

What's going on in the marketplace?

Global equity markets were strong during the month. Continued economic growth and positive earnings (75% of S&P companies beat estimates) propelled U.S. markets. In addition to generally positive news out of the U.S., hopes for a U.S. and China trade-war truce pushed global developed markets higher. Emerging market equities fell slightly due to weaker economic data out of China. Bond markets declined as rates rose slightly in response to continued caution around global growth.

U.S. Equities

U.S. markets gained approximately 3.8% during the month per the Russell 3000. All market cap segments produced positive returns led by small caps, which earned approximately 4.1%. Large caps returned roughly 3.6% and mid-caps came in just behind, gaining 3.0%. Growth outpaced value by 1.5% (R3000G 4.5%, R3000V 3.0%).

During the month, the KRS U.S. Equity portfolio underperformed the Russell 3000 Index by 16 bps (3.6% vs 3.8%). Relative performance was driven by weakness in the internal factor based portfolio, which tilts towards value and to the smaller portion of the large cap universe. As previously stated, value underperformed growth, and mid-caps were the weaker part of the market. Allocation had little effect on relative performance as the overweight to both small and mid-caps offset one another as the best and worst performing market cap segments, respectively.

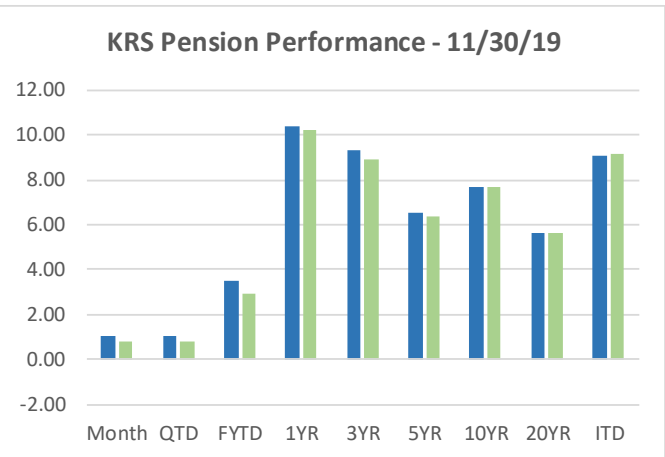
Non-U.S. Equities

Non-U.S. equity markets gained 1.0% for the month per the MSCI ACWI-Ex US Index. Developed markets performed well gaining roughly 1.2%, while emerging markets fell 14 bps. Like in the U.S., growth outperformed value.

The KRS Non-U.S. Equity portfolio gained 1.6% during the month, outpacing the benchmark by roughly 60 bps. Stock selection was good with all active mandates outperforming their respective indices. Both newly funded active emerging market mandates provided positive performance versus the core index return of -0.1%. Allocation decisions had little effect on the period's relative performance.

Fixed Income

The fixed income markets were mixed during the month. The leveraged loan and high yield markets performed well, adding 0.6% and 0.3%, respectively. The intermediate credit and aggregate indices both declined during the month by approximately -0.1%.



The KRS Specialty Credit allocation gained 14 bps during the month. Individual strategy relative performance was mixed. The KRS Core Fixed income portfolio gained 7 bps versus the Bloomberg Barclays Aggregate return of -0.1%. Relative performance was bolstered by the short-term credit mandate, which gained 19 bps.

Alternative Assets

The diversifying strategy group fell -0.2% during the month. Two of the four major portfolio segments provided positive returns, but were not enough to buoy the overall portfolio. The Opportunistic and Absolute Return allocations provided 65

bps and 26 bps, respectively. The Real Return portfolio fell -0.5% and the Real Estate portfolio fell 16 bps. The Private Equity portion of the portfolio dropped 8 bps on the month.

Cash

The Cash portfolio slightly trailed the 3-month T-Bill, returning 13 bps versus 15 bps. This brought the fiscal year return to 0.9%.

