



**County Employees Retirement System
Actuarial Committee – Special Meeting
June 26, 2024 at 2:30 PM ET
Live Video Conference/Facebook Live**

AGENDA

- | | |
|--|--|
| 1. Call to Order | Michael Foster |
| 2. Opening Statement | Eric Branco |
| 3. Roll Call | Sherry Rankin |
| 4. Public Comment | Sherry Rankin |
| 5. Approval of Minutes* -- November 1, 2023 | Michael Foster |
| 6. Forward-Looking Return Expectations | David Lindberg
Craig Morton
Chris Tessman |
| 7. Review of Actuarial Assumptions | Janie Shaw, GRS |
| 8. Historic Review of CERS Unfunded Pension Liability | Janie Shaw, GRS |
| 9. Strategic Plan Discussion* | Ed Owens |
| 10. Adjourn* | Michael Foster |

****Committee Action May Be Taken***

**MINUTES OF MEETING
COUNTY EMPLOYEES RETIREMENT SYSTEM
ACTUARIAL COMMITTEE MEETING
NOVEMBER 1, 2023, AT 2:00 P.M.
VIA LIVE VIDEO TELECONFERENCE**

At the Regular Meeting of the Actuarial Committee of the County Employees Retirement System Board of Trustees held on November 1, 2023, the following members were present: Michael Foster (Chair), Dr. Merl Hackbart, and Dr. Patricia Carver. Staff members present were CERS CEO Ed Owens, III, David Eager, Rebecca Adkins, Erin Surratt, Michael Board, Victoria Hale, Michael Lamb, Connie Davis, Dominique McKinley, Steve Willer, Ashley Gabbard, Shaun Case, Katie Park, and Sherry Rankin. Others present included Janie Shaw, Krysti Kiesel, and Danny White with GRS.

Mr. Foster called the meeting to order.

Mr. Board read the Opening Statement.

Ms. Rankin took Roll Call.

There being no **Public Comment** submitted, Mr. Foster introduced agenda item **Approval of Minutes – April 12, 2023** (Video 00:08:10 to 00:08:50). A motion was made by Dr. Carver and seconded by Dr. Hackbart to approve the minutes as presented. The motion passed unanimously.

Mr. Foster introduced agenda item **Draft Actuarial Valuation** (Video 00:08:51 to 00:44:00). Ms. Janie Shaw, Ms. Krysti Kiesel, and Mr. Danny White with GRS presented the draft 2023 Actuarial Valuation Results with the CERS Actuarial Committee. Dr. Carver made a motion to accept the 2023 Actuarial Valuation Report and forward the report to the CERS Board of Trustees for ratification. Dr. Hackbart seconded the motion and the motion passed unanimously.

Mr. Foster introduced agenda item **Annuity Rate Discussion** (Video 00:44:01 to 01:08:40). There was discussion surrounding the annuity rate for the CERS Hazardous and Nonhazardous plans. It was proposed that CERS either adopt their own actuarial rate or a single blended actuarial rate to be used for all CERS and KRS plans. Ms. Erin Surratt highlighted the administrative burden that

two different rates would create for KPPA. She advised that a significant amount of time would be required for a structural change to the current information technology system and for programming. Additionally, benefit counseling and calculations would become laborious, said Ms. Surratt. There was discussion of a blended rate to compromise with the KRS Board of Trustees and allow for a single rate to be used in the administration of benefits. Dr. Hackbart made a motion to recommend a blended rate of 5.875% to the CERS Board of Trustees. Dr. Carver seconded the motion and the motion passed unanimously.

There being no further business, Mr. Foster requested a motion to *adjourn* the meeting. A motion to adjourn was made by Dr. Carver. Dr. Hackbart seconded the motion and the motion passed unanimously.

Copies of all documents presented are incorporated as part of the Minutes of the Board of Trustees held on November 1, 2023, except documents provided during a closed session conducted pursuant to the open meetings act and exempt under the open records act.

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CERTIFICATION

I do certify that I was present at this meeting, and I have recorded the above actions of the Trustees on the various items considered by it at this meeting. Further, I certify that all requirements of KRS 61.805-61.850 were met in conjunction with this meeting.

Recording Secretary

I, the Chair of the Actuarial Committee of the County Employees Retirement System Board of Trustees, do certify that the Minutes of Meeting held on November 1, 2023, were approved on June 24, 2024.

Chair of the CERS Actuarial Committee

I have reviewed the Minutes of the November 1, 2023, Board of Trustees Meeting for content, form, and legality.

Executive Director
Office of Legal Services

Wilshire



County Employees Retirement System – CERS

Portfolio Expected Return/Risk

June 2024

Contents

- CERS Portfolio Expected Return/Risk
- Wilshire Capital Market Assumptions
 - 2q 2023
 - 1q 2024

Wilshire

CERS Portfolio Expected Return/Risk

CERS Portfolio Expected Return/Risk

- The most significant change since the start of the Asset-Liability Study process began is that asset classes with high sensitivity to growth have decreased assumptions to varying degrees
- The recently approved policy targets reduce growth exposure, and maintain a similar expected return while significantly reducing risk

Expected Returns (%)	6/30/2023	3/31/2024	Change
Global Equity	6.15	5.10	-1.05
Private Equity	9.15	7.90	-1.25
Core Fixed Income	4.85	5.05	0.20
Specialty Credit	7.40	7.48	0.08
Cash	3.85	4.00	0.15
Real Estate	6.00	6.15	0.15
Real Return	6.85	6.75	-0.10

Asset Class	Previous Policy	Newly Approved Policy
Public Equity	50.0%	45.0%
Private Equity	<u>10.0%</u>	<u>8.0%</u>
Total Growth Assets	60.0%	53.0%
Specialty Credit	<u>10.0%</u>	<u>20.0%</u>
Total Defensive Growth Assets	10.0%	20.0%
Core Fixed Income	10.0%	13.0%
Cash	<u>0.0%</u>	<u>2.0%</u>
Total Defensive/Rate Sensitive Assets	10.0%	15.0%
Real Estate	7.0%	5.0%
Real Return	<u>13.0%</u>	<u>7.0%</u>
Total RA / Inflation Sensitive Assets	20.0%	12.0%
Total Assets	100.0%	100.0%
Total Illiquid Assets 1	28.5%	26.5%
Expected Return - 10 Years (%)	6.33	6.36
Standard Deviation of Return (%)	12.79	11.56
+ / (-) in Expected Return (bps)		0.03
+ / (-) in Standard Deviation of Return (bps)		(1.23)
Sharpe Ratio	0.17	0.20

Wilshire

Wilshire Capital Market Assumptions

Wilshire Capital Market Assumptions – 2q 2023

- Second quarter 2023 saw increased rates as The Fed continued it's battle on inflation
- Real GDP continued to slow but remained positive at an annualized rate of 2%
- Consumer spending remained strong while private spending was down by double-digits
- Job growth remained solid and unemployment remained under 4%

Capital Market Assumptions - 2q 2023		
	Return	Risk
Global Equity	6.15%	17.10%
Private Equity	9.15%	27.78%
Core Fixed Income	4.85%	4.70%
Specialty Credit	7.40%	9.06%
Cash	3.85%	0.75%
Real Estate	6.00%	13.93%
Real Return	6.85%	10.67%

Wilshire Capital Market Assumptions – 1q 2024

- Equity assumptions moved lower, mainly on higher current valuations but also lower income return
- Yield curve up across the maturity spectrum, resulting in higher forecasts for fixed income asset classes
- Fed Chair Jerome Powell said that the central bank is in no hurry to raise rates, "This is an economy that doesn't feel like it's suffering from the current level of rates."

Capital Market Assumptions - 1q 2024		
	Return	Risk
Global Equity	5.10%	17.05%
Private Equity	7.90%	27.78%
Core Fixed Income	5.05%	4.70%
Specialty Credit	7.48%	9.06%
Cash	4.00%	0.75%
Real Estate	6.15%	13.93%
Real Return	6.75%	10.67%



April 4, 2024

Board of Trustees
 County Employees Retirement System
 Perimeter Park West
 1260 Louisville Road
 Frankfort, KY 40601

Re: Economic Assumptions for Use in the Upcoming June 30, 2024 Actuarial Valuation

Dear Trustees of the Board:

Each year the actuarial committee reviews the principal economic assumptions (i.e. price inflation, investment return assumption, and payroll growth) for use in the actuarial valuation. Economic and demographic assumptions used in an actuarial valuation should be representative of the System's expected long-term experience. These assumptions are not intended to consistently model short-term (e.g. the next two to five years) experience, but are supposed to be representative of expected long-term trends. As a result, short-term experience may differ significantly from the long-term assumption used in an actuarial valuation.

The three primary economic assumptions used in an actuarial valuation include the price inflation, investment return, and payroll growth assumption. The following analysis and exhibits provide our recommended assumptions to be adopted by the Board for use in the June 30, 2024 actuarial valuation and rationale for each recommendation.

Assumption	June 30, 2023 Valuation Adopted Assumption	June 30, 2024 Valuation Recommended Assumption
Price Inflation	2.50%	2.50%
Investment Return	6.50%	6.50%
Payroll Growth ¹	2.00%	2.00%

¹ The recommended payroll growth assumption includes an underlying assumption that future active membership will remain relatively unchanged.

CERS Board of Trustees
April 4, 2024
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Price Inflation Assumption

Benefits provided to members in CERS are not explicitly impacted by the actual change in price inflation. The current price inflation assumption is 2.50% and was increased from 2.30% in the last experience study. We reviewed several sources that provide various perspectives of forward-looking inflation expectations and recommend the continued use of a 2.50% inflation assumption in the 2024 actuarial valuation.

We recognized that actual inflation as measured by CPI has been much higher than the current 2.50% assumption during the last 36 months. Additionally, many professional forecasters and economists expect that inflation will continue to be elevated above historical levels for the next 12 to 24 months. However, given the long-time horizon of an actuarial valuation, the Federal Reserve's conviction to return to a 2.00% target inflation, and the relative immateriality of this assumption in the actuarial valuation, we believe a 2.50% inflation assumption continues to be reasonable for this purpose. Please see Exhibit 1 for more information on the comparison of future inflation expectations.

Investment Return Assumption

The investment return assumption is perhaps the most important and most subjective assumption used in an actuarial valuation. It represents the expected long-term return on plan assets and is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plan. The investment return assumption was recently increased from 6.25% to 6.50% for performing the June 30, 2023 actuarial valuation.

We believe the most appropriate approach in identifying a reasonable investment return assumption is to understand forward-looking expectations developed by professional investment consulting firms. To do this, we have analyzed CERS's investment policy with the capital market assumptions from eight nationally recognized investment consultants, including Wilshire Advisors which is CERS's investment consultant. The asset allocation used in this analysis is based on the target asset allocation that will be subject to approval in April 2024.

Also, since investment consultants update their assumptions on at least an annual basis, we also compared their expectations developed in 2024, to their prior year assumptions using the same target asset allocation to identify and isolate the change in return expectations due to changes in capital market expectations. Attached is Exhibit 2 that provides this comparison for each investment consulting firm for 2023 and 2024.

It is our recommendation that the CERS Board adopt the continued use of a 6.50% investment return assumption for the valuation of the pension and insurance funds at June 30, 2024. Given the methodology used by the investment consultants to develop their expectations, it is possible their expectations for the shorter term revert higher as the economy enters an expected increasing interest rate setting.



CERS Board of Trustees
April 4, 2024
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Payroll Growth Assumption

The payroll growth assumption is only used in the development of the amortization cost component of the contribution rate. When emerging membership payroll changes are consistent with the payroll growth assumption, the amortization cost will remain relatively constant as a percentage of payroll (assuming there are no other gains or losses). However, if the future change in payroll is consistently less (more) than assumed, then the amortization cost will gradually increase (decrease) as a percentage of membership payroll.

The change in membership payroll is primarily driven by underlying changes in salary increases for individual members as well as the number of members earning benefits in the System. There are many external and economic factors that can influence the change in both of these underlying elements. The assumed rate of salary increases individuals receive are based on long-term expectations of average increases across all economic cycles that include times of expansion and contraction. Similarly, when reviewing the change in active membership headcount, our analysis considers the inherent long-term nature of this assumption across all economic cycles.

The current payroll growth assumption is 2.00% of pay for the Non-Hazardous and Hazardous funds (pension and insurance) and has been the adopted assumption for many years. In other words, the actuarial valuation assumes that total membership payroll will grow by 2.00% each year. Underlying this assumption is an implicit assumption that the active membership headcount will remain relatively unchanged in future years. Note, that in any given year, active headcount could increase or decrease but as long as membership payroll continues to change as assumed, the amortization cost as a percentage of pay will not change due to changes in payroll.

Exhibit three provides a ten-year historical experience of the change in membership headcount and membership payroll. We believe it is reasonable to continue to assume that active membership headcount will remain relatively constant in future years for both the Non-Hazardous and Hazardous funds, as the economic conditions continue to remain steady and improving for local government entities that participate in CERS. As a result, we also believe the current 2.00% payroll growth assumption is reasonable and we recommend the Board adopt a 2.00% payroll growth assumption for use in the June 30, 2024 actuarial valuation for both the Non-Hazardous and Hazardous plans.



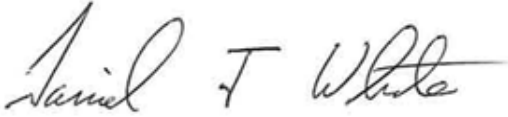
CERS Board of Trustees
April 4, 2024
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Closing Comments

This analysis was conducted in accordance with generally accepted actuarial principles and practices. We believe these recommended assumptions comply with Actuarial Standard of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations.

All of the undersigned are members of the American Academy of Actuaries and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. In addition, all of the undersigned are experienced in performing valuations for large public retirement systems.

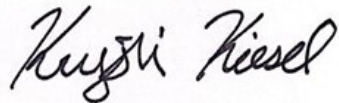
Sincerely,



Daniel J. White, FSA, EA, MAAA
Senior Consultant



Janie Shaw, ASA, EA, MAAA
Consultant



Krysti Kiesel, ASA MAAA
Consultant

Enclosure



Exhibit 1. Comparison of Price Inflation Assumption to Sources of Forward-Looking Expectations

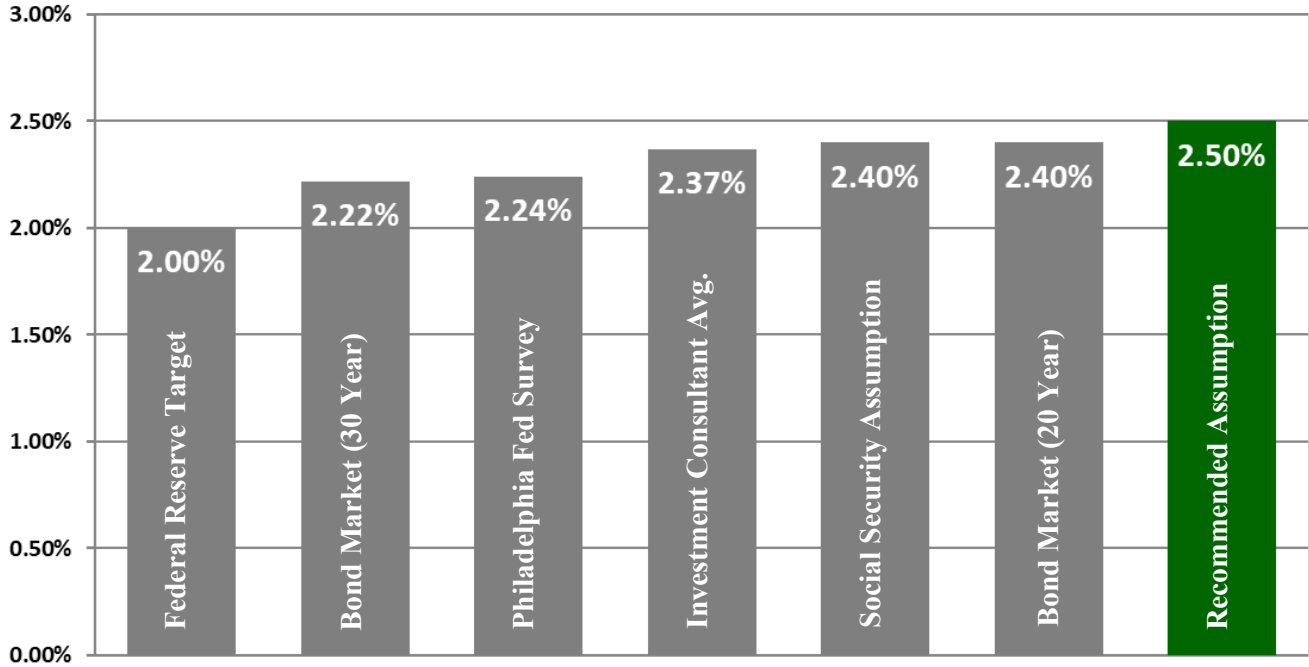


Exhibit 2.

