

What’s going on in the marketplace?

The roller coaster continued during the month of August. Global equity markets traded lower as concerns about slowing global growth weighed on investors. To compound this, trade tensions intensified between the U.S. and China and the potential for a hard Brexit became more of a reality. U.S. equity markets generally fared better than their international counterparts due to the perceived resiliency of the U.S. economy. Declining interest rates caused bonds to rally during the month.

U.S. Equities

U.S. markets fell approximately -2.0% during the month per the Russell 3000. All market cap segments lost ground with large caps holding up the best, falling -1.5%. Both mid and small caps dropped over -4.0%. Growth outperformed value by 2.1% (R3000G -1.0%, R3000V -3.1%).

During the month, the KRS U.S. equity portfolio performed in line with the Russell 3000 Index. The positive influence of solid stock selection (the majority of strategies outperforming their respective indices) was offset by the allocation effect of the portfolio being smaller in terms of market cap.

Non-U.S. Equities

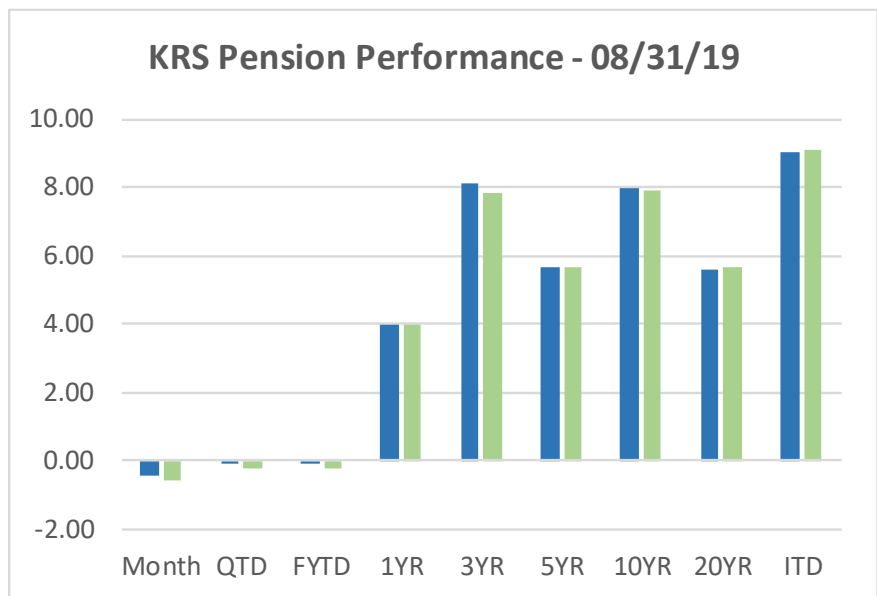
Non-U.S. equities markets were weaker during the period losing -3.1% per the MSCI ACWI-Ex US IMI Index. Both developed and emerging markets struggled. Though developed markets fell roughly -2.5%, they held up better than the emerging markets which fell nearly -5%.

The KRS Non-U.S. equity portfolio fell -2.7% during the month, providing 33 bps of downside protection. Relative outperformance was driven by stock selection; two of the four active mandates (growth oriented) significantly outpaced the index by roughly 1.7%.

Fixed Income

The fixed income market provided positive returns during the month. The aggregate and intermediate credit market segments led the market and earned 2.6% and 1.7%, respectively. The corporate high yield market gained 40 bps, while the leveraged loan segment dropped 27 bps.

The KRS specialty credit allocation added 121 basis points on the month as relative manager performance was mixed. The KRS core fixed income allocation returned 1.4%. The aggregate and intermediate credit investments performed well both in relative and absolute terms. The allocation to shorter-term corporates did not perform as well earning 64 bps and trailing the respective index by 12 bps.



Alternative Assets

The diversifying strategy group fell -0.6% during the month. The Opportunistic allocation was the only segment of the group that was positive, earning 92 bps. The Real Return, Absolute Return, and Real Estate allocations all lost ground, falling 89 bps, 56 bps, and 36 bps, respectively. The Private Equity portion of the portfolio provided a return of 1.2%.

