B-US Fixed Income Segment Median	0.92

Plan Sponsor Peer Group Scattergram - 10 Years



	Return	Standard Deviation
◆ PERS (DB) Core Fixed Income	3.39	3.11
◆ PERS (HC 115) Core Fixed Income	3.39	3.11
◆ STRS Core Fixed Income	3.56	3.02
◆ OP&F Core Fixed Income	3.26	3.50
◆ SERS	4.30	3.44
◆ HPRS	4.53	3.34
● Bloomberg US Agg Bond Index	2.90	3.14
— Median	3.96	3.62

Sharpe Ratio - 10 Years

PERS (DB) Core Fixed Income	0.91
PERS (HC 115) Core Fixed Income	0.91
STRS Core Fixed Income	0.98
OP&F Core Fixed Income	0.77
SERS	1.06
HPRS	1.14
Bloomberg US Agg Bond Index	0.75
All Public Plans > \$1B-US Fixed Income Segment Median	0.95

Performance shown is gross of fees.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Additional Fixed Income										
PERS (DB) US Treasury	0.26	-2.27	4.11	3.09	N/A	N/A	8.08	6.84	0.84	2.33
Bloomberg US Trsy Index	0.26	-2.32	4.07	3.07	N/A	N/A	8.00	6.86	0.86	2.31
Difference	0.00	0.05	0.04	0.02	N/A	N/A	0.08	-0.02	-0.02	0.02
PERS (DB) EMD	-3.91	-4.65	4.49	4.09	3.39	3.29	5.36	13.55	-5.63	13.52
PERS (DB) EMD Custom Benchmark	-3.06	-5.18	4.09	3.69	2.96	2.89	4.32	14.01	-5.33	12.26
Difference	-0.85	0.53	0.40	0.40	0.43	0.40	1.04	-0.46	-0.30	1.26
PERS (DB) High Yield	1.80	5.16	9.04	6.37	6.12	6.88	7.42	14.76	-2.06	7.23
Bloomberg U.S. High Yield Index	1.60	5.28	8.83	6.30	6.15	6.83	7.11	14.32	-2.08	7.50
Difference	0.20	-0.12	0.21	0.07	-0.03	0.05	0.31	0.44	0.02	-0.27
PERS (DB) Securitized Debt	0.61	5.20	8.07	6.97	5.53	10.01	7.40	11.70	3.21	7.52
Bloomberg CMBS Index + 2%	-0.84	4.50	5.38	4.94	4.73	5.25	1.18	10.70	2.79	5.76
Difference	1.45	0.70	2.69	2.03	0.80	4.76	6.22	1.00	0.42	1.76
PERS (DB) TIPS	4.17	5.96	8.40	5.29	4.22	N/A	10.89	8.42	-1.26	2.88
Bloomberg U.S. TIPS Index	4.16	5.96	8.44	5.34	4.25	N/A	10.99	8.43	-1.26	3.01
Difference	0.01	0.00	-0.04	-0.05	-0.03	N/A	-0.10	-0.01	0.00	-0.13
PERS (HC 115) EMD	-3.91	-4.65	4.49	4.09	3.39	3.30	5.36	13.55	-5.63	13.52
PERS (HC 115) EMD Custom Benchmark	-3.06	-5.18	4.09	3.69	2.96	2.89	4.32	14.01	-5.33	12.26
Difference	-0.85	0.53	0.40	0.40	0.43	0.41	1.04	-0.46	-0.30	1.26

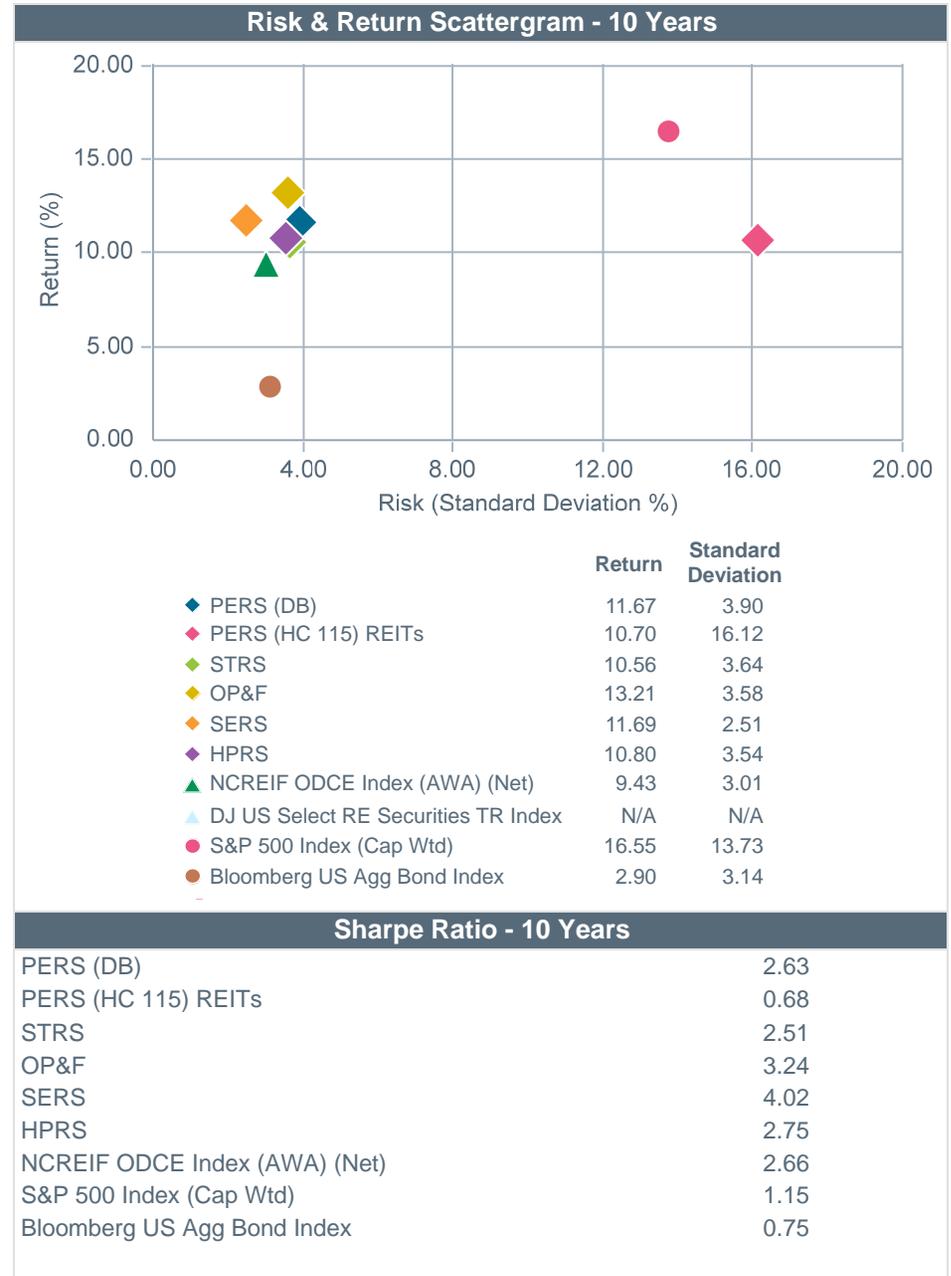
Performance shown is gross of fees.

