Memorandum

To	Ohio Retirement Study Council
From	RVK, Inc.
Subject	Executive Summary: December 31, 2018 Investment Performance
Date	June 13, 2019

Outlined below please find a summary of significant observations, key attributes, and performance metrics of Ohio's six[1] public retirement plans for the period ended December 31, 2018. The purpose of this analysis is to facilitate an objective "apples-to-apples" comparison of the six plans relative to each other, similar benchmarks, and peer group data consisting of similarly sized public pension plans.

While much of the discussion in this summary focuses on results from the trailing one-year period, we strongly encourage the Council to place significant weight on long-term results to better assess the management of the State's various pension plan assets. Though the six investment programs share many similarities, it is important to be aware of the crucial differences that may affect performance when reviewing this analysis. Each plan has unique long-term investment objectives and therefore distinct asset allocations in order to meet these objectives. Investment execution approaches also vary as it relates to active/passive and internal/external management.

The full results of our analysis are contained within our Investment Performance Analysis Report and we hope this Executive Summary will help in your review of that data. The information received by RVK, to the best of our knowledge, is complete and appropriate.

Total Fund Returns and Risk

Returns for the Ohio plans ranged from -1.28% to -5.76% for the 2018 calendar year as global markets produced negative results. During the third quarter US economic growth and monetary policy divergence from global partners drove domestic equity and interest rate markets higher. During the fourth quarter of 2018 a risk-off environment emerged as global growth forecasts, inflation expectations, and corporate earnings expectations began to roll over in unison. The Federal Reserve, European Central Bank, and International Monetary Fund lowered 2019 GDP growth forecasts across regions, while US Economic data remained strong with on-farm payrolls up 312,000 in December on a 3.9% unemployment rate. While most asset classes performed poorly, such as high yield credit and loan markets, duration-sensitive assets and government bonds performed well.

The dispersion in results among the State's retirement plans is driven by differences in asset allocation, asset class structure and investment manager selection, though it is not possible with the data available to RVK for us to weight each factor.

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[1]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.

During the 2018 calendar year, five out of six plans outperformed their custom total fund benchmarks. Each plan will have different investment objectives and goals and the "Total Fund Benchmarks" will reflect this. Total Fund over/under performance can come from differences in actual allocations or investment manager results.
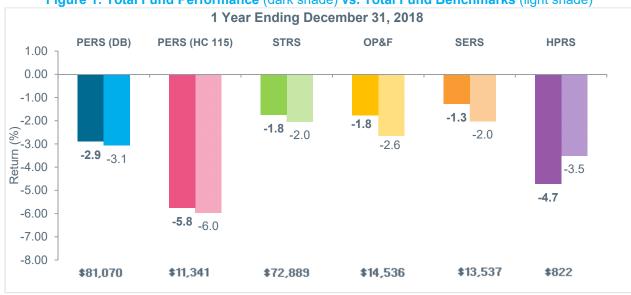
Figure 1: Total Fund Performance (dark shade) **vs. Total Fund Benchmarks** (light shade)

- Total Fund Benchmark is a target allocation index based on the targeted asset class percentages and appropriate asset class indexes for each individual plan
- Market values shown are in millions ($000,000)
- Performance shown is gross of fees
- PERS (DB): Public Employees Retirement System Defined Benefit Pension Plan
- PERS (HC 115): Since the PERS HC is a health care trust (now under HC 115), it has adopted a more conservative asset allocation policy versus the PERS (DB) Fund, with an emphasis on capital preservation, since 2005."
- STRS: State Teachers Retirement System
- OP&F: Ohio Police & Fire Pension Fund
- SERS: School Employees Retirement System
- HPRS: Highway Patrol Retirement System

Asset Allocation

Overall, the six plans all exhibit characteristics of increasingly diversified, institutional quality portfolios. Exposures to public equities (capital appreciation or "growth" assets) make up the largest component for each plan. Within equities, allocations to US equity investments have generally declined over the past ten years while allocations to alternatives, particularly hedge funds and private equity, have increased. The charts in Figure 2 show a 5-year asset allocation "lookback" for each plan and how they have moved to today's portfolio and target.