Review of Forward-Looking Capital Market Expectations Mapped CERS's Target Investment Allocation Subject to Approval in April 2024

	Investment Consultant	50th Percentile Expected Return (Geometric)		Probability of Exceeding 6.50%	
		2024	2023	2024	2023
		(1)	(2)	(3)	(4)
7 to 10 Year Expectations	1	5.9%	6.6%	44%	51%
	2	6.6%	7.0%	51%	59%
	3	6.6%	6.3%	51%	48%
	4	6.9%	7.1%	54%	56%
	5	7.0%	7.5%	56%	60%
	6	7.1%	7.3%	56%	58%
	7	7.2%	7.6%	57%	61%
	8	7.4%	7.0%	59%	55%
20 to 30 Year Expectations	1	6.3%	6.4%	47%	49%
	2	7.3%	7.4%	58%	59%
	3	7.4%	7.7%	59%	62%
	4	7.4%	7.7%	60%	62%
	5	7.5%	7.4%	60%	59%
7-10 Year Expectation Avg:		6.9%	7.0%	53%	56%
20-30 Year Expectation Avg:		7.2%	7.3%	57%	58%

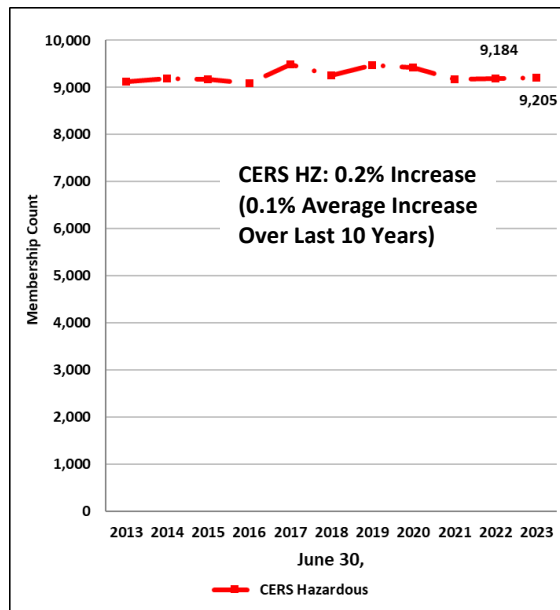
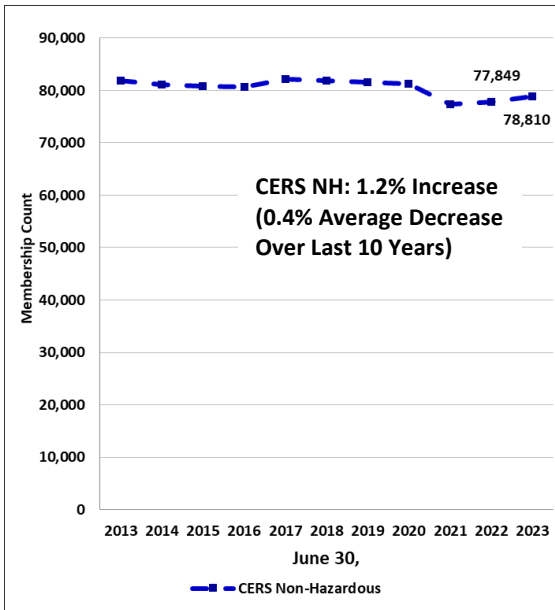
The primary purpose of performing this analysis using multiple investment consulting firms is to quantify the possible difference in forward looking return expectations within the professional investment community. We have provided this analysis based on information from the following investment consulting firms:

- Aon
- BNY Mellon
- Callan
- Cambridge
- Mercer
- NEPC
- RVK
- Wilshire Associates

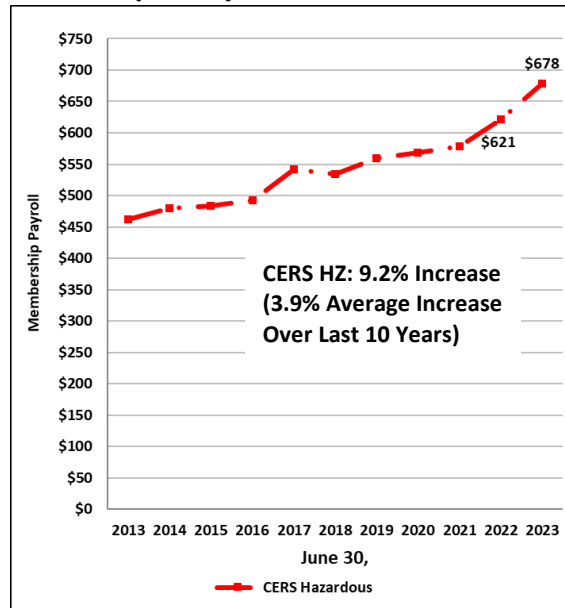
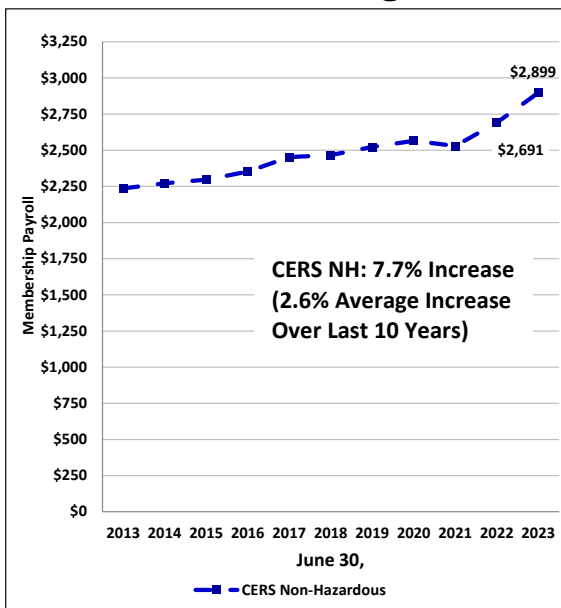


Exhibit 3. Review of Historical Change in Active Membership Headcount and Payroll

Change in Active Membership Headcount



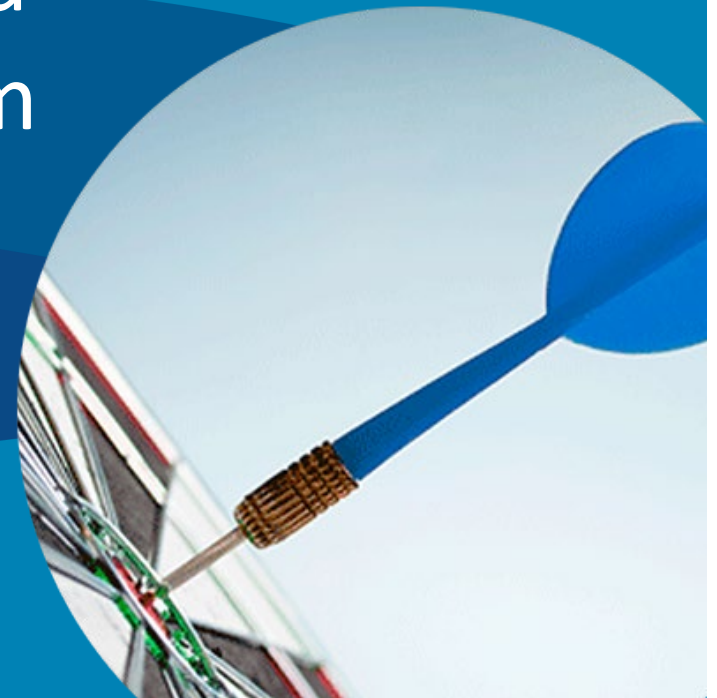
Change in Membership Payroll





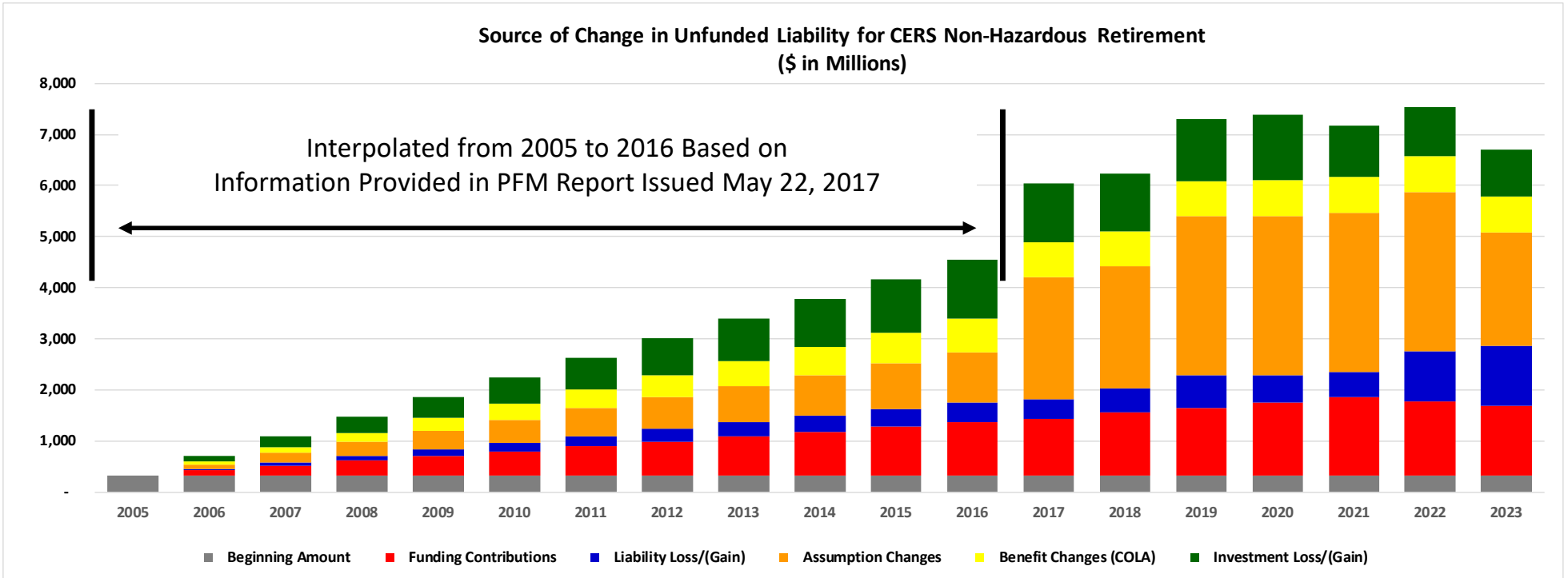
County Employees Retirement System

Reconciliation of the Unfunded
Actuarial Accrued Liability from
2005 to 2023



CERS Non-Hazardous Retirement Fund

Source of Change in Unfunded Liability for CERS Non-Hazardous Retirement
(\$ in Millions)

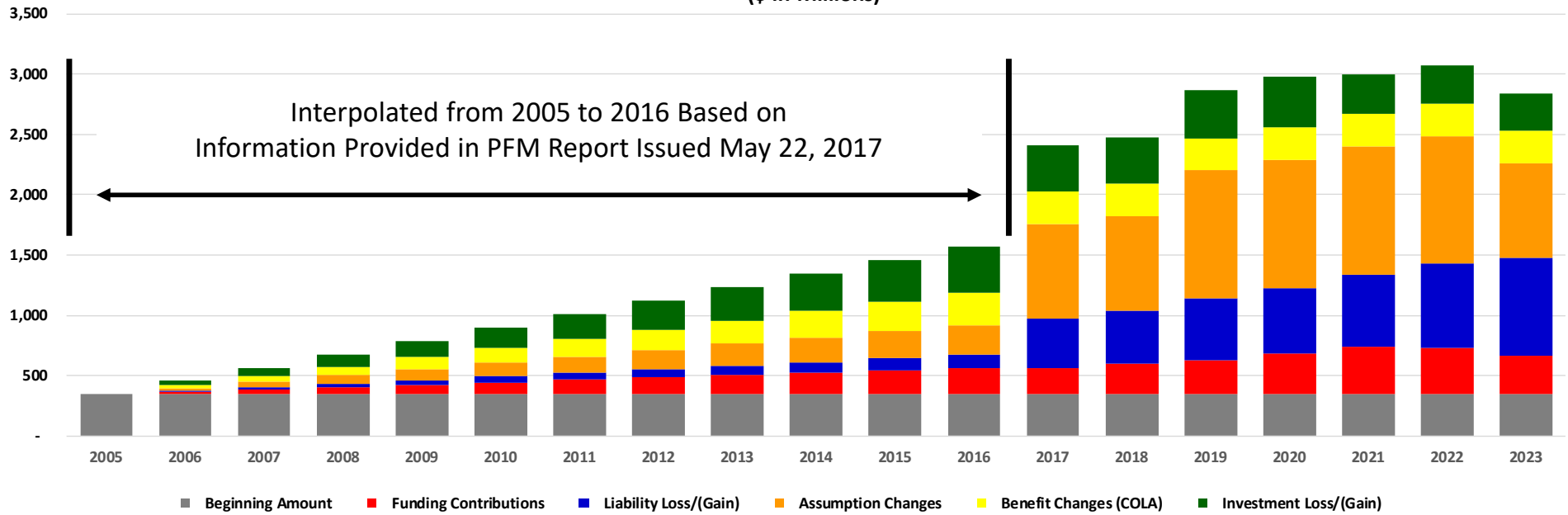


June 30,	Interpolated using information in the #2 PFM Report											Source: GRS Funding Reports								
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Unfunded Liability	\$ 326	\$ 709	\$ 1,093	\$ 1,476	\$ 1,859	\$ 2,242	\$ 2,626	\$ 3,009	\$ 3,392	\$ 3,775	\$ 4,159	\$ 4,542	\$ 6,039	\$ 6,242	\$ 7,306	\$ 7,390	\$ 7,179	\$ 7,525	\$ 6,711	
Investment Loss/(Gain)	-	103	207	310	414	517	621	724	828	931	1,035	1,138	1,153	1,141	1,219	1,294	1,019	958	932	
Benefit Changes (COLA)	-	61	122	183	244	305	367	428	489	550	611	672	672	687	687	687	691	691	695	
Assumption Changes	-	89	179	268	358	447	537	626	716	805	895	984	2,390	2,390	3,119	3,119	3,119	3,119	2,213	
Liability Loss/(Gain)	-	34	68	101	135	169	203	237	271	304	338	372	387	469	632	546	499	982	1,191	
Funding Contributions	-	95	191	286	382	477	573	668	764	859	955	1,050	1,111	1,229	1,323	1,418	1,525	1,449	1,354	
Beginning Amount	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	



CERS Hazardous Retirement Fund

Source of Change in Unfunded Liability for CERS Hazardous Retirement
(\$ in Millions)



June 30,	Interpolated using information in the #2 PFM Report											Source: GRS Funding Reports								
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Unfunded Liability	\$ 344	\$ 455	\$ 566	\$ 677	\$ 788	\$ 899	\$ 1,011	\$ 1,122	\$ 1,233	\$ 1,344	\$ 1,455	\$ 1,566	\$ 2,411	\$ 2,471	\$ 2,870	\$ 2,983	\$ 3,000	\$ 3,073	\$ 2,842	
Investment Loss/(Gain)	-	34	69	103	138	172	207	241	276	310	345	379	384	378	401	425	333	315	308	
Benefit Changes (COLA)	-	24	49	73	97	121	146	170	194	218	243	267	267	269	269	269	270	270	270	
Assumption Changes	-	23	45	68	91	113	136	158	181	204	226	249	789	789	1,062	1,062	1,062	1,062	786	
Liability Loss/(Gain)	-	10	19	29	39	49	58	68	78	88	97	107	411	437	510	547	600	692	811	
Funding Contributions	-	20	40	60	80	100	120	140	160	180	200	220	216	254	284	336	391	390	323	
Beginning Amount	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	



Disclaimers

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- Readers are cautioned to examine original source materials and to consult with subject matter experts before making decisions related to the subject matter of this presentation.





Commonwealth of Kentucky Pension Performance and Best Practices Analysis

Interim Report #2: Historical and Current Assessment

**Summary Presentation to the
Public Pension Oversight Board**

May 22, 2017

PFM Group
Consulting LLC

In conjunction with:
PRM Consulting Group
Stites & Harbison PLLC

215-557-1465
pfm.com

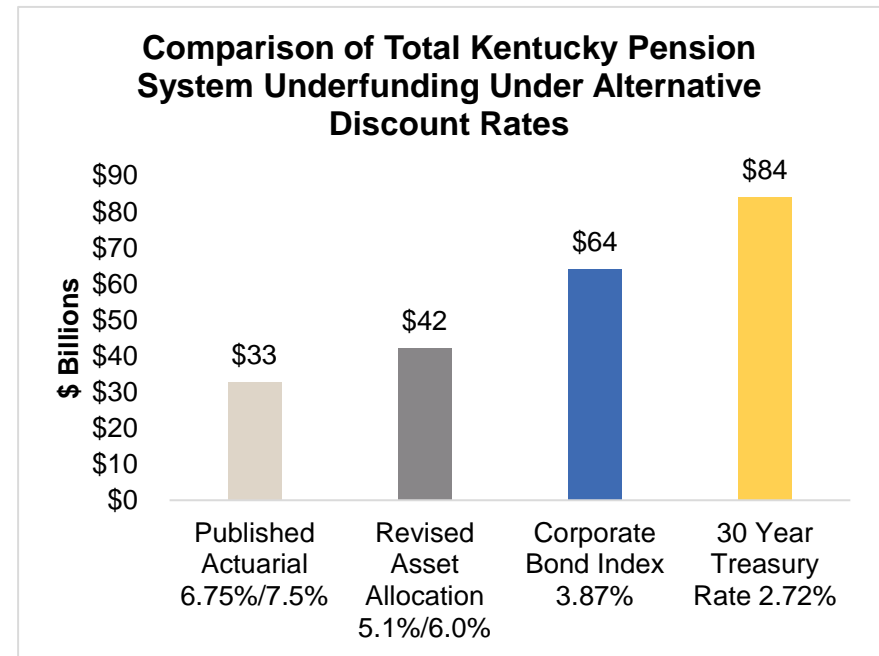


The Magnitude of the Challenge



Kentucky Pension Liabilities are Severely Underfunded

- Kentucky’s unfunded pension liability, already large in absolute and relative terms at \$33 billion under published actuarial rates of return/discount rates, increases significantly when measured using alternative discount rates
- Based on alternate return assumptions for a 10-year investment horizon and increased liquidity positions generally consistent with evolving KRS practices, the unfunded liability would rise to \$42 billion (“Revised Asset Allocation rate”)
- Using weighted average rates across the yield curve for a corporate bond index used in private sector pension reporting (“Corporate Bond Index”) the projected unfunded liability would total \$64 billion
- With the equivalent average rate for U.S. Treasuries, it would total \$84 billion – more than 7 times annual General Fund spending



Source: KRS, TRS, KJFRS Valuation Reports, PRM Consulting Group

The United States Government Accountability Office and the Society of Actuaries have observed that incorporating alternative discount rates up to and including a “risk-free rate” based on the U.S. Treasury yield curve helps measure the risk involved in the plan and its assumptions and liabilities.

Source: United States Government Accountability Office, *Pension Plan Valuation: Views on Using Multiple Measures to Offer a More Complete Financial Picture*, September 2014; Society of Actuaries, Report of the Blue Ribbon Panel on Public Pension Plan Funding, February 2014



Kentucky's Pension Liabilities are by Some Measures the Worst in the U.S.

