

**What’s going on in the marketplace?**

February was a tale of two stories. During the first part of the month, equity markets provided good returns as global growth seemed to be stabilizing and earnings looked optimistic. However, the coronavirus that began in China spread to other countries and created the fear of a potential global slowdown. In response, global equity markets tumbled as investors turned to safety in higher quality bonds.

**The KRS investment portfolio fell -3.32% versus the benchmark drop of -3.41%.**

The portfolio benefited from solid relative performance from its investments in the Specialty Credit, Absolute Return, and Non-U.S. Equity asset classes. In addition, the portfolio’s underweight to Real Return combined with its overweight to Core Fixed Income aided the overall investment portfolio’s performance. The portfolio’s relative outperformance was tempered by weak selection in the Core Fixed Income and U.S. Equity segments, combined with an overweight to public equities, which were weak during the period.

**U.S. Equities**

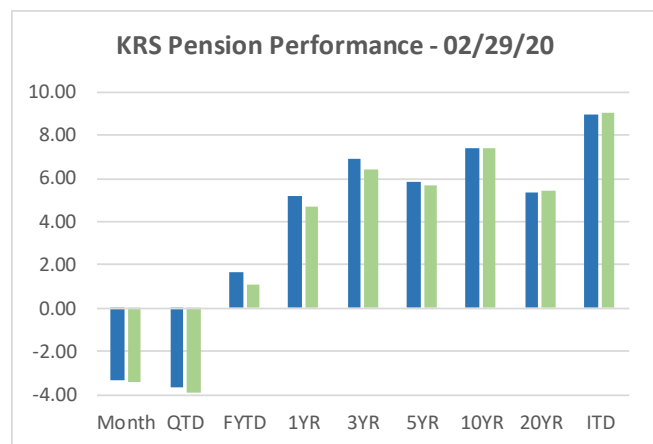
U.S. markets were significantly weaker during the month, falling -8.2% (per the Russell 3000). All market cap segments lost ground; ranging from large caps losing -8.2% to mid-caps falling -9.5%. Growth once again significantly outpaced value by nearly 285 bps (R3000G -6.8%, R3000V -9.7%).

During the month, the KRS U.S. Equity portfolio trailed the Russell 3000 Index by 26 bps. From a stock selection perspective, relative performance of the individual mandates were mixed; however, the net effect was that of a headwind. Allocation positioning also hampered relative performance. Not in terms of sizing, but in terms of style expressed through a slight value tilt in the portfolio.

**Non-U.S. Equities**

Non-U.S. equity markets fell -8.1% for the month per the MSCI ACWI-Ex US Index. Emerging markets (-5.3%) held up better than their developed market counterparts which dropped -8.9%. In general, growth outpaced value in both developed and emerging countries.

The KRS Non-U.S. Equity portfolio lost -7.9% during the month; however, it did provide 18 bps of downside protection versus the benchmark. Stock selection was the primary driver of relative outperformance as three of the four active MSCI ACWI Ex-US mandates outpaced their respective benchmarks. The active emerging market portfolios split in terms of relative performance along style lines, which was not a surprise. The small cap piece of the portfolio provided 91 bps of downside protection over its index. Allocation decisions had little effect on the period’s relative performance.



**Fixed Income**

The fixed income markets were mixed during the period. Investors flocked to safety, driving the core fixed income segment of the market higher. The U.S. Aggregate gained 1.8% and the U.S. Intermediate Credit Index returned just over 1.0%. The

Specialty Credit market was more challenged. The U.S. Corporate High Yield and Leveraged Loan markets fell -1.4% and -1.3%, respectively. However, the U.S. Universal Index gained 1.5% during the month.

The KRS Specialty Credit allocation fell -0.2%, and provided 115 bps of downside protection over the blended index. Individual strategy relative performance was mixed. The KRS Core Fixed Income allocation trailed the Bloomberg Barclays Aggregate (1.8%) by 87 bps. Relative underperformance can be attributed to allocation, as the U.S. Corporate 1-3 year investments returned 0.3%.