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Additional Fixed Income										
PERS (HC 115) High Yield	1.80	5.16	9.04	6.37	6.12	6.89	7.42	14.76	-2.06	7.23
Bloomberg Barclays U.S. High Yield Index	1.60	5.28	8.83	6.30	6.15	6.83	7.11	14.32	-2.08	7.50
Difference	0.20	-0.12	0.21	0.07	-0.03	0.06	0.31	0.44	0.02	-0.27
PERS (HC 115) Securitized Debt	0.61	5.20	8.07	6.97	5.53	10.01	7.40	11.70	3.21	7.52
Bloomberg CMBS Index + 2%	-0.84	4.50	5.38	4.94	4.73	5.25	1.18	10.70	2.79	5.76
Difference	1.45	0.70	2.69	2.03	0.80	4.76	6.22	1.00	0.42	1.76
PERS (HC 115) TIPS	4.17	5.96	8.40	5.29	4.22	3.08	10.89	8.42	-1.26	2.88
Bloomberg U.S. Tips Index	4.16	5.96	8.44	5.34	4.25	3.09	10.99	8.43	-1.26	3.01
Difference	0.01	0.00	-0.04	-0.05	-0.03	-0.01	-0.10	-0.01	0.00	-0.13
STRS Liquid Treasury Portfolio	-0.54	-1.67	3.10	N/A	N/A	N/A	5.90	5.24	1.47	N/A
Bloomberg US Intermediate Treasury Index	-0.58	-1.72	3.04	N/A	N/A	N/A	5.78	5.22	1.41	N/A
Difference	0.04	0.05	0.06	N/A	N/A	N/A	0.12	0.02	0.06	N/A
OP&F High Yield	1.41	5.39	8.47	6.34	6.16	6.73	6.71	13.49	-0.48	7.05
CS Developed Countries High Yield	1.58	5.34	8.53	6.07	6.04	6.60	6.08	14.41	-2.26	7.48
Difference	-0.17	0.05	-0.06	0.27	0.12	0.13	0.63	-0.92	1.78	-0.43
OP&F Private Credit Fixed Income	4.11	15.80	7.99	8.72	N/A	N/A	-1.54	10.47	7.51	12.18
S&P LTSA Levered Loan Index + 2%	3.62	10.58	6.26	N/A	N/A	N/A	3.09	5.26	7.30	N/A
Difference	0.49	5.22	1.73	N/A	N/A	N/A	-4.63	5.21	0.21	N/A
OP&F US TIPS	10.89	15.47	17.07	10.49	10.10	9.18	20.11	15.70	-0.26	2.89
Bridgewater Custom US TIPS Index	8.64	11.81	16.63	8.95	8.32	7.44	23.25	15.12	-5.04	1.90
Difference	2.25	3.66	0.44	1.54	1.78	1.74	-3.14	0.58	4.78	0.99
SERS Private Credit	5.44	16.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 Month LIBOR Rate + 4.5%	2.29	4.67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	3.15	11.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Performance shown is gross of fees. The STRS Liquid Treasury Portfolio was inceptioned June 2017.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Real Estate										
PERS (DB)	13.71	17.08	9.00	8.18	9.99	11.67	2.55	7.86	4.37	9.61
PERS (DB) Real Estate Custom Benchmark	10.68	14.49	6.98	7.41	8.78	9.74	1.37	5.49	8.56	7.55
Difference	3.03	2.59	2.02	0.77	1.21	1.93	1.18	2.37	-4.19	2.06
PERS (HC 115) REITs	18.67	46.02	16.82	9.68	8.48	10.70	-11.40	23.23	-4.10	3.81
DJ US Select Real Estate Securities TR Index	18.69	45.91	16.84	9.65	8.46	10.69	-11.20	23.10	-4.22	3.76
Difference	-0.02	0.11	-0.02	0.03	0.02	0.01	-0.20	0.13	0.12	0.05
STRS	12.80	20.64	9.64	8.33	8.95	10.56	-1.27	10.65	6.65	6.14
STRS Real Estate Custom Benchmark	12.62	21.38	10.21	8.46	8.89	9.81	0.89	9.31	5.09	6.70
Difference	0.18	-0.74	-0.57	-0.13	0.06	0.75	-2.16	1.34	1.56	-0.56
OP&F	15.79	24.21	10.59	11.14	12.22	13.21	0.11	8.76	13.69	10.30
NCREIF ODCE Index (AWA) (Net) (1 Qtr Lag)	10.33	13.64	6.13	6.56	7.93	8.92	0.52	4.64	7.71	6.70
Difference	5.46	10.57	4.46	4.58	4.29	4.29	-0.41	4.12	5.98	3.60
SERS	12.12	18.47	10.36	10.55	10.97	11.69	3.30	9.84	11.41	10.24
SERS Global Real Assets Custom Benchmark	9.01	12.15	6.72	6.84	8.11	8.99	2.00	6.24	7.16	6.89
Difference	3.11	6.32	3.64	3.71	2.86	2.70	1.30	3.60	4.25	3.35
HPRS	7.58	13.70	8.86	10.49	9.50	10.80	2.84	10.32	15.75	10.30
HPRS Real Estate Custom Benchmark (Net)	7.09	12.68	8.16	9.05	9.70	10.06	2.34	9.73	14.00	6.90
Difference	0.49	1.02	0.70	1.44	-0.20	0.74	0.50	0.59	1.75	3.40
NCREIF ODCE Index (AWA) (Net)	14.56	21.02	8.23	7.74	8.61	9.43	0.34	4.39	7.36	6.66

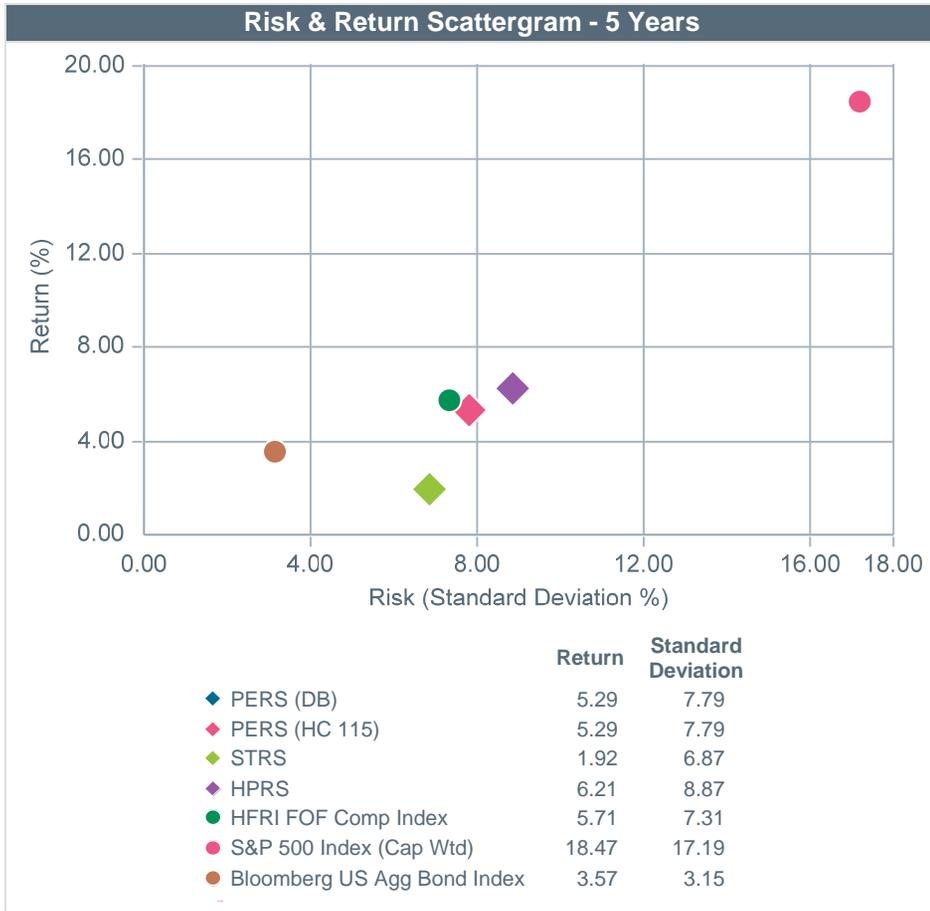
Performance shown may be net or gross of fees depending on underlying investments. Prior to 2008, HPRS's real estate portfolio consisted of two buildings. Since then, HPRS has shifted its focus to externally managed funds.