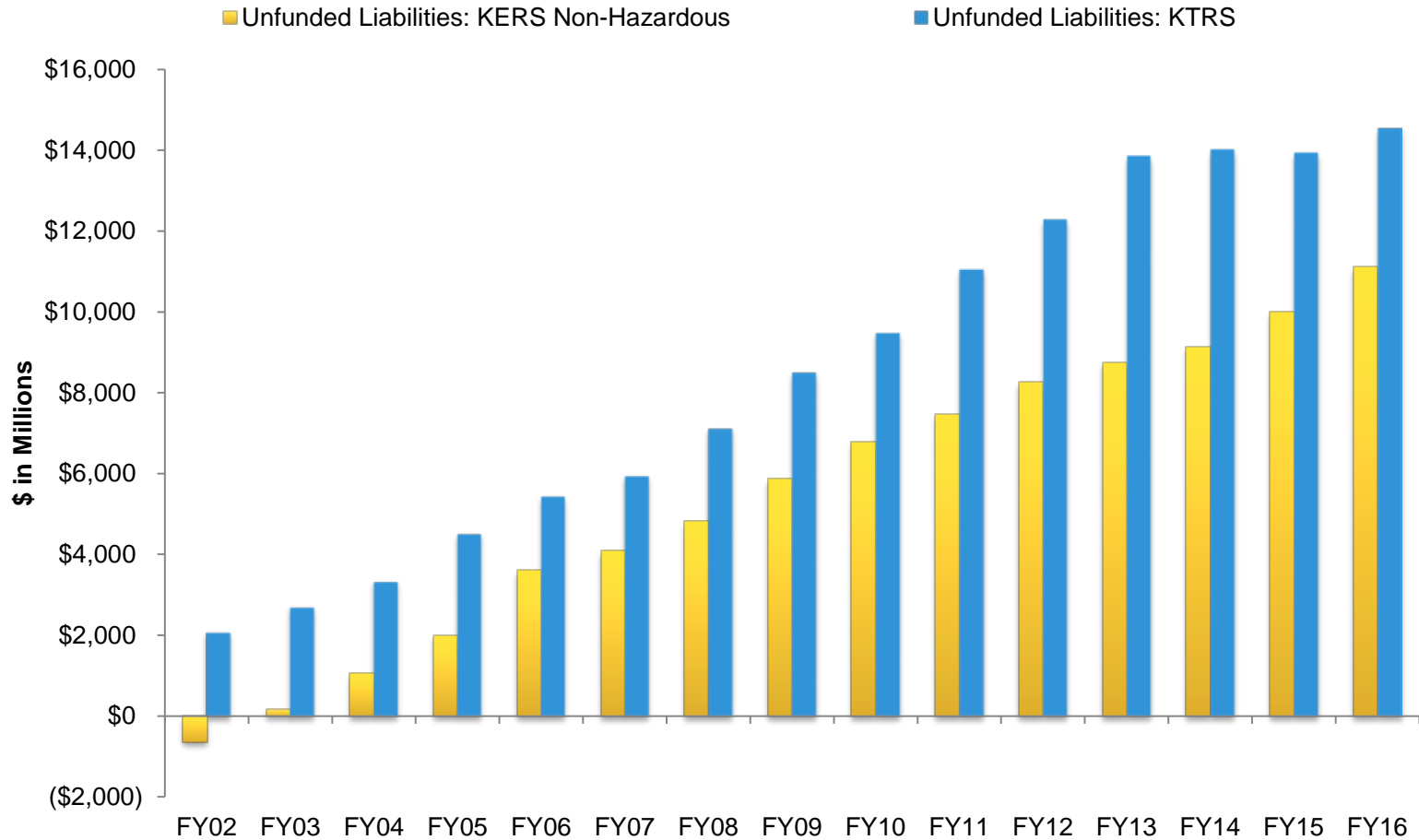
- The Commonwealth's share of the retirement system's aggregate pension liabilities was measured by the bond rating agency Standard & Poor's as the worst-funded among all states for FY15, the most recent year analyzed
- Other recent measurements of net pension liabilities and the annual required contribution (ARC) compared to governmental revenues by Moody's Investors Service and the Center for Retirement Research at Boston College, respectively, have also found Kentucky to be among the four states with the highest stress due to pension obligations

FY2015 Worst-Funded Pension Ratios Aggregate of State Liabilities		
	Median	74.6%
	Average	73.2%
46	Rhode Island	55.5%
47	Connecticut	49.4%
48	Illinois	40.2%
49	New Jersey	37.8%
50	Kentucky	37.4%

Source: Standard & Poor's, *U.S. State Pensions: Weak Market Returns Will Contribute to Rise in Expense*, September 12, 2016



The Unfunded Liability of Kentucky's Two Largest State Pension Systems has Increased Dramatically

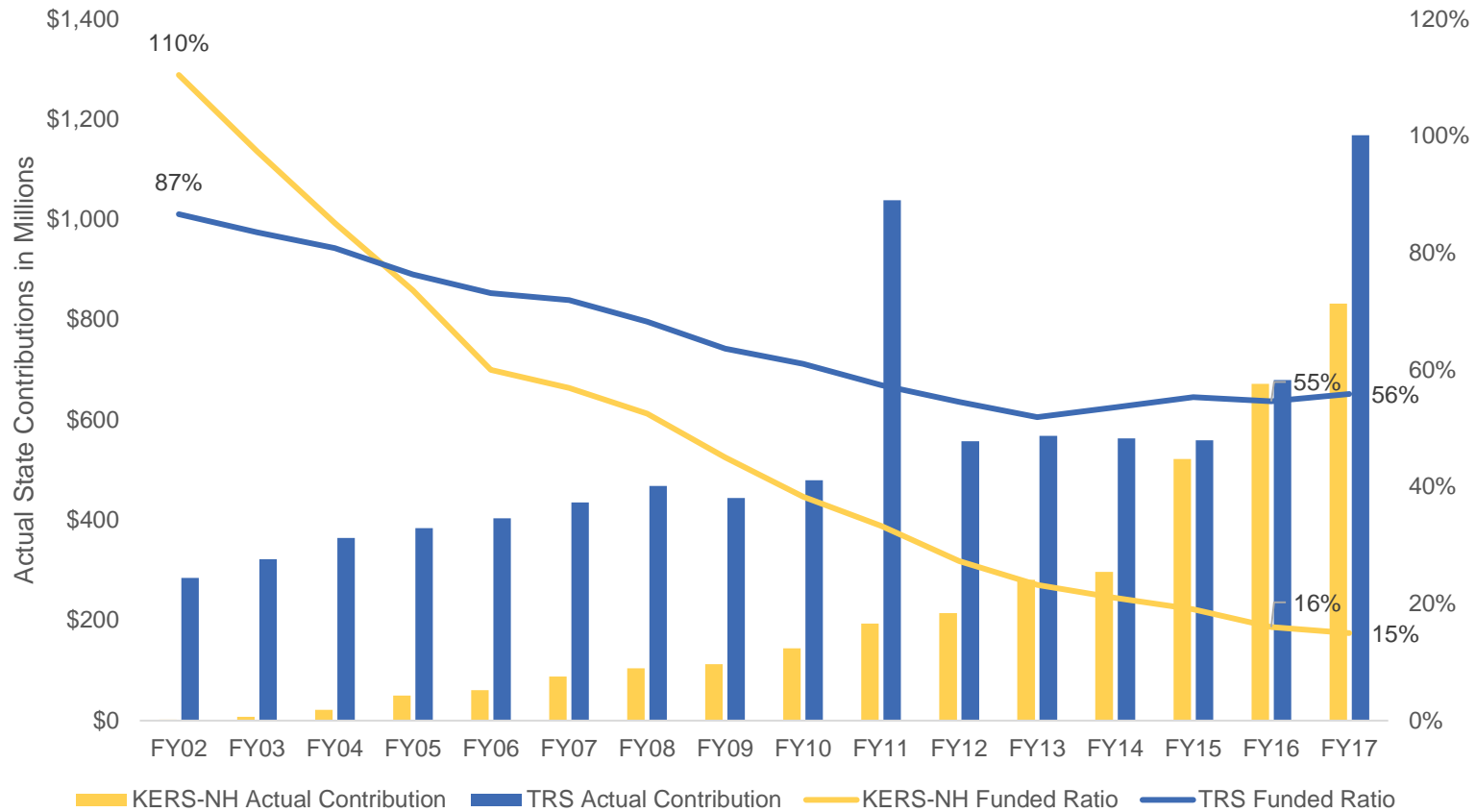


Source: Commonwealth of Kentucky valuation reports for KRS, TRS as of 6/30/16



Despite Increasing State Expenditures for the Largest Systems, Funded Ratios Have Sharply Declined

KERS-NH and TRS Budget Contributions and Funded Ratio

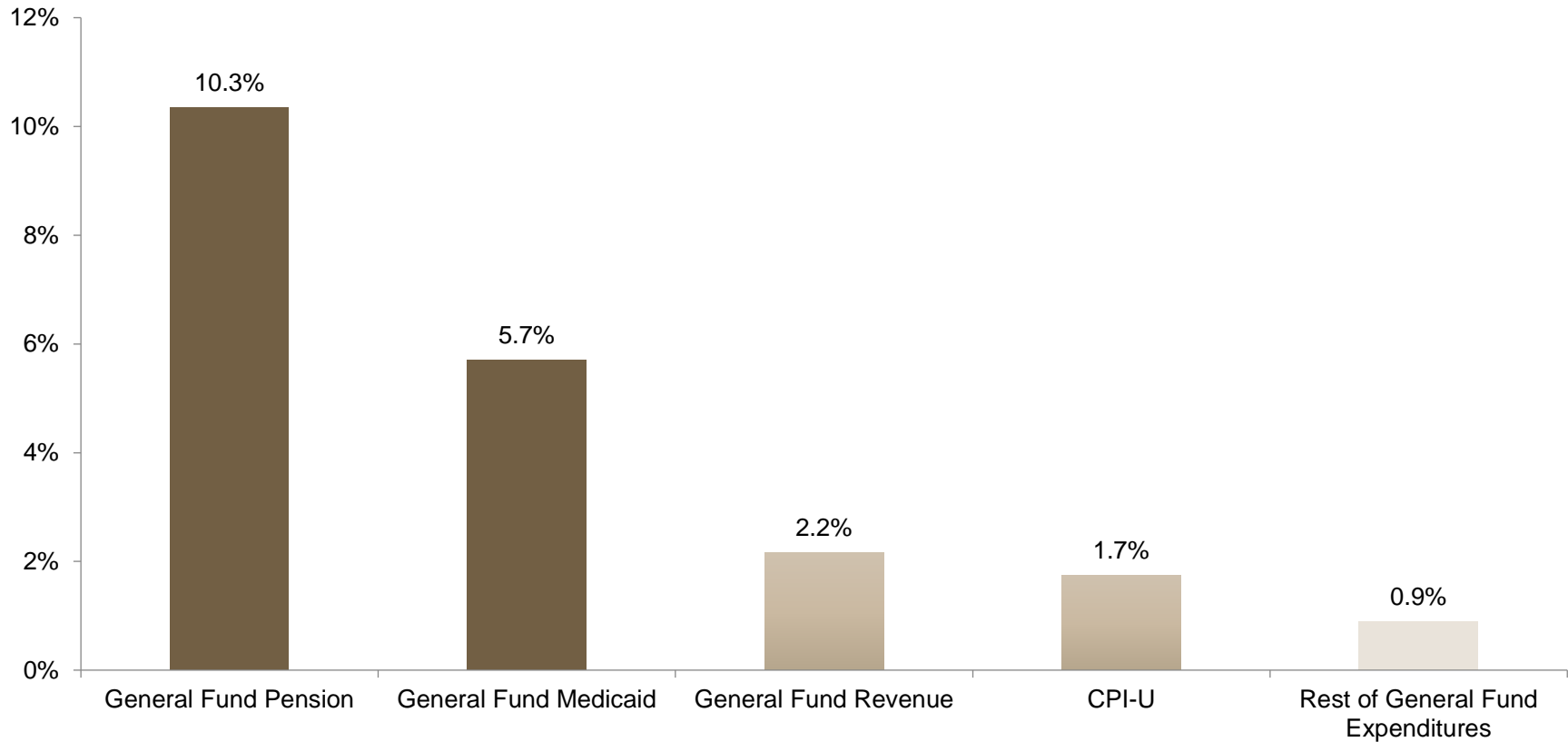


Source: Commonwealth of Kentucky valuation reports for KRS, TRS as of 6/30/16, and Kentucky Office of the State Budget Director data. FY17 funded ratio from Cavanaugh MacDonald data based on the projections and assumptions of the 6/30/16 valuations. FY11 figure includes pension obligation bond proceeds for TRS.



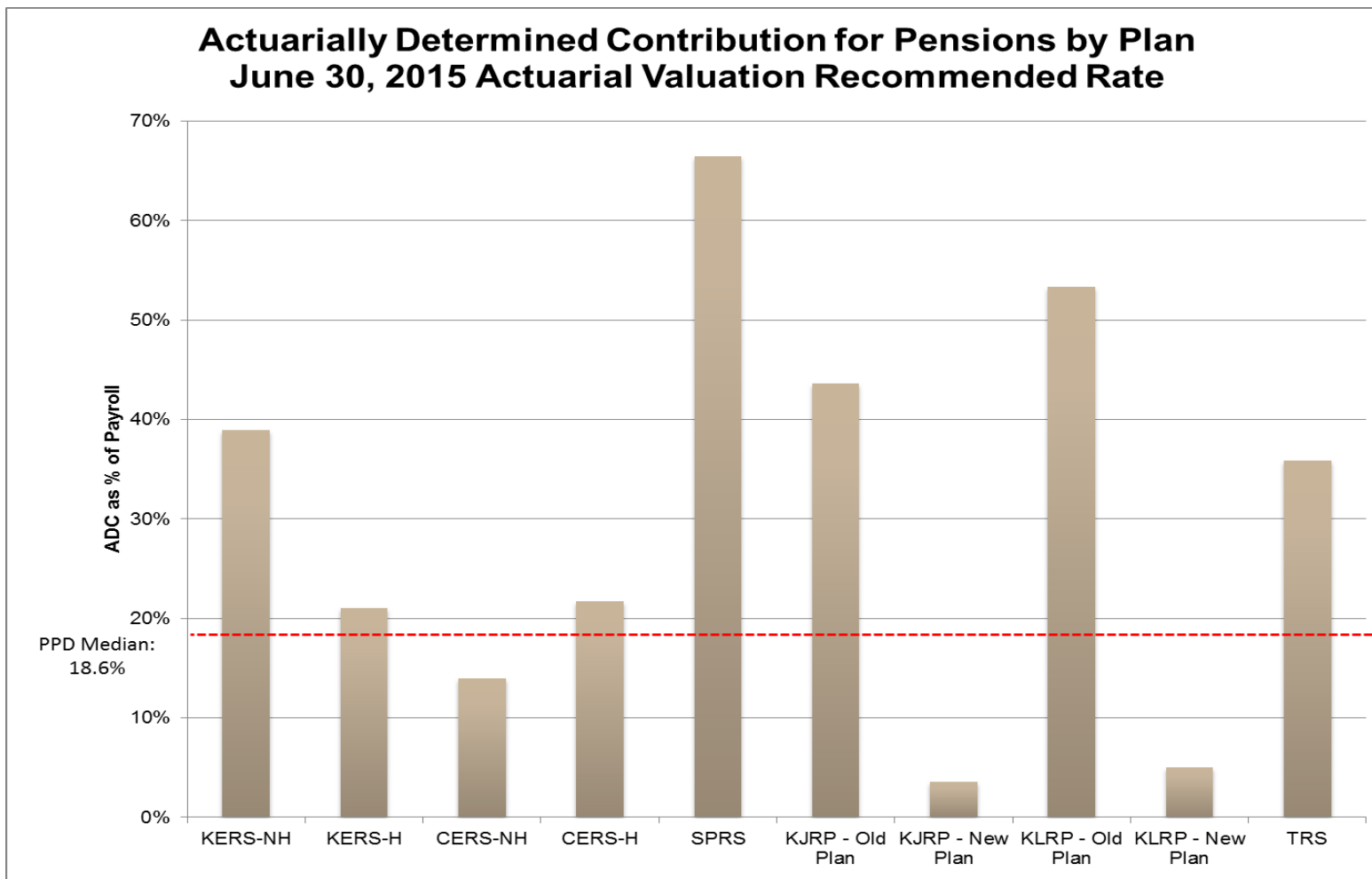
Pension Expenditures are Crowding out the Rest of the Budget and Growing Much Faster than Revenues

**Pension Expenditures: Rapid Growth
FY07-FY17 Compound Annual Growth Rate**





Pension Expenditures Are Also High Relative to Salaries



Source: System valuation reports, Center for Retirement Research: The Funding of State and Local Pensions, 2015- 2020, June 2016



KERS-NH Was Projected to Decline Still Further from 16% Funded Under the Previous Assumptions, Even With Healthy Earnings, High Payroll Growth and Full Required Funding

Comparison of Pension Amortization Schedules						
KERS-NH June 30, 2016 Valuation and Actuarial Assumptions						
Level % of Payroll (Current Baseline Amortization Method as Defined in 2013SB2 vs. Level \$ Amortization)						
(\$ in Millions)						
Year	Employer Contribution		Unfunded Liability		Funded Ratio	
	Level %	Level \$	Level %	Level \$	Level %	Level \$
2019	\$731.7	\$1,082.2	\$11,620	\$11,258	12.9%	15.6%
2020	752.6	1,113.1	11,741	10,982	12.2%	17.9%
2021	793.3	1,117.3	11,789	10,643	12.0%	20.5%
2022	817.6	1,151.5	11,814	10,245	11.9%	23.6%
2023	851.9	1,099.4	11,805	9,875	12.1%	26.5%
2024	879.0	1,134.5	11,767	9,443	12.4%	29.7%
2025	912.1	1,071.0	11,692	9,047	13.0%	32.7%
2026	942.7	1,106.9	11,581	8,588	13.8%	36.1%
2027	976.7	1,040.2	11,428	8,166	14.9%	39.2%
2028	1,010.4	1,076.1	11,229	7,680	16.3%	42.7%
2029	1,044.0	1,005.8	10,983	7,234	18.0%	46.0%
2030	1,080.6	1,041.0	10,683	6,721	20.1%	49.7%
2031	1,114.8	968.8	10,327	6,249	22.5%	53.1%
2032	1,154.6	1,003.4	9,907	5,710	25.5%	57.0%
2033	\$1,190.7	\$929.8	\$9,422	\$5,211	28.9%	60.7%

Source: Cavanaugh MacDonald

Note: Actuarial assumptions include 6.75% earnings assumption, 4% payroll growth, and 26-year remaining amortization period.



Alternative Assumptions Increase General Fund Pressures

Commonwealth of Kentucky General Fund Budget Estimates TRS and KERS-NH Budget Estimates Baseline June 30, 2016 Valuation and Alternative Assumptions (\$ in Millions)						
Year	TRS			KERS-NH		
	Published Actuarial Assumptions	Published Actuarial Assumptions with Level \$ Amortization	Revised Asset Allocation Discount Rate (6%), Level % Amortization	Published Actuarial Assumptions	Published Actuarial Assumptions with Level \$ Amortization	Revised Asset Allocation Discount Rate (5.1%), 0% Payroll Growth
2019	\$1,056.8	\$1,392.4	\$1,407.7	\$377.8	\$558.8	\$622.2
2020	1,071.0	1,403.6	1,454.5	388.6	574.7	640.0
2021	1,116.3	1,454.7	1,526.9	409.6	576.9	639.9
2022	1,185.3	1,501.4	1,596.8	422.2	594.5	659.5
2023	1,251.5	1,540.1	1,661.2	439.9	567.7	628.3
2024	1,296.2	1,546.2	1,703.1	453.9	585.8	648.3
2025	1,341.5	1,548.3	1,745.4	471.0	553.0	611.5
2026	1,386.5	1,546.8	1,786.8	486.8	571.6	632.0
2027	1,432.5	1,544.7	1,828.2	504.3	537.1	593.5
2028	1,479.7	1,542.2	1,870.5	521.7	555.6	614.0
2029	1,529.8	1,540.0	1,915.1	539.1	519.3	573.2
2030	1,582.1	1,538.0	1,961.4	557.9	537.5	593.3
2031	1,636.5	1,536.4	2,009.1	575.6	500.2	551.0
2032	1,692.4	1,534.6	2,058.0	596.2	518.1	570.7
2033	\$1,751.3	\$1,533.7	\$2,108.4	\$614.8	\$480.1	\$527.4

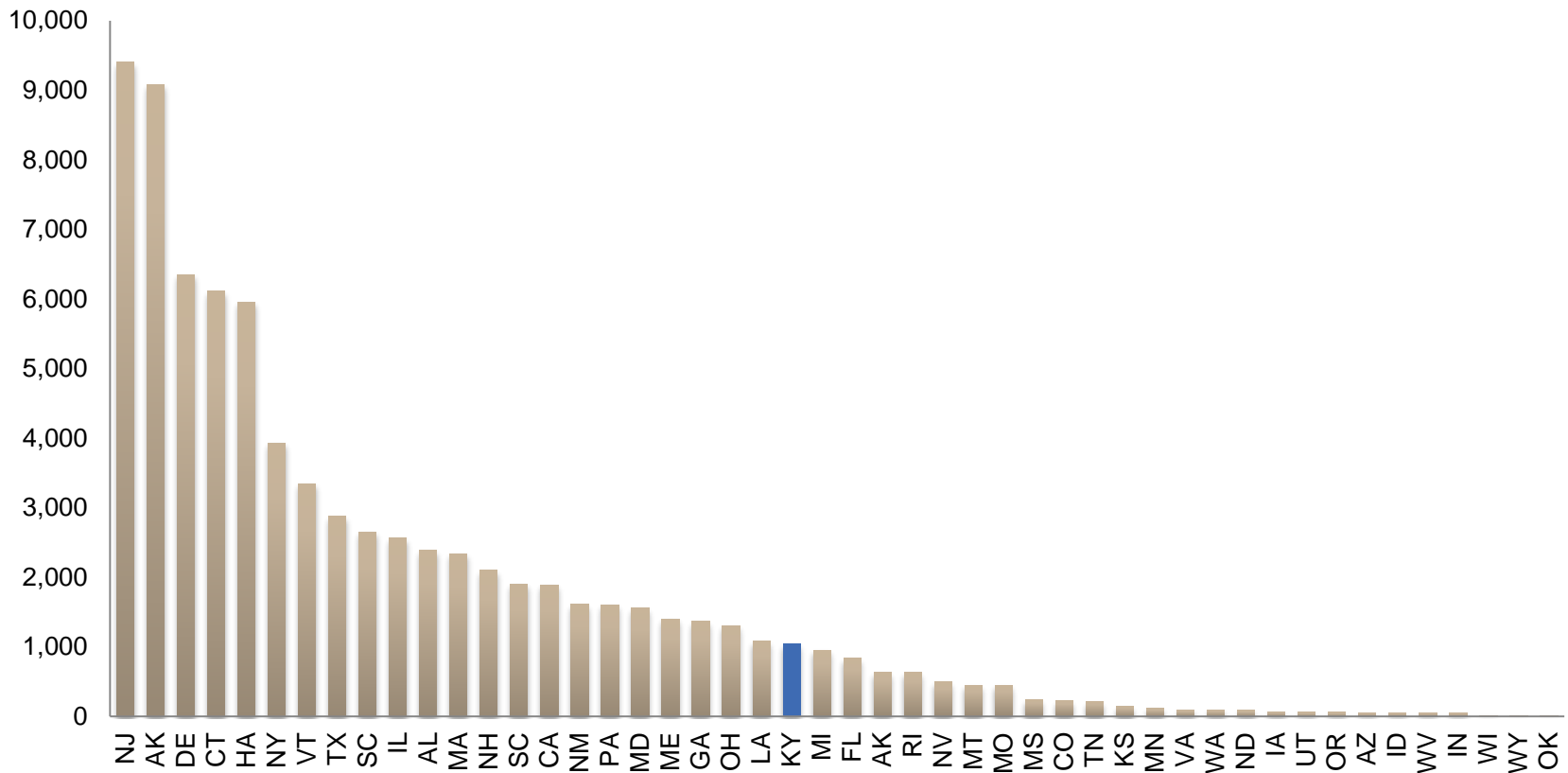
Source: PFM analysis based on information from the Kentucky Office of the State Budget Director and employer contribution estimates from Cavanaugh MacDonald.