HPRS currently has the largest allocation to US equity at 30% while OP&F has the smallest domestic equity allocation at 17.1%. PERS (HC 115) has the largest fixed income allocation at 33%. The average total allocation to hedge funds, private equity, and other alternatives among the six plans is 21.1%. Relative to peer median allocations (All Public Plans > $1B), four of six plans have higher strategic exposures to international equities (peer median: 18.6%) and two of six plans have higher strategic exposures to US equities (peer median: 25.3%). Four of six plans have higher allocations to real estate (peer median: 7.6%).

Figure 2: Asset Allocation Changes (5 Years)

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

- Cash Equivalents for PERS (DB) consists of cash, rebalancing, and additional annuity. Cash Equivalents for PERS (HC 115) consists of cash and rebalancing. Rebalancing account holds US and Non-US equity and treasury futures. OPERS typically holds 30bps of cash (invested in OPERS STIF) for liquidity needs.

The table below highlights recent target allocation changes since our last report.
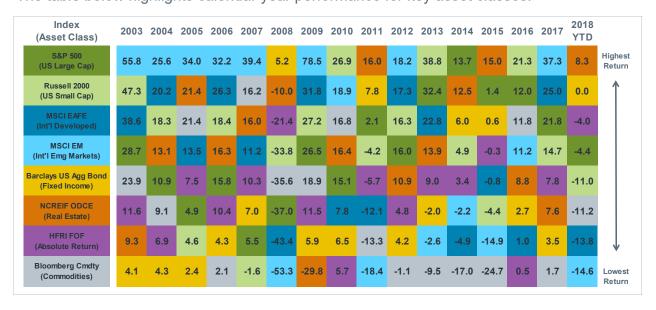
Figure 3: Changes to Target Allocations Since 06/30/2018

	Domestic Equity	International Equity	Fixed Income	Real Estate	Hedge Funds	Private Equity	Other Alternatives	Cash Equivalents
PERS (DB)	---	---	---	---	---	---	---	---
PERS (HC 115)	---	---	---	---	---	---	---	---
STRS	-1.00%	---	---	---	---	---	1.00%	---
OP&F	-0.50%	-0.50%	-0.25%	---	---	0.50%	0.75%	---
SERS	---	---	---	---	---	---	---	---
HPRS	---	---	---	---	---	---	---	---

Detailed asset allocation targets as of 12/31/2018 can be found in the full Investment Performance Analysis. OP&F Other Alternatives consists of Real Assets (+0.75%). STRS Other Alternatives consists of Opportunistic Investments Excluding Hedge Funds (+1.00%).

Figure 4: Annual Asset Class Performance

The table below highlights calendar year performance for key asset classes.

Index (Asset Class)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 YTD	
S&P 500 (US Large Cap)	55.8	25.6	34.0	32.2	39.4	5.2	78.5	26.9	16.0	18.2	38.8	13.7	15.0	21.3	37.3	8.3	Highest Return
Russell 2000 (US Small Cap)	47.3	20.2	21.4	26.3	16.2	-10.0	31.8	18.9	7.8	17.3	32.4	12.5	1.4	12.0	25.0	0.0	↑
MSCI EAFE (Int'l Developed)	38.6	18.3	21.4	18.4	16.0	-21.4	27.2	16.8	2.1	16.3	22.8	6.0	0.6	11.8	21.8	-4.0	
MSCI EM (Int'l Emg Markets)	28.7	13.1	13.5	16.3	11.2	-33.8	26.5	16.4	-4.2	16.0	13.9	4.9	-0.3	11.2	14.7	-4.4	
Barclays US Agg Bond (Fixed Income)	23.9	10.9	7.5	15.8	10.3	-35.6	18.9	15.1	-5.7	10.9	9.0	3.4	-0.8	8.8	7.8	-11.0	
NCREIF ODCE (Real Estate)	11.6	9.1	4.9	10.4	7.0	-37.0	11.5	7.8	-12.1	4.8	-2.0	-2.2	-4.4	2.7	7.6	-11.2	
HFRI FOF (Absolute Return)	9.3	6.9	4.6	4.3	5.5	-43.4	5.9	6.5	-13.3	4.2	-2.6	-4.9	-14.9	1.0	3.5	-13.8	↓
Bloomberg Cmdty (Commodities)	4.1	4.3	2.4	2.1	-1.6	-53.3	-29.8	5.7	-18.4	-1.1	-9.5	-17.0	-24.7	0.5	1.7	-14.6	Lowest Return