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 allocations. The overweight had a slightly positive effect on the fund's relative performance.

NOTES:

- 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.
- Individual plan allocation and performance (pg.4).
- 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) | Private Equity Composite (Insurance) |
| Inception (07/01/02) to 06/30/11 | Inception (07/01/02) to 06/30/11 |
| 60.00% S&P 1500 Composite Index | 80.00% S&P 1500 Composite Index |
| 40.00% Barclays US Corporate High Yield Index | 20.00% Barclays US Corporate High Yield Index |
| 07/01/11 to 12/31/15 | 07/01/11 to 12/31/15 |
| 100.00% Russell 3000 Index + 4% (Qtr Lag) | 100.00% Russell 3000 Index + 4% (Qtr Lag) |
| 01/01/16 to Present | 01/01/16 to Present |
| 100.00% Russell 3000 Index + 3% (Qtr Lag) | 100.00% Russell 3000 Index + 3% (Qtr Lag) |
- 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> | <u>Insurance Benchmark Composite 01/01/16 to 08/31/17</u> |
| US Equity: Russell 3000 (25.6%) | US Equity: Russell 3000 (26.5%) |
| Non US Equity: MSCI AXCI Ex-US IMI (25.2%) | Non US Equity: MSCI AXCI Ex-US IMI (26.5%) |
| Global Fixed Income: Barclays Universal Index (6.8%) | Global Fixed Income: Barclays Universal Index (6.0%) |
| Credit Fixed Income: Barclays US High Yield (7.2%) | Credit Fixed Income: Barclays US High Yield (6.0%) |
| Real Estate: NCREIF ODCE (5.0%) | Real Estate: NCREIF ODCE (5.0%) |
| Absolute Return: HFRI Diversified FOF (10.0%) | Absolute Return: HFRI Diversified FOF (10.0%) |
| Real Return: Allocation Specific (8.0%) | Real Return: Allocation Specific (8.0%) |
| Private Equity<5Yrs: Actual Performance | Private Equity<5Yrs: Actual Performance |
| Private Equity>5Yrs: Russell 3000 Index+3% (10.0%) | Private Equity>5Yrs: Russell 3000 Index+3% (10.0%) |
| Cash: Cit Grp 3-mos Treasury Bill (2.2%) | Cash: Cit Grp 3-mos Treasury Bill (2.0%) |
| <u>Pension Benchmark Composite 09/01/17 to 05/31/18 - Transition Period w/Sliding Targets</u> | <u>Insurance Benchmark Composite 09/01/17 to 05/31/18 - Transition Period w/Sliding Targets</u> |
| US Equity: Russell 3000 (23.6%) | US Equity: Russell 3000 (24.5%) |
| Non US Equity: MSCI AXCI Ex-US IMI (23.2%) | Non US Equity: MSCI AXCI Ex-US IMI (24.5%) |
| Global Fixed Income: Barclays Universal Index (9.0%) | Global Fixed Income: Barclays Universal Index (8.0%) |
| Credit Fixed Income: Barclays US High Yield (9.0%) | Credit Fixed Income: Barclays US High Yield (8.0%) |
| Real Estate: NCREIF ODCE (5.0%) | 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.

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

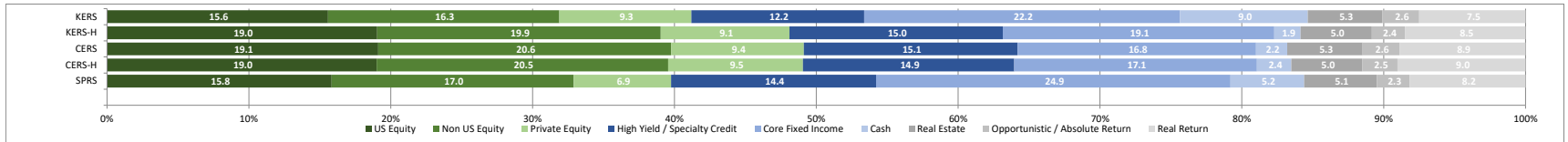
US Equity: Russell 3000 (17.9%)
Non US Equity: MSCI AXCI Ex-US IMI (21.9%)
Global Fixed Income: Barclays Universal Index (13.0%)
Credit Fixed Income: Barclays US High Yield (11.0%)
Real Estate: NCREIF ODCE (5.0%)
Absolute Return: HFRI Diversified FOF (10.0%)
Real Return<5yrs: Actual Performance
Real 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%)