Note: Budget amount based on the actuarially determined contribution under each scenario, not reflective of prior under- or over-funding. The TRS Revised Discount Rate estimates also reflect reduction of the payroll growth assumption to 2.5%.



Kentucky's OPEB (Retiree Healthcare) Liabilities are Relatively Better-Funded

Unfunded OPEB Liability per Capita



Source: Standard & Poor's, Rising U.S. State Post-Employment Benefit Liabilities Signal An Unsustainable Trend, September 7 2016. Note: Nebraska and South Dakota have no OPEB liability. Liabilities are as reported for the most recent valuation date available, between 12/31/2013 and 6/30/2015.



Kentucky has Done More to Fund OPEB and Limit Liability than Most Other States

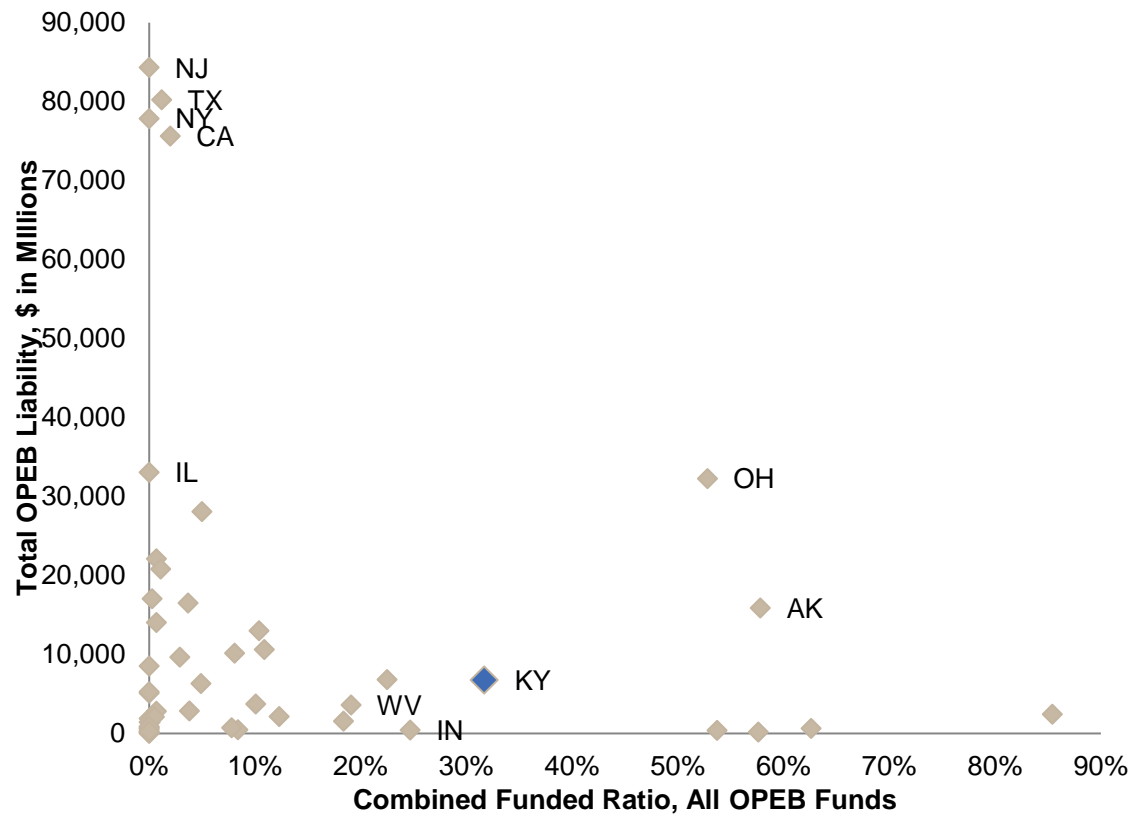
While still a part of the overall challenge, Kentucky is better positioned with funding its OPEB liability

- Set aside dedicated funding earlier than most other states
- Employees contribute toward future benefits
- \$6 billion in unfunded liability is much lower than for pensions

Benefit reforms

- KRS in 2003
- TRS in 2010

Total OPEB Liability v. OPEB Funded Ratio



Source: Standard & Poor's, Rising U.S. State Post-Employment Benefit Liabilities Signal An Unsustainable Trend, September 7 2016. Note: Nebraska and South Dakota have no OPEB liability. Liabilities are as reported for the most recent valuation date available, between 12/31/2013 and 6/30/2015.



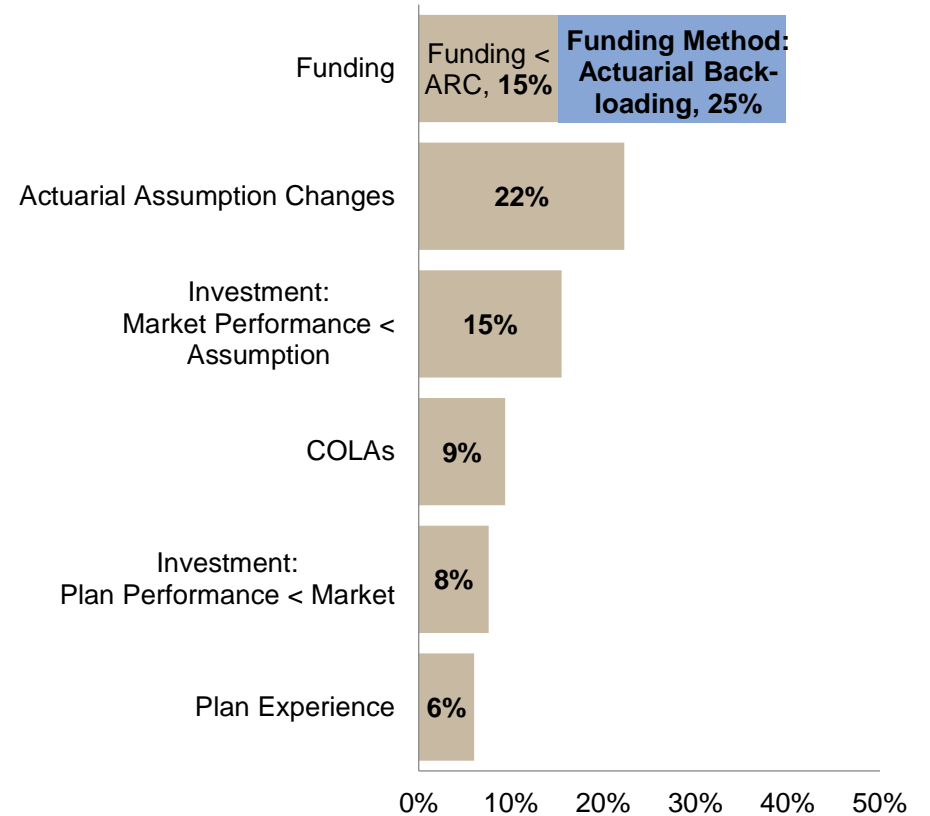
How Did We Get Here



How Did We Get Here: Summary

- ◆ Across all state systems in the aggregate, the largest cause of the increase in the unfunded pension liability was the use of the level percentage of payroll funding method (“actuarial back-loading” with “negative amortization”) – amplified by pay increase assumptions far higher than actual pay increases over this 11-year time period
 - A further contributing factor is Kentucky’s biennial budget. The County plans reset their contribution rates annually, whereas the State plans reset their contribution rates every second year
- ◆ The next two largest factors were:
 - Changes in actuarial assumptions
 - Market investment performance, measured by a benchmark portfolio being below the assumed valuation earnings rate
 - These two factors are related, as the decision to reduce the valuation earnings rate reflected the lower actual and reduced future investment earnings expectations
- ◆ The fourth major cause was employer funding less than the actuarially recommended rates
 - An issue for three of the six plans – and was a major cause of the increase for the KERS Non-Hazardous plan
- ◆ The fifth major cause was cost-of-living adjustments (COLAs) granted with no additional funding provided

Summary Components of \$25.3 Billion Increase in Unfunded Pension Liabilities: All Systems



Source: PRM Consulting Group



How Did We Get Here: Summary by System

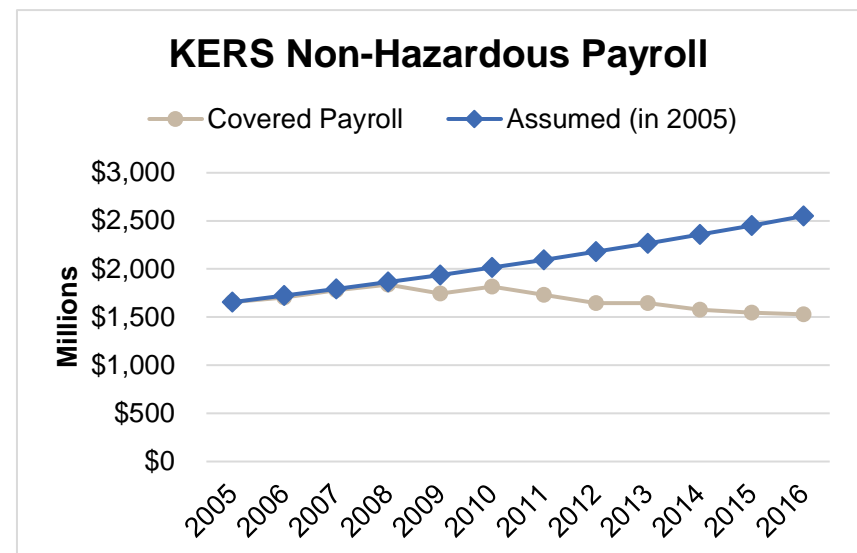
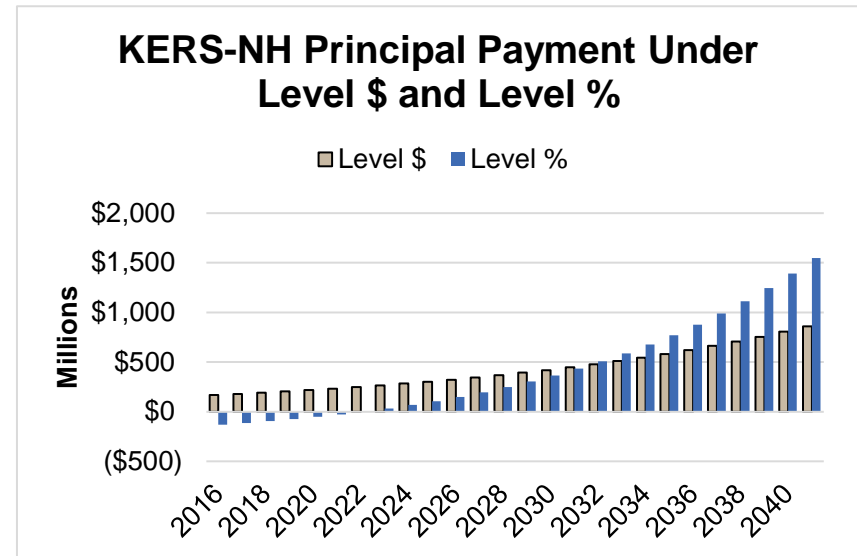
- The actuarial back-loading and amortization method were a significant factor in the increase in unfunded liability for all the systems
- Changes in actuarial assumptions to reduce the discount rate, update mortality tables, and reflect demographic patterns was also a consistently large factor
- The CERS-H and SPRS plans had relatively significant unfavorable plan experience
- Sub-par market performance was a larger factor than individual plan management underperformance for most systems

Factors Increasing the Unfunded Pension Liability 6/30/2005 to 6/30/2016: Amounts in \$Millions										
Causes	TRS	KERS-NH	KERS-H	CERS-NH	CERS-H	SPRS	KJRP	KLRP	TOTAL	
Actuarial Back-loading	\$3,278	\$1,153	\$89	\$1,269	\$353	\$111	\$31	\$2	\$6,286	25%
Actuarial Assumption Changes	1,958	2,319	82	984	249	50	25	5	5,672	22%
Plan Experience	232	539	39	372	107	107	43	2	1,441	6%
Investment: Market Performance Below Assumption	1,926	639	80	931	297	45	5	2	3,925	15%
Investment: Plan Performance Below Market	1,014	610	(5)	207	82	8	14	0	1,930	8%
Funding Less Than the ARC	1,588	2,561	(10)	(220)	(133)	42	(11)	3	3,820	15%
COLAs	0	1,291	68	672	267	72	27	3	2,400	9%
	\$9,996	\$9,112	\$343	\$4,215	\$1,222	\$435	\$133	\$17	\$25,473	100%



Actuarial Back-loading Illustrated

- The level percent of payroll method used by Kentucky’s systems assumes funding contributions grow along with payroll. Principal payments are allocated heavily to the end of the amortization period. In the early years of the period, payments may not be large enough to offset interest on the unfunded liability, creating “negative amortization”
- The KERS-NH amortization period was also reset to 30 years in 2013, and the TRS period was reset every year until 2014. When the period is reset, payments do not progress to paying down the unfunded liability
- Additionally, if payroll does not grow as assumed, then payments do not progress to pay down the unfunded liability. KERS-NH actuarial valuations assumed between 3.5% and 4.5% annual growth since 2005, yet covered payroll declined by a compound annual average of 1.1%





How Did We Get Here: KERS-NH

- Underfunding the ARC was the largest factor in the increase in unfunded liability for KERS-NH from 2005 to 2016
- Changes in actuarial assumptions, mainly reduction in the discount rate from 8.25% to 6.75% to reflect experience and future expectations, represented the second-largest factor
- The authorization of ad hoc COLAs that were not actuarially funded was also a significant cause of the increase

Major Category	KERS-NH - Causes of Growth in Unfunded Liability	Amount
Funding	Appropriation was less than the Actuarially Recommended Contribution (ARC)	\$2,561
Actuarial	Actuarial Back-loading	1,153
Investment	Investment performance was less than market performance	610
Investment	Market performance was less than the valuation interest rate	639
COLA	COLAs granted without any additional funding	1,291
Actuarial	Actuarial assumption changes	2,319
Actuarial	Plan experience different from assumptions	539
	Total	\$9,112



How Did We Get Here: CERS-NH

- Actuarial back-loading was the biggest factor in the increase in the CERS-NH unfunded liability from 2005 to 2016
 - Employer participants actually funded more than the ARC over the time period, but the ARC itself was insufficient
- Changes in actuarial assumptions represented the second-largest factor
- The authorization of ad hoc COLAs that were not actuarially funded was also a significant factor

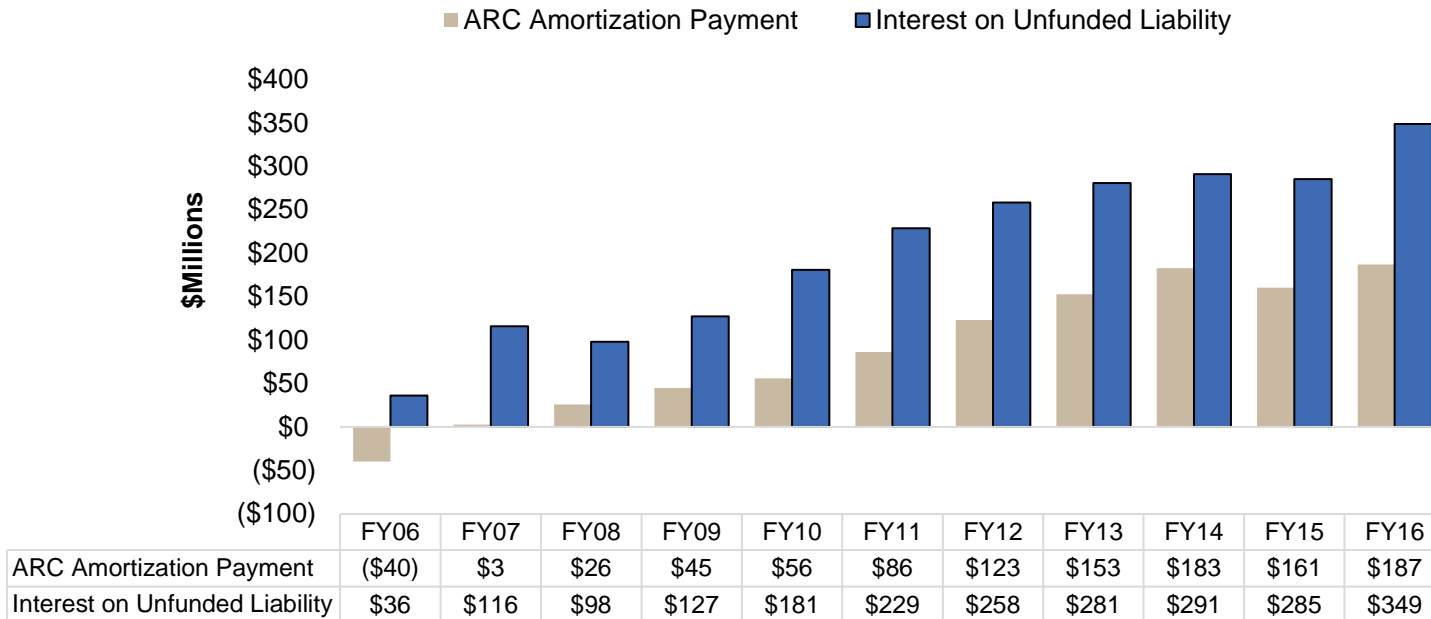
CERS-NH - Causes of Growth in Unfunded Liability		Amount
Funding	Appropriation was less (more) than the Actuarially Recommended Contribution (ARC)	(\$220)
Actuarial	Actuarial Back-loading	1,269
Investment	Investment performance was less than market performance	207
Investment	Market performance was less than the valuation interest rate	931
COLA	COLAs granted without any additional funding	672
Actuarial	Actuarial assumption changes	984
Actuarial	Plan experience different from assumptions	372
	Total	\$4,215