Figure 5: Fund Performance vs. Actuarial Rate of Return (Gray)

1-, 5-, and 10-Years (dark to light) Ending December 31, 2018

	PERS (DB)	PERS (HC 115)	STRS	OP&F	SERS	HPRS
1-Year	-2.90	-5.76	-1.75	-1.78	-1.28	-4.73
5-Year	5.87	3.84	6.38	6.13	6.62	4.70
10-Year	9.11	8.08	9.59	10.05	9.18	8.61
Actuarial	7.20	6.00	7.45	8.00	7.50	7.25

Over the trailing 10-year period, all six plans have outperformed their current actuarial assumed rate of return as shown by Figure 5.

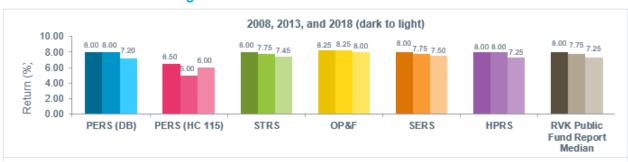**Figure 6: Historical Actuarial Rates of Return**

2008, 2013, and 2018 (dark to light)

	PERS (DB)	PERS (HC 115)	STRS	OP&F	SERS	HPRS	RVK Public Fund Report Median
2008	8.00	6.50	8.00	8.25	8.00	8.00	8.00
2013	8.00	5.00	7.75	8.25	7.75	8.00	7.75
2018	7.20	6.00	7.45	8.00	7.50	7.25	7.25

Over the past ten years, the median actuarial rate of return for public funds within the RVK universe has declined (see Figure 6). Actuarial rates for three of the six Ohio plans are above the RVK universe median. Figure 7 shows the dispersion of actuarial rates of return around the median of 7.25%.

Figure 7: RVK Public Fund Report Survey Actuarial Rates of Return – As of 12/31/2018

Rate	Count
6.50	2
6.60	1
6.75	5
6.80	1
7.00	15
7.20	1
7.25	20
7.35	1
7.45	2
7.50	11
7.60	0
7.65	2
7.70	0
7.75	2
8.24	1

RVK prepares a proprietary Public Fund Report with over 70 participating public funds across the U.S., including Ohio PERS and Ohio STRS. Participating public funds are surveyed semi-annually.

Longer-term performance remains strong as all six plans have outperformed or kept pace with their custom benchmark over the trailing 7-year period (see Figure 8).

Figure 8: Long-Term Fund Performance (dark shade) vs. Total Fund Benchmarks (light shade)

Plan sponsor peer group benchmarking is another way to compare performance results of Ohio's retirement plans, however there can be a wide range in investment objectives and different benefit plan structures. For example the PERS Health Care Fund's objective of capital preservation leads to a larger allocation to fixed income. Relative to peers, four of the six plans outperformed the All Public Plans > $1B median over the trailing 3-year period and four plans also outperformed the median peer over the trailing 10-year period (see Figure 9).

When reviewing a peer group of plan sponsors with assets greater than $10B, ranks generally improve over the 10-year period for all plans (may not be an appropriate asset level cutoff for all plans, for example HPRS has $822m in plan assets).
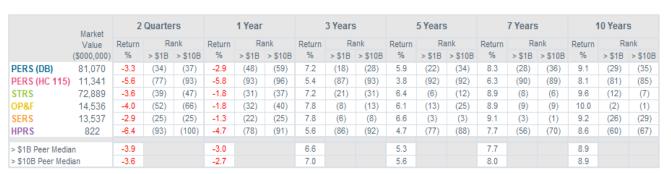
Figure 9: Fund Performance vs. Public Plans