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

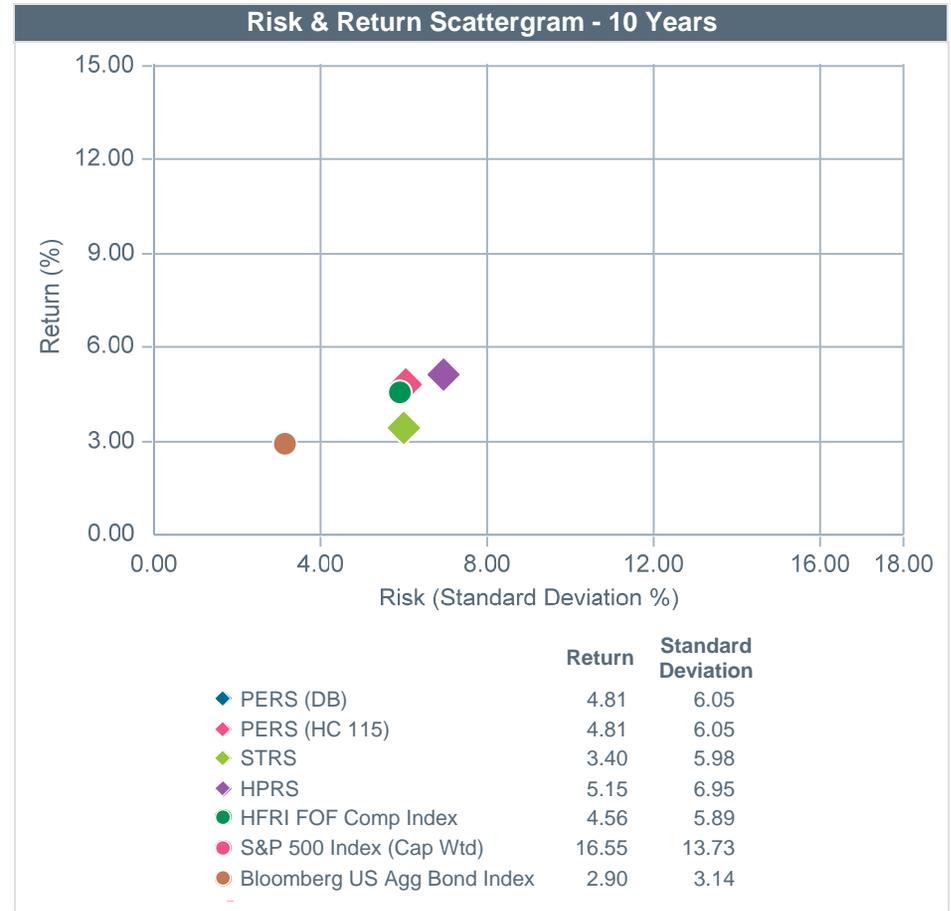
Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Hedge Funds										
PERS (DB)	5.89	9.78	6.99	5.29	4.06	4.81	3.63	7.66	-1.51	7.25
PERS (DB) Hedge Funds Custom Benchmark	0.74	10.71	8.40	5.78	4.77	4.99	6.04	8.49	-3.19	7.38
Difference	5.15	-0.93	-1.41	-0.49	-0.71	-0.18	-2.41	-0.83	1.68	-0.13
PERS (HC 115)	5.89	9.78	6.99	5.29	4.06	4.81	3.63	7.66	-1.51	7.25
PERS (HC 115) Hedge Funds Custom Benchmark	0.74	10.71	8.40	5.78	4.77	4.99	6.04	8.49	-3.19	7.38
Difference	5.15	-0.93	-1.41	-0.49	-0.71	-0.18	-2.41	-0.83	1.68	-0.13
STRS	6.06	2.14	1.16	1.92	1.77	3.40	-2.47	3.91	0.64	5.59
HFRI FOF Comp Index	1.16	6.17	8.46	5.71	4.08	4.56	10.88	8.39	-4.02	7.77
Difference	4.90	-4.03	-7.30	-3.79	-2.31	-1.16	-13.35	-4.48	4.66	-2.18
HPRS	-0.08	8.09	10.79	6.21	4.54	5.15	12.02	12.31	-5.96	5.70
HFRI FOF Comp Index	1.16	6.17	8.46	5.71	4.08	4.56	10.88	8.39	-4.02	7.77
Difference	-1.24	1.92	2.33	0.50	0.46	0.59	1.14	3.92	-1.94	-2.07

Performance shown is net of fees. SERS Hedge Funds strategy was closed during Q3 2021.



Sharpe Ratio - 5 Years

PERS (DB)	0.54
PERS (HC 115)	0.54
STRS	0.14
HPRS	0.59
HFRI FOF Comp Index	0.62
S&P 500 Index (Cap Wtd)	1.02
Bloomberg US Agg Bond Index	0.81



Sharpe Ratio - 10 Years

PERS (DB)	0.69
PERS (HC 115)	0.69
STRS	0.48
HPRS	0.66
HFRI FOF Comp Index	0.67
S&P 500 Index (Cap Wtd)	1.15
Bloomberg US Agg Bond Index	0.75

Performance shown is net of fees.

Performance										
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Private Equity										
PERS (DB)	21.53	44.84	23.00	20.78	16.49	16.81	16.38	10.39	15.48	19.60
PERS (DB) Private Equity Custom Benchmark	18.02	49.22	22.40	19.41	15.81	18.09	13.78	8.02	15.00	15.13
Difference	3.51	-4.38	0.60	1.37	0.68	-1.28	2.60	2.37	0.48	4.47
STRS	20.05	53.50	29.97	25.72	20.48	19.84	25.49	13.97	19.85	19.35
STRS Private Equity Benchmark	17.82	N/A								
Difference	2.23	N/A								
OP&F	22.86	54.51	29.02	24.88	20.49	18.22	22.30	13.65	19.82	18.02
OP&F Private Equity Custom Benchmark	22.86	54.51	29.02	24.88	20.49	18.22	22.30	13.65	19.82	18.02
Difference	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SERS	22.72	48.06	24.56	22.68	19.86	19.20	15.77	12.76	18.27	21.56
Burgiss All Private Equity Benchmark	12.46	44.38	20.51	17.89	15.04	17.56	12.16	8.08	16.05	12.10
Difference	10.26	3.68	4.05	4.79	4.82	1.64	3.61	4.68	2.22	9.46
HPRS	10.74	37.63	21.94	16.43	13.64	12.61	20.12	9.66	8.80	8.46
HPRS Private Equity Custom Benchmark	10.28	37.07	21.85	17.20	15.55	18.78	20.12	9.87	8.80	12.37
Difference	0.46	0.56	0.09	-0.77	-1.91	-6.17	0.00	-0.21	0.00	-3.91

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. The STRS Private Equity Benchmark is the quarterly Cambridge Associates Private Equity and Venture Capital Index, one quarter lagged to be consistent with external fund reporting, effective July 1, 2021.

Private Equity as of June 30, 2021

	2 Quarters	1 Year	3 Year	5 Year	7 Year	10 Year	2020	2019	2018	2017
STRS	27.86	64.49	25.96	22.47	18.28	17.30	25.49	13.97	19.85	19.35
STRS Private Equity Custom Benchmark *	15.67	45.56	19.90	19.05	15.08	16.06	22.08	32.30	-4.29	22.32
Difference	12.19	18.93	6.06	3.42	3.20	1.24	3.41	-18.33	24.14	-2.97

* Through June 30, 2021, the STRS Private Equity Custom Benchmark is calculated monthly and is the Russell 3000 Index +100 basis points. Prior to July 1, 2012, the STRS Private Equity Custom Benchmark was 300 basis points above the Russell 3000 Index.