CERS-NH Actuarial Back-loading

- In each of the 11 years, the interest on the unfunded liability for CERS-NH exceeded the ARC amortization payment. Over the 11-year period the aggregate amount was \$1.3 billion
- In FY2006, the employer contribution was also less than the employer Normal Cost

**CERS-NH Amortization Payment Amounts
Less Than Interest on the Unfunded Liability**





How Did We Get Here: TRS

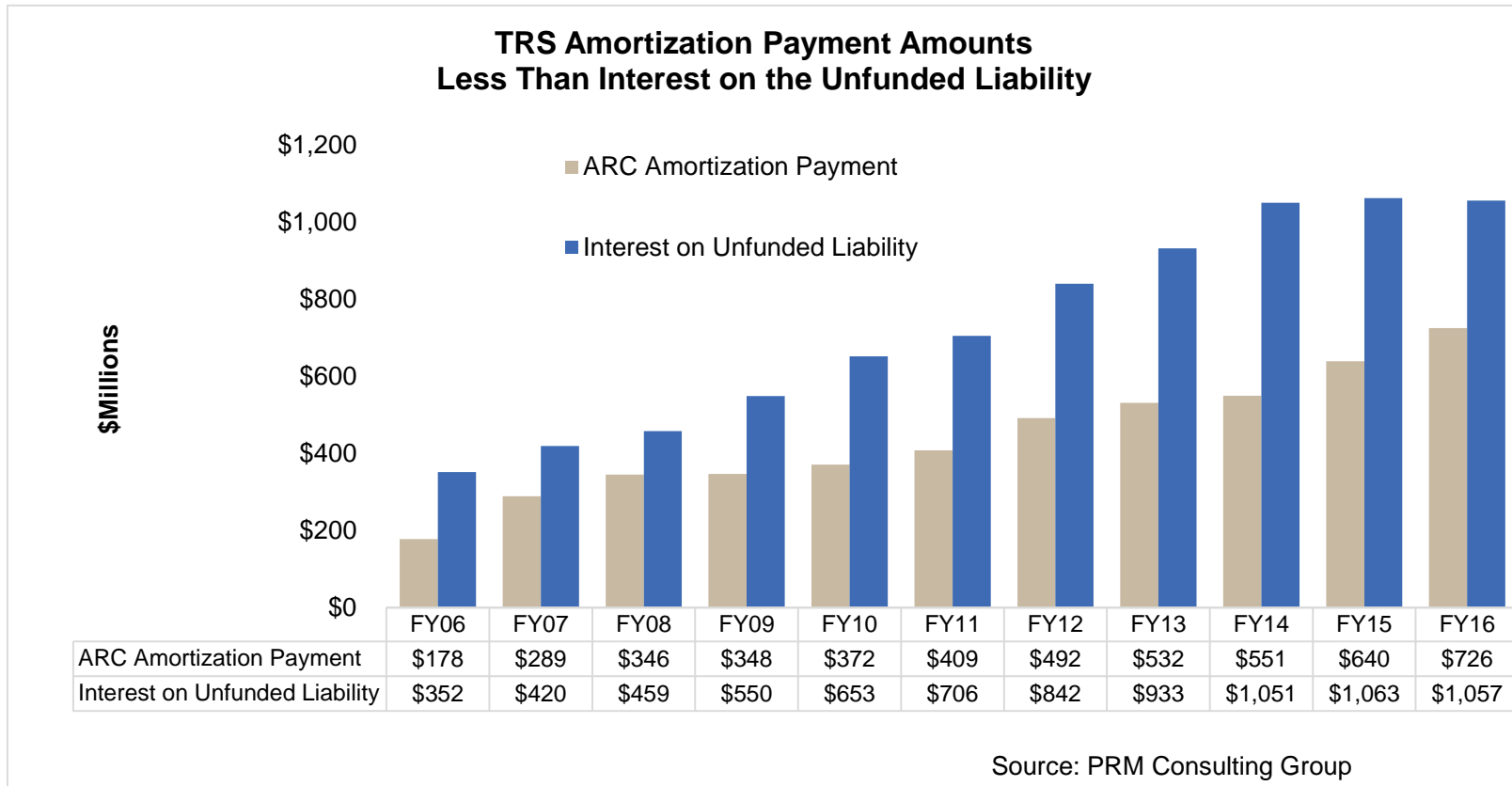
- Actuarial back-loading, attributable in part to the open/rolling amortization period that was annually reset until 2014, was the biggest factor in the TRS increase in unfunded liability
- While underfunding of the ARC was also a meaningful factor, actuarial back-loading, changes in assumptions, and investment performance compared to the 7.5% discount rate were all larger causes of increase in the unfunded liability between 2005 and 2016

Major Category	TRS - Causes of Increase in Unfunded Liability	Amount
Funding	Appropriation was less than the Actuarially Recommended Contribution (ARC)	\$1,588
Actuarial	Actuarial Back-loading	3,278
Investment	Investment performance was less (more) than market performance	1,014
Investment	Market performance was less than the valuation interest rate	1,926
Actuarial	Actuarial assumption changes	1,958
Actuarial	Plan experience different from assumptions	232
	Total	\$9,996



TRS Actuarial Back-loading

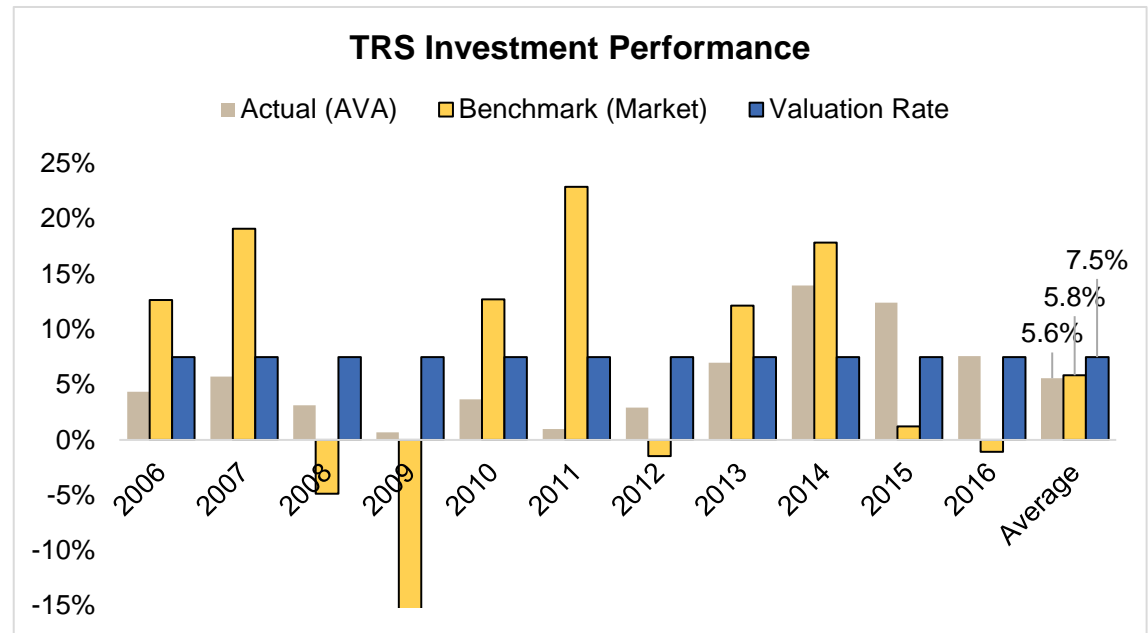
- ◆ The ARC has been underfunded for the Teachers' Retirement System since FY2004, however, even full ARC funding would have been insufficient to keep the unfunded liability from growing, due to the level percent of payroll amortization and past rolling amortization periods





TRS Investment Returns

- ◆ Although TRS returns have been better than KRS returns over the past 5- and 10-year periods, investment performance contributed more to the increase in unfunded liability for TRS in dollar terms than for KERS-NH:
 - TRS has a larger asset base; as a result, underperforming the valuation assumption by 1% will have a greater \$ impact
 - TRS has not reduced its 7.5% discount rate assumption, while KRS has done so multiple times (reflected in the KRS “actuarial assumption changes” category rather than investment returns)



Source: PRM Consulting Group



Cash Flows and Solvency Analysis



Kentucky Systems Reported an Aggregate \$7 Billion Negative Cash Flow from FY2006-FY2016

- ◆ The KRS and TRS systems had significant recurring negative cash flows from FY2006-FY2016
 - The accounting definition of cash flows excludes investment earnings
- ◆ Only the CERS-H plan had positive cash flow over the period
- ◆ KERS-NH and TRS had to routinely liquidate assets over the time period in order to pay benefits

Total Kentucky Pension Fund Cash Flows FY2006-FY2016 Inflows + Interest/Dividends – Outflows (\$ in 000s)			
Fund	Inflows	Outflows	Cash Flow
KERS-NH	\$4,792,048	\$9,061,781	\$(4,269,733)
KERS-H	477,393	502,187	(24,794)
SPRS	304,008	512,277	(208,269)
CERS-NH	5,428,274	5,744,284	(316,010)
CERS-H	1,942,982	1,780,890	162,092
TRS	13,612,859	15,866,112	(2,253,253)
Total	\$26,557,564	\$33,467,531	\$(6,909,967)

Source: KRS, TRS financial statements



The Most Stressed Systems had Declining Assets

- ◆ KERS-NH and SPRS had a decline in net position (net assets) from FY2006 to FY2016
- ◆ Although the net position of TRS and CERS-NH increased in total, each had declines in net position in five of the years
- ◆ The increases in net position for KERS-H, CERS-NH, CERS-H, and TRS were significantly smaller than the offsetting increases in liabilities

Total Kentucky Pension Fund Changes in Plan Assets, FY2006-FY2016 Net Increase/ (Decrease) in Plan Assets (\$ in 000s)			
Fund	Additions	Deductions	Changes in Net Position
KERS-NH	\$5,692,406	\$9,061,781	\$(3,369,375)
KERS-H	634,015	502,187	131,828
SPRS	391,520	512,277	(120,757)
CERS-NH	7,031,777	5,744,284	1,287,493
CERS-H	2,389,874	1,780,890	608,984
TRS	19,232,030	15,866,112	3,365,918
Total	\$35,371,622	\$33,467,531	\$1,904,091

Source: KRS, TRS financial statements



Negative Cash Flows Projected to Continue at KERS-NH

- Based on the assumptions, contribution requirements, and amortization schedule of the June 30, 2016 KERS-NH valuation, negative cash flows are projected to continue until benefit payments begin to level off while the amortization schedule continues to increase

KERS-NH Pension Fund Projected Cash Flows Based on June 30, 2016 Valuation and Assumptions: 6.75% Earnings, 4% Payroll Growth Annually Inflows - Outflows (\$ in 000s)			
Year	Inflows	Outflows	Cash Flow
FY16	614,761	946,407	(331,646)
FY17	740,104	970,194	(230,090)
FY18	756,955	980,487	(223,532)
FY19	817,653	991,093	(173,440)
FY20	840,985	1,000,951	(159,966)
FY21	884,308	1,010,891	(126,583)
FY22	911,371	1,021,291	(109,920)
FY23	948,591	1,031,667	(83,076)
FY24	978,803	1,041,248	(62,445)
FY25	1,015,157	1,050,188	(35,031)
FY26	1,049,221	1,058,845	(9,624)

Source: Cavanaugh MacDonald

Note: does not include dividends/interest or other investment earnings



Negative Cash Flows Projected to Continue at TRS

- ◆ TRS is also projected to experience negative annual cash flows based on the assumptions, contribution requirements, and amortization schedule of the June 30, 2016 valuation, even if the 7.5% earnings assumption is met annually and the full Actuarially Determined Contribution (ADC) is made annually for the first time since FY2004
- ◆ It is not uncommon for a mature system with a high level of retirees to actives to operate with negative cash flows and rely on investment earnings to offset changes in net position
 - The recurring negative cash flows of the magnitude projected for TRS indicate the level of risk and stress associated with a plan that is 55% funded. The negative cash flow would be greater in years where:
 - The earnings assumption is not met
 - Payroll growth is lower than assumed
 - Authorized funding levels are lower than the ADC

TRS Pension Fund Projected Cash Flows Based on June 30, 2016 Valuation and Assumptions: 7.5% Earnings, 3.5% Payroll Growth Annually Inflows - Outflows (\$ in 000s)			
Year	Inflows	Outflows	Cash Flow
FY16	878,499	1,841,835	(963,336)
FY17	1,364,932	1,964,173	(599,241)
FY18	1,380,628	2,054,888	(674,260)
FY19	1,446,733	2,127,401	(680,668)
FY20	1,469,823	2,200,779	(730,956)
FY21	1,525,999	2,273,937	(747,938)
FY22	1,607,509	2,373,992	(766,483)
FY23	1,686,030	2,429,201	(743,171)
FY24	1,742,259	2,507,931	(765,672)
FY25	1,799,455	2,590,340	(790,885)
FY26	1,856,506	2,674,843	(818,337)

Source: Cavanaugh MacDonald
 Note: does not include dividends/interest
 or other investment earnings



Liabilities and the Discount Rate

- Public plans continue to use the expected long-term rate of return on investments to discount the value of future benefit payments to a present value liability figure (the discount rate). The size of the liability and annual funding requirement – the annual required contribution (ARC) prior to FY2015, or actuarially determined contribution (ADC) afterward – are sensitive to the discount rate and other actuarial and economic assumptions
- Private plans subject to the federal Employee Retirement Income Security Act (“ERISA”) typically discount liabilities for reporting and funding based on high-quality corporate bond rates like the Corporate Bond Index. *“The bond-based approach is premised on the theory that pension benefits are ‘bond-like,’ in that they constitute promises to make specific payments in the future, and should be similarly valued.”* (United States Government Accountability Office, Pension Plan Valuation: Views on Using Multiple Measures to Offer a More Complete Financial Picture, September 2014)
- Governmental Accounting Standards Board (GASB) Statements 67 and 68 issued in 2012 and recently implemented by state and local pension plans and plan sponsors adopted a hybrid of the traditional earnings-based assumption and a bond-based assumption for reporting, but not funding, purposes.

 - The Statements require the application of the long-term earnings rate on assets projected to cover future liabilities, and an index of 20-year government bond rates to any projected future shortfall. This “blended” rate is to be applied and reported only where the actual contributions have consistently been materially below the required contribution, and therefore assets are projected to be depleted
 - The FY2015 and FY2016 TRS and KJFRS reports used such a blended rate



Revised Asset Allocation Rates

- KRS is revising its asset allocation approach to reflect the varying degrees of stress and diminished assets of its plans
- Our report includes alternate return assumptions for a 10-year investment horizon and two levels of increased liquidity positions generally consistent with updated KRS policy, with up to an allocation of 25% short-term bonds and 25% cash for the highly stressed plans.
- These assumptions were based on PFM Asset Management's expected 10-year return for a portfolio with increased allocation to short-term bonds and cash. The time horizon for the investment return and the matching of asset investments to liabilities and the cash flows of paying benefits reflect the condition of the plans

	PFMAM 70/30 Model	Scenario 1	Scenario 2
Equity	70.0%	35.0%	52.5%
Domestic Equity	46.0%	23.0%	34.5%
International Developed Equity	16.5%	8.3%	12.5%
Emerging Markets Equity	7.5%	3.8%	5.5%
Fixed Income	30.0%	65.0%	47.5%
Core Fixed Income	22.0%	11.0%	16.5%
Investment Grade Corporate	2.0%	1.0%	1.5%
Emerging Markets Debt	2.0%	1.0%	1.5%
High Yield	2.0%	1.0%	1.5%
Bank Loans	2.0%	1.0%	1.5%
Short Bonds	0.0%	25.0%	13.0%
Cash	0.0%	25.0%	12.0%

10 Year Return Assumptions			
Expected Return	6.9%	5.1%	6.0%
Standard Deviation	11.6%	6.1%	8.8%
Probability of 5.0% Return	68.1%	51.2%	62.3%
Probability of 5.5% Return	64.2%	41.8%	56.0%
Probability of 6.0% Return	58.8%	30.8%	49.6%
Probability of 6.5% Return	52.1%	22.5%	42.5%
Probability of 7.0% Return	50.5%	16.4%	36.0%
Probability of 7.5% Return	43.3%	11.5%	29.3%

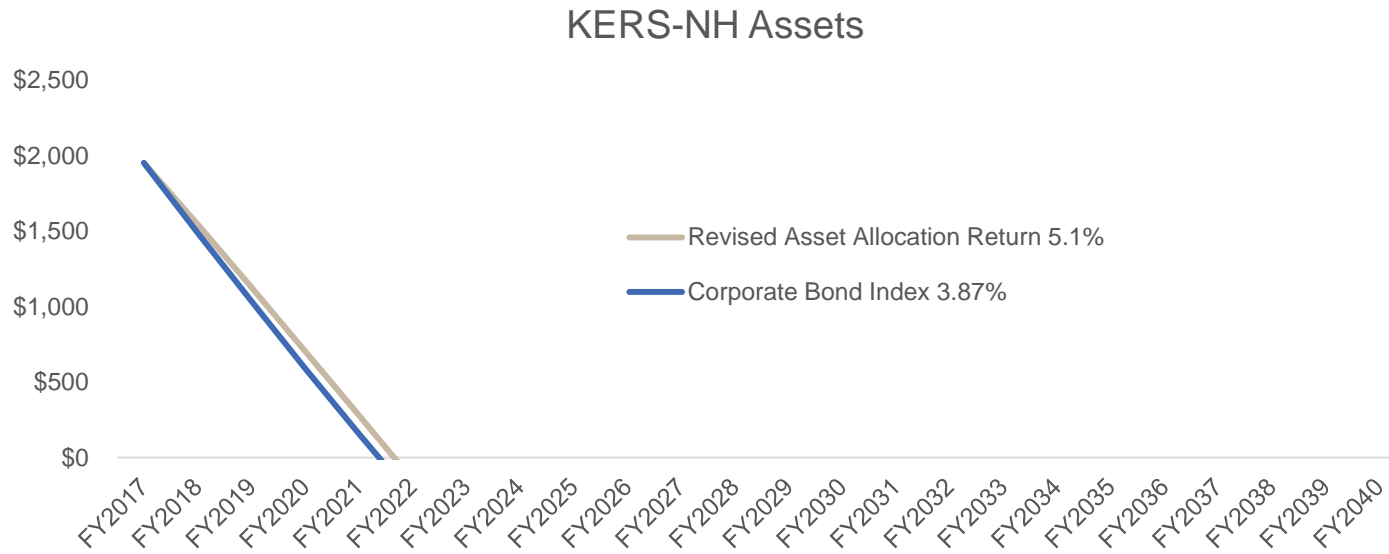
Source: PFM Asset Management

Return assumptions for a 10-year investment horizon were derived by extrapolating from intermediate-term (5 year) and long-term (30 year) capital market assumptions. Please refer to PFMAM's 2017 Capital Market Assumptions for a complete description of the methodology used to develop these assumptions and important disclosures.