	Market Value ($000,000)	2 Quarters			1 Year			3 Years			5 Years			7 Years			10 Years		
		Return %	Rank > $1B	Rank > $10B	Return %	Rank > $1B	Rank > $10B	Return %	Rank > $1B	Rank > $10B	Return %	Rank > $1B	Rank > $10B	Return %	Rank > $1B	Rank > $10B	Return %	Rank > $1B	Rank > $10B
PERS (DB)	81,070	-3.3	(34)	(37)	-2.9	(48)	(59)	7.2	(18)	(28)	5.9	(22)	(34)	8.3	(28)	(36)	9.1	(29)	(35)
PERS (HC 115)	11,341	-5.6	(77)	(93)	-5.8	(93)	(96)	5.4	(87)	(93)	3.8	(92)	(92)	6.3	(90)	(89)	8.1	(81)	(85)
STRS	72,889	-3.6	(39)	(47)	-1.8	(31)	(37)	7.2	(21)	(31)	6.4	(6)	(12)	8.9	(8)	(6)	9.6	(12)	(7)
OP&F	14,536	-4.0	(52)	(66)	-1.8	(32)	(40)	7.8	(8)	(13)	6.1	(13)	(25)	8.9	(9)	(9)	10.0	(2)	(1)
SERS	13,537	-2.9	(25)	(25)	-1.3	(22)	(25)	7.8	(6)	(8)	6.6	(3)	(3)	9.1	(3)	(1)	9.2	(26)	(29)
HPRS	822	-6.4	(93)	(100)	-4.7	(78)	(91)	5.6	(86)	(92)	4.7	(77)	(88)	7.7	(56)	(70)	8.6	(60)	(67)
> $1B Peer Median		-3.9			-3.0			6.6			5.3			7.7			8.9		
> $10B Peer Median		-3.6			-2.7			7.0			5.6			8.0			8.9		

While additional analysis is needed to fully understand the risk posture of each plan, the risk and return charts shown below suggest four of six plans have generated more return for each unit of risk exposure (as measured by standard deviation) than the median peer over the trailing 5-year period. Five plans to varying degrees have exhibited more asset risk relative to peers over the trailing 10-year period (see Figure 10). Peers may have different risk/return results for a variety of reasons, including but not limited to: objectives and goals, target allocations, time of allocation changes, investment restrictions, asset class exposures, or investment management execution.

Figure 10: All Public Plans > $1B Risk and Return

5 Years Ending December 31, 2018

		Return	Standard Dev.	Sharpe Ratio
◆	PERS (DB)	5.9	5.2	1.0
◆	PERS (HC 115)	3.8	6.0	0.4
◆	STRS	6.4	5.5	1.0
◆	OP&F	6.1	5.6	1.0
◆	SERS	6.6	5.2	1.1
◆	HPRS	4.7	6.2	0.7
—	Median	5.3	5.6	0.8

[3]Grey boxes on scatterplot charts represent members of the peer universe.

10 Years Ending December 31, 2018

		Return	Standard Dev.	Sharpe Ratio
◆	PERS (DB)	9.1	9.0	1.0
◆	PERS (HC 115)	8.1	9.7	0.8
◆	STRS	9.6	9.0	1.0
◆	OP&F	10.0	9.6	1.0
◆	SERS	9.2	8.6	1.0
◆	HPRS	8.6	9.6	0.9
—	Median	8.9	8.6	1.0

[3]Grey boxes on scatterplot charts represent members of the peer universe.

Asset Class Returns and Risk

The following section includes information on all "major" asset classes. Broad market benchmarks are included for illustrative purposes. Additional details, including system-specific benchmark performance, are available within our Investment Performance Analysis.

Traditional Asset Classes:

Traditional asset classes typically make up a portfolio's core allocation and include investments in stocks and bonds, with characteristics of capital appreciation (growth) from stocks and capital preservation (safety) from bonds. Depending on the type of investment, real estate may fall within traditional or alternative categories and exposures can have income, inflation protection, and/or capital appreciation characteristics.

