Kentucky Retirement Systems

Investment Return Assumption and Funding Methodology Review

Presented by
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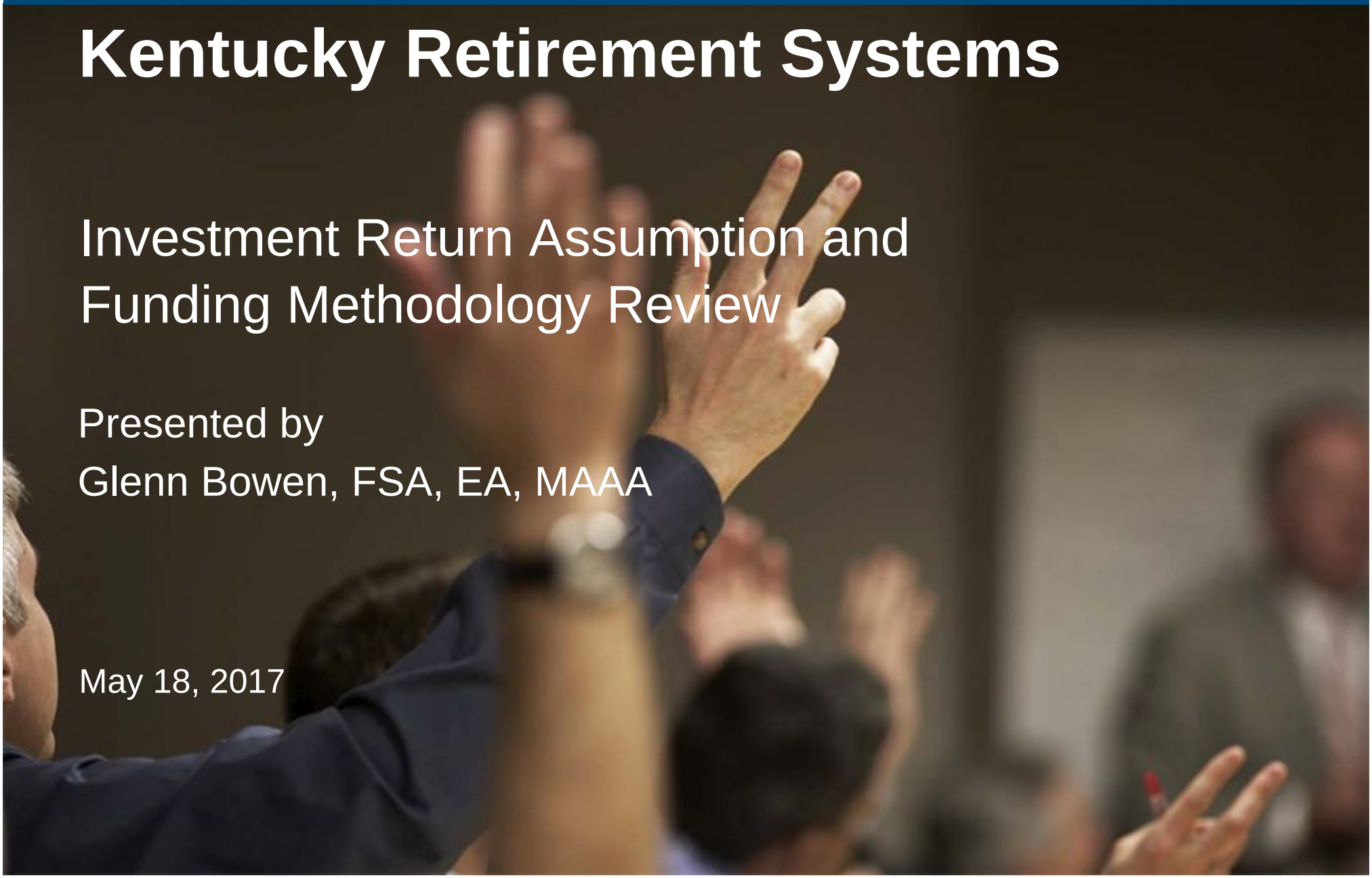
May 18, 2017



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Outline

- Investment return assumption review
- Funding methodology review

NOTES

- Milliman was retained to conduct a high level analysis
  - We have not collected census data from KRS
  - We have not programmed the valuations for the KRS systems
- All dollar amounts shown are rough estimates
- Official cost estimates should be based on detailed studies and projections conducted by KRS' retained actuary.

