

What’s going on in the marketplace?

Global equity markets fell during the month of October driven by continued fear of rising Covid-19 infection rates, re-imposed restrictions and partial lockdowns, and the potential ramifications these might have on a global economic recovery. Despite generally positive economic news in the U.S., domestic equity markets slightly underperformed their international counterparts on uncertainty regarding fiscal stimulus negotiations and upcoming elections. U.S. bonds sold off as Treasury yields rose, and global bonds remained roughly flat.

The KRS investment portfolio returned -0.5% versus the benchmark of -0.7%.

The portfolio benefitted from relative outperformance provided by several asset classes, especially within the Core Fixed Income, U.S. Equity, Specialty Credit, and Absolute Return segments of the portfolio. Further, the significant underweight to the Real Return bucket was beneficial. Offsetting some of this relative outperformance was weakness in the Non-U.S. Equity portfolio and the overweight position to public equities as these were the weakest performing asset classes during the month.

U.S. Equities

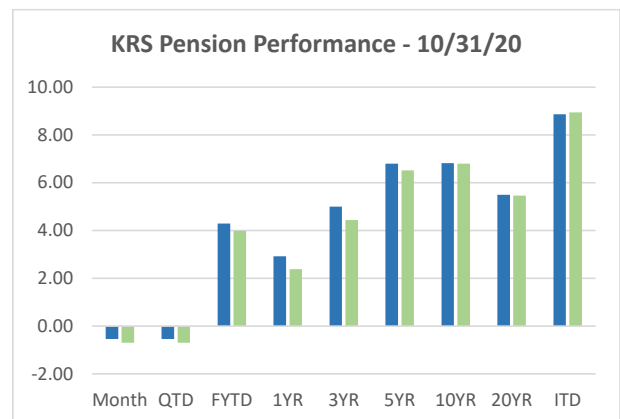
U.S. markets fell -2.2% during the month per the Russell 3000. Despite both mid- and small cap markets providing positive absolute returns in excess of 2%, they could not offset the drag from the large cap market which fell -2.7% (MC: 2.2% vs SC: 2.1% vs LC: -2.7%). For the second month in a row, value outperformed provided growth, providing over 2% downside protection (R3000V: -1.0% vs R3000G: -3.2%).

During the month, the KRS U.S. Equity portfolio provided 41 bps of downside protection, returning -1.8% versus the Russell 3000 Index return of -2.2%. For the most part, stock selection was solid across the board with most strategies outperforming their respective indices. The portfolio’s slight value tilt was beneficial, as was the smaller market cap positioning.

Non-U.S. Equities

Non-U.S. equity markets declined -2.2% for the month per the MSCI ACWI-Ex US Index. Emerging markets not only held up better than their developed market counterparts (MSCI World Ex-US: -3.9%), but provided a positive absolute return of 2.1% (MSCI EM). Unlike in the U.S., growth continued to outpace value in the international markets.

The KRS Non-U.S. Equity portfolio fell -2.5% during the month, trailing the benchmark by 32 bps. KRS’ external MSCI ACWI Ex-US and MSCI EM individual mandates were mixed in terms of relative performance versus their respective benchmarks; however, the mix was skewed negative and those that trailed did so to a greater degree than those that outperformed. The value tilt hampered relative performance.



Fixed Income

Fixed Income markets were mixed in terms of their performance during the month. The higher yielding segments with more significant credit risk outperformed those segments that are traditionally considered safer which lost ground during the period. The high yield and leveraged loan markets gained 0.5% and 0.2%, respectively. The U.S. Aggregate Index lost -45 bps, followed by the intermediate bond market fell nearly -0.2%, while global bonds were relatively unchanged for the month.

The KRS Specialty Credit allocation returned 58 bps, outpacing its benchmark by 22 bps during the month. Individual strategy relative performance was pretty even split; however, those that outperformed their respective indices did so to a greater degree than those that underperformed their respective indices, especially within the high yield portfolio. The KRS Core Fixed Income

portfolio gained 8 bps, outpacing the Bloomberg Barclays Aggregate (0.1% vs -0.5%). Relative performance amongst the individual mandates was good, with the intermediate portfolios bolstering the overall allocation.