Solvency Analysis

- Given the at-risk funded position, contribution history, and cash flow and liquidity concerns of the major state plans, we tested the KERS-NH and TRS plans under several alternate assumptions and scenarios to identify whether the plans would be projected to remain solvent
- The additional amounts appropriated for KERS-NH have had a significant benefit. If future funding of KERS-NH reverted to the prior, pre-FY2016 patterns of funding roughly 60% of the ARC, assuming 0% payroll growth, the plan is projected to go insolvent within several years, even if the published actuarial return assumption is met



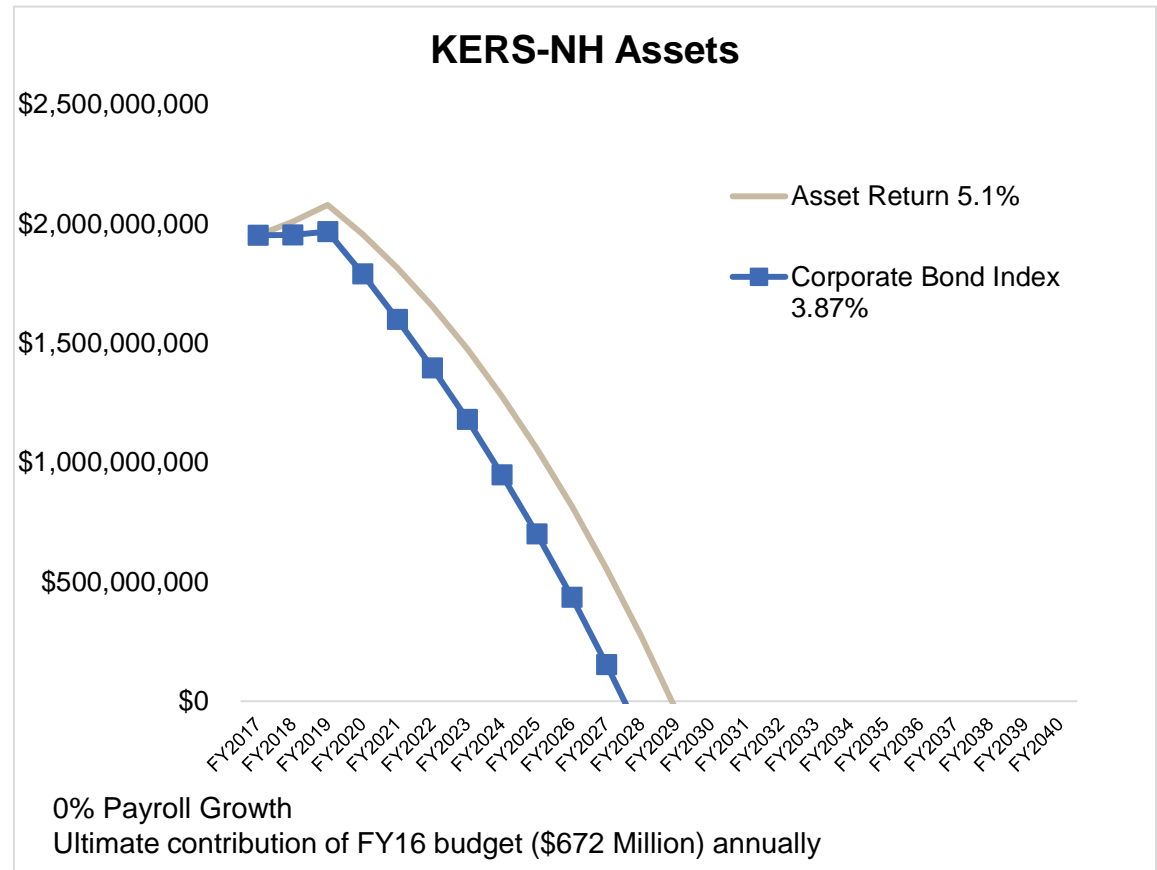
Source: PRM Consulting Group



KERS-NH Faces Insolvency Without Elevated Funding Levels

- ◆ The amounts appropriated in the FY2017-2018 budget were significantly higher than the ADC. If these amounts were maintained and the Revised Asset Allocation or Corporate Bond Index rates are achieved ever year on average, the plan is projected to remain solvent, even with 0% payroll growth.

- ◆ The plan is projected to become insolvent:
 - By FY2022 if the employer contribution reverts to pre-FY17 levels
 - By FY2028 if employer contribution is maintained at FY2016 levels, payroll growth is 0%, and the Corporate Bond Index rate is earned, or FY2029 if the Revised Asset Allocation rate is earned
 - By FY2033 if employer contribution is maintained at the average of FY2016-FY2018 levels, payroll growth is 0%, and the Corporate Bond Index rate is earned, or FY2037 if the Revised Asset Allocation rate is earned (not shown)

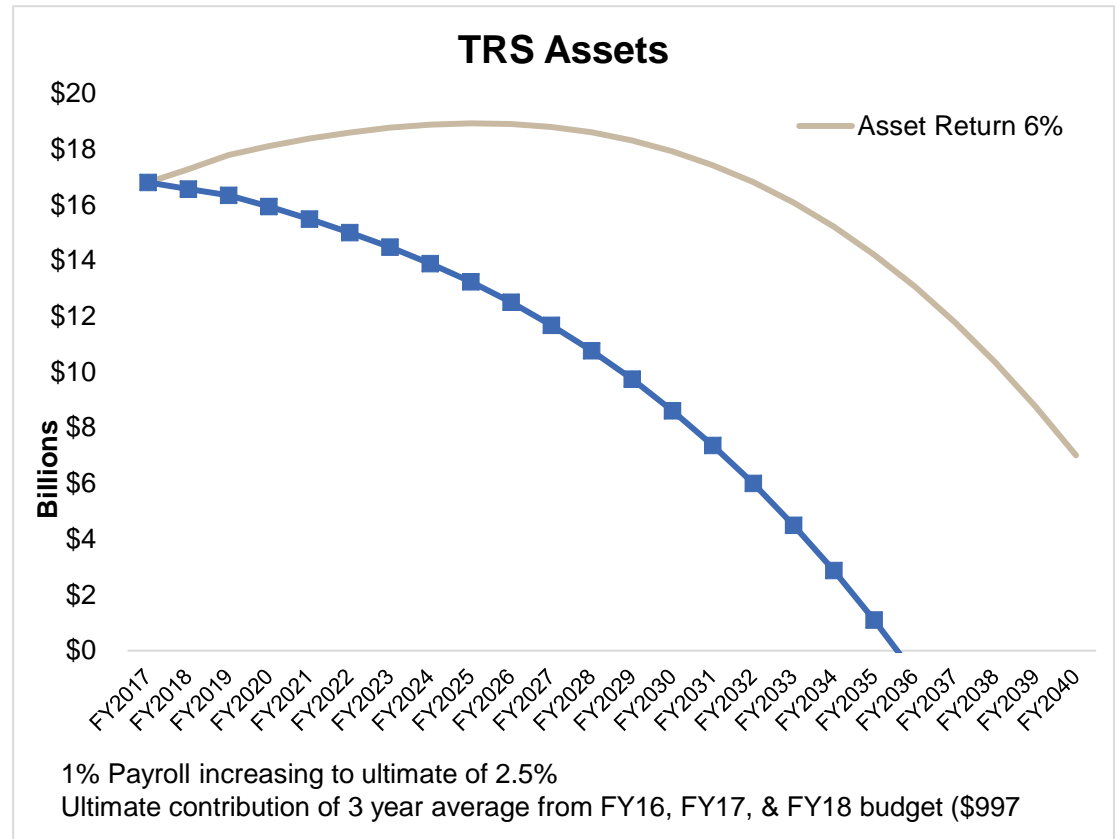




TRS is More Stable but Also Pressured

- ◆ If the TRS recommended employer contribution levels are fully achieved in FY2019 and thereafter (which would be the first time since FY2004) and assets earn the Revised Asset Allocation return of 6.0% per year or higher, the plan is projected to remain solvent.

- ◆ The plan is projected to become insolvent, if:
 - The employer contribution reverts to pre-FY17 levels
 - The average of the FY2016-2018 budgeted amounts is maintained in future years, and payroll growth is initially a reduced 1% per year increasing to the actuarial assumption of 2.5% per year. If assets earn the Revised Asset Allocation return of 6.0% per year insolvency is estimated to occur in FY2044, while insolvency is estimated to occur in FY2036 if the plan earns the Corporate Bond Index rate



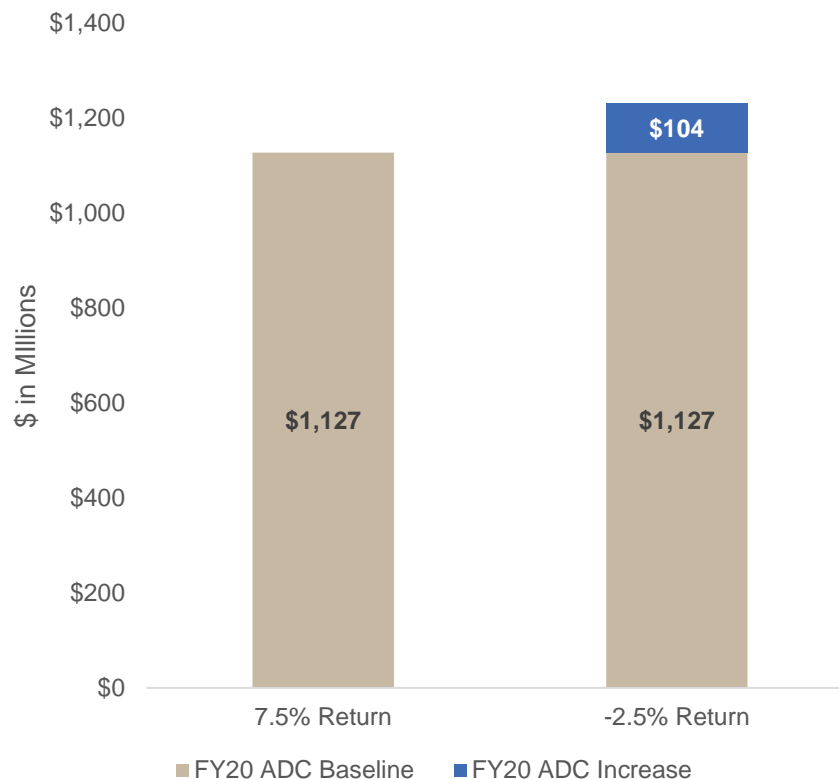
Source: PRM Consulting Group



Market Downturns Would Increase Future Funding Requirements

- ◆ In addition to the solvency analysis scenarios, we modeled the impact of an immediate economic downturn on the ADC funding requirement
- ◆ The asset base of KERS-NH is now so low that deviations would not have a large, short-term impact on the contribution requirements or solvency
- ◆ A market return one standard deviation lower than the return assumption for TRS would result in a \$104 million, or 9%, increase in the ADC after smoothing the losses
 - This corresponds to a -2.5% annual return compared to the 7.5% assumption
 - TRS returns were equal to or lower than this level in roughly 12% of the trailing 12-month return periods between July 2003 and June 2016

Estimated Impact of a Downturn on TRS Required Contribution



Source: PRM Consulting Group estimate based on Cavanaugh MacDonald 6/30/16 valuation data

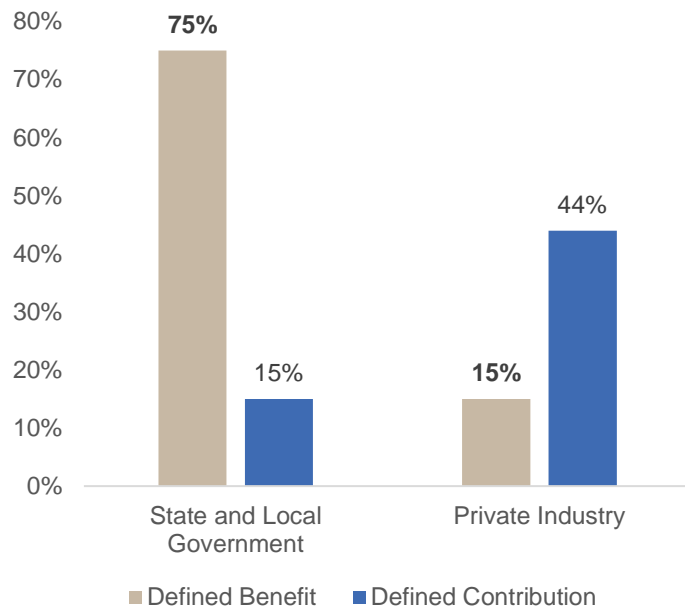


Benefits Benchmarking



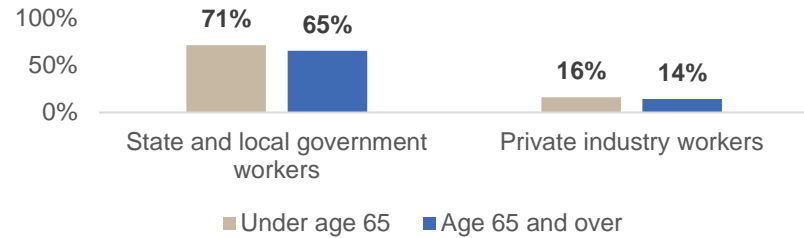
Government Benefits Diverge from Private Sector Benefits Nationally and in Kentucky

Worker Participation in Pension Plans by Sector and Type 2016



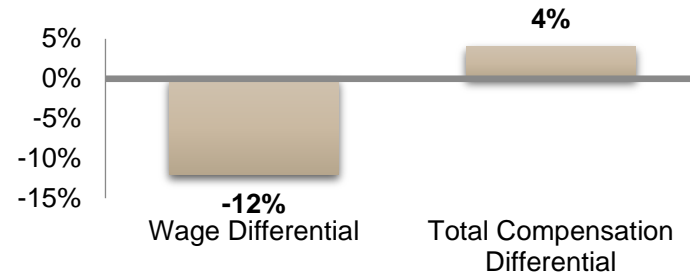
Source: Bureau of Labor Statistics National Compensation Survey, March 2016

Access to Retiree Health Care Benefits, Private Sector and State and Local Government



Source: Bureau of Labor Statistics, National Compensation Survey, March 2012 (most recent available on this topic)

Compensation: Kentucky State Employees v. Comparable Private Sector Workers



Source: American Enterprise Institute for Public Policy Research, April 2014



Benefit Benchmarking

- As part of our evaluation, we gathered information on past and current benefit provisions for the Kentucky Retirement Systems. This detailed information is contained in Appendix A of our full report
- We also collected information for 20 other state systems for civilians, state police, teachers, and judges in order to compare terms. This detailed information is contained in Appendix B. These states include the states contiguous to Kentucky, other states where teachers are not in the Social Security system, and other regional competitors or states with relevant benefit provisions, identified with input from Commonwealth leadership
- A sub-set of these states were reviewed to quantify the present value of the pension benefit for KERS-NH and TRS members in order to make a direct comparison of value that factors in the different elements of the benefit structure

States Surveyed for Pensions/OPEB	KY, CA, CO, FL, GA, IL, IN, IA, MA, MI, MO, NY, NC, OH, PA, SC, TN, TX, VA, WV, WI
Pension Plan Characteristics Surveyed	Plan Structure (DB, DC, Hybrid), Benefit Formula, Employee Contribution, Vesting, AFC Period, Normal Retirement Eligibility, Social Security Participation, and COLA
OPEB Plan Characteristics Surveyed	Plan Structure (DB, DC), Active Employee Contribution, Retire Premium Co-Share (Under 65/65 and Over), Employer Contribution (Under 65/65 and Over), Insurance Coverage, Eligibility, and Prescriptions



Summary of Plan Structures

◆ State civilian plans:

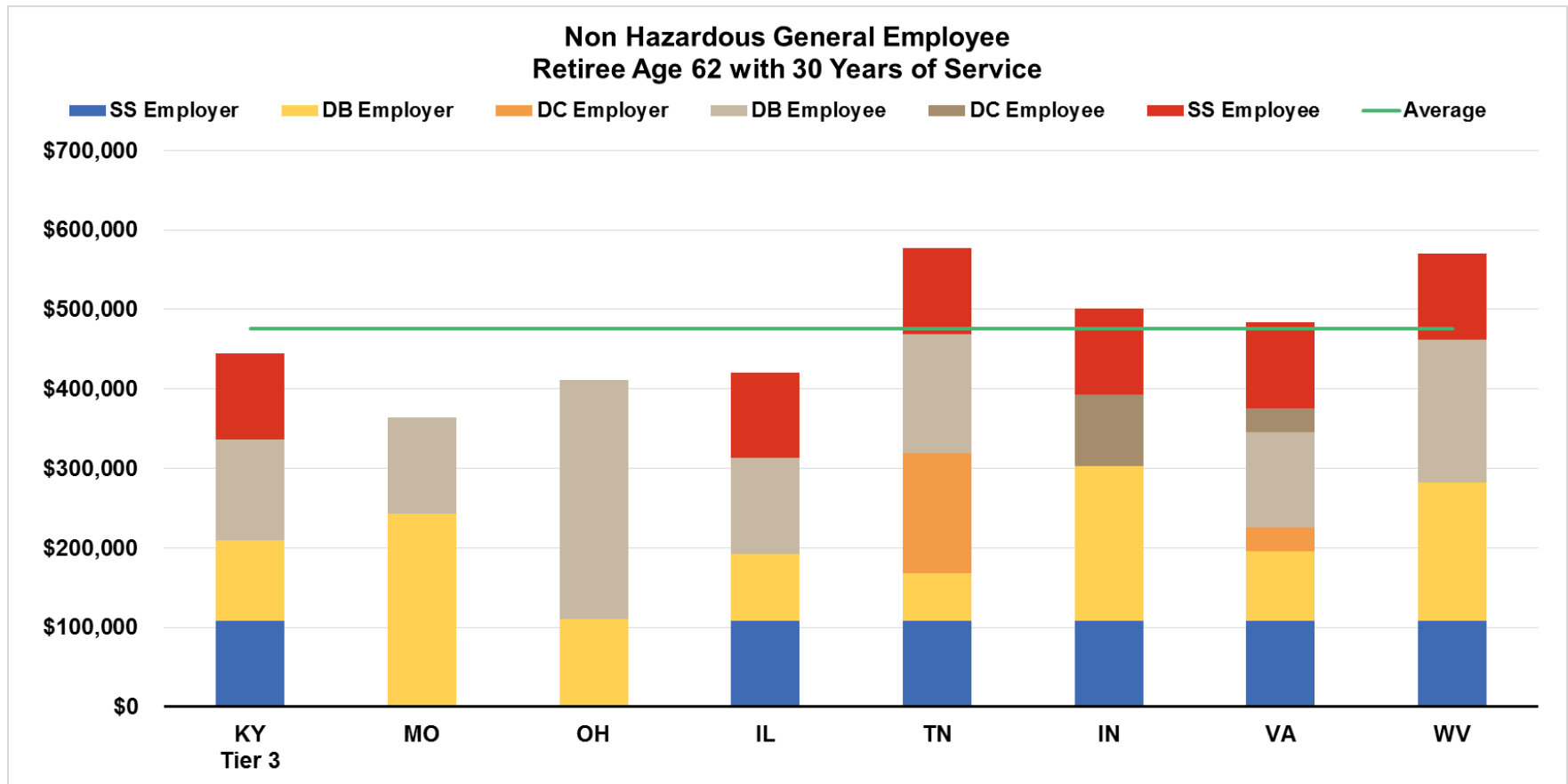
- 15 DB plans for new hires, four hybrid DB/DC plans, and one DC plan
- The KERS-NH employee contribution is at the median for plans reviewed
- Eight states, like Kentucky, do not offer new hires traditional defined benefit retiree medical insurance with the majority of the premiums paid by the employer

◆ State teacher plans:

- 17 DB plans for new hires, three hybrid DB/DC plans
- The TRS employee contribution is below the median for the plans of states where teachers are not enrolled in Social Security
- Nine states do not offer new hires traditional defined benefit retiree medical insurance with the majority of the premiums paid by the employer