### Alternative Assets

The diversifying strategy group lost -1.8% during the month; relative performance of the individual sub asset classes was mixed. The Opportunistic portfolio earned 0.6%, while the Real Estate portfolio was relatively flat, falling just -9 bps. The Absolute Return portfolio lost -34 bps; however, its index returned -1.5% during the period. The Real Return portfolio struggled as it fell -3.3%, this was driven by a few investments, most notably in the MLP space, which dropped 11.0%. The Private Equity portion of the portfolio gained 27 bps during the month.

### Cash

The Cash portfolio outpaced the 3-month T-Bill, returning 21 bps versus 13 bps.

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#### 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	<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
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Private Equity>5Yrs: Russell 3000 Index+3% (10.0%)  
Cash: Cit Grp 3-mos Treasury Bill (2.2%)  
Pension Benchmark Composite 09/01/17 to 05/31/18 -  
Transition Period w/Sliding Targets  
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%)  
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.

Private Equity>5Yrs: Russell 3000 Index+3% (10.0%)  
Cash: Cit Grp 3-mos Treasury Bill (2.0%)  
Insurance Benchmark Composite 09/01/17 to 05/31/18 -  
Transition Period w/Sliding Targets  
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%)  
Private Equity<5Yrs: Actual Performance  
Private Equity>5Yrs: Russell 3000 Index+3% (10.0%)  
Cash: Cit Grp 3-mos Treasury Bill (2.0%)

**Insurance Benchmark Composite 06/01/18 to Present**

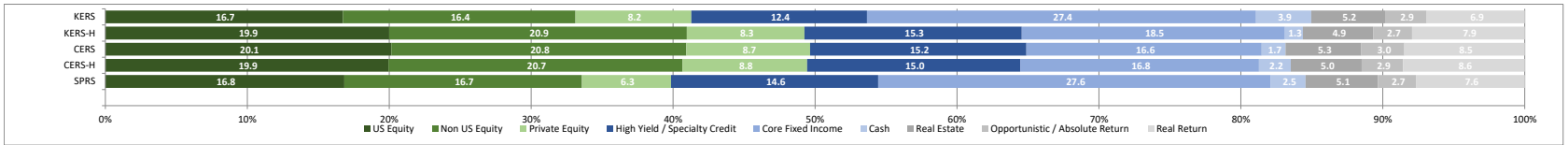
**US Equity: Russell 3000 (17.9%)**  
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**Global Fixed Income: Barclays Universal Index (13.0%)**  
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**Private Equity>5Yrs: Russell 3000 Index+3% (9.2%)**  
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KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 02/29/20