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - NET RETURNS - 08/31/19

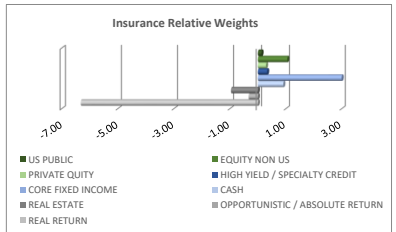
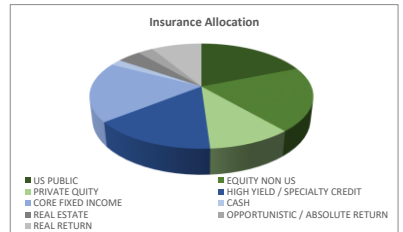
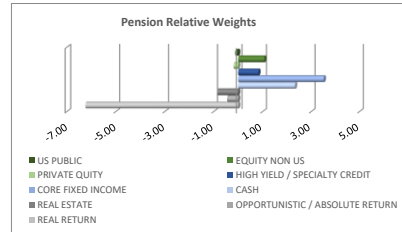
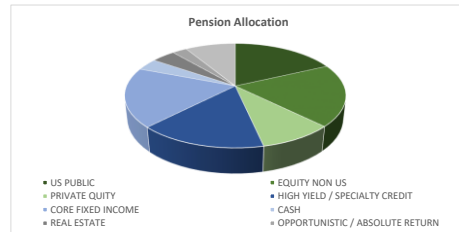
| Structure | Benchmark | Inception | Market Value | % of Total | Month | | QTD | | Fiscal YTD | | 1 Year | | 3 Years | | 5 Years | | 10 Years | | 20 Years | | ITD | |
|---------------------------------|--------------------------------------------|-----------|-------------------|------------|-------|-----------|-------|-----------|------------|-----------|--------|-----------|---------|-----------|---------|-----------|----------|-----------|----------|-----------|-------|-----------|
| | | | | | 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 | 12,753,254,872.44 | 100.00 | -0.45 | -0.58 | -0.04 | -0.24 | -0.04 | -0.24 | 4.00 | 3.95 | 8.14 | 7.82 | 5.64 | 5.64 | 7.96 | 7.94 | 5.62 | 5.68 | 9.00 | 9.10 |
| GROWTH | | | 7,957,091,622.32 | 62.39 | -0.98 | | -0.41 | | -0.41 | | 3.11 | | | | | | | | | | 4.64 | |
| US PUBLIC | KY Domestic Equity Blend | 4/1/1984 | 2,305,666,294.63 | 18.08 | -2.04 | -2.04 | -0.71 | -0.58 | -0.71 | -0.58 | 0.59 | 1.31 | 11.51 | 12.24 | 8.83 | 9.60 | 12.72 | 13.37 | 6.31 | 6.73 | 11.18 | 11.25 |
| EQUITY NON US | KY Ret.Int'l Eq. Blended Index | 7/1/2000 | 2,457,406,831.86 | 19.27 | -2.73 | -3.06 | -3.52 | -4.16 | -3.52 | -4.16 | -2.89 | -4.08 | 7.31 | 5.88 | 2.90 | 1.57 | 5.26 | 5.08 | | | 2.93 | 3.10 |
| PRIVATE QUITY | Russell 3000 + 3%(Qtr Lag) | 7/1/2002 | 1,174,836,795.86 | 9.21 | 1.22 | 1.22 | 3.48 | 3.48 | 3.48 | 3.48 | 15.20 | 15.20 | 14.21 | 14.21 | 11.50 | 11.50 | 13.76 | 15.48 | | | 11.20 | 11.09 |
| HIGH YIELD / SPECIALTY CREDIT | Bloomberg Barclays US High Yield | | 2,019,183,689.97 | 15.83 | 1.21 | | 1.66 | | 1.66 | | 7.03 | | | | | | | | | | 6.66 | |
| FIXED INCOME / LIQUIDITY | | | 2,824,442,690.05 | 22.15 | 1.22 | | 1.36 | | 1.36 | | 6.90 | | | | | | | | | | 6.57 | |
| CORE FIXED INCOME | Bloomberg Barclays US Aggregate | | 2,348,647,494.32 | 18.42 | 1.41 | 2.59 | 1.54 | 2.82 | 1.54 | 2.82 | 7.42 | 10.17 | 2.68 | 3.09 | 3.18 | 3.35 | | | | | 3.47 | 4.22 |
| CASH | Citigroup Treasury Bill-3 Month | 1/1/1988 | 475,795,195.73 | 3.73 | 0.18 | 0.19 | 0.39 | 0.39 | 0.39 | 0.39 | 2.42 | 2.36 | 1.86 | 1.47 | 1.25 | 0.92 | 0.90 | 0.50 | 2.18 | 1.74 | 3.55 | 3.11 |
| DIVERSIFYING STRATEGIES | | | 1,972,267,362.34 | 15.46 | -0.60 | | -0.50 | | -0.50 | | 3.69 | | | | | | | | | | 3.93 | |
| REAL ESTATE | NCREIF NFI-ODCE Net 1 Qtr in Arrears Index | 7/1/1984 | 529,809,938.04 | 4.15 | -0.36 | 0.00 | -0.09 | 0.00 | -0.09 | 0.00 | 7.13 | 6.55 | 9.93 | 7.01 | 9.35 | 9.18 | 9.23 | 7.73 | 7.32 | 7.46 | 6.15 | 6.43 |
| OPPORTUNISTIC / ABSOLUTE RETURN | HFRI Diversified | | 324,898,998.18 | 2.55 | -0.56 | -0.44 | 0.05 | -0.02 | 0.05 | -0.02 | -0.70 | 1.18 | 2.74 | 3.52 | 1.76 | 2.36 | | | | | 3.57 | 2.88 |
| REAL RETURN | Pension Real Return Custom Benchmark | 7/1/2011 | 1,117,558,426.12 | 8.76 | -0.89 | -0.89 | -1.03 | -1.03 | -1.03 | -1.03 | 2.86 | 2.86 | 3.81 | 3.81 | 1.91 | 1.91 | | | | | 3.66 | 2.64 |

