

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

Global equity markets continued their 2019 rise during the month despite investors being pulled in two directions. Investors were faced with weighing the potential slowing global growth versus accommodative central banks. Dovish signals from the Fed combined with the hopes of a trade deal between the U.S. and China pushed the markets higher. Bond yields declined in the face of rising equity markets, causing a rise in fixed income markets.

### U.S. Equities

U.S. equity markets gained roughly 1.5% during the month per the Russell 3000. Large caps returned to lead the market after underperforming their small cap counterparts during the first two months of 2019. Large caps returned nearly 2%, while both mid-caps (-0.6%) and small caps (-2.1%) lost ground during the month. Again, growth outpaced value, this time by nearly 215 bps (R3000G 2.5%, R3000V 0.4%).

The KRS U.S. Equity portfolio underperformed the Russell 3000 Index by 45 basis points during the month (1.0% vs 1.5%). The portfolio's relative performance was driven by both stock selection and allocation decisions. From a stock selection perspective, the all cap growth and small cap strategies trailed their respective indices. The internal factor based portfolio trailed the S&P 500 by 84 bps, which has more to do with its tilts toward value and smaller in terms of market cap (see above). From an allocation perspective, the previous comment holds true for the portfolio in general.

### Non-U.S. Equities

Non-U.S. equities provided gaining just over 0.5% per the MSCI ACWI Ex-U.S. Emerging markets outpaced developed markets by roughly 30bps, while growth outperformed value for the period.

The KRS Non-U.S. Equity portfolio outpaced the index by 15 basis points during the month (0.7% vs 0.5%). Stock selection was primarily responsible for the relative outperformance as three of the four active large cap managers either met or outperformed their index. The small cap allocation also outperformed its index. Allocation decisions had little impact on relative performance.

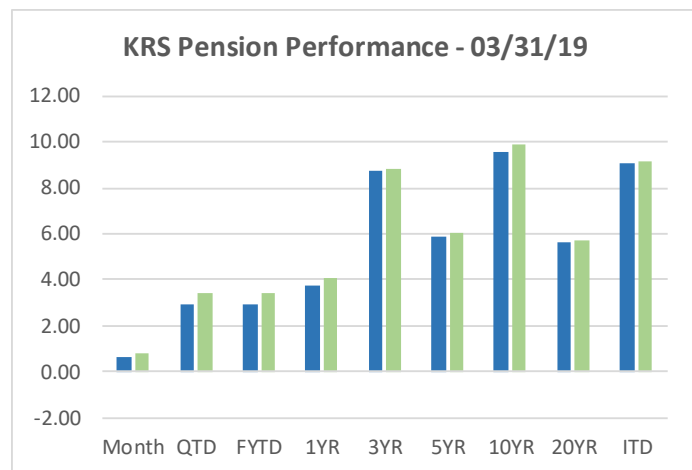
### Fixed Income

The fixed income market performed well during the month. The Aggregate and intermediate credit portions of the market led the way, returning 1.9% and 1.6%, respectively. The high yield market returned just over 0.9% for the period. The only real negative return came from the leveraged loan portion of the market, which lost close to 20 bps.

The KRS specialty credit allocation performed well, returning 0.8%. Results were mixed amongst individual mandates with respect to relative performance. The KRS core portion of the portfolio performed well, providing an absolute return of 142 bps.

### Alternative Assets

The diversifying strategy group gained 1.4% during the period. The Real Return portfolio earned 1.6% during the month, and was the strongest segment of the market. The Real Estate and Opportunistic portfolios added 131 bps and 95 bps,



respectively. The Absolute Return allocation gained 0.6%. The Private Equity portion of the portfolio lost ground, returning -2.89%; however, it's important to note that the asset class is reported on a lag reflecting performance during a turbulent fourth quarter last year.

## Cash

The cash portfolio performed inline during the month (0.2% vs 0.2%). The cash allocation finished the period above target (4.0%) in part due to the continued transitioning of assets to the newly approved asset allocation.

### 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 -</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	<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
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Real Return>5yrs: CPI+3% (8%)  
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%)  
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\*\*Fund composite benchmark is a roll-up of individual plans, which may differ from one another.

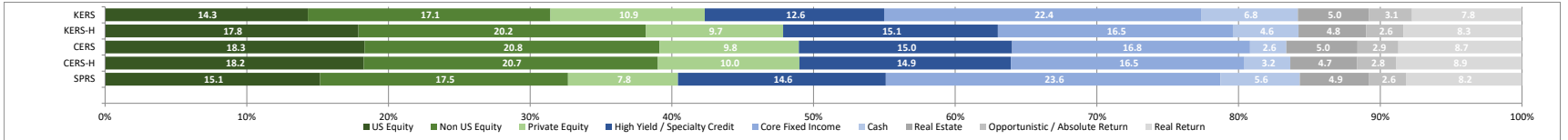
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KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 03/31/19