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)

Private Equity Composite (Pension) 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) 01/01/16 to Present 100.00% Russell 3000 Index + 3% (Qtr Lag)	Private Equity Composite (Insurance) 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) 01/01/16 to Present 100.00% Russell 3000 Index + 3% (Qtr Lag)
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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 -</u> <u>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 Real Return>5Yrs: CPI+3% (8%)	<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 -</u> <u>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 Real Return>5Yrs: CPI+3% (8%)
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Private Equity<5Yrs: Actual Performance
Private Equity>5Yrs: Russell 3000 Index+3% (10.0%)
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%)
Private Equity<5Yrs: Actual Performance
Private Equity>5Yrs: Russell 3000 Index+3% (9.4%)
Cash: Cit Grp 3-mos Treasury Bill (2.2%)

**Fund composite benchmark is a roll-up of individual plans, which may differ from one another.

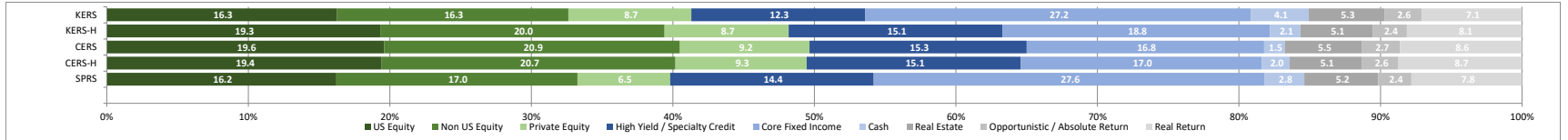
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KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 11/30/19

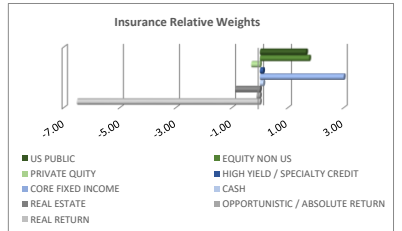
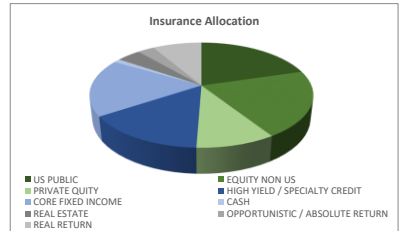
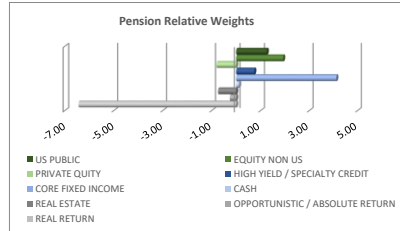
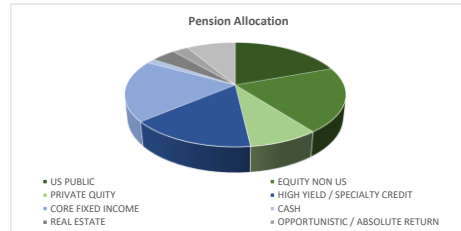
Structure	Benchmark	Inception	Market Value	% of Total	Month		QTD		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
TOTAL FUND	KY Ret. Blended Index	4/1/1984	13,094,108,213.85	100.00	1.00	0.81	2.22	1.93	3.53	2.91	10.40	10.20	9.28	8.93	6.51	6.36	7.70	7.69	5.59	5.62	9.04	9.13
GROWTH		7/1/2018	8,368,857,731.96	63.91	1.62	1.62	3.34	1.93	4.61	2.91	12.16	10.20	9.28	8.93	6.51	6.36	7.70	7.69	5.59	5.62	9.04	9.13
US PUBLIC	KY Domestic Equity Blend	4/1/1984	2,546,716,005.63	19.45	3.64	3.80	5.70	6.04	7.04	7.27	15.07	15.49	13.21	14.22	9.98	10.61	12.88	13.49	6.40	6.84	11.33	11.40
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	7/1/2000	2,634,079,341.31	20.12	1.61	0.99	5.24	4.59	4.02	2.79	13.64	11.07	11.08	9.32	5.39	4.08	5.41	5.15			3.29	3.44
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	1,126,744,225.89	8.60	-0.08	-0.08	0.05	0.05	5.14	5.14	11.33	11.33	14.14	14.14	11.52	11.52	12.96	15.38			11.23	11.36
HIGH YIELD / SPECIALTY CREDIT	High Yield Custom Benchmark	7/1/2017	2,061,318,133.13	15.74	0.14	0.46	0.13	0.37	2.13	1.54	7.42	6.93									5.15	4.45
FIXED INCOME / LIQUIDITY		7/1/2018	2,689,630,479.92	20.54	0.08	0.40	0.13	0.37	1.65	1.54	7.49										5.59	5.59
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	2,491,099,349.69	19.02	0.07	-0.05	0.42	0.25	1.79	2.53	8.60	10.79	3.89	4.10	2.96	3.08					3.37	3.38
CASH	Citigroup Treasury Bill-3 Month	1/1/1988	198,531,130.23	1.52	0.13	0.15	0.29	0.32	0.86	0.86	2.36	2.31	1.86	1.61	1.34	1.02	0.90	0.55	2.13	1.71	3.54	3.10
DIVERSIFYING STRATEGIES		7/1/2018	2,036,147,070.07	15.55	-0.24	0.26			1.85	1.85	7.46										4.94	4.94
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	7/1/1984	558,012,398.16	4.26	-0.16	0.00	1.58	1.58	5.73	0.77	11.53	5.46	11.20	6.61	10.15	8.76	10.58	8.87	7.97	7.35	6.27	6.40
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		357,823,353.92	2.74	0.26	0.53	0.61	0.78	0.18	-0.05	0.02	4.40	2.54	3.47	1.91	2.32					3.49	2.80
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	1,120,311,317.99	8.56	-0.48	-0.48	-0.59	-0.59	0.07	0.07	7.13	7.13	4.51	4.51	2.66	2.66					3.68	2.69