Alternative Assets

The diversifying strategy group returned 23 bps during the month, with three of the four major portfolio segments providing positive returns during the period. The Opportunistic portfolio returned 1.8%, the Absolute Return portfolio gained 0.3%, and the Real Estate portfolio added 9 bps. The Real Return portfolio fell -34 bps. The Private Equity portion of the portfolio returned 1.7% on the month.

Cash

The Cash portfolio performed in line with the 3-month T-Bill, returning 1bp. This brought the fiscal year return to 4 bps.

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 (pgs.4&5).
- 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 - 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%)	<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%)
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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 07/31/18
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%)
Pension Benchmark Composite 07/31/18 to Present
US Equity: Russell 3000 (18.2%)
Non US Equity: MSCI AXCI Ex-US IMI (18.2%)
Core Fixed Income: Barclays US Aggregate (14.8%)
Specialty Credit/High Yield FI: Custom Benchmark (15.0%)
Real Estate: NCREIF ODCE (5.0%)
Absolute Return: HFRI Diversified FOF (3.0%)
Real Return<5yrs: Actual Performance
Real Return>5yrs: CPI+3% (15.0%)
Private Equity<5Yrs: Actual Performance
Private Equity>5Yrs: Russell 3000 Index+3% (9.4%)
Cash: Cit Grp 3-mos Treasury Bill (1.4%)

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 07/31/18
US Equity: Russell 3000 (17.9%)
Non US Equity: MSCI AXCI Ex-US IMI (21.9%)
Global Fixed Income: Barclays Universal Index (13.0%)
Credit Fixed Income: Barclays US High Yield (11.0%)
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% (9.2%)
Cash: Cit Grp 3-mos Treasury Bill (2.0%)
Insurance Benchmark Composite 07/31/18 to Present
US Equity: Russell 3000 (18.75%)
Non US Equity: MSCI AXCI Ex-US IMI (18.75%)
Core Fixed Income: Barclays US Aggregate (5.0%)
Specialty Credit/High Yield FI: Custom Benchmark (13.5%)
Real Estate: NCREIF ODCE (10.0%)
Absolute Return: HFRI Diversified FOF (3.0%)
Real Return<5yrs: Actual Performance
Real Return>5yrs: CPI+3% (15.0%)
Private Equity<5Yrs: Actual Performance
Private Equity>5Yrs: Russell 3000 Index+3% (15.0%)
Cash: Cit Grp 3-mos Treasury Bill (1.0%)

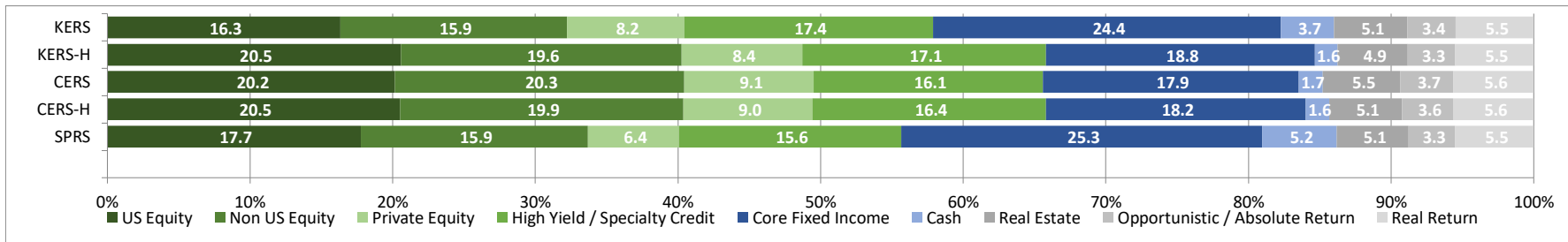
**Fund composite benchmark is a roll-up of individual plans, which may differ from one another.