KENTUCKY RETIREMENT SYSTEMS - PENSION FUND - PLAN NET RETURNS - 08/31/19

| 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 | | 2,250,209,415.02 | 100.00 | -0.17 | -0.33 | 3.30 | 3.16 | 0.32 | 0.00 | 4.39 | 4.50 | 7.56 | 7.40 | 5.29 | 5.45 | 7.77 | 7.82 | 5.52 | 5.62 | 8.94 | 9.07 |
| KERS-H | KY Ret. KERS Haz Plan Index | | 683,706,961.59 | 100.00 | -0.47 | -0.63 | 3.34 | 3.29 | -0.08 | -0.24 | 3.80 | 3.93 | 8.17 | 7.99 | 5.64 | 5.52 | 7.97 | 7.92 | 5.63 | 5.67 | 9.00 | 9.09 |
| CERS | KY Ret. CERS Plan Index | | 7,137,217,584.03 | 100.00 | -0.53 | -0.63 | 3.35 | 3.29 | -0.15 | -0.24 | 3.82 | 3.93 | 8.22 | 7.99 | 5.67 | 5.50 | 7.98 | 7.92 | 5.63 | 5.67 | 9.01 | 9.09 |
| CERS-H | KY Ret. CERS Haz Plan Index | | 2,399,180,997.64 | 100.00 | -0.53 | -0.63 | 3.34 | 3.29 | -0.15 | -0.24 | 3.85 | 3.93 | 8.21 | 7.99 | 5.70 | 5.51 | 7.99 | 7.92 | 5.64 | 5.67 | 9.01 | 9.09 |
| SPRS | KY Ret. SPRS Plan Index | | 282,939,918.23 | 100.00 | -0.19 | -0.33 | 3.20 | 3.16 | 0.20 | 0.00 | 4.19 | 4.38 | 7.72 | 7.61 | 5.06 | 5.32 | 7.68 | 7.81 | 5.48 | 5.61 | 8.92 | 9.06 |



