

### What's going on in the marketplace?

The month of July brought modest advances in the global equity markets, as gains in the U.S. were able to offset the generally weaker performance of the international markets. U.S. markets continued to show signs of growth and were further buoyed by anticipation of a Fed rate cut. International markets, especially emerging markets, were hampered by continued fears regarding global growth and trade policy. U.S. bond markets were positive and outpaced Non-U.S. fixed income markets.

### U.S. Equities

U.S. markets were up nearly 1.5% during the month per the Russell 3000. All market cap segments provided positive returns with large caps outpacing midcaps followed by small caps. Growth outperformed value by nearly 1.4% (R3000G 2.2%, R3000V 0.8%).

During the month, the KRS U.S. equity portfolio underperformed the Russell 3000 Index, trailing by 13 basis points. The underperformance can be explained in part by weaker stock selection within the large cap and the all-cap growth mandates. In addition, positioning down the cap spectrum hampered performance.

### Non-U.S. Equities

Non-U.S. equities markets were weaker during the period losing -1.1% per the MSCI ACWI-Ex US IMI Index. Both developed and emerging markets struggled falling over -1%. Developed markets held up slightly better than the emerging markets by roughly 15 bps.

The KRS Non-U.S. equity portfolio fell -0.8% during the month, while providing 33 bps of downside protection. Relative outperformance was driven by stock selection as two of the four active mandates significantly outpaced the index by roughly 2.3%.

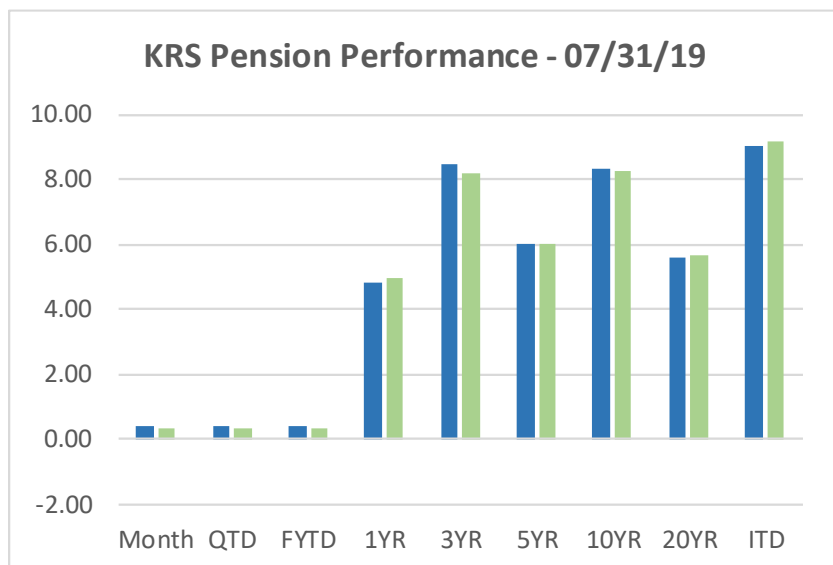
### Fixed Income

The fixed income market provided positive returns during the month. The leveraged loan segment led the market and gained 0.80%, followed by the corporate high yield market which added 56 bps, and then the aggregate index which returned 0.22%.

The KRS specialty credit allocation added 45 basis points on the month as relative manager performance was mixed. The KRS core fixed income allocation returned 0.13% trailing the aggregate market by 8 bps. The portfolio's intermediate credit investment kept pace with its index returning 22 bps; however, traditional aggregate investments slightly trailed.

### Alternative Assets

The diversifying strategy group gained 0.1% during the month. The Opportunistic and Absolute Return allocations led the way returning 75 bps and 61 bps, respectively. The Real Estate portfolio gained 0.3%, while



the Real Return allocation was slightly weaker, falling 14 bps. The Private Equity portion of the portfolio provided a return of 2.2%.

## Cash

The cash portfolio performed inline during the month (0.2% vs 0.2%). The cash allocation finished the period above target (3.7%) in part due to the continued transitioning of assets to the newly approved asset allocation. The overweight had not effect on the fund's relative performance.