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 10/31/20

Structure	Inception	Market Value	% of Total	Month	QTD	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	20 Years	ITD
TOTAL FUND	4/1/1984	13,173,031,984.62	100.00	-0.54	-0.54	4.29	2.92	5.00	6.80	6.82	5.49	8.86
KY Ret. Blended Index				-0.70	-0.70	3.98	2.38	4.44	6.51	6.79	5.46	8.94
GROWTH	7/1/2018	8,493,879,771.43	64.48	-0.91	-0.91	5.92	3.63					5.35
PUBLIC EQUITY	4/1/1984	5,020,876,514.37	38.11	-2.14	-2.14	5.57	4.19	5.24	8.14	7.91	4.88	10.22
Global Equity Blended Index				-2.19	-2.19	5.65	3.88	4.89	7.95	7.93	4.87	10.05
US PUBLIC	4/1/1984	2,534,552,615.75	19.24	-1.75	-1.75	6.60	8.23	9.05	10.70	12.09	6.40	11.17
KY Domestic Equity Blend				-2.16	-2.16	6.85	10.15	10.04	11.48	12.82	6.88	11.28
EQUITY NON US	7/1/2000	2,486,323,898.62	18.87	-2.54	-2.54	4.55	0.06	1.86	5.85	4.16		3.06
KY Ret.Int'l Eq. Blended Index				-2.22	-2.22	4.43	-2.26	-0.25	4.46	3.79		3.11
PRIVATE EQUITY	7/1/2002	1,139,738,096.64	8.65	1.69	1.69	9.11	4.00	10.13	9.86	12.06		10.88
Russell 3000 + 3%(Qtr Lag)				1.69	1.69	9.11	4.00	10.13	9.86	15.54		11.66
HIGH YIELD / SPECIALTY CREDIT	7/1/2017	2,333,265,160.42	17.71	0.58	0.58	4.91	1.46	4.24				4.83
High Yield Custom Benchmark				0.36	0.36	4.75	2.62	3.61				3.87
FIXED INCOME / LIQUIDITY	7/1/2018	2,852,836,934.93	21.66	0.07	0.07	1.19	3.81					4.99
CORE FIXED INCOME	7/1/2013	2,563,273,565.29	19.46	0.08	0.08	1.38	4.98	4.32	3.80			3.62
Bloomberg Barclays US Aggregate				-0.45	-0.45	0.17	6.19	5.07	4.08			3.80
CASH	1/1/1988	289,563,369.64	2.20	0.01	0.01	0.04	1.20	1.93	1.51	0.92	1.90	3.47
Citigroup Treasury Bill-3 Month				0.01	0.01	0.04	0.86	1.62	1.16	0.60	1.48	3.04
DIVERSIFYING STRATEGIES	7/1/2018	1,826,797,309.06	13.87	0.23	0.23	2.45	-2.51					1.96
REAL ESTATE	7/1/1984	572,976,367.95	4.35	0.09	0.09	-0.19	3.47	8.84	9.09	9.83	7.21	6.21
NCREIF NFI-ODCE Net 1 Qtr in Arrears Index^				0.00	0.00	-1.75	1.33	4.72	6.35	9.78	6.80	6.28
OPPORTUNISTIC / ABSOLUTE RETURN		473,149,809.37	3.59	0.34	0.34	2.49	-1.73	0.20	1.10			2.99
HFRI Diversified				-0.09	-0.09	3.85	5.31	2.69	3.06			3.01
REAL RETURN	7/1/2011	780,671,131.74	5.93	-0.34	-0.34	1.93	-7.99	-0.82	2.32			2.45
Pension Real Return Custom Benchmark				-0.34	-0.34	1.93	-7.99	-0.82	2.32			1.57