US Equity

The US equity portfolios for three plans outperformed their benchmark during the 2018 calendar year. Four out of six plans outperformed the peer median over the same period (see Figure 11). Absolute performance over the past 10 years has been strong for all plans.

Figure 11: US Equity Performance

	2 Quarters		1 Year		3 Years		5 Years		7 Years		10 Years	
	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank
PERS (DB)	-8.1	(19)	-5.0	(24)	8.9	(35)	7.7	(32)	12.3	(28)	13.1	(37)
PERS (HC 115)	-8.1	(19)	-5.0	(24)	8.9	(35)	N/A	N/A	N/A	N/A	N/A	N/A
STRS	-9.3	(50)	-5.3	(39)	8.7	(45)	7.7	(32)	12.0	(50)	12.9	(48)
OP&F	-7.5	(13)	-3.3	(6)	11.0	(2)	8.9	(5)	13.1	(3)	14.6	(6)
SERS	-9.1	(47)	-6.1	(63)	8.5	(51)	7.5	(40)	12.5	(21)	13.4	(30)
HPRS	-10.9	(89)	-8.0	(87)	8.3	(57)	7.4	(48)	12.2	(36)	13.6	(18)
R 3000 Index	-8.2		-5.2		9.0		7.9		12.5		13.2	
Peer Median	-9.3		-5.9		8.5		7.2		12.0		12.9	

[4]OP&F is benchmarked to the Wilshire 5000

International Equity

The international equity portfolios for four of six plans outperformed their respective benchmarks during the 2018 calendar year. STRS earned the highest absolute performance during the period with a return of -11.8% (see Figure 12). Four out of five funds outperformed their respective benchmarks over the 10-year period.

Figure 12: International Equity Performance

	2 Quarters		1 Year		3 Years		5 Years		7 Years		10 Years	
	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank
PERS (DB)	-11.2	(51)	-14.2	(66)	6.1	(17)	2.5	(20)	6.4	(42)	7.8	(51)
PERS (HC 115)	-11.2	(51)	-14.2	(66)	6.1	(17)	N/A	N/A	N/A	N/A	N/A	N/A
STRS	-9.3	(11)	-11.8	(11)	5.5	(35)	3.5	(7)	7.5	(6)	8.5	(11)
OP&F	-13.9	(100)	-17.3	(100)	3.1	(100)	0.6	(100)	5.9	(64)	7.7	(54)
SERS	-10.8	(39)	-14.0	(62)	5.5	(33)	1.9	(39)	6.3	(43)	8.0	(36)
HPRS	-13.3	(99)	-14.9	(83)	3.7	(94)	0.6	(100)	5.4	(85)	6.1	(100)
MSCI ACW Ex US IMI	-11.5		-14.8		4.4		0.8		5.1		7.0	
Peer Median	-11.2		-13.5		4.9		1.7		6.1		7.8	

[5]MSCI ACW Ex US IMI may not be the direct benchmark for all the applicable systems international equity exposure, but it is included as a broad benchmark for illustrative purposes.

Fixed Income

Domestic fixed income markets ended the 2018 calendar year flat at 0.0%, as measured by the Bloomberg US Aggregate Bond Index. During the period, three out of six plans outperformed their respective benchmarks. Five out of six plans also outperformed the peer median. All plans outperformed the broad market index over the 7-year trailing period, as shown by Figure 13. SERS fixed income composite returned 5.9% versus 3.5% for the Bloomberg US Aggregate Bond Index, the highest absolute and relative return earned among the five plans that have 10 years of performance history.