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Long Term Investment Return Assumption

System	Valuation Assumption	Milliman Assumption Current Asset Allocation	Milliman Assumption Proposed Asset Allocation
KERS NonHaz [1]	6.75%	6.55%	5.90%
KERS Haz	7.50%	6.70%	6.70%
CERS NonHaz	7.50%	6.70%	6.70%
CERS Haz	7.50%	6.70%	6.70%
SPRS [1]	6.75%	6.55%	5.90%

[1] Portfolios and related assumptions for KERS NonHaz and SPRS insurance benefits are consistent with KERS Haz and CERS portfolios and assumptions

(all dollar amounts shown are rough estimates)

Rough Estimates of Cost Impact

System	Benefit	June 30, 2016 Liability Impact ($ billions)	2017-18 Contribution Impact ($ millions)
KERS NonHaz	Pension	$1.19	$ 88
KERS NonHaz	Insurance	0.25	23
KERS Haz	Pension	0.08	9
KERS Haz	Insurance	0.04	4
CERS NonHaz	Pension	1.13	107
CERS NonHaz	Insurance	0.31	33
CERS Haz	Pension	0.34	33
CERS Haz	Insurance	0.17	15
SPRS	Pension	0.07	5
SPRS	Insurance	0.03	2
TOTAL		$3.61	$319

(all dollar amounts shown are rough estimates)

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Select & Ultimate Investment Return Assumption

System	Expected Return 10-year Select Period	Expected Return Ultimate Period (10+ years)	Expected Return 30-year Timeframe
KERS NonHaz [1]	5.15%	6.25%	5.90%
KERS Haz	6.25%	6.90%	6.70%
CERS NonHaz	6.25%	6.90%	6.70%
CERS Haz	6.25%	6.90%	6.70%
SPRS [1]	5.15%	6.25%	5.90%

[1] Portfolios and related assumptions for KERS NonHaz and SPRS insurance benefits are consistent with KERS Haz and CERS portfolios and assumptions

(all dollar amounts shown are rough estimates)

Funding Methodology - overview

- Illustrations are for KERS Non-Hazardous pension
  - June 30, 2016 market value of assets = $1.9 billion
  - 2015-16 benefit payments = $0.9 billion
  - Assets represent two years worth of benefit payments
  - High liquidity needs
  - High funding needs
- Current funding methodology converts dollars into percentages of payroll for purposes of determining contributions
  - Payroll assumed to grow 4% per year
  - 2016-17 payroll on target to be 4% LESS than 2015-16 payroll

(all dollar amounts shown are rough estimates)

Funding Methodology – Question #1

- Should a retirement system with the funded status of KERS Non-Hazardous pension be smoothing assets for contribution purposes?
  - June 30, 2016 actuarial value of assets exceeds market value of assets by $160 million
    - A small amount compared to liabilities
    - A material amount compared to assets
  - The difference is due to net deferred losses to be recognized over time (up to 5 years)
  - Under current funding methodology, recognizing market value of assets would increase 2017-18 contribution by $8 million

(all dollar amounts shown are rough estimates)

Funding Methodology – Question #2

- Should a retirement system with the funded status of KERS Non-Hazardous pension be using a funding methodology that allows the unfunded liability to increase?
  - Under current funding methodology:
    - 2017-18 payment toward unfunded liability is $630 million
    - This is less than the interest on the unfunded liability
    - Negative amortization occurs
    - The unfunded liability will not drop below current levels until halfway through the amortization period (year 14)
  - Paying interest only on the unfunded liability to prevent it from increasing would require a contribution of $760 million

(all dollar amounts shown are rough estimates)

Funding Methodology – Question #3

- Should a retirement system with the funded status of KERS Non-Hazardous pension be using a funding methodology that is expressed as a percent of payroll?
  - Under current funding methodology, the actuary calculates a dollar amount of contribution, divides by payroll and expresses the resulting contribution rate as a percent of payroll
    - If payroll grows by less than the assumed amount, the System receives less dollars in contributions
    - This happens regardless of what the payroll growth assumption is
  - Invoicing employers in dollar terms will generate the expected amount of dollars, regardless of payroll
    - Prevent $50 million shortfall in Scenario 1
    - Prevent $60 million shortfall in Scenario 2

(all dollar amounts shown are rough estimates)

Funding Methodology – Question #4

- Should a retirement system with the funded status of KERS Non-Hazardous pension work on paying down the unfunded liability now instead of years from now?
  - Under current funding methodology, significant negative amortization occurs
  - Paying interest only will prevent the unfunded liability from growing, but will not reduce it
  - Using a level dollar approach to amortizing the unfunded liability will begin paying down the debt
  - At the current 27 year period:
    - Annual payment is $0.96 billion
    - Over 27 years the nominal interest payments decrease by $4 billion

(all dollar amounts shown are rough estimates)

Funding Methodology – Question #5

- Should a retirement system with the funded status of KERS Non-Hazardous pension target paying down the unfunded liability over 27 years?
  - Cash flow needs may require an acceleration
  - Components of prior experience leading to current unfunded liability are not known
  - 20 year period illustrated for discussion purposes
  - At 20 year period with level dollar amortization:
    - Annual payment is $1.11 billion
    - Over time the nominal interest payments decrease by an additional $4 billion

(all dollar amounts shown are rough estimates)

Basis for Analysis

- Milliman was retained to conduct a high level analysis, and we have not collected census data from KRS nor have we programmed the valuations for the KRS systems. Official cost estimates should be based on detailed studies conducted by KRS' retained actuary.
- Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these projections and changes in plan provisions or applicable law.
- The May 16, 2017 letter is an integral component of this analysis and should be read in its entirety. Caveats and statements of reliance appearing in our May 16, 2017 letter continue to apply.