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 10/31/20

Plan	Inception	Market Value	% of Total	Month	3 Months	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	20 Years	ITD
KERS		2,417,823,225.43	100.00	-0.41	1.85	4.29	4.20	5.19	6.41	6.71	5.43	8.83
KY Ret. KERS Plan Index				-0.66	0.66	3.51	2.56	4.44	6.25	6.66	5.40	8.90
KERS- H		724,587,778.46	100.00	-0.58	1.52	4.29	2.73	4.89	6.82	6.81	5.48	8.86
KY Ret. KERS Haz Plan Index				-0.71	1.05	4.13	2.49	4.52	6.58	6.78	5.46	8.93
CERS		7,274,013,274.11	100.00	-0.57	1.55	4.30	2.61	4.90	6.85	6.82	5.49	8.86
KY Ret. CERS Plan Index				-0.71	1.05	4.13	2.49	4.52	6.59	6.78	5.46	8.93
CERS- H		2,458,909,505.49	100.00	-0.57	1.53	4.29	2.52	4.87	6.84	6.82	5.49	8.86
KY Ret. CERS Haz Plan Index				-0.71	1.05	4.13	2.49	4.52	6.59	6.78	5.46	8.93
SPRS		297,698,200.80	100.00	-0.45	1.41	3.98	3.74	5.04	6.43	6.59	5.37	8.80
KY Ret. SPRS Plan Index				-0.66	0.66	3.51	2.56	4.43	6.33	6.65	5.39	8.90



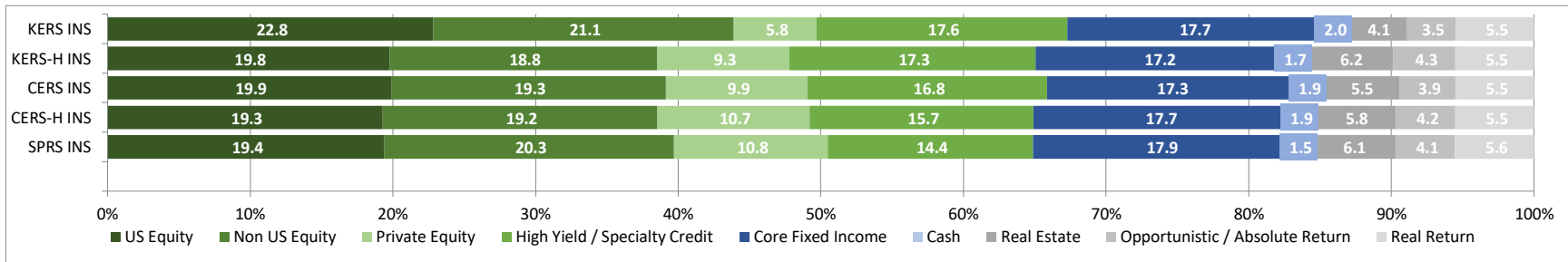
Note: The above chart displays the average monthly allocation.