Performance										
	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Other Alternatives										
PERS (DB) Commodities	5.28	36.99	7.91	2.93	-1.91	N/A	-21.96	17.54	-13.59	6.40
S&P Goldman Sachs Commodity Index (TR)	4.92	35.46	6.72	2.07	-2.65	N/A	-23.72	17.63	-13.82	5.77
Difference	0.36	1.53	1.19	0.86	0.74	N/A	1.76	-0.09	0.23	0.63
PERS (DB) Risk Parity	4.56	11.94	15.62	10.53	7.94	N/A	5.96	30.30	-9.93	18.51
PERS (DB) Risk Parity Custom Benchmark	3.90	11.56	15.12	8.87	7.79	N/A	5.25	29.93	-10.07	11.50
Difference	0.66	0.38	0.50	1.66	0.15	N/A	0.71	0.37	0.14	7.01
PERS (DB) Opportunistic	3.98	11.59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (DB) Opportunistic Benchmark	5.10	12.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	-1.12	-1.04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Commodities	5.28	36.99	7.91	2.93	-1.91	-5.07	-21.96	17.54	-13.59	6.40
S&P Goldman Sachs Commodity Index (TR)	4.92	35.46	6.72	2.07	-2.65	-5.83	-23.72	17.63	-13.82	5.77
Difference	0.36	1.53	1.19	0.86	0.74	0.76	1.76	-0.09	0.23	0.63
PERS (HC 115) Risk Parity	4.56	11.94	15.62	10.53	7.94	N/A	5.96	30.30	-9.93	18.51
PERS (HC 115) Risk Parity Custom Benchmark	3.90	11.56	15.12	8.87	7.79	N/A	5.25	29.93	-10.07	11.50
Difference	0.66	0.38	0.50	1.66	0.15	N/A	0.71	0.37	0.14	7.01
PERS (HC 115) Opportunistic	3.98	11.59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PERS (HC 115) Opportunistic Benchmark	5.10	12.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	-1.12	-1.04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Performance shown may be net or gross of fees depending on underlying investments. PERS (DB) and PERS (HC115) funded new opportunistic investment portfolios in the fourth quarter of 2020.

	Trailing Performance (%)						Calendar Year Performance (%)			
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
Other Alternatives										
STRS Opportunistic/Diversified Investments	9.45	23.68	8.84	7.43	6.19	7.43	-1.60	5.93	4.74	5.96
STRS Opportunistic/Diversified Blended Benchmark	6.31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	3.14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OP&F Real Assets	5.22	7.85	4.40	5.35	4.08	N/A	-0.28	5.80	10.45	3.26
OP&F Real Assets Custom Benchmark	3.39	9.84	7.20	6.46	5.66	N/A	-0.11	12.27	0.40	10.59
Difference	1.83	-1.99	-2.80	-1.11	-1.58	N/A	-0.17	-6.47	10.05	-7.33
OP&F MLPs	0.77	41.02	5.75	-0.28	-2.48	N/A	-26.09	13.46	-13.10	-4.08
Alerian MLP Index	-2.23	39.35	7.77	0.49	-2.84	N/A	-23.37	17.21	-12.42	-6.52
Difference	3.00	1.67	-2.02	-0.78	0.36	N/A	-2.72	-3.75	-0.68	2.44
OP&F Gold	2.83	-3.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S&P GSCI Gold Index Minus the Cost of Financing	2.81	-4.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Difference	0.02	0.79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SERS Opportunistic & Tactical Portfolio	6.77	22.04	9.12	9.41	7.37	N/A	0.96	5.47	5.33	14.55
SERS Opportunistic Custom Benchmark	0.85	0.46	5.37	5.56	5.17	N/A	0.36	16.04	-2.03	14.37
Difference	5.92	21.58	3.75	3.85	2.20	N/A	0.60	-10.57	7.36	0.18
HPRS Real Assets	9.61	27.85	12.28	4.82	N/A	N/A	-1.92	12.89	-6.64	-4.27
HPRS Real Assets Custom Benchmark (Net)	9.39	27.18	11.54	6.57	N/A	N/A	-3.04	12.54	-0.53	-0.43
Difference	0.22	0.67	0.74	-1.75	N/A	N/A	1.12	0.35	-6.11	-3.84

Performance shown may be net or gross of fees depending on underlying investments. The OP&F Gold composite was inceptioned during the second half of 2020. Beginning with the Dec. 2021 report, STRS will report Opportunistic/Diversified Investments (which includes Hedge Funds). Effective July 1, 2021, the STRS Opportunistic/diversified blended benchmark consists of the actual Opportunistic Investments Portfolio weight multiplied by the Cambridge Associates Private Credit Index one quarter lagged to be consistent with external fund reporting plus the actual weight of the Diversified Investments Portfolio multiplied by the HFRI Fund of Funds Composite Index, which is a monthly index where subsequent revisions will be reflected in the following period.

STRS Other Alternatives as of June 30, 2021

	2 Quarters	1 Year	3 Year	5 Year	7 Year	10 Year	2020	2019	2018	2017
STRS Opportunistic Investments ex HF	13.78	25.54	6.28	7.37	5.94	7.35	-1.58	6.39	6.25	6.07
STRS Opportunistic Custom Benchmark *	14.55	42.78	17.57	16.73	12.83	13.57	19.70	29.75	-6.18	19.95
Difference	-0.77	-17.24	-11.29	-9.36	-6.89	-6.22	-21.28	-23.36	12.43	-13.88

* Through June 30, 2021, the STRS Opportunistic Custom Benchmark is calculated monthly and is the Russell 3000 Index -100 basis points.

Plan Specific Pages



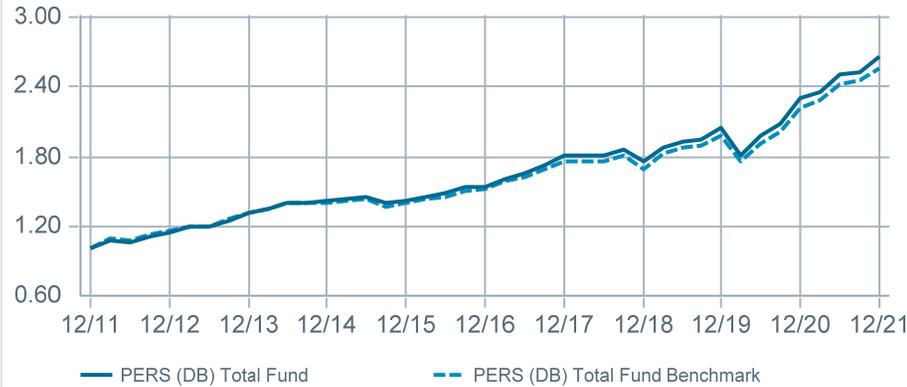
Ohio Retirement Study Council
Public Employees Employment Retirement System (DB)
Total Fund Characteristics

As of December 31, 2021

Summary

- PERS (DB) has generated an annualized 0.36% of alpha over the trailing 5-year period and 0.32% 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



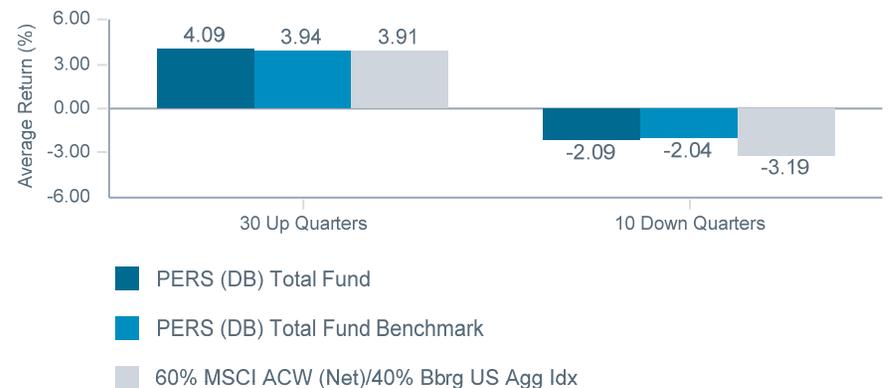
MPT Stats

	5 Years	10 Years
Maximum Return	10.35	10.35
Minimum Return	-11.66	-11.66
Standard Deviation	9.54	7.73
vs. PERS (DB) Total Fund Benchmark		
Info Ratio	0.59	0.50
Tracking Error	0.87	0.82
Alpha	0.36	0.32
vs. S&P 500 Index (Cap Wtd)		
Beta	0.53	0.52
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.06	1.22