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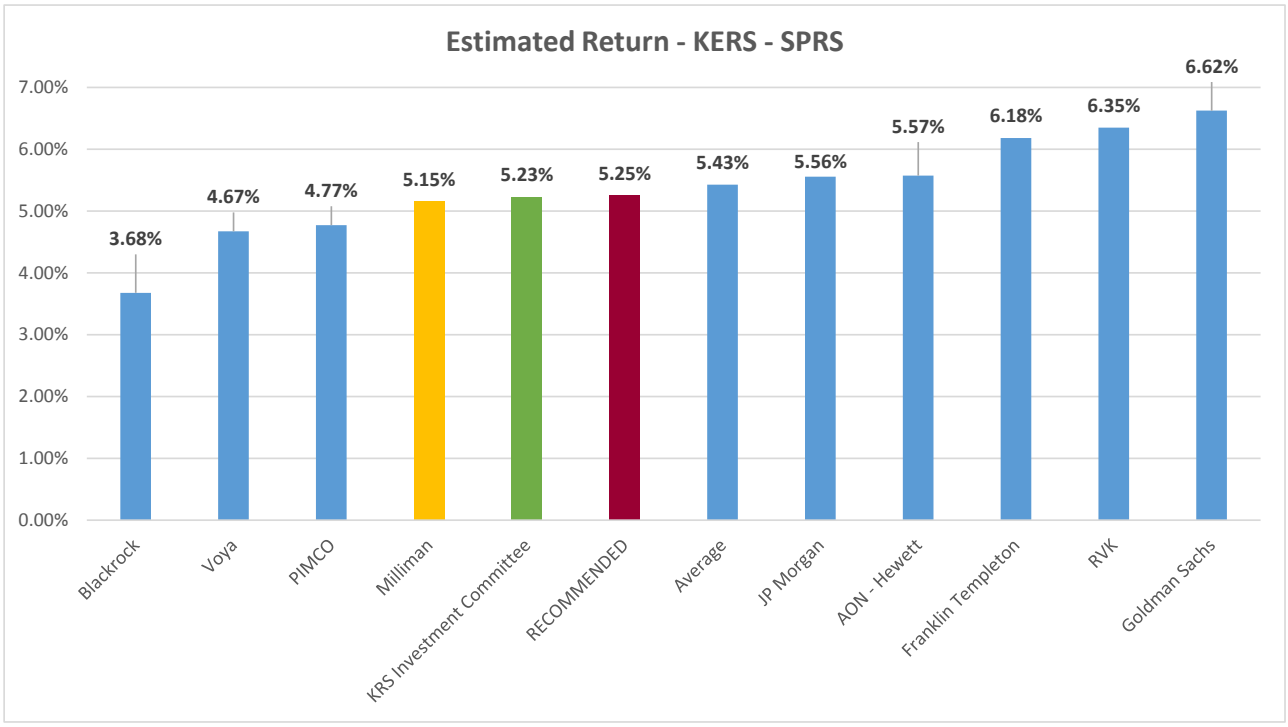
KERS / SPRS