Note: The above chart displays the average monthly allocation.

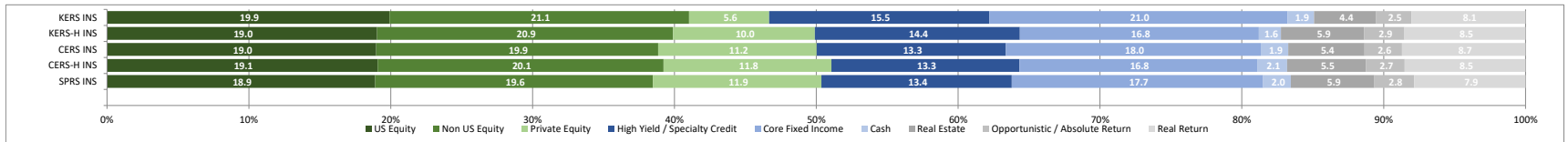


KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - NET RETURNS - 08/31/19

| 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 | 5,437,490,400.69 | 100.00 | -0.49 | -0.63 | -0.15 | -0.36 | -0.15 | -0.36 | 3.70 | 3.71 | 8.26 | 8.00 | 5.77 | 5.90 | 7.89 | 8.37 | 5.08 | 5.36 | 7.37 | 7.71 |
| GROWTH | | 7/1/2018 | 3,496,140,473.65 | 64.30 | -1.03 | | -0.59 | | -0.59 | | 2.72 | | | | | | | | | | 4.34 | |
| US PUBLIC | KY Domestic Equity Blend | 7/1/1992 | 1,026,770,330.94 | 18.88 | -2.04 | -2.04 | -0.72 | -0.58 | -0.72 | -0.58 | 0.59 | 1.31 | 11.52 | 12.24 | 9.10 | 9.60 | 12.72 | 13.27 | 6.53 | 6.45 | 9.58 | 9.50 |
| EQUITY NON US | KY Ret.Int'l Eq. Blended Index | 4/1/2000 | 1,076,632,006.44 | 19.80 | -2.75 | -3.06 | -3.51 | -4.16 | -3.51 | -4.16 | -3.05 | -4.08 | 7.21 | 5.88 | 2.77 | 1.57 | 4.95 | 4.90 | | | 2.91 | 2.31 |
| PRIVATE QUITY | Russell 3000 + 3%(Qtr Lag) | 7/1/2002 | 559,334,580.09 | 10.29 | 1.03 | 1.03 | 2.31 | 2.31 | 2.31 | 2.31 | 13.28 | 13.28 | 14.82 | 14.82 | 13.94 | 13.94 | 15.14 | 15.47 | | | 10.34 | 10.55 |
| HIGH YIELD / SPECIALTY CREDIT | Bloomberg Barclays US High Yield | | 833,403,556.18 | 15.33 | 1.18 | | 1.62 | | 1.62 | | 6.94 | | | | | | | | | | 6.33 | |
| FIXED INCOME / LIQUIDITY | | 7/1/2018 | 1,105,567,961.11 | 20.33 | 1.23 | | 1.39 | | 1.39 | | 6.75 | | | | | | | | | | 6.45 | |
| CORE FIXED INCOME | Bloomberg Barclays US Aggregate | 7/1/2013 | 1,001,839,808.26 | 18.42 | 1.35 | 2.59 | 1.48 | 2.82 | 1.48 | 2.82 | 7.73 | 10.17 | 2.64 | 3.09 | 2.80 | 3.35 | | | | | 3.13 | 3.50 |
| CASH | Citigroup Treasury Bill-3 Month | 7/1/1992 | 103,728,152.85 | 1.91 | 0.18 | 0.19 | 0.39 | 0.39 | 0.39 | 0.39 | 2.37 | 2.36 | 1.61 | 1.47 | 1.07 | 0.92 | 0.68 | 0.50 | 1.92 | 1.74 | 2.63 | 2.50 |
| DIVERSIFYING STRATEGIES | | 7/1/2018 | 836,149,541.85 | 15.38 | -0.46 | | -0.35 | | -0.35 | | 3.96 | | | | | | | | | | 4.09 | |
| REAL ESTATE | NCREIF NFI-ODCE Net 1 Qtr in Arrears Index | 5/1/2009 | 219,425,000.53 | 4.04 | -0.36 | 0.00 | -0.09 | 0.00 | -0.09 | 0.00 | 7.29 | 6.55 | 10.14 | 7.01 | 9.56 | 9.18 | | | | | 9.03 | 5.93 |
| OPPORTUNISTIC / ABSOLUTE RETURN | HFRI Diversified | | 145,005,433.08 | 2.67 | -0.57 | -0.44 | 0.04 | -0.02 | 0.04 | -0.02 | -0.67 | 1.18 | 2.73 | 3.52 | 1.79 | 2.36 | | | | | 3.52 | 2.88 |
| REAL RETURN | Pension Real Return Custom Benchmark | 7/1/2011 | 471,719,108.24 | 8.68 | -0.66 | -0.66 | -0.80 | -0.80 | -0.80 | -0.80 | 3.20 | 3.20 | 3.59 | 3.59 | 1.86 | 1.86 | | | | | 3.43 | 2.72 |