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 11/30/19

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		2,282,435,806.60	100.00	0.86	0.73	2.99	2.75	3.32	2.75	9.61	9.96	8.49	8.38	5.95	6.13	7.44	7.52	5.47	5.54	8.97	9.08
KERS-H	KY Ret. KERS Haz Plan Index		705,110,357.69	100.00	1.01	0.87	3.60	3.26	3.52	3.00	10.31	10.33	9.30	9.14	6.56	6.35	7.71	7.67	5.60	5.62	9.05	9.13
CERS	KY Ret. CERS Plan Index		7,342,314,793.63	100.00	1.04	0.87	3.72	3.26	3.56	3.00	10.51	10.33	9.40	9.14	6.60	6.33	7.73	7.67	5.61	5.62	9.05	9.12
CERS-H	KY Ret. CERS Haz Plan Index		2,475,755,417.87	100.00	1.03	0.87	3.67	3.26	3.51	3.00	10.48	10.33	9.38	9.14	6.62	6.33	7.74	7.67	5.61	5.62	9.05	9.12
SPRS	KY Ret. SPRS Plan Index		288,491,856.78	100.00	0.87	0.73	3.15	2.75	3.35	2.75	9.91	9.96	8.66	8.59	5.86	6.04	7.37	7.51	5.43	5.54	8.95	9.08



Note: The above chart displays the average monthly allocation.