## NOTES:

- 1) Returns displayed are "net". For the purposes of this report, total fund return information is net of fees and expenses, with audited data beginning in July 2011. At the manager level returns are net of fees beginning with July 2011, and gross of fees for prior data.
- 2) Individual plan allocation and performance (pg.4).
- 3) Prior to January 1, 2014, the inception date for the Private Equity asset class was stated as 10/1/1990 for Pension Fund and 6/1/2001 for Insurance Fund. Prior to 07/01/02, the characteristics of the allocation, and the benchmark itself, were more closely aligned with Real Estate. As such, it is not appropriate to report this portion of the return stream within the Private Equity allocation, whose true inception date has been determined to be 07/01/02 based on funding the Systems' first private equity mandate. The portion of the original return streams that are no longer reported within the Private Equity allocation (Pension from 10/1/90 to 06/30/02; Insurance 06/01/01 to 06/30/02) are reported within the Fund Level performance figures.
- 4)

<b>Private Equity Composite (Pension)</b> Inception (07/01/02) to 06/30/11 60.00% S&P 1500 Composite Index 40.00% Barclays US Corporate High Yield Index 07/01/11 to 12/31/15 100.00% Russell 3000 Index + 4% (Qtr Lag) <b>01/01/16 to Present</b> <b>100.00% Russell 3000 Index + 3% (Qtr Lag)</b>	<b>Private Equity Composite (Insurance)</b> Inception (07/01/02) to 06/30/11 80.00% S&P 1500 Composite Index 20.00% Barclays US Corporate High Yield Index 07/01/11 to 12/31/15 100.00% Russell 3000 Index + 4% (Qtr Lag) <b>01/01/16 to Present</b> <b>100.00% Russell 3000 Index + 3% (Qtr Lag)</b>
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- 5) The Private Equity & Real Return Benchmarks, from one month returns up until five year returns, is equal to the performance of the associated KRS allocations. Given there is not appropriate benchmark to use for short term performance evaluation, this will allow greater focus on longer term returns, which is more appropriate given the long term nature of these investments.

<u>Pension Benchmark Composite 01/01/16 to 08/31/17</u> US Equity: Russell 3000 (25.6%) Non US Equity: MSCI AXCI Ex-US IMI (25.2%) Global Fixed Income: Barclays Universal Index (6.8%) Credit Fixed Income: Barclays US High Yield (7.2%) Real Estate: NCREIF ODCE (5.0%) Absolute Return: HFRI Diversified FOF (10.0%) Real Return: Allocation Specific (8.0%) Private Equity<5Yrs: Actual Performance Private Equity>5Yrs: Russell 3000 Index+3% (10.0%) Cash: Cit Grp 3-mos Treasury Bill (2.2%) <u>Pension Benchmark Composite 09/01/17 to 05/31/18 - Transition Period w/Sliding Targets</u> US Equity: Russell 3000 (23.6%) Non US Equity: MSCI AXCI Ex-US IMI (23.2%) Global Fixed Income: Barclays Universal Index (9.0%) Credit Fixed Income: Barclays US High Yield (9.0%) Real Estate: NCREIF ODCE (5.0%) Absolute Return: HFRI Diversified FOF (10.0%) Real Return<5yrs: Actual Performance	<u>Insurance Benchmark Composite 01/01/16 to 08/31/17</u> US Equity: Russell 3000 (26.5%) Non US Equity: MSCI AXCI Ex-US IMI (26.5%) Global Fixed Income: Barclays Universal Index (6.0%) Credit Fixed Income: Barclays US High Yield (6.0%) Real Estate: NCREIF ODCE (5.0%) Absolute Return: HFRI Diversified FOF (10.0%) Real Return: Allocation Specific (8.0%) Private Equity<5Yrs: Actual Performance Private Equity>5Yrs: Russell 3000 Index+3% (10.0%) Cash: Cit Grp 3-mos Treasury Bill (2.0%) <u>Insurance Benchmark Composite 09/01/17 to 05/31/18 - Transition Period w/Sliding Targets</u> US Equity: Russell 3000 (24.5%) Non US Equity: MSCI AXCI Ex-US IMI (24.5%) Global Fixed Income: Barclays Universal Index (8.0%) Credit Fixed Income: Barclays US High Yield (8.0%) Real Estate: NCREIF ODCE (5.0%) Absolute Return: HFRI Diversified FOF (10.0%) Real Return<5yrs: Actual Performance
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Cash: Cit Grp 3-mos Treasury Bill (2.2%)  
**Pension Benchmark Composite 06/01/18 to Present**  
**US Equity: Russell 3000 (17.0%)**  
**Non US Equity: MSCI AXCI Ex-US IMI (21.0%)**  
**Global Fixed Income: Barclays Universal Index (13.0%)**  
**Credit Fixed Income: Barclays US High Yield (12.4%)**  
**Real Estate: NCREIF ODCE (5.0%)**  
**Absolute Return: HFRI Diversified FOF (10.0%)**  
Real Return<5yrs: Actual Performance  
Real Return>5yrs: CPI+3% (10.0%)  
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\*\*Fund composite benchmark is a roll-up of individual plans, which may differ from one another.