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	26,109,968,756	23.88	23.80
International Equity	24,112,074,596	22.05	23.00
Core Fixed Income	11,450,940,249	10.47	11.00
U.S. Treasury	3,058,170,059	2.80	3.00
High Yield	2,098,277,583	1.92	2.00
Global High Yield	6,681	0.00	0.00
EMD	4,797,495,266	4.39	5.00
Floating Rate Debt	665,816	0.00	0.00
Securitized Debt	1,359,645,052	1.24	1.00
TIPS	3,649,828,225	3.34	3.00
Real Estate	10,076,491,913	9.22	10.00
Hedge Funds	79,087,375	0.07	0.00
Opportunistic	369,417,258	0.34	0.20
Commodities	1,495,704,396	1.37	1.00
Private Equity	14,026,827,802	12.83	12.00
Risk Parity	5,687,545,206	5.20	5.00
Cash Equivalents	946,398,618	0.87	0.00
Additional Annuity	15,702,208	0.01	0.00
Other Pension Assets	46,163	0.00	0.00
Total Fund	109,334,293,224	100.00	100.00

Up/Down Markets - 10 Years



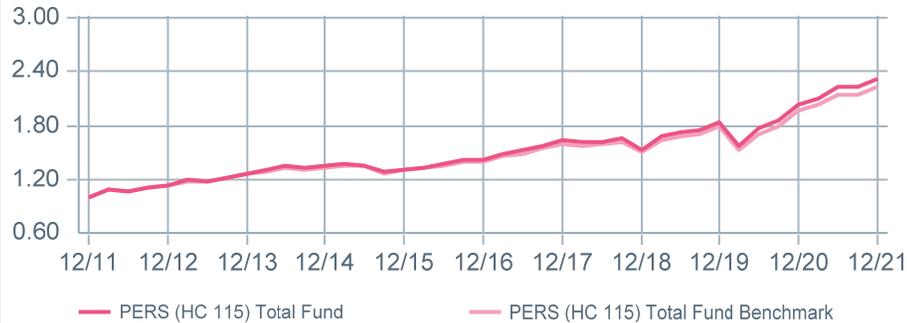
Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



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 - 10 Years



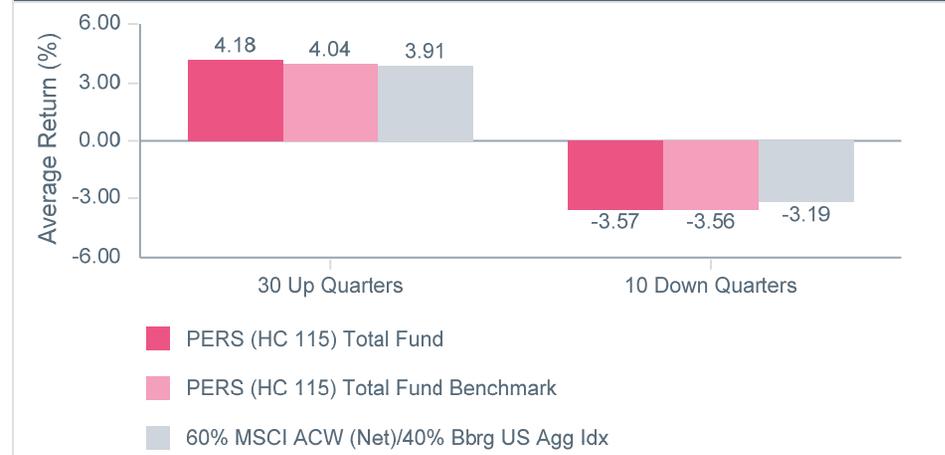
MPT Stats

	10 Years
Maximum Return	12.24
Standard Deviation	9.22
Minimum Return	-14.63
vs. PERS (HC 115) Total Fund Benchmark	
Info Ratio	0.96
Tracking Error	0.41
Alpha	0.37
vs. S&P 500 Index (Cap Wtd)	
Beta	0.53
vs. ICE BofAML 3 Mo US T-Bill Index	
Sharpe Ratio	2.96

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	4,084,511,986	28.23	27.80
International Equity	3,530,109,122	24.40	25.00
Core Fixed Income	2,378,898,243	16.44	17.00
EMD	231,736,882	1.60	2.00
High Yield	555,936,324	3.84	4.00
Floating Rate Debt	144,523	0.00	0.00
Securitized Debt	313,716,724	2.17	2.00
TIPS	1,054,133,338	7.29	7.00
Global High Yield	33,117	0.00	0.00
REITs	1,057,124,881	7.31	7.00
Hedge Funds	2,485,833	0.02	0.00
Opportunistic	50,375,081	0.35	0.20
Commodities	583,531,785	4.03	4.00
Risk Parity	302,208,254	2.09	2.00
Cash Equivalents	52,195,793	0.36	0.00
U.S. Treasury	272,362,039	1.88	2.00
Rebalancing	-	-	0.00
Total Fund	14,469,503,925	100.00	100.00

Up/Down Markets - 10 Years

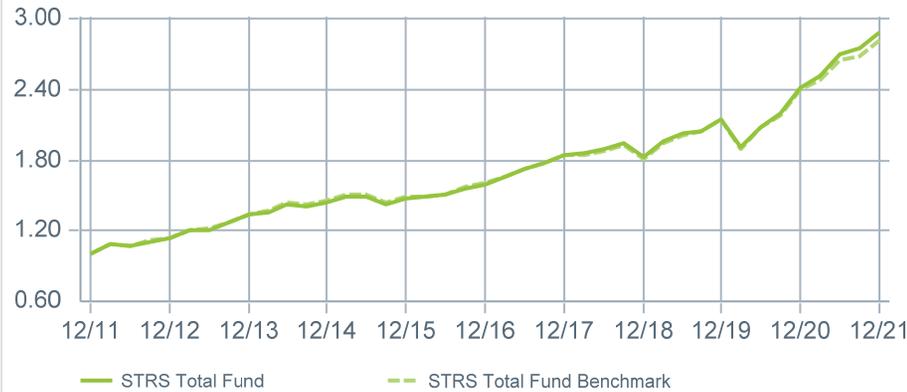


Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

Summary

- STRS has generated 0.42% of alpha over the trailing 5-year period and 0.24% 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



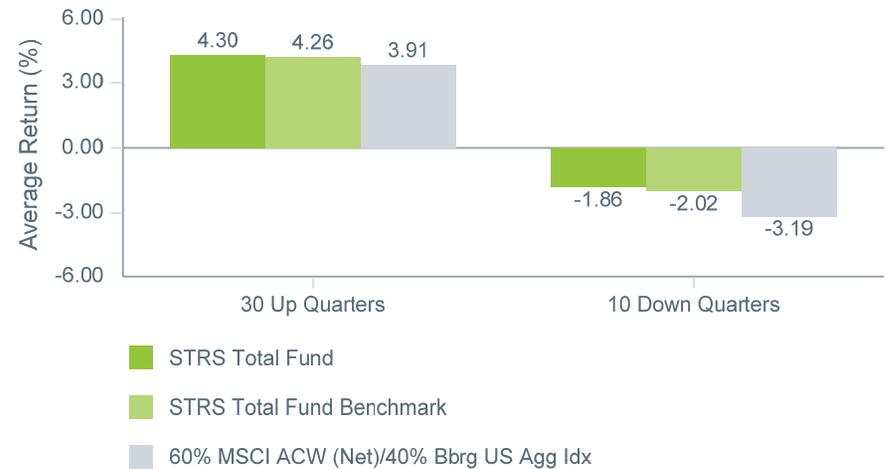
MPT Stats

	5 Years	10 Years
Maximum Return	10.00	10.00
Minimum Return	-11.51	-11.51
Standard Deviation	9.63	7.83
vs. STRS Total Fund Benchmark		
Info Ratio	1.31	0.59
Tracking Error	0.46	0.46
Alpha	0.42	0.24
vs. S&P 500 Index (Cap Wtd)		
Beta	0.54	0.55
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.15	1.31