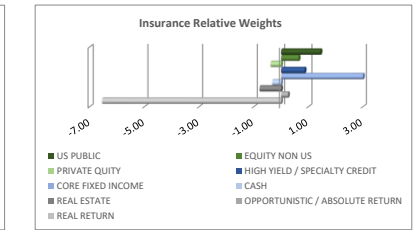
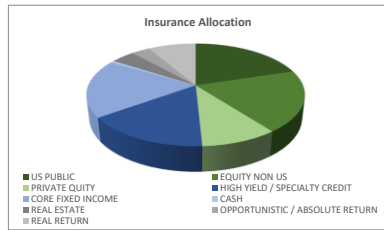
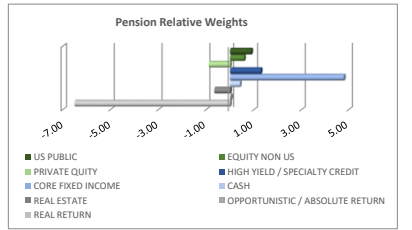
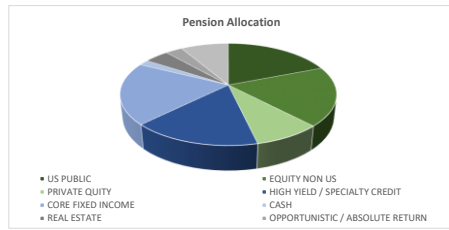
Structure	Benchmark	Inception	Market Value	% of Total	Month		QTD		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
					KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark	KRS	Benchmark
TOTAL FUND	KY Ret. Blended Index	4/1/1984	12,871,370,484.44	100.00	-3.32	-3.41	-3.66	-3.90	1.67	1.10	5.18	4.73	6.89	6.44	5.87	5.66	7.39	7.42	5.36	5.41	8.92	9.01
GROWTH	Growth Custom Benchmark	7/1/2018	8,062,672,300.06	62.64	-5.09	-5.94	-5.94	-5.94	0.86	0.86	4.44	4.44	6.89	6.44	5.87	5.66	7.39	7.42	5.36	5.41	8.92	9.01
PUBLIC EQUITY	Global Equity Blended Index	4/1/1984	4,873,042,198.63	37.86	-8.17	-8.13	-9.30	-9.43	-1.09	-1.40	3.49	3.00	7.04	6.75	5.56	5.34	8.12	8.22	4.37	4.46	10.17	10.01
US PUBLIC	KY Domestic Equity Blend	4/1/1984	2,455,267,483.68	19.08	-8.45	-8.19	-8.87	-8.29	0.38	1.22	5.69	6.50	8.34	9.28	7.97	8.72	11.83	12.52	5.87	6.38	11.05	11.14
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	7/1/2000	2,417,774,714.95	18.78	-7.90	-8.08	-9.71	-10.60	-2.43	-4.05	1.46	-0.89	6.12	4.11	3.70	2.36	4.88	4.71			2.91	3.03
PRIVATE EQUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	1,094,790,520.34	8.51	0.27	0.27	-1.48	-1.48	4.93	4.93	5.36	5.36	13.30	13.30	11.30	11.30	12.78	15.88			11.05	11.66
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield	7/1/2017	2,094,839,581.09	16.28	-0.22	-1.37	0.21	-1.08	3.27	2.25	6.39	4.79									6.00	4.30
FIXED INCOME / LIQUIDITY	Bloomberg Barclays US Aggregate	7/1/2018	2,766,457,355.07	21.49	0.86	1.97	3.91	3.91			7.58										6.12	
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	2,534,071,155.65	19.69	0.93	1.80	2.14	3.76	4.21	6.30	8.46	11.68	4.30	5.01	3.32	3.58					3.61	3.81
CASH	Citigroup Treasury Bill-3 Month	1/1/1988	232,386,199.42	1.81	0.21	0.13	0.35	0.26	1.71	1.29	2.60	2.12	2.09	1.71	1.50	1.10	0.97	0.58	2.10	1.66	3.53	3.09
DIVERSIFYING STRATEGIES	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index*	7/1/2018	2,042,699,650.81	15.87	-1.79	0.00	1.20	0.00	1.82	4.92	4.64	2.12	2.09	1.71	1.50	1.10	0.97	0.58	2.10	1.66	4.17	3.09
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index*	7/1/1984	556,209,781.12	4.34	-0.09	0.00	1.20	0.00	8.17	1.96	11.39	6.64	11.24	6.34	10.42	8.36	10.48	9.84	7.98	7.26	6.30	6.39
OPPORTUNISTIC / ABSOLUTE R	HFRF Diversified	7/1/2011	391,871,026.56	3.04	-0.34	-1.53	-0.50	-1.03	0.40	0.85	0.50	3.29	1.99	2.84	1.77	2.13					3.42	2.83
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	1,092,618,843.13	8.49	-3.30	-3.30	-4.02	-4.02	-1.62	-1.62	2.01	2.01	2.45	2.45	2.50	2.50					3.37	2.41