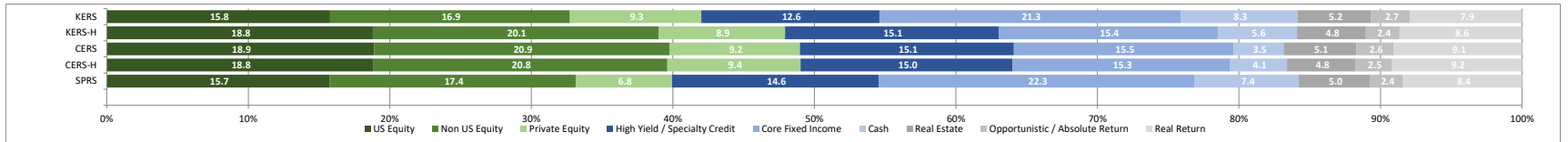
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KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 07/31/19

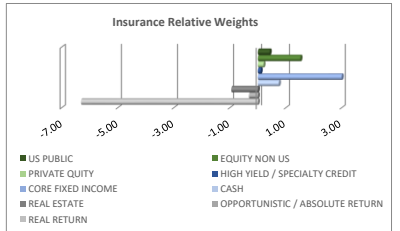
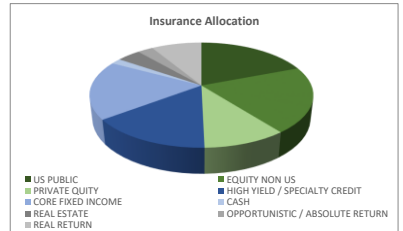
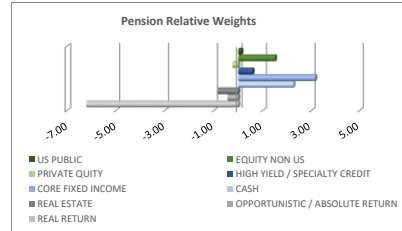
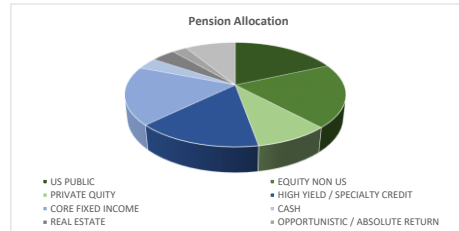
Structure	Benchmark	Inception	Market Value	% of Total	Month		QTD		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
TOTAL FUND	KY Ret. Blended Index	4/1/1984	12,837,040,098.70	100.00	0.41	0.35	0.41	0.35	0.41	0.35	4.81	4.93	8.44	8.16	6.02	6.04	8.32	8.28	5.62	5.68	9.04	9.14
GROWTH			8,060,565,633.81	62.79	0.57	0.57	0.57	0.57	0.57	0.57	4.54	4.54									5.96	5.96
US PUBLIC	KY Domestic Equity Blend	4/1/1984	2,353,046,815.66	18.33	1.36	1.49	1.36	1.49	1.36	1.49	5.64	7.05	12.39	13.11	10.20	10.96	13.31	14.00	6.39	6.79	11.27	11.34
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	7/1/2000	2,530,283,810.25	19.71	-0.81	-1.14	-0.81	-1.14	-0.81	-1.14	-1.77	-2.97	8.46	7.17	3.59	2.32	6.00	5.84			3.09	3.29
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	1,176,166,801.14	9.16	2.23	2.23	2.23	2.23	2.23	2.23	13.78	13.78	13.74	13.74	11.22	11.22	14.05	16.53			11.28	11.55
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield		2,001,068,206.76	15.59	0.45	0.45	0.45	0.45	0.45	0.45	6.41	6.41									6.32	6.32
FIXED INCOME / LIQUIDITY			2,787,572,827.78	21.72	0.14	0.14	0.14	0.14	0.14	0.14	6.15	6.15									5.90	5.90
CORE FIXED INCOME	Bloomberg Barclays US Aggregate		2,317,792,621.43	18.06	0.13	0.22	0.13	0.22	0.13	0.22	6.95	8.08	2.16	2.17	3.08	3.05					3.28	4.00
CASH	Citigroup Treasury Bill-3 Month	1/1/1988	469,780,206.35	3.66	0.21	0.20	0.21	0.20	0.21	0.20	2.38	2.33	1.81	1.42	1.21	0.88	0.89	0.48	2.19	1.75	3.55	3.11
DIVERSIFYING STRATEGIES			1,989,339,078.92	15.50	0.10	0.10	0.10	0.10	0.10	0.10	4.18	4.18									4.82	4.82
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	7/1/1984	533,780,863.74	4.16	0.27	0.00	0.27	0.00	0.27	0.00	7.50	6.55	10.06	7.01	9.43	9.18	9.27	7.73	7.31	7.46	6.17	6.44
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		327,669,296.09	2.56	0.61	0.33	0.61	0.33	0.61	0.33	-0.09	1.92	3.07	3.75	1.79	2.35					3.67	2.95
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	1,127,888,919.09	8.79	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	3.49	3.49	4.22	4.22	2.32	2.32					3.81	2.78