Figure 13: Fixed Income Performance

	2 Quarters		1 Year		3 Years		5 Years		7 Years		10 Years	
	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank	% Return	Rank
PERS (DB) Core FI	1.7	(11)	-0.1	(39)	2.1	(88)	2.7	(63)	2.5	(68)	4.1	(75)
PERS (HC 115) Core FI	1.7	(11)	-0.1	(39)	2.1	(88)	N/A	N/A	N/A	N/A	N/A	N/A
STRS	1.5	(18)	0.2	(27)	3.0	(52)	2.9	(56)	2.8	(57)	5.1	(45)
OP&F Core FI	1.5	(18)	1.2	(9)	3.2	(44)	3.1	(46)	2.9	(51)	4.8	(59)
SERS	1.3	(30)	-0.4	(56)	3.1	(47)	3.0	(53)	3.4	(33)	5.9	(27)
HPRS	1.3	(25)	2.4	(4)	4.7	(10)	3.7	(24)	3.4	(32)	5.2	(40)
B US Agg Bond Index	1.7		0.0		2.1		2.5		2.1		3.5	
Peer Median	0.9		-0.3		3.0		3.0		2.9		4.9	

[6]Bloomberg US Agg Bond Index may not be the direct benchmark for all the applicable systems fixed income exposure, but it is included as a broad benchmark for illustrative purposes.

Real Estate

Of the five plans with exposure to core and value-added real estate, returns ranged from 15.7% to 4.4% during the 2018 calendar year. PERS (HC 115)'s REITs (real estate investment trusts) composite declined -4.1%. Over the trailing 10-year period, returns ranged from 6.0% to 8.3% per annum (see Figure 14).

Figure 14: Real Estate Performance

Core and Value-Added Real Estate							
	2 Quarters	1 Year	3 Years	5 Years	7 Years	10 Years	10 Years
	% Return	% Return	% Return	% Return	% Return	% Return	Standard Deviation
PERS (DB)	4.0	4.4	8.6	12.3	12.8	8.3	6.6
STRS	1.7	6.6	7.5	10.2	11.0	7.6	7.2
OP&F	4.7	13.7	12.4	14.5	14.4	7.1	9.4
SERS	5.2	11.4	10.6	12.0	12.3	6.0	9.0
HPRS	7.9	15.7	11.2	12.3	11.6	6.7	7.2
NCREIF ODCE Index (Net) (AWA)	3.4	7.4	7.3	9.4	10.0	6.0	7.4
REITs							
PERS (HC 115)	-5.8	-4.1	2.0	N/A	N/A	N/A	N/A
DJ US Sel RE Securities	-5.9	-4.2	2.0	N/A	N/A	N/A	N/A

[7]NCREIF ODCE Index (Net) (AWA) may not be the direct benchmark for all the applicable systems real estate exposure, but it is included as a broad benchmark for illustrative purposes.

Alternative Asset Classes

Alternative investments are typically added to a portfolio to provide further diversification of assets, enabling investors to reduce expected portfolio volatility without sacrificing return potential. Exposures may include hedge funds, private equity, private real estate, commodities, and opportunistic exposures to equity or fixed income segments/securities. As compared to traditional asset classes, alternative investments can be less transparent (although this is improving), less liquid (potential fund lock-up periods or staged withdrawals), and more expensive (although costs are generally decreasing). Investment managers rely on manager skill, extensive research, and sourcing of opportunities to add value, all which lead to unique characteristics and higher costs.

As with any investment, alternative investments are also subject to a variety of risks, including, but not limited to: operational, complexity, leverage, liquidity, concentration, volatility, headline, fraud, and regulatory. A thorough and ongoing due diligence process is needed to mitigate these risks. Figure 15 shows the correlation between broad market benchmarks for alternatives (private real estate, REITs, hedge funds, private equity) and traditional asset classes (public equities and fixed income).

Figure 15: Alternative Asset Class Index Correlation

	NCREIF ODCE Index	DJ US Select RE Secr Index	HFRI FOF Comp Index	Cambridge US PE Index (Qtr Lag)
S&P 500 Index (Cap Wtd)	0.20	0.72	0.78	0.19
Russell 2000 Index	0.16	0.75	0.74	0.15
MSCI EAFE Index	0.14	0.65	0.86	0.22
MSCI Emg Mkts Index	0.02	0.54	0.85	0.13
Bloomberg US Agg Bond Index	-0.18	0.11	-0.23	-0.11
NCREIF ODCE Index	1.00	0.21	0.20	0.63
DJ US Select RE Secr Index	0.21	1.00	0.47	0.29
HFRI FOF Comp Index	0.20	0.47	1.00	0.24
Cambridge US PE Index (Qtr Lag)	0.63	0.29	0.24	1.00

[8]Correlations are based on 15 years of performance ending December 31, 2018.