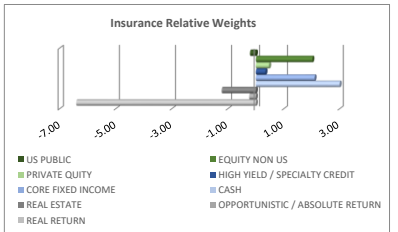
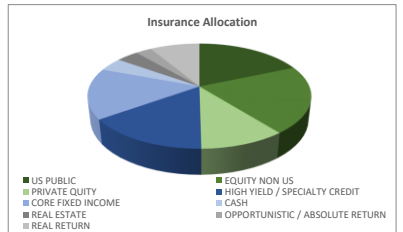
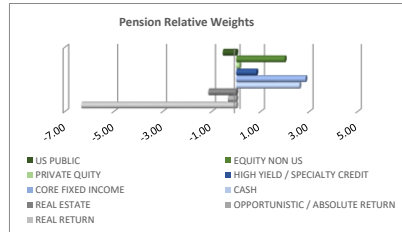
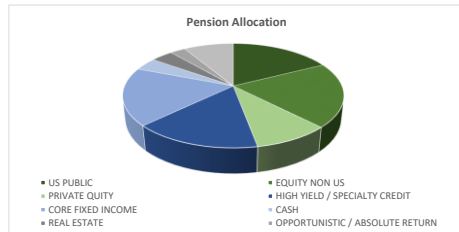
Structure	Benchmark	Inception	Market Value	% of Total	Month		QTD		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
TOTAL FUND	KY Ret. Blended Index	4/1/1984	12,446,404,032.22	100.00	0.61	0.82	6.09	6.93	2.92	3.38	3.73	4.09	8.70	8.78	5.91	6.06	9.59	9.90	5.61	5.69	9.03	9.14
GROWTH			7,825,896,922.95	62.88	0.23		7.80		2.48												2.48	
US PUBLIC	KY Domestic Equity Blend	4/1/1984	2,184,088,621.12	17.55	1.01	1.54	14.25	14.04	3.33	4.70	7.69	8.77	12.65	13.49	9.42	10.36	15.18	16.04	6.56	6.75	11.21	11.28
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	7/1/2000	2,499,438,141.89	20.08	0.69	0.46	11.14	10.30	-2.12	-2.42	-3.88	-4.96	8.78	8.21	3.64	2.85	9.32	9.31			3.01	3.26
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	1,173,707,359.06	9.43	-2.89	-2.89	-1.99	-1.99	7.84	7.84	10.64	10.64	12.01	12.01	10.82	10.82	12.63	17.27			11.15	10.60
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield		1,969,662,800.88	15.82	0.76		3.69		4.47												5.95	
FIXED INCOME / LIQUIDITY			2,729,633,139.48	21.93	1.22		2.43		3.89												3.89	
CORE FIXED INCOME	Bloomberg Barclays US Aggregate		2,233,243,631.96	17.94	1.42	1.92	2.79	3.01	4.35	4.65	4.40	4.48	2.23	2.03	2.90	2.72					2.98	3.11
CASH	Citigroup Treasury Bill-3 Month	1/1/1988	496,389,507.52	3.99	0.23	0.21	0.63	0.60	1.71	1.67	2.16	2.11	1.62	1.17	1.05	0.74	0.82	0.41	2.23	1.79	3.56	3.82
DIVERSIFYING STRATEGIES			1,891,169,051.87	15.19	1.36		4.41		3.41												3.41	
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	7/1/1984	480,679,397.47	3.86	1.31	1.52	1.83	1.52	7.04	5.29	9.49	7.36	10.07	7.27	9.51	9.41	9.07	6.01	7.41	7.55	6.18	6.47
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		331,767,161.92	2.66	0.59	0.75	0.98	4.26	-0.06	0.05	0.50	0.75	3.74	3.87	2.07	2.11					3.79	2.82
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	1,078,722,492.48	8.67	1.61	1.61	6.78	6.78	2.91	2.91	3.13	3.13	6.05	6.05	2.80	2.80					3.72	2.65

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 03/31/19

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		2,106,573,358.38	100.00	0.36	0.95	5.13	6.59	3.07	3.64	3.75	4.38	7.95	8.25	5.49	5.74	9.38	9.76	5.51	5.63	8.97	9.10
KERS-H	KY Ret. KERS Haz Plan Index		666,103,682.38	100.00	0.61	0.79	6.15	7.01	2.81	3.34	3.61	4.06	8.67	8.93	5.93	5.94	9.61	9.87	5.62	5.68	9.03	9.14
CERS	KY Ret. CERS Plan Index		7,040,510,801.54	100.00	0.66	0.79	6.29	7.01	2.83	3.34	3.65	4.06	8.84	8.96	5.97	5.93	9.62	9.87	5.62	5.68	9.03	9.14
CERS-H	KY Ret. CERS Haz Plan Index		2,361,381,877.55	100.00	0.68	0.79	6.30	7.01	2.85	3.34	3.70	4.06	8.82	8.95	6.01	5.93	9.63	9.87	5.63	5.68	9.04	9.14
SPRS	KY Ret. SPRS Plan Index		271,834,309.86	100.00	0.65	0.95	5.61	6.59	2.97	3.53	3.65	4.20	8.12	8.50	5.32	5.70	9.30	9.75	5.47	5.62	8.94	9.10



Note: The above chart displays the average monthly allocation.