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	27,738,624,846	27.93	28.00
International Equity	22,856,870,016	23.01	23.00
Fixed Income	18,778,867,021	18.91	21.00
Real Estate	8,810,709,911	8.87	10.00
Opportunistic (Incl. Hedge Funds)	8,384,206,498	8.44	10.00
Private Equity	11,152,558,832	11.23	7.00
Cash Equivalents	1,599,387,354	1.61	1.00
Total Fund	99,321,224,478	100.00	100.00

Up/Down Markets - 10 Years

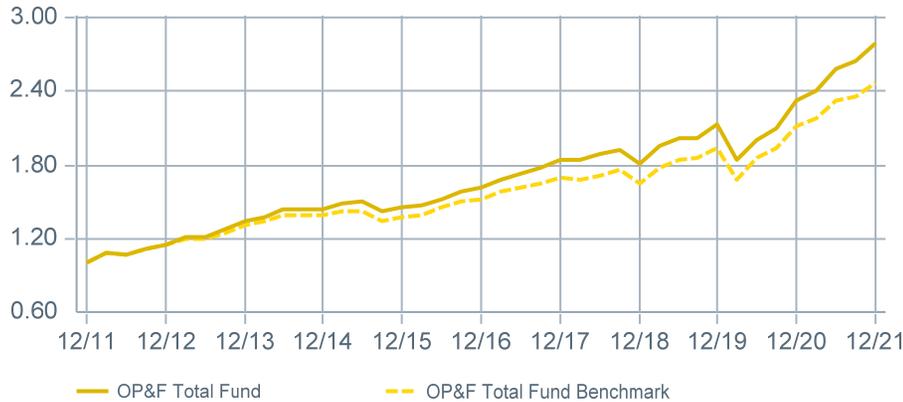


Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

Summary

- OP&F has generated 1.10% of alpha over the trailing 5-year period and 1.11% 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



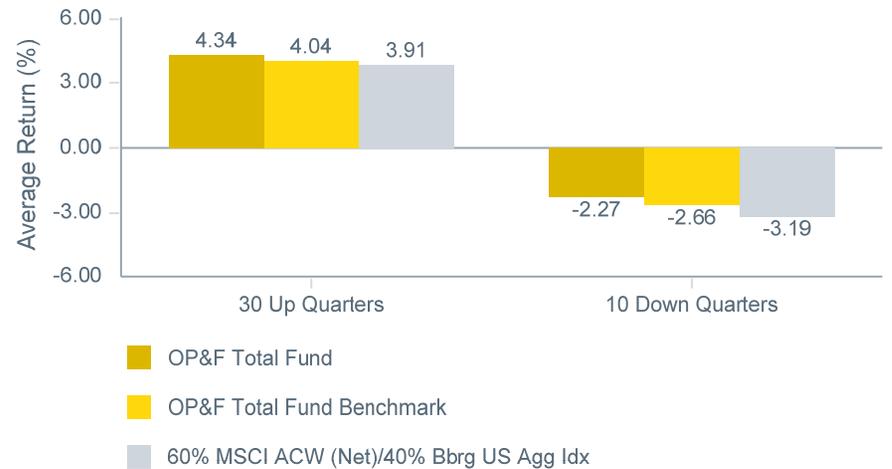
MPT Stats

	5 Years	10 Years
Maximum Return	10.66	10.66
Minimum Return	-13.55	-13.55
Standard Deviation	10.23	8.41
vs. OP&F Total Fund Benchmark		
Info Ratio	1.05	1.12
Tracking Error	1.30	1.17
Alpha	1.10	1.11
vs. S&P 500 Index (Cap Wtd)		
Beta	0.57	0.57
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.01	1.18

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	4,485,483,707	22.86	18.48
International Equity	2,831,732,074	14.43	11.20
High Yield Fixed Income	1,451,863,766	7.40	7.00
US TIPS	1,775,746,488	9.05	13.60
Core Fixed Income	1,879,167,470	9.58	18.40
Private Credit	535,446,859	2.73	2.60
Real Estate	1,933,809,299	9.86	9.60
Private Markets	2,003,344,177	10.21	6.40
MLPs	1,126,954,489	5.74	4.00
Real Assets	688,560,068	3.51	3.60
Gold	186,927,974	0.95	5.12
Cash Equivalents	719,411,352	3.67	0.00
Total Fund	19,618,447,723	100.00	100.00

Up/Down Markets - 10 Years

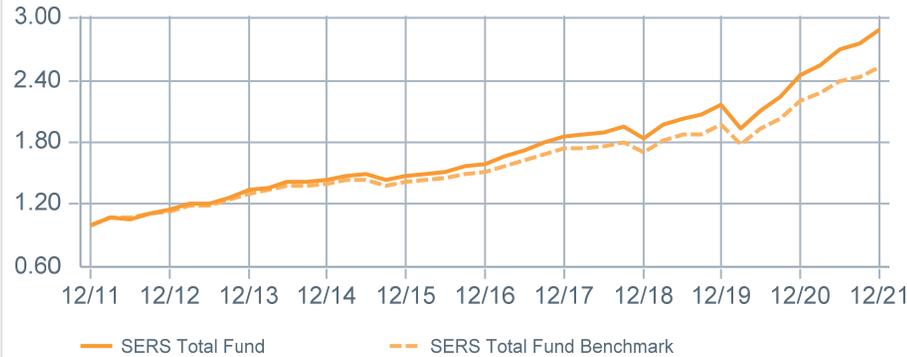


Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding. OP&F's target allocations are based on notional value, and have been scaled to 100% for this report.

Summary

- SERS has generated 0.77% of alpha over the trailing 5-year period and 0.29% 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



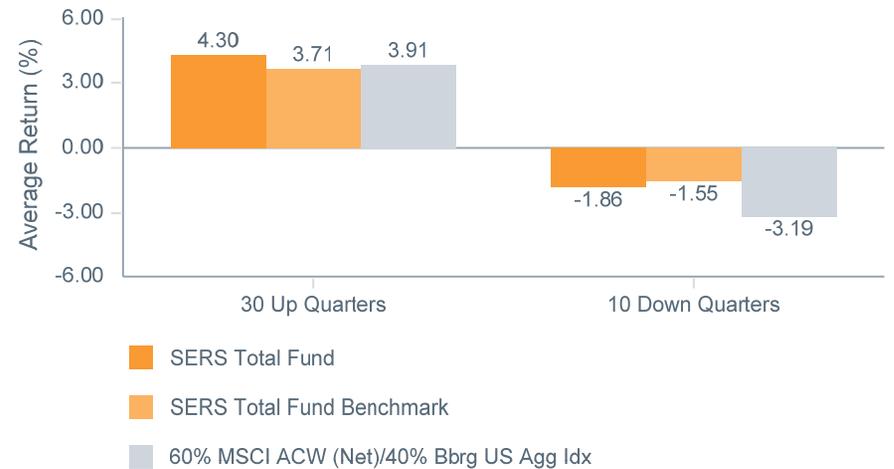
MPT Stats

	5 Years	10 Years
Maximum Return	9.94	9.94
Minimum Return	-11.00	-11.00
Standard Deviation	9.20	7.61
vs. SERS Total Fund Benchmark		
Info Ratio	1.62	1.20
Tracking Error	1.17	1.21
Alpha	0.77	0.29
vs. S&P 500 Index (Cap Wtd)		
Beta	0.52	0.52
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	1.21	1.34

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	4,934,277,098	26.36	24.75
International Equity	3,795,005,165	20.28	20.25
Fixed Income	2,566,067,416	13.71	19.00
Private Credit	632,700,709	3.38	5.00
Real Estate	3,147,531,319	16.82	17.00
Opportunistic Investments	923,368,786	4.93	0.00
Private Equity	2,122,296,964	11.34	12.00
Cash Equivalents	596,276,982	3.19	2.00
Total Fund	18,717,524,439	100.00	100.00