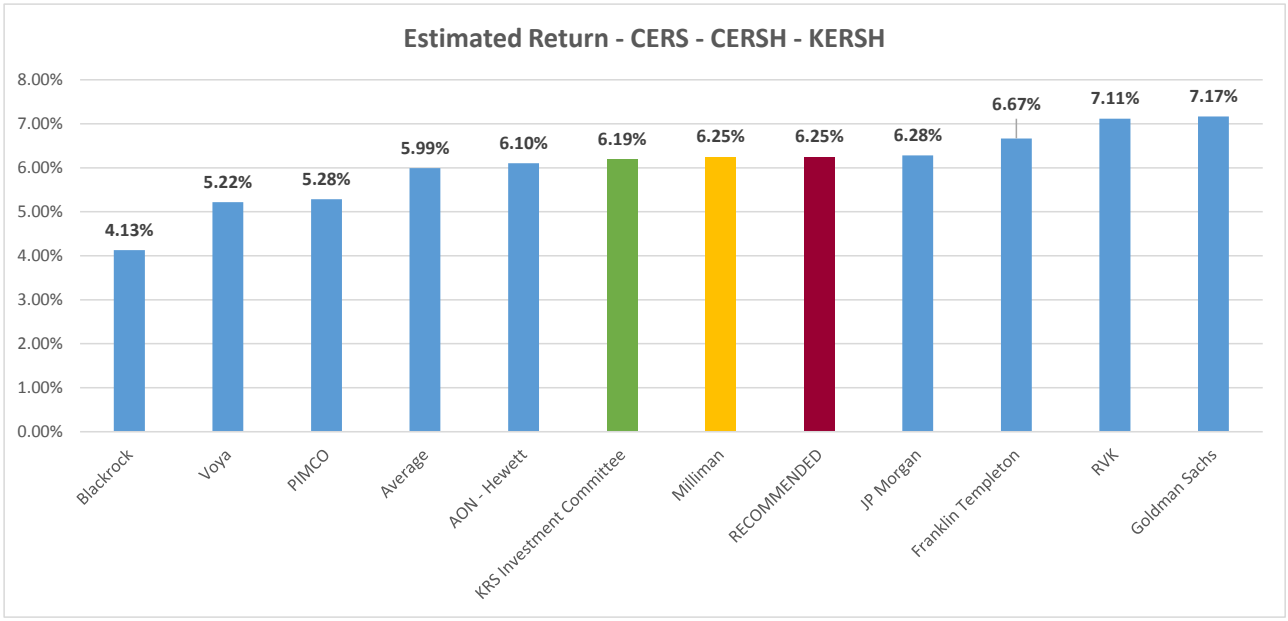
Risk Class		Allocation	RVK	AON - Hewett	Goldman Sachs	Voya	Franklin Templeton	Blackrock	PIMCO	JP Morgan	Average	KRS Investment Committee
			Return Assumptions									
Equity Risk	**45%**											
Equity - Public	35.00%											
US Large Cap		**8.50%**	7.00%	6.40%	6.70%	5.00%	7.30%	4.10%	4.60%	6.25%	**5.92%**	4.50%
US Mid Cap		**5.00%**	7.00%	6.40%	8.10%	6.80%	7.30%	4.10%	4.60%	6.75%	**6.38%**	4.50%
US Small Cap		**4.00%**	7.50%	6.60%	8.70%	7.20%	9.20%	4.10%	4.60%	7.00%	**6.86%**	5.50%
International Developed		**12.50%**	8.25%	7.10%	7.70%	2.70%	7.50%	5.50%	5.10%	6.75%	**6.33%**	6.50%
Emerging Markets		**5.00%**	10.75%	7.70%	11.80%	5.80%	8.70%	5.50%	6.20%	9.25%	**8.21%**	7.25%
Equity Private	10.00%	**10.00%**	10.00%	8.40%	10.10%	7.00%	9.30%	5.00%	7.20%	8.00%	**8.13%**	6.50%
Credit Risk	**30%**											
Liquid Public	27.00%											
Global Bonds		**10.00%**	2.25%	3.00%	2.20%	2.50%	2.90%	1.80%	2.10%	3.00%	**2.47%**	3.00%
Global IG Credit		**10.00%**	3.50%	3.00%	2.70%	3.00%	3.85%	2.30%	3.60%	3.25%	**3.15%**	3.75%
High Yield		**3.00%**	6.00%	4.30%	3.50%	3.80%	4.30%	3.00%	4.20%	5.75%	**4.36%**	5.50%
EMD		**4.00%**	5.00%	6.20%	5.70%	5.40%	4.20%	3.70%	5.10%	5.50%	**5.10%**	6.00%
Cash	3.00%	**3.00%**	2.25%	2.20%	2.20%	2.40%	2.25%	1.50%	1.50%	2.00%	**2.04%**	1.50%
Illiquid Private	0.00%											
Diversifying Strategies	**25%**											
Real Estate		**10.00%**	6.25%	6.30%	10.50%	5.70%	5.90%	4.00%	5.70%	6.00%	**6.29%**	7.00%
Absolute Return		**10.00%**	6.25%	4.20%	4.30%	6.20%	6.00%	2.80%	5.00%	4.25%	**4.88%**	5.00%
Real Return		**5.00%**	5.25%	4.80%	7.40%	3.00%	5.90%	2.50%	5.70%	4.00%	**4.82%**	5.00%
Portfolio Estimated Return		100.00%	**6.35%**	**5.57%**	**6.62%**	**4.67%**	**6.18%**	**3.68%**	**4.77%**	**5.56%**	**5.43%**	**5.23%**

Private Equity Return: If not forecast, equals US Large Cap + 200bps
Illiquid Credit Return: If not forecast, equals US High Yield +300bps