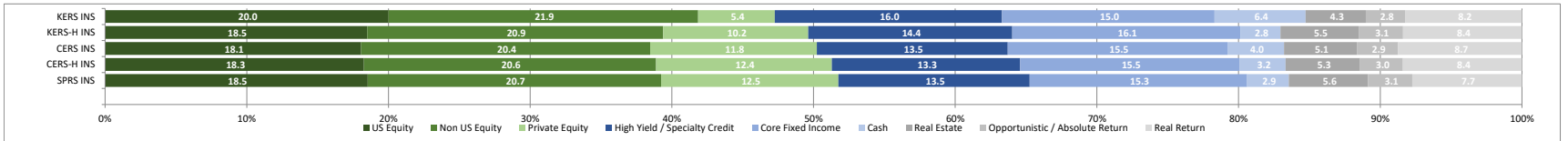


KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 03/31/19

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	5,285,233,200.23	100.00	0.71	0.92	6.20	7.04	2.77	3.26	3.75	4.14	8.93	9.04	6.07	6.37	10.17	10.99	5.12	5.42	7.38	7.74
GROWTH		7/1/2018	3,441,701,890.94	65.12	0.44		7.92		2.33												2.33	
US PUBLIC	KY Domestic Equity Blend	7/1/1992	979,743,432.02	18.54	1.02	1.46	14.20	14.04	3.36	4.7	7.64	8.77	12.70	13.49	9.64	10.36	15.13	15.87	6.62	6.53	9.59	9.52
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	4/1/2000	1,097,626,761.17	20.77	0.64	0.54	11.03	10.30	-2.23	-2.42	-4.08	-4.96	8.63	8.21	3.51	2.85	8.91	9.03			3.00	2.45
PRIVATE QUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	553,547,714.26	10.47	-1.39	-1.39	-0.73	-0.73	7.37	7.37	12.30	12.30	13.72	13.72	13.61	13.61	15.02	17.21			10.24	10.06
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield		810,783,983.49	15.34	0.76		3.29		4.37												5.57	
FIXED INCOME / LIQUIDITY		7/1/2018	1,044,332,538.09	19.76	1.16		2.33		3.82												3.82	
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	824,249,388.74	15.60	1.42	1.92	2.76	2.94	4.33	4.65	4.29	4.48	2.20	2.03	2.54	2.74					2.63	2.92
CASH	Citigroup Treasury Bill-3 Month	7/1/1992	220,083,149.35	4.16	0.19	0.21	0.61	0.60	1.68	1.67	2.14	2.11	1.33	1.17	0.89	0.72	0.59	0.41	1.96	1.79	2.63	2.50
DIVERSIFYING STRATEGIES		7/1/2018	799,398,473.01	15.13	1.32		4.12		3.39												3.39	
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index	5/1/2009	199,547,018.67	3.78	1.44	1.52	1.95	1.52	7.19	5.29	9.62	7.36	10.28	7.27	9.73	9.41					9.26	6.06
OPPORTUNISTIC / ABSOLUTE RETURN	HFRI Diversified		145,755,100.21	2.76	0.59	0.75	0.99	4.26	0.01	0.05	0.55	0.75	3.75	3.87	2.10	2.11					3.74	2.82
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	454,096,354.13	8.59	1.48	1.48	6.14	6.14	2.77	2.77	2.84	2.84	5.54	5.54	2.65	2.65					3.45	2.70

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - PLAN NET RETURNS - 03/31/19

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		888,137,723.91	100.00	0.65	1.08	6.53	6.96	2.20	3.34	2.89	4.11	8.37	9.16	5.57	6.09	9.87	10.87	4.97	5.36	7.28	7.71
KERS-H INS	KY Ins. KERS Haz Plan Index		515,569,265.41	100.00	0.70	0.78	6.17	6.69	2.71	3.31	3.64	4.23	8.87	9.16	5.99	6.15	10.16	10.90	5.11	5.38	7.37	7.72
CERS INS	KY Ins. CERS Plan Index		2,400,880,317.47	100.00	0.73	0.92	6.12	7.04	2.83	3.26	3.86	4.18	9.00	9.11	6.14	6.17	10.22	10.91	5.14	5.38	7.39	7.72
CERS-H INS	KY Ins. CERS Haz Plan Index		1,287,187,580.23	100.00	0.73	0.92	6.12	7.04	2.87	3.26	3.82	4.18	9.05	9.11	6.20	6.17	10.25	10.91	5.16	5.38	7.40	7.72
SPRS INS	KY Ins. SPRS Plan Index		193,458,308.83	100.00	0.67	0.92	6.09	7.04	2.83	3.26	3.86	4.18	9.04	9.10	6.16	6.18	10.24	10.92	5.15	5.39	7.40	7.72



Note: The above chart displays the average monthly allocation.