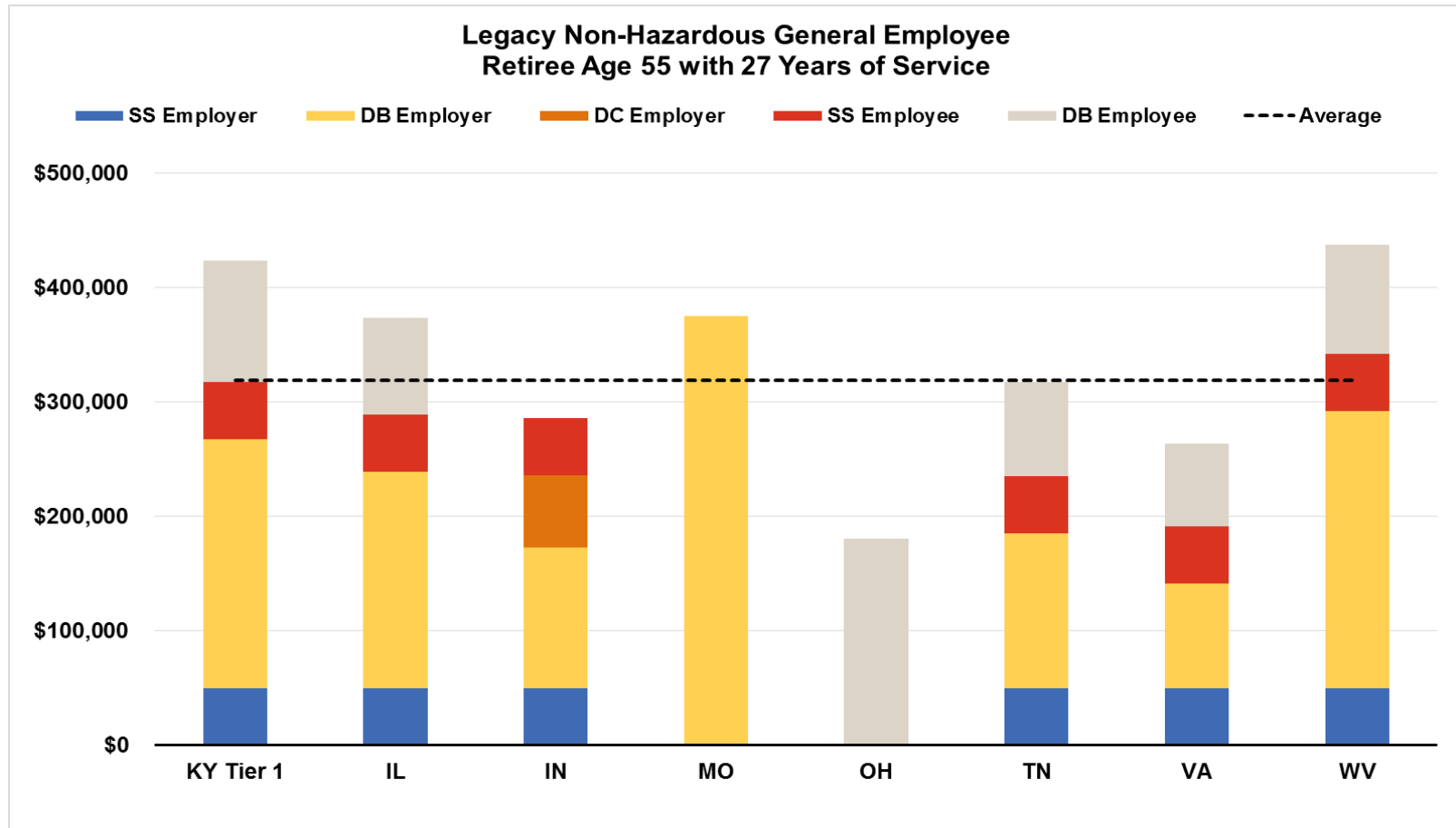


The KERS-NH Tier 3 Cash Balance Plan Continues to Provide a Competitive Benefit



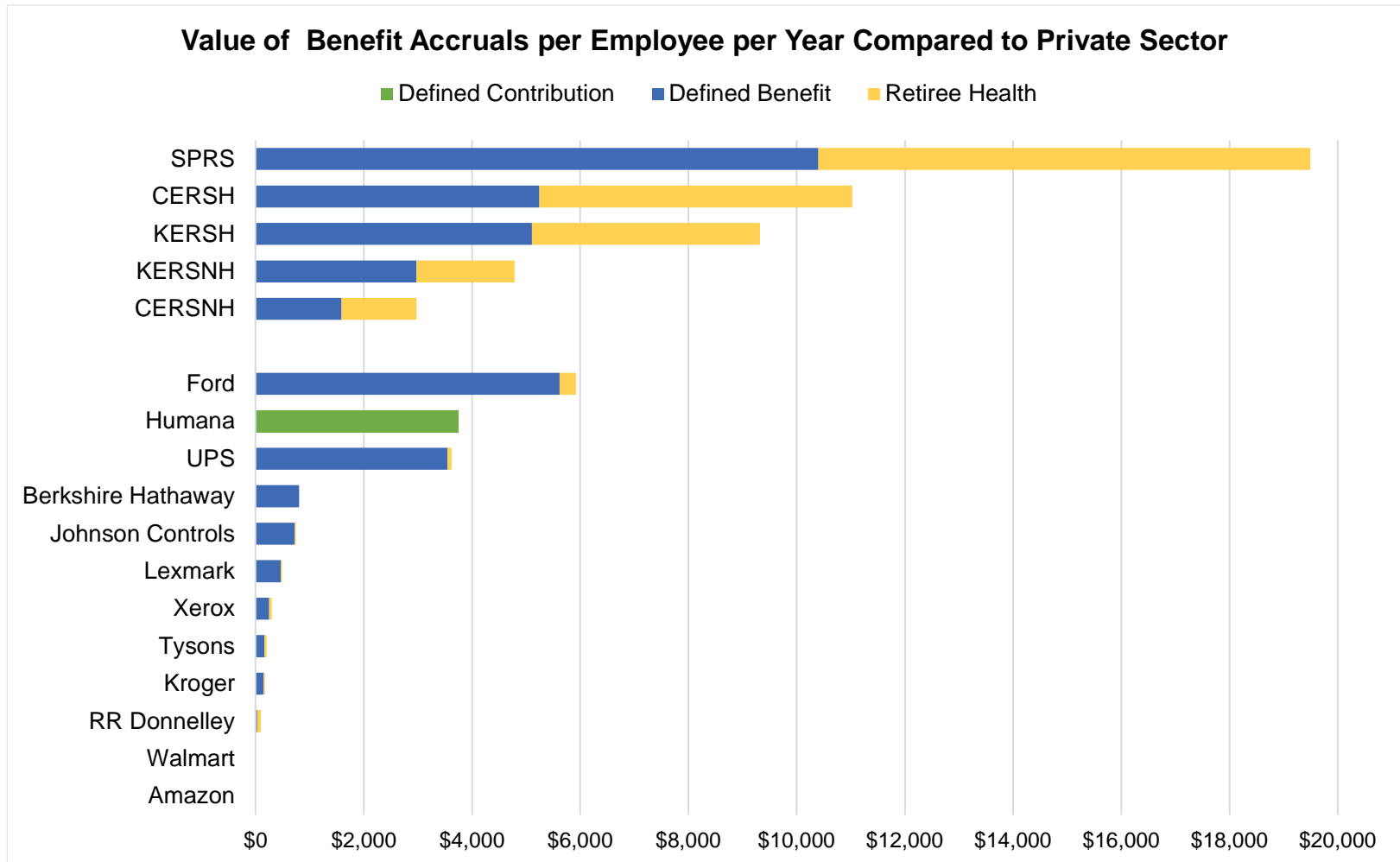


Current KERS-NH Employees in the Tier 1 Plan Receive an Above-Average Benefit and Favorable Retirement Eligibility





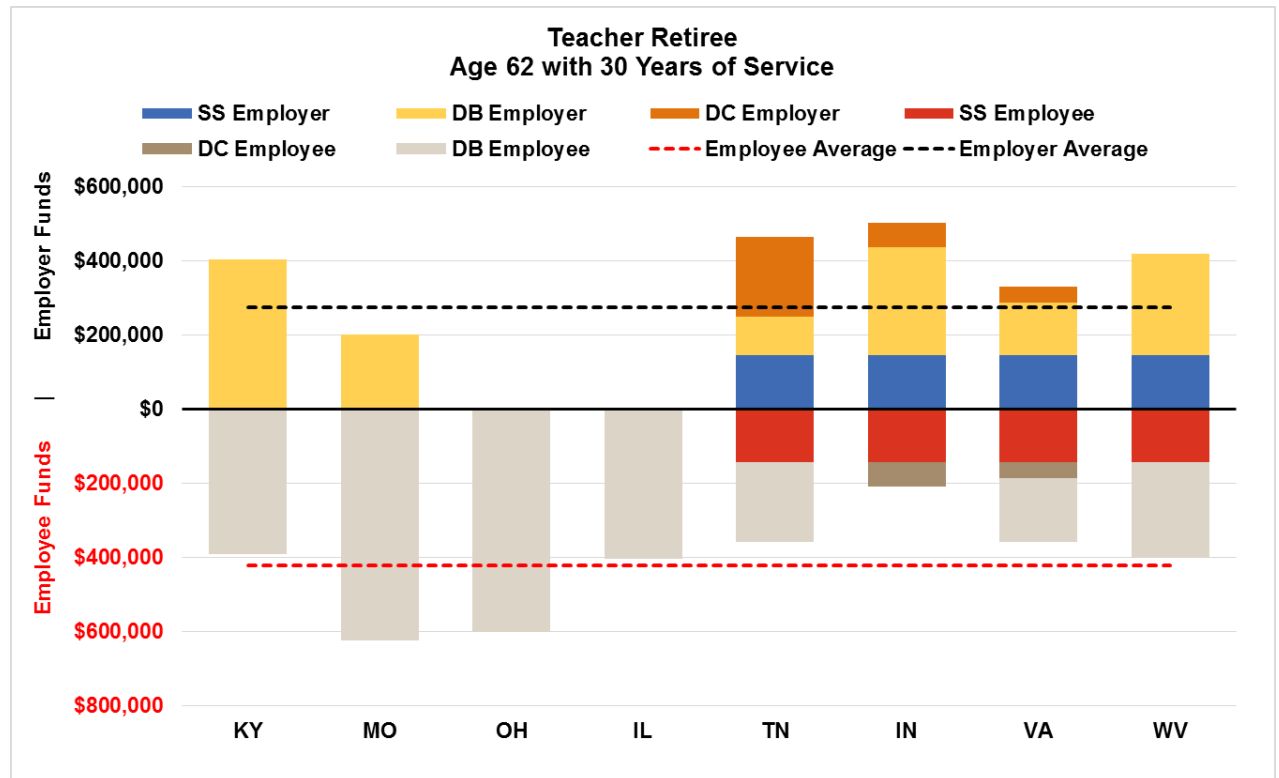
KRS Retiree Benefits have Higher Value than the Benefits Offered by the Largest Kentucky Private Sector Employers





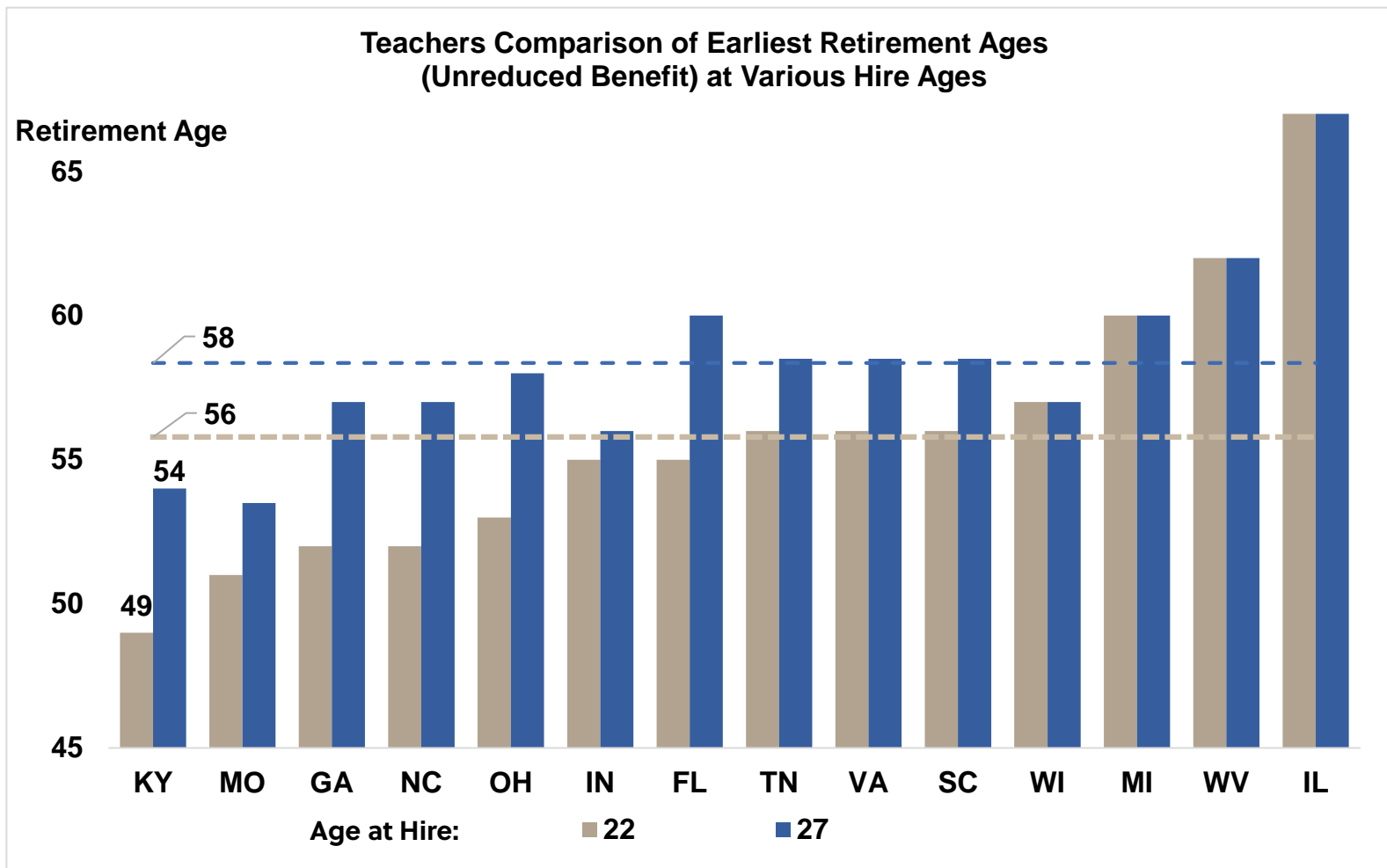
The TRS Plan Provides an Above-Average Benefit

- The current TRS plan provides an above-average benefit, particularly through the employer contribution and the relatively generous retirement eligibility provisions
- The Illinois and Ohio plans do not offer an unreduced benefit for retirement at age 62 with 30 years
- Kentucky teachers can retire at any age with 27 years of service, at age 60 with 5 years, and at age 55 with 5-10 years (depending on date of hire)





Kentucky Teachers Earn Full Benefits Early





Investment Analysis



Investment Analysis: KRS Overview

- ◆ PFM Asset Management has developed a detailed analysis of the investment allocation, performance, and risk profile of each of the Commonwealth's retirement systems (see Appendix to the full Report 2)
- ◆ KRS total performance falls in bottom quartile for all trailing periods provided and significantly lags the investment return assumption. Asset allocation, with shifting targets over recent years, has been the primary detractor of relative KRS performance
 - International equity allocation increased from 40% of public equity to 50% of public equity in 2011 and lagged the Russell 3000 Index by more than 1.1% basis points annually
 - Hedge fund allocation of roughly 10% was added in 2011 and lagged the Russell 3000 Index by nearly 800 basis points annually
 - Real return allocation has averaged 8-10% of the portfolio during the past 5 years and has lagged the Russell 3000 Index by more than 800 basis points annually
 - Private equity allocation has added value over public equity for most trailing periods, but the investment return has lagged KRS' benchmark (Russell 3000 Index + 3%) by 260 basis points annually for the past 10 years
- ◆ Performance at the asset class level has generally been in-line with the relevant index for longer periods (10+ years), with the exception of real estate, indicating that asset allocation rather than manager selection has been the primary detractor of performance



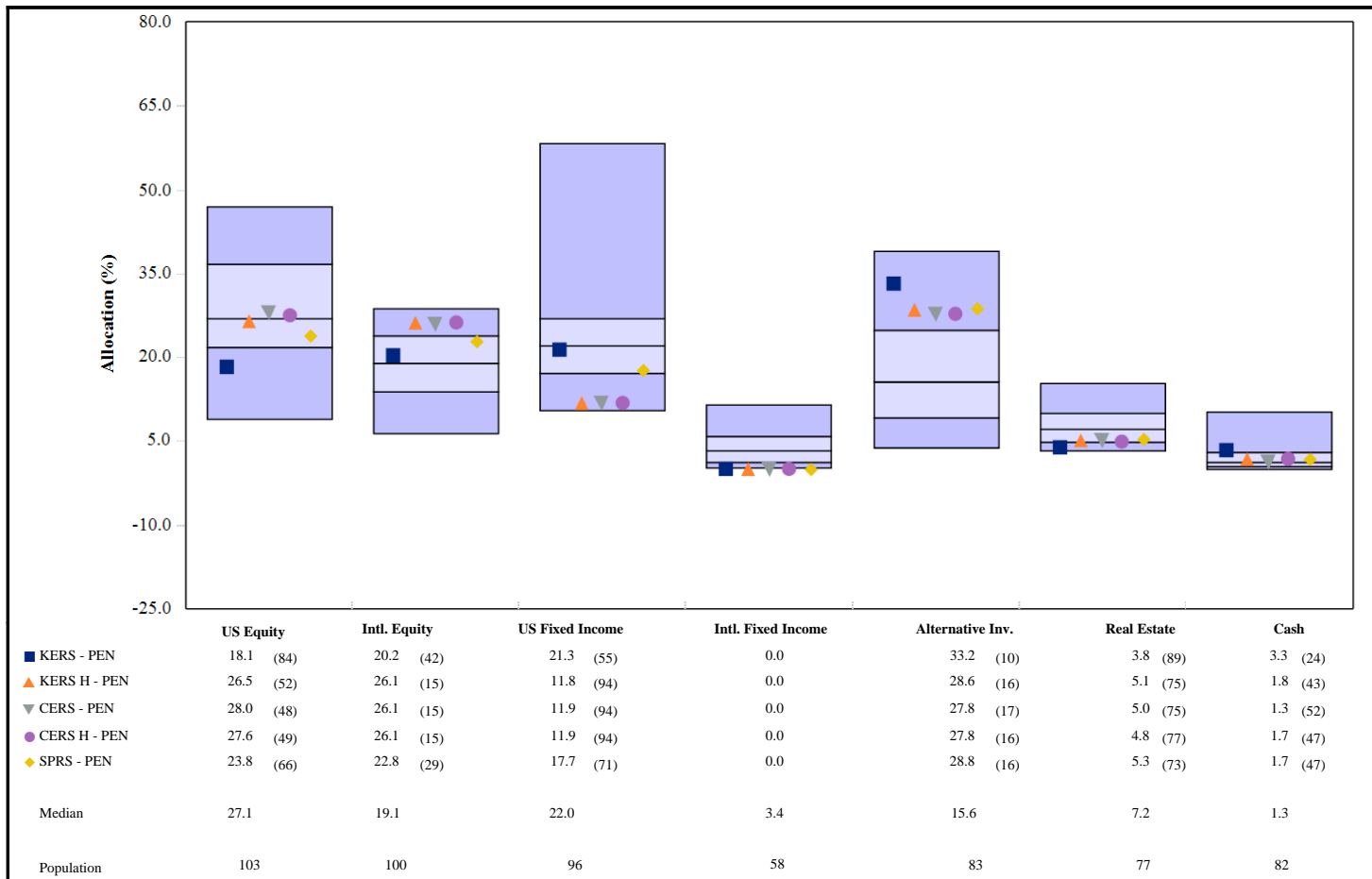
KRS Pension – Performance vs. Benchmarks