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 10/31/20

Structure	Inception	Market Value	% of Total	Month	QTD	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	20 Years	ITD
				KRS	KRS	KRS	KRS	KRS	KRS	KRS	KRS	
TOTAL FUND	4/1/1987	5,757,867,973.33	100.00	-0.57	-0.57	4.25	2.26	4.81	6.85	6.62	4.90	7.25
KY Ret. Blended Index				-0.76	-0.76	3.84	1.93	4.36	6.58	7.08	5.05	7.57
GROWTH	7/1/2018	3,812,447,402.73	66.21	-0.89	-0.89	5.61	2.37					4.64
Growth Custom Benchmark				-0.27	-0.27	9.16	6.20					6.99
PUBLIC EQUITY	7/1/1992	2,246,508,356.34	39.02	-2.14	-2.14	5.63	4.19	5.18	8.21	7.82	5.05	8.43
Global Equity Blended Index				-2.19	-2.19	5.64	3.83	4.85	7.93	7.87	4.65	8.22
US PUBLIC	7/1/1992	1,146,492,983.47	19.91	-1.76	-1.76	6.61	8.16	9.01	10.84	12.04	6.55	9.62
KY Domestic Equity Blend				-2.16	-2.16	6.85	10.15	10.04	11.48	12.77	6.51	9.62
EQUITY NON US	4/1/2000	1,100,015,372.87	19.10	-2.53	-2.53	4.62	0.06	1.74	5.77	3.97		3.04
KY Ret.Int'l Eq. Blended Index				-2.22	-2.22	4.43	-2.26	-0.25	4.46	3.80		2.37
PRIVATE EQUITY	7/1/2002	527,238,035.33	9.16	1.87	1.87	6.60	-3.23	7.96	9.38	12.51		9.53
Russell 3000 + 3%(Qtr Lag)				1.87	1.87	6.60	-3.23	7.96	9.38	15.71		11.15
HIGH YIELD / SPECIALTY CREDIT	7/1/2017	1,038,701,011.06	18.04	0.52	0.52	4.83	1.17	3.96				4.52
Bloomberg Barclays US High Yield				0.36	0.36	4.75	2.62	3.61				3.87
FIXED INCOME / LIQUIDITY	7/1/2018	1,142,976,580.03	19.85	0.05	0.05	1.18	3.72					4.90
CORE FIXED INCOME	7/1/2013	1,007,397,557.19	17.50	0.06	0.06	1.35	4.58	4.14	3.72			3.28
Bloomberg Barclays US Aggregate				-0.45	-0.45	0.17	6.19	5.07	4.08			3.80
CASH	7/1/1992	135,579,022.84	2.35	0.01	0.01	0.04	0.75	1.67	1.25	0.76	1.68	2.56
Citigroup Treasury Bill-3 Month				0.01	0.01	0.04	0.86	1.62	1.16	0.60	1.48	2.44
DIVERSIFYING STRATEGIES	7/1/2018	802,758,165.84	13.94	0.10	0.10	2.74	-1.33					2.58
REAL ESTATE	5/1/2009	242,577,732.54	4.21	0.08	0.08	0.06	3.98	9.02	9.35	9.99		9.00
NCREIF NFI-ODCE Net 1 Qtr in Arrears Index^				0.00	0.00	-1.75	1.33	4.72	6.35	9.78		5.50
OPPORTUNISTIC / ABSOLUTE RETURN		226,827,482.38	3.94	0.34	0.34	2.43	-1.72	0.25	1.12			2.95
HFRI Diversified				-0.09	-0.09	3.85	5.31	2.69	3.06			3.01
REAL RETURN	7/1/2011	333,352,950.92	5.79	-0.75	-0.75	1.95	-6.18	-0.10	2.57			2.48
Pension Real Return Custom Benchmark				-0.75	-0.75	1.95	-6.18	-0.10	2.57			1.87

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - PLAN NET RETURNS - 10/31/20

Plan	Inception	Market Value	% of Total	Month	3 Months	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	20 Years	ITD
KERS INS		1,062,115,762.92	100.00	-0.81	1.23	4.23	2.98	4.44	6.55	6.36	4.77	7.18
KY Ins. KERS Plan Index				-0.76	0.75	3.87	2.05	4.38	6.60	6.98	5.00	7.54
KERS - H INS		531,366,068.80	100.00	-0.56	1.53	4.24	2.01	4.65	6.73	6.58	4.87	7.24
KY Ins. KERS Haz Plan Index				-0.76	0.75	3.87	2.05	4.43	6.62	7.01	5.02	7.55
CERS INS		2,605,712,085.39	100.00	-0.52	1.48	4.23	2.10	4.83	6.86	6.66	4.91	7.26
KY Ins. CERS Plan Index				-0.76	0.75	3.87	2.05	4.43	6.61	7.02	5.03	7.55
CERS - H INS		1,351,707,901.24	100.00	-0.49	1.55	4.26	2.02	4.86	6.91	6.68	4.92	7.27
KY Ins. CERS Haz Plan Index				-0.76	0.75	3.87	2.05	4.43	6.61	7.02	5.03	7.55
SPRS INS		206,966,163.11	100.00	-0.53	1.60	4.29	2.41	4.99	6.97	6.71	4.94	7.28
KY Ins. SPRS Plan Index				-0.76	0.75	3.87	2.05	4.43	6.61	7.03	5.03	7.55



Note: The above chart displays the average monthly allocation.