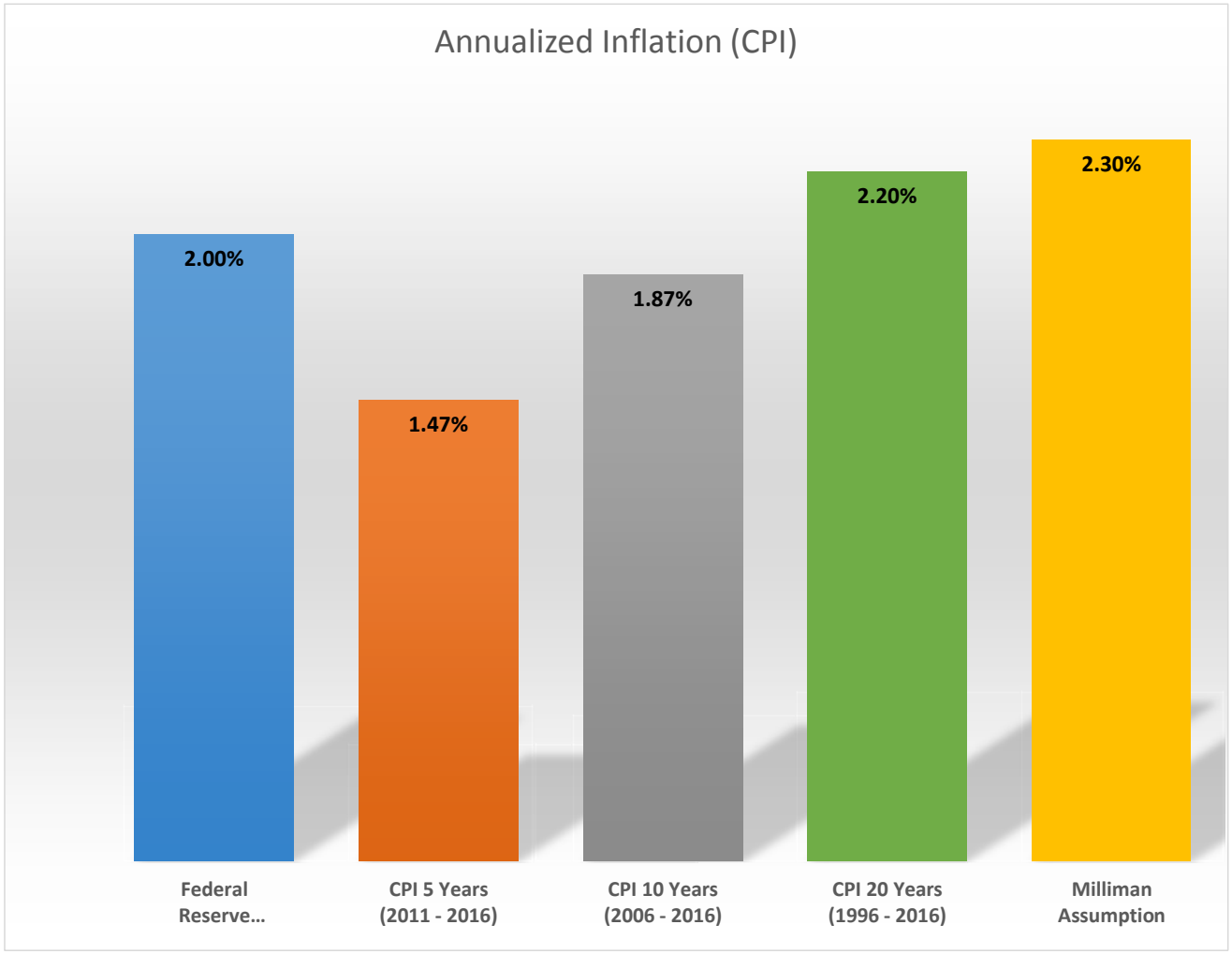

Estimated Return - KERS - SPRS
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
3.68%
4.67%
4.77%
5.15%
5.23%
5.25%
5.43%
5.56%
5.57%
6.18%
6.35%
6.62%
Blackrock
Voya
PIMCO
Milliman
KRS Investment Committee
RECOMMENDED
Average
JP Morgan
AON - Hewett
Franklin Templeton
RVK
Goldman Sachs