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 07/31/19

Plan	Benchmark	Inception	Market Value	% of Total	Month		3 Months		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
KERS	KY Ret. KERS Plan Index		2,249,960,264.55	100.00	0.49	0.33	1.83	1.75	0.49	0.33	4.92	5.19	7.77	7.67	5.55	5.75	8.09	8.13	5.51	5.60	8.57	9.10
KERS-H	KY Ret. KERS Haz Plan Index		684,544,298.02	100.00	0.40	0.38	1.68	1.69	0.40	0.38	4.64	4.95	8.47	8.34	6.04	5.92	8.33	8.26	5.63	5.67	9.04	9.14
CERS	KY Ret. CERS Plan Index		7,205,212,782.37	100.00	0.38	0.38	1.70	1.69	0.38	0.38	4.71	4.95	8.54	8.35	6.09	5.92	8.35	8.26	5.64	5.67	9.04	9.14
CERS-H	KY Ret. CERS Haz Plan Index		2,415,752,680.74	100.00	0.38	0.38	1.71	1.69	0.38	0.38	4.73	4.95	8.53	8.35	6.13	5.92	8.36	8.26	5.64	5.67	9.05	9.14
SPRS	KY Ret. SPRS Plan Index		281,570,079.98	100.00	0.39	0.33	1.70	1.75	0.39	0.33	4.75	5.08	7.92	7.86	5.39	5.65	8.00	8.12	5.47	5.60	8.95	9.10



Note: The above chart displays the average monthly allocation.