KENTUCKY RETIREMENT SYSTEMS - INSURANCE FUND - PLAN NET RETURNS - 08/31/19

| 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 | | 933,452,164.23 | 100.00 | -0.62 | -0.61 | 3.05 | 3.18 | -0.30 | -0.32 | 2.71 | 3.79 | 7.56 | 8.02 | 5.22 | 5.60 | 7.56 | 8.26 | 4.92 | 5.31 | 7.26 | 7.68 |
| KERS-H INS | KY Ins. KERS Haz Plan Index | | 522,551,799.21 | 100.00 | -0.55 | -0.61 | 3.22 | 3.18 | -0.22 | -0.32 | 3.60 | 3.79 | 8.17 | 8.07 | 5.67 | 5.67 | 7.86 | 8.30 | 5.07 | 5.32 | 7.36 | 7.69 |
| CERS INS | KY Ins. CERS Plan Index | | 2,468,956,126.16 | 100.00 | -0.46 | -0.61 | 3.32 | 3.18 | -0.13 | -0.32 | 3.83 | 3.79 | 8.35 | 8.06 | 5.84 | 5.69 | 7.94 | 8.31 | 5.10 | 5.33 | 7.38 | 7.69 |
| CERS-H INS | KY Ins. CERS Haz Plan Index | | 1,313,940,235.97 | 100.00 | -0.48 | -0.61 | 3.34 | 3.18 | -0.15 | -0.32 | 3.89 | 3.79 | 8.41 | 8.06 | 5.91 | 5.69 | 7.97 | 8.31 | 5.12 | 5.33 | 7.39 | 7.69 |
| SPRS INS | KY Ins. SPRS Plan Index | | 198,590,079.54 | 100.00 | -0.45 | -0.61 | 3.36 | 3.18 | -0.09 | -0.32 | 3.85 | 3.79 | 8.42 | 8.06 | 5.88 | 5.71 | 7.96 | 8.31 | 5.11 | 5.33 | 7.39 | 7.69 |



Note: The above chart displays the average monthly allocation.