CERS/CERSH/KERSH			Return Forecasts									
Risk Class		Allocation	RVK	AON - Hewett	Goldman Sachs	Voya	Franklin Templeton	Blackrock	PIMCO	JP Morgan	Average	KRS Investment Committee
Equity Risk	**45%**											
Equity - Public	35.00%											
US Large Cap		**5.00%**	7.00%	6.40%	6.70%	5.00%	7.30%	4.10%	4.60%	6.25%	**5.92%**	4.50%
US Mid Cap		**6.00%**	7.00%	6.40%	8.10%	6.80%	7.30%	4.10%	4.60%	6.75%	**6.38%**	4.50%
US Small Cap		**6.50%**	7.50%	6.60%	8.70%	7.20%	9.20%	4.10%	4.60%	7.00%	**6.86%**	5.50%
International Developed		**12.50%**	8.25%	7.10%	7.70%	2.70%	7.50%	5.50%	5.10%	6.75%	**6.33%**	6.50%
Emerging Markets		**5.00%**	10.75%	7.70%	11.80%	5.80%	8.70%	5.50%	6.20%	9.25%	**8.21%**	7.25%
Equity Private	10.00%	**10.00%**	10.00%	8.40%	10.10%	7.00%	9.30%	5.00%	7.20%	8.00%	**8.13%**	6.50%
Credit Risk	**30%**											
Liquid Public	20.00%											
Global Bonds		**4.00%**	2.25%	3.00%	2.20%	2.50%	2.90%	1.80%	2.10%	3.00%	**2.47%**	3.00%
Global Credit		**2.00%**	3.50%	3.00%	2.70%	3.00%	3.85%	2.30%	3.60%	3.25%	**3.15%**	3.75%
High Yield		**7.00%**	6.00%	4.30%	3.50%	3.80%	4.30%	3.00%	4.20%	5.75%	**4.36%**	5.50%
EMD		**5.00%**	5.00%	6.20%	5.70%	5.40%	4.20%	3.70%	5.10%	5.50%	**5.10%**	6.00%
Cash		**2.00%**	2.25%	2.20%	2.20%	2.40%	2.25%	1.50%	1.50%	2.00%	**2.04%**	1.50%
Illiquid Private	10.00%	**10.00%**	9.00%	7.30%	6.50%	6.80%	7.30%	6.00%	7.20%	8.75%	**7.36%**	8.50%
Diversifying Strategies	**25%**											
Real Estate		**5.00%**	6.25%	6.30%	10.50%	5.70%	5.90%	4.00%	5.70%	6.00%	**6.29%**	9.00%
Absolute Return		**10.00%**	6.25%	4.20%	4.30%	6.20%	6.00%	2.80%	5.00%	4.25%	**4.88%**	5.00%
Real Return		**10.00%**	5.25%	4.80%	7.40%	3.00%	5.90%	2.50%	5.70%	4.00%	**4.82%**	7.00%
Portfolio Estimated Return		100.00%	**7.06%**	**6.03%**	**7.01%**	**5.08%**	**6.67%**	**4.05%**	**5.28%**	**6.18%**	**5.92%**	**6.09%**

Private Equity Return: If not forecast, equals US Large Cap + 200bps
Illiquid Credit Return: If not forecast, equals US High Yield +300bps


Estimated Return - CERS - CERSH - KERSH
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
4.13%
5.22%
5.28%
5.99%
6.10%
6.19%
6.25%
6.25%
6.28%
6.67%
7.11%
7.17%
Blackrock
Voya
PIMCO
Average
AON - Hewett
KRS Investment Committee
Milliman
RECOMMENDED
JP Morgan
Franklin Templeton
RVK
Goldman Sachs

Source	Percent
Federal Reserve Target	2.00%
CPI 5 Years (2011 - 2016)	1.47%
CPI 10 Years (2006 - 2016)	1.87%
CPI 20 Years (1996 - 2016)	2.20%
Milliman Assumption	2.30%



Kentucky Retirement Systems

CAFR - Participating Members

Retirement Plan	Member % Change FY 06 to FY07	Member % Change FY 07 to FY08	Member % Change FY08 to FY09	Member % Change FY09 to FY10	Member % Change FY10 to FY11	Member % Change FY11 to FY12	Member % Change FY12 to FY13	Member % Change FY13 to FY14	Member % Change FY14 to FY15	Member % Change FY15 to FY16
KERS Non-Hazardous	2.58%	0.36%	-4.21%	2.24%	-1.00%	-9.48%	0.07%	-4.41%	-3.24%	-3.27%
KERS Hazardous	0.67%	1.01%	-1.34%	-0.99%	0.00%	-4.78%	1.00%	-2.50%	-3.43%	1.88%
CERS Non-Hazardous	1.46%	0.35%	-1.76%	1.14%	0.71%	-2.62%	-1.49%	-0.86%	-0.32%	-0.23%
CERS Hazardous	4.44%	1.09%	-4.09%	-2.00%	-1.62%	-2.94%	-0.08%	0.78%	-0.24%	-0.96%
SPRSHZ	-6.91%	3.76%	-4.73%	1.59%	0.42%	-6.01%	-0.55%	-5.21%	9.59%	-3.09%
Total	**1.94%**	**0.45%**	**-2.72%**	**1.22%**	**-0.01%**	**-4.91%**	**-0.85%**	**-1.91%**	**-1.22%**	**-1.13%**