Up/Down Markets - 10 Years

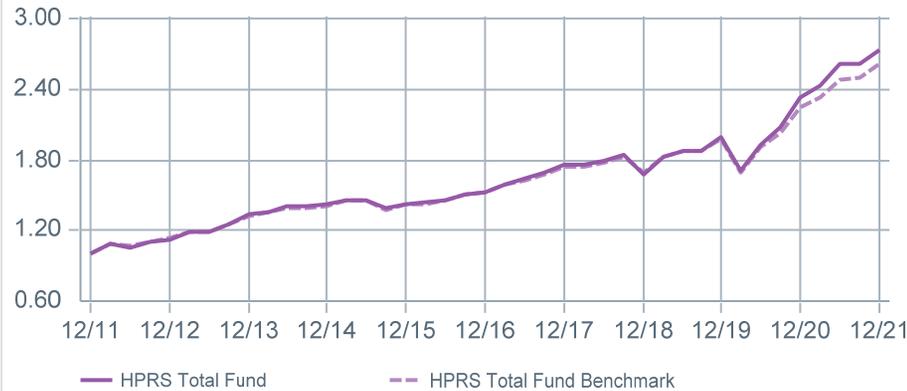


Performance shown is gross of fees. Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

Summary

- HPRS has lost **-0.02%** of alpha over the trailing 5-year period, and lost **-0.27%** 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



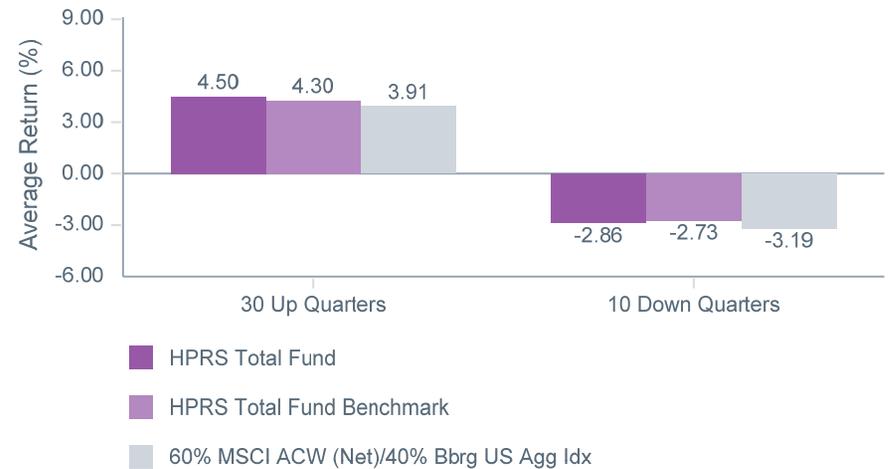
MPT Stats

	5 Years	10 Years
Maximum Return	13.60	13.60
Minimum Return	-14.84	-14.84
Standard Deviation	12.36	9.79
vs. HPRS Total Fund Benchmark		
Info Ratio	0.65	0.42
Tracking Error	1.25	1.16
Alpha	0.06	-0.23
vs. S&P 500 Index (Cap Wtd)		
Beta	0.70	0.68
vs. ICE BofAML 3 Mo US T-Bill Index		
Sharpe Ratio	0.90	1.01

Asset Allocation vs. Targets

	Market Value (\$)	Allocation (%)	Target (%)
US Equity	245,168,498	21.55	21.00
International Equity	67,534,382	5.94	6.00
Global Equity	253,990,272	22.33	24.00
Fixed Income	152,520,280	13.41	15.00
Real Estate	70,589,460	6.20	8.00
Hedge Funds	99,910,492	8.78	8.00
Private Equity	169,834,078	14.93	11.00
Real Assets	33,657,769	2.96	4.00
Cash Equivalents	44,456,227	3.91	3.00
Total Fund	1,137,661,458	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.

	Market Value (\$000)	Trailing Performance (%)						Calendar Year Performance (%)			
		2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017
HPRS	1,137,661	4.15	16.91	17.53	12.25	9.74	10.55	16.86	18.85	-4.57	15.01
HPRS Total Fund Benchmark		5.23	16.61	15.86	11.47	9.20	10.10	13.16	17.85	-3.38	14.55
Difference		-1.08	0.30	1.67	0.78	0.54	0.45	3.70	1.00	-1.19	0.46
<i>All Public Plans > \$1B-TF Median</i>		5.09	15.55	15.05	11.26	9.22	9.98	12.05	17.29	-3.13	16.00
Rank		71	37	10	20	29	27	3	23	76	62
Population		206	205	201	198	193	185	232	227	184	195
<i>All Public Plans \$250M to \$1B-TF Median</i>		4.40	13.88	15.52	11.08	9.02	9.92	13.07	18.67	-4.46	15.13
Rank		63	12	11	18	21	28	9	43	55	53
Population		122	120	118	114	111	106	135	141	101	99

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.
- Peer group ranks are measured in percentiles.
- 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 12/31/2021

(annualized fees shown in basis points)								
	Domestic Equity	Global Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
■ PERS (DB)	2	-	23	6	105	53	149	44
■ PERS (HC 115)	0	-	3	1	-	-	5	2
■ STRS	11	-	18	6	47	69	200	63
■ OP&F	41	-	39	30	76	68	-	68
■ SERS	20	-	47	52	77	110	-	145
■ HPRS	16	52	89	48	127	112	90	119

- Fees for Private Equity are based on committed capital, with the exception of SERS and OP&F, which is based on AUM.
- PERS (DB) and PERS (HC 115) Other Alternatives include Risk Parity, Opportunistic, and Commodities.
- PERS (DB) and PERS (HC 115) expenses for Real Estate, Private Equity, and Hedge Funds include net management fees and partnership expenses. Fees are estimated and are for externally managed accounts or portfolios.
- PERS (HC 115) Domestic Equity fee is 0.35 bps.
- STRS Other Alternatives fees include Opportunistic/Diversified Investments excluding Hedge Fund exposure.
- OP&F Fixed income fee is the weighted average of Core Fixed Income, High Yield, Private Credit Fixed Income, and US TIPS. Core Fixed income and US TIPS fees are on the notional value of the portfolio.
- OP&F Other Alternatives fees include Real Assets, MLPs, and Gold.
- SERS Other Alternatives fees include Opportunistic and Tactical Portfolio.
- HPRS Other Alternatives fees include Real Assets.

Appendix

Percentage of Assets Managed by External Managers – as of 12/31/2021

Percentage of Assets Managed by External Managers - As of 12/31/2021								
	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
■ PERS (DB)	52%	4%	77%	25%	100%	100%	100%	78%
■ PERS (HC 115)	27%	4%	77%	14%	-	-	100%	35%
■ STRS	34%	10%	47%	11%	14%	100%	100%	78%
■ OP&F	100%	100%	100%	100%	100%	100%	-	100%
■ SERS	97%	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, Opportunistic, and Commodities.
- STRS Other Alternatives include Opportunistic/Diversified Investments (includes Hedge Fund exposure).
- OP&F Other Alternatives include Real Assets, MLPs, and Gold.
- OP&F's Cash is 45% externally managed.
- SERS Other Alternatives include Opportunistic Investments and Tactical Portfolio.
- SERS has one internally-managed Cash mandate.
- HPRS Other Alternatives include Real Assets.