Hedge Funds

Hedge Fund exposures are typically intended to provide attractive risk-adjusted returns and diversification benefits to a portfolio over the long-term. These attributes are often obtained via investments that rely on manager skill rather than specific asset class exposures, and allow for flexibility of allocations and tools.

Composite returns during the 2018 calendar year ranged from -6.0% to 0.6% among the five plans with dedicated hedge fund composites. Over the trailing 5-year period the hedge fund allocation for two plans (out of the four with 5 years of performance history) outperformed their respective benchmarks.

Figure 16: Hedge Funds Performance

5 Years Ending December 31, 2018

	Return	Standard Dev.
PERS (DB)	2.3	3.6
STRS	2.4	2.9
SERS	2.3	3.5
HPRS	0.7	5.0
HFRI FOF Comp	1.4	3.9
S&P 500	8.5	9.5
B US Agg	2.5	2.9

Private Equity

Private Equity investments typically attempt to achieve returns above public market returns while providing some diversification benefits. Private equity investments provide a way to access companies, industries, and strategies not easily available to public markets and allows skilled managers to effect meaningful change to businesses, thus improving value.

Five of the six plans have dedicated exposure to private equity. Over the trailing 7-year period, the time-weighted returns for these allocations have ranged from 8.6% to 17.0% per annum. One of the five plans have outperformed their respective benchmarks over the trailing 10-year period. Although we prefer to measure private equity performance using since inception money-weighted returns (IRR), we have included time-weighted performance in our full Investment Performance Analysis for illustrative purposes.

Figure 17: Private Equity Performance

	10 Years Ending December 31, 2018				
Plan	PERS (DB)	STRS	OP&F	SERS	HPRS
% Return	12.5	12.6	11.8	12.8	6.6
Benchmark % Return	12.6	15.1	15.4	12.6	13.1

[9]HPRS's private equity portfolio did not begin in earnest until after 2008. Therefore longer period trailing returns may not be relevant.

Additional Investments

We have included additional asset class composites which are not shared across the majority of the six plans within our Investment Performance Analysis.

Considerations

After careful analysis, we put forth the following considerations for the Ohio Retirement Study Council:

1. Be mindful of target asset allocation for each fund and the goals they are attempting to achieve. Currently all the funds are diversified across multiple asset classes and exhibit characteristics of prudent investor diversification.

    ➔ The determination of a fund's asset allocation is the single most important investment decision and is a major determinant of long-term return and the volatility risk of asset values. Creating a diversified portfolio of asset classes enables the investor to achieve a potential higher rate of return while minimizing volatility of the portfolio. A fund following a smoother, less volatile path compounds value at a faster rate.

    ➔ Don't assume that all of the plans should have the same asset allocation. Differences in their liabilities, funding status, the risk tolerance of their fiduciaries and other factors will likely produce legitimate differences in their respective asset allocations.

2. Monitor the change in asset allocation over time.

    ➔ Target allocations should be formally reviewed (by the Board) every few years with potentially more frequent informal reviews (by Staff). From each review there can be multiple reasons for adopting new targets (with generally gradual shifts) – from a rare occurrence of the overarching goal of the investment program changing to potential consideration of significant, longer-term economic or market changes to the possibility of opportunities to improve the risk/return tradeoff.

3. While this and subsequent reports we deliver to the council will focus on recent information in return and risk taken at each of the funds, we strongly encourage you to once again focus on the 3 and 5-year risk and return results to better gauge the stewardship of the State's pension assets.

All performance shown is gross of fees, with the exception of externally managed real estate, hedge fund, and private equity investments. Total Fund performance shown is gross of fees but is net of embedded fees on externally managed real estate and alternative investments. Peer group ranks are measured in percentiles.

The HC115 individual composites do not include the prior performance history of the HC composites.