Retirement Plan	Annual Member Growth Rate FY11 to FY16	Annual Member Growth Rate FY06 to FY16
KERS Non-Hazardous	-4.12%	-2.10%
KERS Hazardous	-1.60%	-0.87%
CERS Non-Hazardous	-1.11%	-0.37%
CERS Hazardous	-0.70%	-0.59%
SPRSHZ	-1.21%	-1.23%
Total	**-2.01%**	**-1.12%**

CAFR Payroll Amounts and Member Counts are lower than PIR extract data due to CAFR data excluding Inactive Accounts, Refunded Amounts and Retired - Reemployed Members

Kentucky Retirement Systems

CAFR - Payroll/Compensation

Retirement Plan	Payroll % Change FY06 to FY07	Payroll % Change FY07 to FY08	Payroll % Change FY08 to FY09	Payroll % Change FY09 to FY10	Payroll % Change FY10 to FY11	Payroll % Change FY11 to FY12	Payroll % Change FY12 to FY13	Payroll % Change FY13 to FY14	Payroll % Change FY14 to FY15	Payroll % Change FY15 to FY16
KERS Non-Hazardous	4.58%	3.24%	-4.54%	3.46%	-4.60%	-5.01%	-0.03%	-4.07%	-2.11%	-0.97%
KERS Hazardous	4.39%	2.67%	-1.79%	-1.70%	-7.32%	-0.81%	0.03%	-2.23%	-0.31%	14.67%
CERS Non-Hazardous	4.76%	4.32%	0.78%	2.44%	1.78%	-1.76%	-0.01%	1.61%	1.08%	2.44%
CERS Hazardous	7.51%	3.32%	-1.04%	-0.59%	0.09%	-0.59%	-0.55%	3.79%	0.93%	1.90%
SPRSHZ	3.15%	8.17%	-3.02%	-0.30%	-5.46%	-0.66%	-6.44%	-1.41%	2.57%	-0.47%
Total	**4.93%**	**3.78%**	**-1.62%**	**2.36%**	**-1.20%**	**-2.81%**	**-0.14%**	**-0.38%**	**-0.08%**	**1.53%**

Retirement Plan	Annual Payroll Growth Rate FY11 to FY16	Annual Payroll Growth Rate FY06 to FY16
KERS Non-Hazardous	-2.46%	-1.07%
KERS Hazardous	2.09%	0.62%
CERS Non-Hazardous	0.66%	1.73%
CERS Hazardous	1.08%	1.45%
SPRSHZ	-1.32%	-0.47%
Total	**-0.39%**	**0.61%**

CAFR Payroll Amounts and Member Counts are lower than PIR extract data due to CAFR data excluding Inactive Accounts, Refunded Amounts and Retired - Reemployed Members

KERS Non-Hazardous Sensitivity Analysis		
$000's		
	FY2016	Economic Assumptions
	Valuation Results	Proposed
Retirement		
Discount Rate	*6.75%*	*5.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$13,224,698	$15,300,603
Actuarial Value of Assets	$2,112,286	$2,112,286
Unfunded Liability	$11,112,412	$13,188,317
Funded Ratio	**15.97%**	**13.81%**
Contribution Rate	**41.98%**	**66.52%**
Insurance		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$2,456,678	$2,580,815
Actuarial Value of Assets	$743,270	$743,270
Unfunded Liability	$1,713,408	$1,837,545
Funded Ratio	**30.26%**	**28.80%**
Contribution Rate	**8.41%**	**11.41%**
KERS Non-Hazardous Total		
Discount Rate	*6.75%/7.50%*	*5.25%/6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$15,681,376	$17,881,418
Actuarial Value of Assets	$2,855,557	$2,855,557
Unfunded Liability	$12,825,820	$15,025,862
Funded Ratio	**18.21%**	**15.97%**
Contribution Rate based on FY 2016 Valuation**	**50.39%**	**77.93%**
* Decrease in inflation reflected in corresponding decrease in salary increase assumption and health care cost trend rates		
** FY 2018 Contribution Rates may differ from the 2016 Valuation. Rates in Economic column do not include FY 2017 and FY 2018 additional funding (ARC+)		