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 02/29/20

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		2,306,784,817.83	100.00	-2.72	-2.91	-1.16	-1.24	2.13	1.48	5.13	5.21	6.57	6.31	5.49	5.60	7.21	7.32	5.27	5.36	8.87	8.98
KERS-H	KY Ret. KERS Haz Plan Index		695,218,992.60	100.00	-3.52	-3.52	-1.98	-1.88	1.46	1.08	4.94	4.71	6.83	6.56	5.88	5.66	7.39	7.40	5.36	5.40	8.92	9.00
CERS	KY Ret. CERS Plan Index		7,164,177,525.71	100.00	-3.48	-3.52	-1.95	-1.88	1.54	1.08	5.14	4.71	6.91	6.55	5.92	5.64	7.41	7.40	5.37	5.40	8.93	9.00
CERS-H	KY Ret. CERS Haz Plan Index		2,417,265,301.49	100.00	-3.46	-3.52	-2.01	-1.88	1.43	1.08	5.04	4.71	6.88	6.55	5.93	5.64	7.41	7.40	5.37	5.40	8.93	9.00
SPRS	KY Ret. SPRS Plan Index		287,923,846.79	100.00	-2.79	-2.91	-1.16	-1.24	2.15	1.48	5.54	5.21	6.61	6.37	5.67	5.70	7.13	7.31	5.23	5.35	8.85	8.98



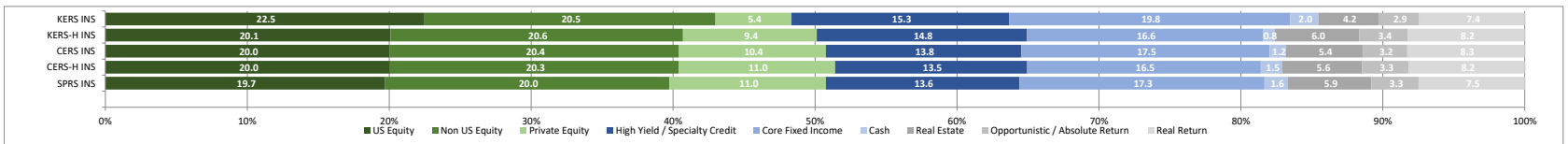
Note: The above chart displays the average monthly allocation.



KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 02/29/20

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	5,532,720,717.06	100.00	-3.45	-3.45	-3.91	-4.08	1.38	0.88	4.99	4.61	6.90	6.57	5.97	5.87	7.24	7.79	4.84	5.05	7.30	7.63
GROWTH	Growth Custom Benchmark	7/1/2018	3,599,061,491.32	65.05	-5.15	-4.57	-6.16	-5.14	0.40	1.95	4.17	6.47	6.90	6.57	5.97	5.87	7.24	7.79	4.84	5.05	7.30	7.63
PUBLIC EQUITY	Global Equity Blended Index	7/1/1992	2,189,991,808.79	39.58	-8.25	-8.13	-9.35	-9.44	-1.16	-1.42	3.35	2.97	6.92	6.73	5.63	5.35	8.00	8.11	4.67	4.34	8.33	8.12
US PUBLIC	KY Domestic Equity Blend	7/1/1992	1,116,990,812.79	20.19	-8.53	-8.19	-8.94	-8.29	0.27	1.22	5.59	6.50	8.30	9.28	8.16	8.72	11.81	12.43	6.15	6.04	9.44	9.39
EQUITY NON US	KY Ret.Int'l Eq. Blended Index	4/1/2000	1,073,000,996.00	19.39	-7.97	-8.08	-9.76	-10.60	-2.48	-4.05	1.33	-0.89	5.95	4.11	3.58	2.36	4.58	4.61			2.89	2.26
PRIVATE EQUITY	Russell 3000 + 3%(Qtr Lag)	7/1/2002	531,417,976.33	9.61	0.37	0.37	-2.62	-2.62	2.12	2.12	4.00	4.00	13.42	13.42	13.01	13.01	13.87	15.97			10.02	11.14
HIGH YIELD / SPECIALTY CREDIT	Bloomberg Barclays US High Yield	7/1/2017	877,651,706.20	15.86	-0.19	-1.37	0.28	-1.08	3.19	2.25	6.29	4.79									5.72	4.30
FIXED INCOME / LIQUIDITY	Bloomberg Barclays US Aggregate	7/1/2018	1,053,125,411.32	19.03	0.85	1.99	3.97	3.97			7.47										6.06	
CORE FIXED INCOME	Bloomberg Barclays US Aggregate	7/1/2013	1,015,903,056.45	18.36	0.91	1.80	2.11	3.76	4.17	6.3	8.42	11.68	4.32	5.01	3.31	3.58					3.29	3.81
CASH	Citigroup Treasury Bill-3 Month	7/1/1992	37,222,354.87	0.67	0.13	0.13	0.26	0.26	1.27	1.29	2.09	2.12	1.82	1.71	1.23	1.10	0.76	0.58	1.86	1.66	2.61	2.48
DIVERSIFYING STRATEGIES	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index*	7/1/2018	880,832,806.74	15.92	-1.53	0.00	1.15	0.00	2.37	5.48	5.48	4.64	11.35	6.34	10.48	8.36					4.52	
REAL ESTATE	NCREIF NFI-ODCE Net 1 Qtr in Arrears Index*	5/1/2009	232,986,982.42	4.21	-0.09	0.00	1.42	0.00	8.28	1.96	11.66	6.64	11.35	6.34	10.48	8.36					9.41	5.83
OPPORTUNISTIC / ABSOLUTE R	HFRF Diversified	7/1/2011	180,232,992.09	3.25	-0.36	-1.53	-0.53	-1.03	0.38	0.85	0.49	3.29	2.00	2.84	1.79	2.13					3.38	2.83
REAL RETURN	Pension Real Return Custom Benchmark	7/1/2011	467,610,832.23	8.45	-2.87	-2.87	-3.43	-3.43	-0.79	-0.79	2.79	2.79	2.64	2.64	2.53	2.53					3.23	2.56

Plan	Benchmark	Inception	Market Value	% of Total	Month		3 Months		Fiscal YTD		1 Year		3 Years		5 Years		10 Years		20 Years		ITD	
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KERS INS	KY Ins. KERS Plan Index		975,928,964.67	100.00	-3.68	-3.45	-2.05	-1.95	1.27	0.93	4.67	4.68	6.14	6.46	5.44	5.67	6.92	7.68	4.68	5.00	7.20	7.60
KERS-H INS	KY Ins. KERS Haz Plan Index		524,592,559.10	100.00	-3.40	-3.45	-2.01	-1.95	1.38	0.93	4.98	4.68	6.81	6.59	5.89	5.74	7.23	7.71	4.83	5.02	7.30	7.61
CERS INS	KY Ins. CERS Plan Index		2,507,296,967.72	100.00	-3.43	-3.45	-2.08	-1.95	1.35	0.93	4.96	4.68	6.99	6.62	6.03	5.77	7.29	7.72	4.86	5.02	7.31	7.61
CERS-H INS	KY Ins. CERS Haz Plan Index		1,323,499,462.71	100.00	-3.35	-3.45	-2.07	-1.95	1.38	0.93	5.03	4.68	7.07	6.63	6.11	5.77	7.32	7.72	4.88	5.02	7.32	7.61
SPRS INS	KY Ins. SPRS Plan Index		201,402,761.99	100.00	-3.27	-3.45	-1.93	-1.95	1.54	0.93	5.11	4.68	7.12	6.63	6.11	5.78	7.32	7.73	4.88	5.02	7.32	7.61



Note: The above chart displays the average monthly allocation.