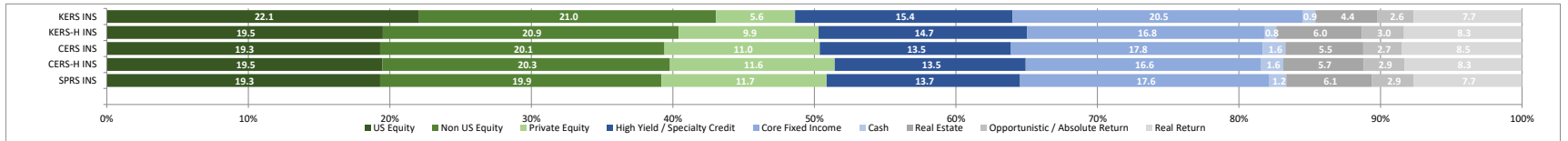


KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 11/30/19

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	5,642,299,441.44	100.00	1.05	0.86	2.34	2.06	3.52	2.88	10.31	10.16	9.43	9.17	6.68	6.63	7.56	8.02	5.06	5.33	7.43	7.76
GROWTH	Growth Custom Benchmark	7/1/2018	3,707,326,658.72	65.71	1.62	1.25	3.36	3.32	4.40	4.35	11.86	11.47									7.20	8.06
US PUBLIC	KY Domestic Equity Blend	7/1/1992	3,150,983,714.40	20.40	3.63	3.80	5.69	6.04	7.01	7.27	15.01	15.49	13.21	14.22	10.21	10.61	12.77	13.32	6.65	6.58	9.79	9.72
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	4/1/2000	1,157,448,072.58	20.51	1.62	0.99	5.28	4.59	4.02	2.79	13.46	11.07	10.93	9.32	5.28	4.08	5.12	5.02			3.27	2.65
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	546,562,821.17	9.69	-0.08	-0.08	0.04	0.04	3.66	3.66	9.96	9.96	14.86	14.86	13.58	13.58	14.35	15.41			10.26	10.83
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield	7/1/2017	852,332,050.57	15.11	0.10	0.46	0.06	0.37	2.03	1.54	7.13	6.93									5.83	4.45
FIXED INCOME / LIQUIDITY		7/1/2018	1,062,778,169.53	18.84	0.08	0.42			1.70	1.70	7.37										5.51	5.51
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	999,427,340.77	17.71	0.08	-0.05	0.44	0.25	1.77	2.53	8.55	10.79	3.87	4.10	2.95	3.08					3.05	3.38
CASH	Citigroup Treasury Bill-3 Month	7/1/1992	63,350,828.76	1.12	0.13	0.15	0.29	0.32	0.86	0.88	2.31	2.31	1.73	1.61	1.16	1.02	0.72	0.55	1.89	1.71	2.62	2.49
DIVERSIFYING STRATEGIES		7/1/2018	872,552,396.52	15.46	-0.13	0.55			2.16	2.16	7.70										5.18	5.18
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	5/1/2009	232,370,483.75	4.12	-0.01	0.00	1.53	1.53	5.84	0.77	11.75	5.46	11.45	6.61	10.28	8.76					9.41	5.86
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		162,450,274.64	2.88	0.27	0.53	0.63	0.78	0.22	-0.05	0.09	4.40	2.57	3.47	1.95	2.32					3.45	2.80
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	477,731,638.13	8.47	-0.38	-0.38	-0.07	-0.07	0.54	0.54	7.37	7.37	4.43	4.43	2.62	2.62					3.49	2.80

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - PLAN NET RETURNS - 11/30/19

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		983,469,094.70	100.00	1.16	0.88	3.69	3.27	3.38	2.93	9.79	10.22	8.69	9.17	6.14	6.40	7.24	7.91	4.90	5.27	7.33	7.72
KERS-H INS	KY Ins. KERS Haz Plan Index		538,564,333.78	100.00	1.05	0.88	3.69	3.27	3.46	2.93	10.22	10.22	9.34	9.24	6.59	6.46	7.54	7.94	5.05	5.29	7.42	7.73
CERS INS	KY Ins. CERS Plan Index		2,557,942,703.93	100.00	1.02	0.88	3.64	3.27	3.51	2.93	10.32	10.22	9.51	9.23	6.75	6.49	7.61	7.95	5.08	5.29	7.44	7.74
CERS-H INS	KY Ins. CERS Haz Plan Index		1,356,675,096.58	100.00	1.03	0.88	3.67	3.27	3.52	2.93	10.39	10.22	9.59	9.23	6.82	6.49	7.64	7.95	5.10	5.29	7.45	7.74
SPRS INS	KY Ins. SPRS Plan Index		205,648,213.53	100.00	1.03	0.88	3.64	3.27	3.54	2.93	10.35	10.22	9.58	9.23	6.79	6.51	7.63	7.96	5.09	5.30	7.45	7.74



Note: The above chart displays the average monthly allocation.