KERS Hazardous Sensitivity Analysis $000's		
	FY2016	Economic Assumptions
	Valuation Results	Proposed
Retirement		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$936,706	$1,056,660
Actuarial Value of Assets	$559,487	$559,487
Unfunded Liability	$377,219	$497,173
Funded Ratio	**59.73%**	**52.95%**
Contribution Rate	**20.48%**	**33.95%**
Insurance		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$0	$0
Actuarial Value of Assets	$473,160	$473,160
Unfunded Liability	($95,415)	($74,826)
Funded Ratio	**125.26%**	**118.78%**
Contribution Rate	**1.34%**	**2.14%**
KERS Hazardous Total		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$1,314,451	$1,454,994
Actuarial Value of Assets	$1,032,647	$1,032,647
Unfunded Liability	$281,804	$422,347
Funded Ratio	**78.56%**	**70.97%**
Contribution Rate based on FY 2016 Valuation**	**21.82%**	**36.09%**

* Decrease in inflation reflected in corresponding decrease in salary increase assumption and health care cost trend rates

** FY 2018 Contribution Rates may differ from the 2016 Valuation. Rates in Economic column do not include FY 2017 and FY 2018 additional funding (ARC+)

CERS Non-Hazardous Sensitivity Analysis

$000's

	FY2016 Valuation Results	Economic Assumptions Proposed
Retirement		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$11,076,457	$12,467,390
Actuarial Value of Assets	$6,535,372	$6,535,372
Unfunded Liability	$4,541,084	$5,932,017
Funded Ratio	**59.00%**	**52.42%**
Contribution Rate	**14.48%**	**24.41%**
Insurance		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$2,988,121	$3,159,763
Actuarial Value of Assets	$2,079,811	$2,079,811
Unfunded Liability	$908,310	$1,079,952
Funded Ratio	**69.60%**	**65.82%**
Contribution Rate	**4.70%**	**6.40%**
CERS Non-Hazardous Total		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$14,064,578	$15,627,153
Actuarial Value of Assets	$8,615,183	$8,615,183
Unfunded Liability	$5,449,395	$7,011,969
Funded Ratio	**61.25%**	**55.13%**
Contribution Rate based on FY 2016 Valuation**	**19.18%**	**30.81%**

* Decrease in inflation reflected in corresponding decrease in salary increase assumption and health care cost trend rates

** FY 2018 Contribution Rates may differ from the 2016 Valuation.

CERS Hazardous Sensitivity Analysis		
$000's		
	FY2016	Economic Assumptions
	Valuation Results	Proposed
Retirement		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$3,704,456	$4,212,372
Actuarial Value of Assets	$2,139,119	$2,139,119
Unfunded Liability	$1,565,337	$2,073,253
Funded Ratio	**57.74%**	**50.78%**
Contribution Rate	**22.20%**	**39.11%**
Insurance		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$1,558,818	$1,636,881
Actuarial Value of Assets	$1,135,784	$1,135,784
Unfunded Liability	$423,034	$501,096
Funded Ratio	**72.86%**	**69.39%**
Contribution Rate	**9.35%**	**12.72%**
CERS Hazardous Total		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$5,263,274	$5,849,253
Actuarial Value of Assets	$3,274,903	$3,274,904
Unfunded Liability	$1,988,371	$2,574,349
Funded Ratio	**62.22%**	**55.99%**
Contribution Rate based on FY 2016 Valuation**	**31.55%**	**51.83%**

* Decrease in inflation reflected in corresponding decrease in salary increase assumption and health care cost trend rates

** FY 2018 Contribution Rates may differ from the 2016 Valuation.

SPRS Sensitivity Analysis		
$000's		
	FY2016	Economic Assumptions
	Valuation Results	Proposed
Retirement		
Discount Rate	*6.75%*	*5.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$775,160	$902,272
Actuarial Value of Assets	$234,568	$234,568
Unfunded Liability	$540,593	$667,705
Funded Ratio	**30.26%**	**26.00%**
Contribution Rate	**71.57%**	**116.60%**
Insurance		
Discount Rate	*7.50%*	*6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$257,197	$268,618
Actuarial Value of Assets	$172,704	$172,704
Unfunded Liability	$84,494	$95,915
Funded Ratio	**67.15%**	**64.29%**
Contribution Rate	**18.10%**	**24.25%**
SPRS Total		
Discount Rate	*6.75%/7.50%*	*5.25%/6.25%*
Payroll Growth	*4.00%*	*0.00%*
*Inflation Rate **	*3.25%*	*2.30%*
Actuarial Accrued Liability	$1,032,358	$1,170,891
Actuarial Value of Assets	$407,271	$407,271
Unfunded Liability	$625,086	$763,620
Funded Ratio	**39.45%**	**34.78%**
Contribution Rate based on FY 2016 Valuation**	**89.67%**	**140.85%**

* Decrease in inflation reflected in corresponding decrease in salary increase assumption and health care cost trend rates.

** FY 2018 Contribution Rates may differ from the 2016 Valuation. Rates in Economic column do not include FY 2017 and FY 2018 additional funding (ARC+)