Percentage of Actively Managed Assets – as of 12/31/2021

Percentage of Assets Actively Managed - As of 12/31/2021								
	Total Fund	Domestic Equity	International Equity	Fixed Income	Real Estate	Private Equity	Hedge Funds	Other Alternatives
■ PERS (DB)	71%	13%	82%	86%	100%	100%	100%	80%
■ PERS (HC 115)	52%	13%	82%	78%	-	-	100%	38%
■ STRS	89%	67%	100%	100%	84%	100%	100%	100%
■ OP&F	83%	73%	100%	50%	100%	100%	-	100%
■ SERS	76%	29%	79%	100%	96%	100%	-	100%
■ HPRS	83%	20%	100%	100%	100%	100%	100%	100%

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

Custom Benchmark Glossary

PERS (DB) Total Fund Custom Benchmark:

- 23.8% Russell 3000 Index
- 23.0% PERS (DB) International Equity Custom Benchmark
- 11.0% PERS (DB) Core Fixed Income Custom Benchmark
- 3.0% Bloomberg U.S. Treasury Index
- 2.0% Bloomberg U.S. High Yield Index
- 5.0% PERS (DB) EMD Custom Benchmark
- 1.0% PERS (DB) Securitized Debt Custom Benchmark
- 3.0% Bloomberg U.S. TIPS Index
- 10.0% PERS (DB) Real Estate Custom Benchmark
- 12.0% PERS (DB) Private Equity Custom Benchmark
- 0.2% PERS (DB) S&P Risk Parity Index – 8% Target Volatility
- 1.0% Commodities Custom Benchmark
- 5.0% PERS (DB) Risk Parity Custom Benchmark

PERS (HC 115) Total Fund Custom Benchmark:

- 27.8% Russell 3000 Index
- 25.0% PERS (HC 115) International Equity Custom Benchmark
- 17.0% PERS (HC 115) Core Fixed Income Custom Benchmark
- 2.0% PERS (HC 115) EMD Custom Benchmark
- 4.0% Bloomberg U.S. High Yield Index
- 2.0% PERS (HC 115) Securitized Debt Custom Benchmark
- 7.0% Bloomberg U.S. TIPS Index
- 7.0% Dow Jones U.S. Select Real Estate Securities TR Index
- 0.2% PERS (HC 115) S&P Risk Parity Index – 8% Target Volatility
- 4.0% Commodities Custom Benchmark
- 2.0% PERS (HC 115) Risk Parity Custom Benchmark
- 2.0% Bloomberg U.S. Treasury Index

STRS Total Fund Custom Benchmark:

- 28.0% Russell 3000 Index
- 23.0% MSCI World Ex US Index (50% Hedged)/ MSCI Emg Mkts Index
- 21.0% STRS Fixed Income Blended Benchmark
- 10.0% STRS Real Estate Custom Benchmark
- 17.0% Alternative Investment Blended Benchmark
- 1.0% ICE BofA US 3-Month Treasury Bill Index

OP&F Total Fund Custom Benchmark:

- 18.48% Wilshire 5000 Index
- 11.2% MSCI ACW Ex US IMI Index (Net)
- 18.4% Bloomberg US Aggregate Bond Index + Leverage Factor
- 7.0% CS High Yield Dev. Countries Only Index
- 13.6% Bridgewater Custom US TIPS Index
- 2.6% S&P LTSA Levered Loan Index + 2%
- 9.6% NCREIF ODCE (Net) (1 Quarter Lag)
- 3.6% OP&F Real Assets Custom Index
- 4.0% Alerian MLP Index
- 6.4% OP&F Private Equity Custom Benchmark
- 5.12% S&P GSCI Gold Index Minus the Cost of Financing

*OP&F's target allocations are based on notional value, and have been scaled to 100% for this report.

SERS Total Fund Custom Benchmark:

- 24.75% Russell 3000 Index
- 20.25% SERS International Equity Custom Benchmark
- 19.0% Bloomberg US Aggregate Bond Index
- 17.0% NCREIF Property Index (1 Quarter Lag)
- 5.0% 3 Month LIBOR Rate + 4.5%
- 12.0% Burgiss All Private Equity (1 Quarter Lag)
- 2.0% Citigroup 30 Day T-Bill Index

HPRS Total Fund Custom Benchmark:

- 21.0% Russell 3000 Index
- 6.0% HPRS International Equity Custom Benchmark
- 24.0% HPRS Global Equity Custom Benchmark
- 15.0% HPRS Fixed Income Custom Benchmark
- 8.0% HPRS Total Real Estate Composite (Net)
- 8.0% HFRI FOF Composite Index
- 11.0% HPRS Total Private Equity Custom Composite
- 4.0% HPRS Real Assets Composite (Net)
- 3.0% BofA Merrill Lynch 91-Day T-Bill

Custom Benchmark Glossary

PERS (DB) International Equity Custom Benchmark:

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

PERS (DB) Core Fixed Income Custom Benchmark:

- Bloomberg US Aggregate Bond Index

PERS (DB) EMD Custom Benchmark:

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

PERS (DB) Securitized Debt Custom Benchmark:

- 50% Bloomberg Non-Agency Investment Grade CMBS: BBB Total Return Index (Unhedged) (USD)
- 50% Bloomberg Non-Agency CMBS Agg Eligible Total Return Index Value (Unhedged) (USD)

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:

- 65% HFRI Event Driven (Total) Index
- 35% HFRI Relative (Total) Index

PERS (DB) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (DB) Risk Parity Custom Benchmark:

- HFR Risk Parity Institutional Custom Index

PERS (HC 115) International Equity Custom Benchmark:

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

PERS (HC 115) Core Fixed Income Custom Benchmark:

- Bloomberg US Aggregate Bond Index

PERS (HC 115) EMD Custom Benchmark:

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

PERS (HC 115) Securitized Debt Custom Benchmark:

- 50% Bloomberg Non-Agency Investment Grade CMBS: BBB Total Return Index (Unhedged) (USD)
- 50% Bloomberg Non-Agency CMBS Agg Eligible Total Return Index Value (Unhedged) (USD)

PERS (HC 115) Hedge Funds Custom Benchmark:

- 65% HFRI Event Driven (Total) Index
- 35% HFRI Relative (Total) Index

PERS (HC 115) Opportunistic Custom Benchmark:

- The market weight of underlying portfolio benchmarks

PERS (HC 115) Risk Parity Custom Benchmark:

- HFR Risk Parity Institutional Custom Index

STRS International Equity Custom Benchmark:

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

STRS Real Estate Custom Benchmark:

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

STRS Private Equity Benchmark:

- The Private Equity Benchmark is the quarterly Cambridge Associates Private Equity and Venture Capital Index, one quarter lagged to be consistent with external fund reporting, effective July 1, 2021.

Custom Benchmark Glossary

STRS Opportunistic/Diversified Blended Benchmark:

- Effective July 1, 2021, the Opportunistic/diversified blended benchmark consists of the actual Opportunistic Investments Portfolio weight multiplied by the Cambridge Associates Private Credit Index one quarter lagged to be consistent with external fund reporting plus the actual weight of the Diversified Investments Portfolio multiplied by the HFRI Fund of Funds Composite Index, which is a monthly index where subsequent revisions will be reflected in the following period.

OP&F Real Assets Custom Benchmark:

- 45% FTSE Dev Core 50/50 Infrastructure Index
- 35% NCREIF Timberland Index
- 20% NCREIF Farmland Index (1 Quarter Lag)

OP&F Private Equity Custom Benchmark:

- Actual net of fee return of the Private Equity Composite

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:

- Bloomberg US Aggregate Bond Index + 2%
- Prior to 2020Q1: SERS Total Fund Custom Benchmark

HPRS International Equity Custom Benchmark:

- 67% MSCI Emerging Markets
- 33% MSCI EAFE Small Cap

HPRS Fixed Income Custom Benchmark:

- 40% Bloomberg Aggregate Bond Index
- 45% Credit Suisse Leveraged Loans
- 15% JP Morgan EMBI Global Diversified

HPRS Total Private Equity Custom Benchmark:

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

Glossary

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

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

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

Capital Markets Review -

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Glossary

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.

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:

Alpha

Absolute Return Strategies
Currency Overlay
GTAA (Global Tactical Asset Allocation)

Capital Appreciation

Public Equity
Private Equity
Preferred Securities
High Yield
Convertible Fixed Income
TALF Funds
Distressed Debt
Emerging Market Fixed Income
MLPs
Value Added Real Estate
Opportunistic Real Estate

Capital Preservation

Core Fixed Income
CMBS Fixed Income
Asset Backed Fixed Income
Domestic Core Plus Fixed Income
Mortgage Backed Fixed Income
International Developed Fixed Income
Cash Equivalents
Stable Value

Inflation

TIPS
Bank Loans
Core Real Estate
Real Return
Inflation Hedges
REITs
Commodities

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

BOISE

CHICAGO

NEW YORK

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