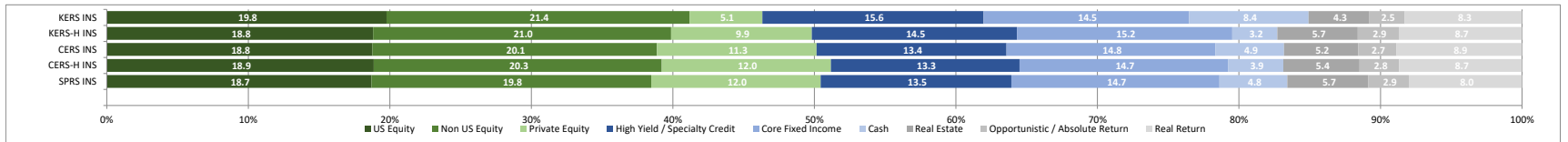


KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 07/31/19

Structure	Benchmark	Inception	Market Value	% of Total	Month		QTD		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
TOTAL FUND	KY Ret. Blended Index	4/1/1987	5,465,197,215.01	100.00	0.34	0.26	0.34	0.26	0.34	0.26	4.56	4.73	8.57	8.35	6.19	6.30	8.30	8.79	5.06	5.34	7.40	7.75
GROWTH		7/1/2018	3,538,268,770.55	64.74	0.45	0.45	0.45	0.45	0.45	0.45	4.21	4.21									5.68	5.68
US PUBLIC	KY Domestic Equity Blend	7/1/1992	1,047,847,088.87	19.17	1.35	1.49	1.35	1.49	1.35	1.49	5.65	7.05	12.40	13.11	10.46	10.96	13.33	13.91	6.58	6.47	9.69	9.62
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	4/1/2000	1,107,727,476.74	20.27	-0.79	-1.14	-0.79	-1.14	-0.79	-1.14	-1.91	-2.97	8.39	7.17	3.47	2.32	5.67	5.66			3.07	2.49
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	557,207,618.57	10.20	1.26	1.26	1.26	1.26	1.26	1.26	12.09	12.09	14.41	14.41	13.69	13.69	15.45	16.57			10.32	11.01
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield		825,486,586.37	15.10	0.44	0.44	0.44	0.44	0.44	0.44	6.30	6.30									5.99	5.99
FIXED INCOME / LIQUIDITY			1,084,826,839.64	19.85	0.15	0.15	0.15	0.15	0.15	0.15	5.99	5.99									5.75	5.75
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	989,361,897.33	18.10	0.13	0.22	0.13	0.22	0.13	0.22	6.93	8.08	2.15	2.17	2.72	3.05					2.94	3.21
CASH	Citigroup Treasury Bill-3 Month	7/1/1992	95,464,942.31	1.75	0.21	0.20	0.21	0.20	0.21	0.20	2.35	2.33	1.56	1.42	1.04	0.88	0.66	0.48	1.93	1.75	2.63	2.50
DIVERSIFYING STRATEGIES		7/1/2018	842,395,665.55	15.41	0.11	0.11	0.11	0.11	0.11	0.11	4.33	4.33									4.85	4.85
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	5/1/2009	221,082,009.87	4.05	0.27	0.00	0.27	0.00	0.27	0.00	7.66	6.55	10.28	7.01	9.65	9.18					9.15	5.98
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		146,310,846.90	2.68	0.61	0.33	0.61	0.33	0.61	0.33	-0.02	1.92	3.04	3.75	1.82	2.35					3.62	2.95
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	475,002,808.78	8.69	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	3.63	3.63	3.88	3.88	2.20	2.20					3.55	2.83

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - PLAN NET RETURNS - 07/31/19

Plan	Benchmark	Inception	Market Value	% of Total	Month		3 Months		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
KERS INS	KY Ins. KERS Plan Index		934,525,871.34	100.00	0.32	0.29	1.40	1.60	0.32	0.29	3.73	4.78	7.92	8.38	5.66	6.05	7.98	8.68	4.91	5.28	7.30	7.72
KERS-H INS	KY Ins. KERS Haz Plan Index		526,615,929.57	100.00	0.33	0.29	1.63	1.60	0.33	0.29	4.52	4.78	8.50	8.42	6.11	6.11	8.28	8.72	5.05	5.30	7.40	7.73
CERS INS	KY Ins. CERS Plan Index		2,482,790,418.35	100.00	0.33	0.29	1.67	1.60	0.33	0.29	4.64	4.80	8.64	8.41	6.26	6.13	8.34	8.73	5.09	5.30	7.42	7.73
CERS-H INS	KY Ins. CERS Haz Plan Index		1,321,766,170.75	100.00	0.33	0.29	1.70	1.60	0.33	0.29	4.72	4.80	8.71	8.41	6.33	6.13	8.38	8.73	5.10	5.30	7.43	7.73
SPRS INS	KY Ins. SPRS Plan Index		199,498,825.85	100.00	0.36	0.29	1.68	1.60	0.36	0.29	4.67	4.80	8.71	8.41	6.29	6.14	8.36	8.73	5.09	5.31	7.42	7.73



Note: The above chart displays the average monthly allocation.