As of June 30, 2016	3 Years	5 Years	7 Years	10 Years	Jul-2003 To Jun-2016
KERS - PEN	4.99	5.11	8.44	4.89	6.23
KERS - PEN Benchmark	5.75	5.82	8.82	5.45	6.55
<i>Over/Under Performance</i>	<i>-0.76</i>	<i>-0.71</i>	<i>-0.38</i>	<i>-0.56</i>	<i>-0.32</i>
KERS H - PEN	5.35	5.32	8.60	5.00	6.31
KERS H - PEN Benchmark	5.34	5.57	8.64	5.33	6.46
<i>Over/Under Performance</i>	<i>0.01</i>	<i>-0.25</i>	<i>-0.04</i>	<i>-0.33</i>	<i>-0.15</i>
CERS - PEN	5.07	5.16	8.48	4.91	6.25
CERS - PEN Benchmark	5.32	5.56	8.63	5.32	6.45
<i>Over/Under Performance</i>	<i>-0.25</i>	<i>-0.40</i>	<i>-0.15</i>	<i>-0.41</i>	<i>-0.20</i>
CERS H - PEN	5.39	5.35	8.62	5.01	6.32
CERS H - PEN Benchmark	5.32	5.56	8.63	5.32	6.45
<i>Over/Under Performance</i>	<i>0.07</i>	<i>-0.21</i>	<i>-0.01</i>	<i>-0.31</i>	<i>-0.13</i>
SPRS - PEN	4.98	5.10	8.44	4.89	6.23
SPRS - PEN Benchmark	5.43	5.63	8.68	5.35	6.48
<i>Over/Under Performance</i>	<i>-0.45</i>	<i>-0.53</i>	<i>-0.24</i>	<i>-0.46</i>	<i>-0.25</i>



KRS Pension – Asset Allocation Comparison

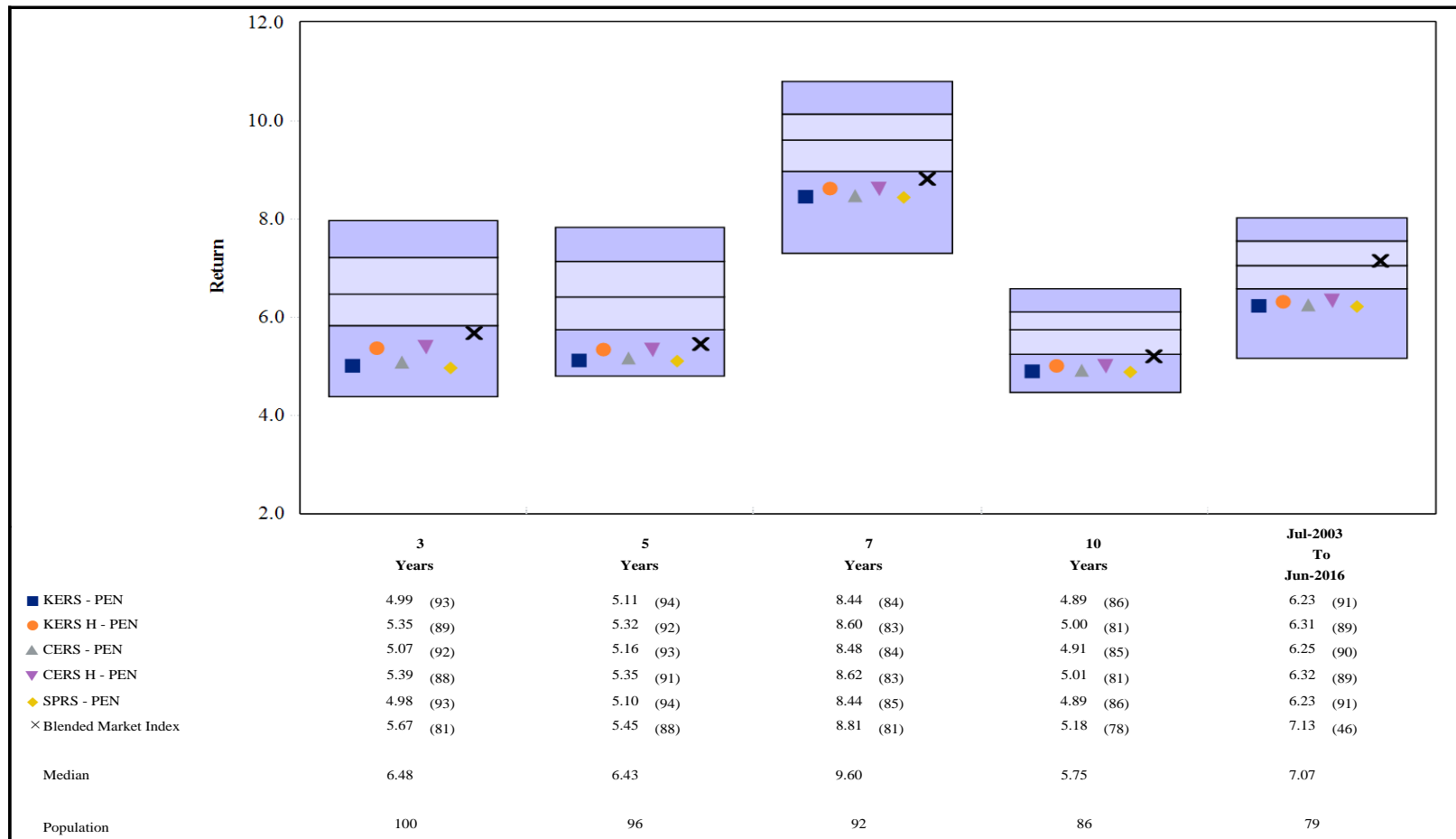
Asset Allocation Analysis
 All Public Plans > \$1 Billion
 As of June 30, 2016





KRS Pension – Trailing Investment Performance

Plan Sponsor Peer Group Analysis
All Public Plans > \$1 Billion
As of June 30, 2016





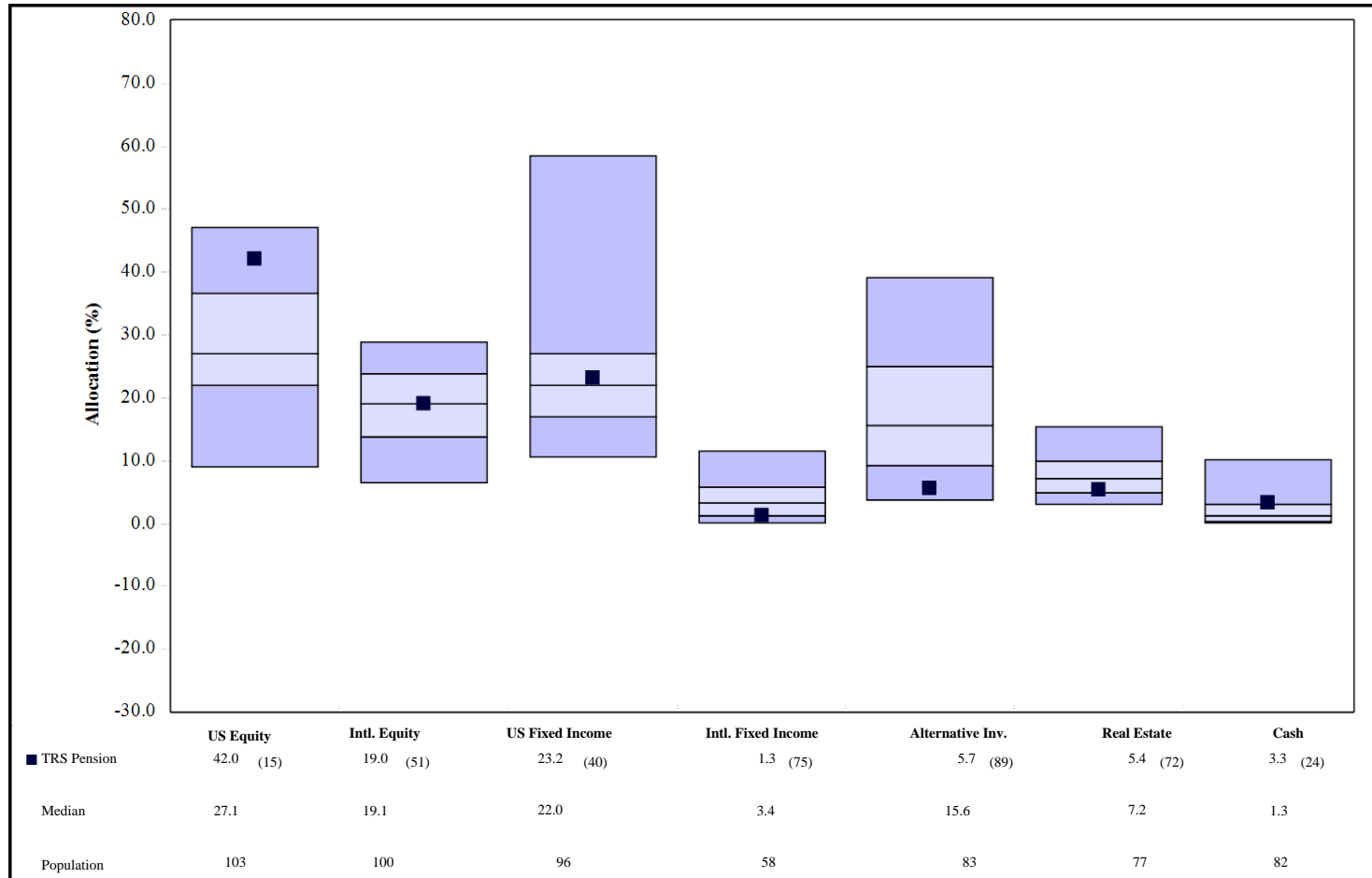
TRS Pension – Investment Performance Attribution

- ◆ Compared to a peer universe of public plans > \$1 billion, TRS Pension performance ranked in the 76th percentile since July 2003 (6.58% return), the beginning date of the monthly returns data provided by TRS, however, improved to the 19th percentile over ten years (6.29% return)
- ◆ From FY 2009-2016, the Pension Plan's performance ranked above the 50th percentile in 6 out of the 8 fiscal year periods, after ranking close to the 90th percentile each year from FY 2004-2008
- ◆ International equity was absent from the portfolio until July 2005 and has gradually increased to 19%
 - The low allocation to international equity relative to domestic hurt performance from 2003-2007, and has contributed to the outperformance from 2008-2015
- ◆ The Plan has become more aggressive with increasing levels of risk over time, with fixed income representing 43% of the portfolio in March 2003 and gradually decreasing to 25% as of June 2016
- ◆ The TRS private equity allocation has helped overall performance with a return of 9.64% since it was included in the portfolio in July 2008, compared to a return of 8.68% for the Russell 3000



TRS Pension – Asset Allocation Comparison

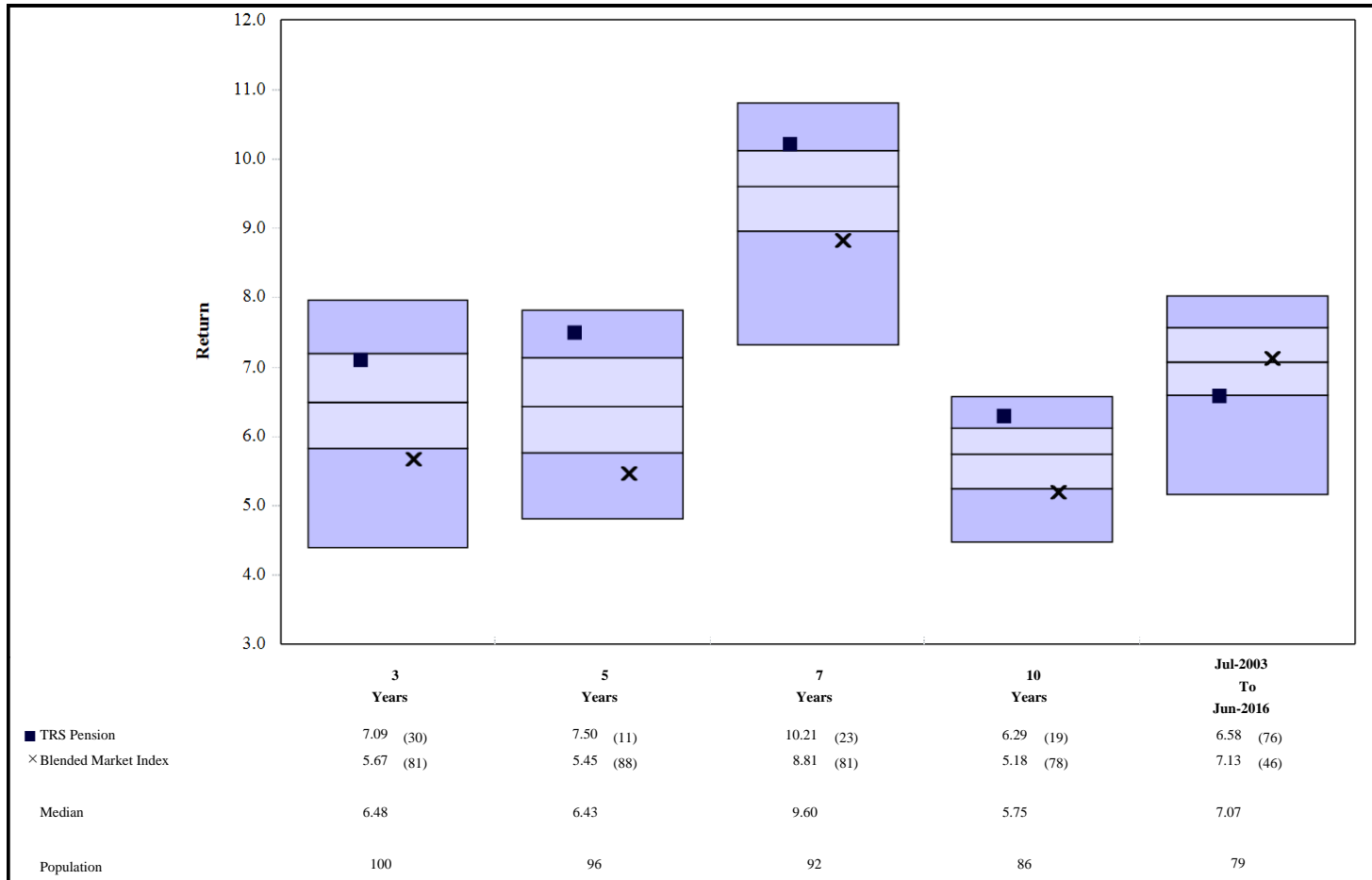
ASSET ALLOCATION ANALYSIS
 All Public Plans > \$1 Billion
 As of June 30, 2016





TRS Pension – Trailing Investment Performance

Plan Sponsor Peer Group Analysis
 All Public Plans > \$1 Billion
 As of June 30, 2016

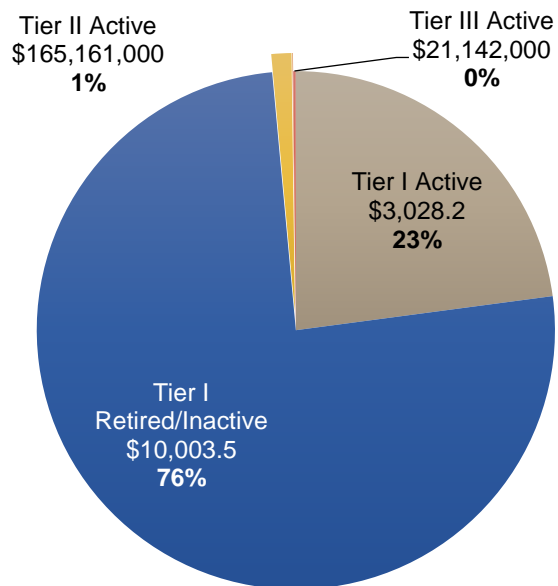




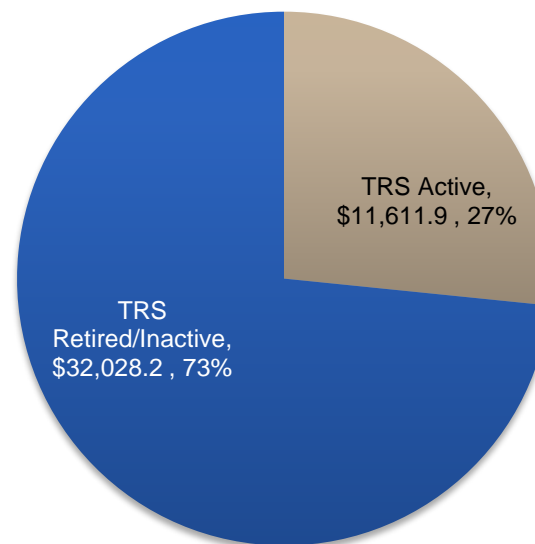
The Challenge Ahead

- Compounding the severe challenge ahead, the majority of accrued liabilities of the largest systems are associated with members who are already retired/ inactive
- As past reforms have shown, this complicates efforts to align costs and risk management with the ability to pay

KERS Non-Hazardous Accrued Liability by Tier



TRS Accrued Liability by Status





Report 3: Next Steps

- ◆ In Report #3, we will present ideas and alternatives for improving the long-term security, reliability, and affordability of Kentucky's retiree benefit programs
- ◆ Building on our analysis of factors that have led to the current conditions, including our previous Report #1 on transparency and governance, areas to be addressed prospectively are expected to include:
 - Actuarial method and assumptions
 - Investment practices and approach
 - Benefit levels and risk exposure
 - Funding policy
- ◆ Through past legislative reforms, recent Board actions, and significant additional funding in FY17-18, Kentucky has already taken positive steps in many of these critical areas
- ◆ Nonetheless, the continued scale of the Commonwealth's remaining challenge requires further strong, corrective action:
 - ***A status quo approach is not sustainable***

Thank You





STRATEGIC PLANNING PROCESS
ACTUARY COMMITTEE

1. GOVERNANCE

- a. **Work with the Actuary to ensure utilization of industry prevalence practices and methods for the analysis and recommendation of actuarial assumptions (economic and demographic) for use in the actuarial evaluation.**

First Quarter 2025

- b. **The CERS Pension Plans to attain 100% funded ratio within the time prescribed by the Actuary by implemented Board certified employer contributions that may increase/decrease over time.**

Second Quarter 2048

- c. **The CERS Board will continue to work with the Kentucky General Assembly to mitigate any changes to the stated funding policy which might result in actuarial backloading (i.e., negative amortization of the unfunded actuarial accrued liability).**

First Quarter 2025

2. ORGANIZATIONAL EXCELLENCE

- a. **The CERS Board will request the Actuary to perform a risk analysis or stress test from time to time to understand and quantify the possible financial risks due to possible changing economic conditions or risks associated with possible legislative changes.**

First Quarter 2026

3. CUSTOMER SERVICE DELIVERY

4. INFRASTRUCTURE AND KEY RESOURCES