



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

Kentucky Public Pension Oversight Board

Teachers' Retirement System of the State of Kentucky

Ed Koebel, EA, FCA, MAAA
November 26, 2018



2018 Valuation Results

Key Findings

- Net Investment Return on Market Value of 10.50%
 - Trust Fund to pay retiree benefits was approximately \$20.0 Billion as of June 30, 2018
 - Was \$11.5 Billion as of June 30, 2009
 - Trust Fund increased \$1.3 Billion for 2018 FYE due to combination of investment gain and negative cash flow
 - Negative cash flow for 2018 as a percentage of market value of assets is (3.63)%
 - Contributions in of \$1.4 Billion
 - Benefit Payments out of \$2.0 Billion
 - Last year's cash flow percentage was (3.45)%

Key Findings

- Increase of 0.17% as a percentage of payroll in State Contribution Requirement from last year above the employer statutory rate
 - Cumulative increase of 14.27% of payroll or about \$551 Million

- TRS received 97% of the Actuarially Determined Employer Contribution for the fiscal year ending June 30, 2018 (99% in 2017 fiscal year)
 - Additional \$475M received this year above statutory
 - 2019/2020 Biennium expects more of the same (\$554M and \$538M, respectively)

Key Findings

- Unfunded Accrued Liability (UAL)
 - Accrued Liability minus Actuarial Assets as of the valuation date
 - Remained at \$14.3 Billion as of June 30, 2018
 - Payment each year of \$872 Million will pay the UAL over a 26-year period

- Funding Ratio increased from 56.4% to 57.7%
 - Lowest point was 51.9% at June 30, 2013
 - Increased 4 out of the last 5 years

Actuarial Assumptions

Review of Assumptions

- A study of the TRS' experience is conducted every five years
 - Last study was performed for the five-year period ending June 30, 2015
- The study reviews the current economic and demographic assumptions and recommends modifications where appropriate
- The actuary is guided by Actuarial Standards of Practice (ASOP) in the development of assumptions
- The study also considers the current actuarial methods

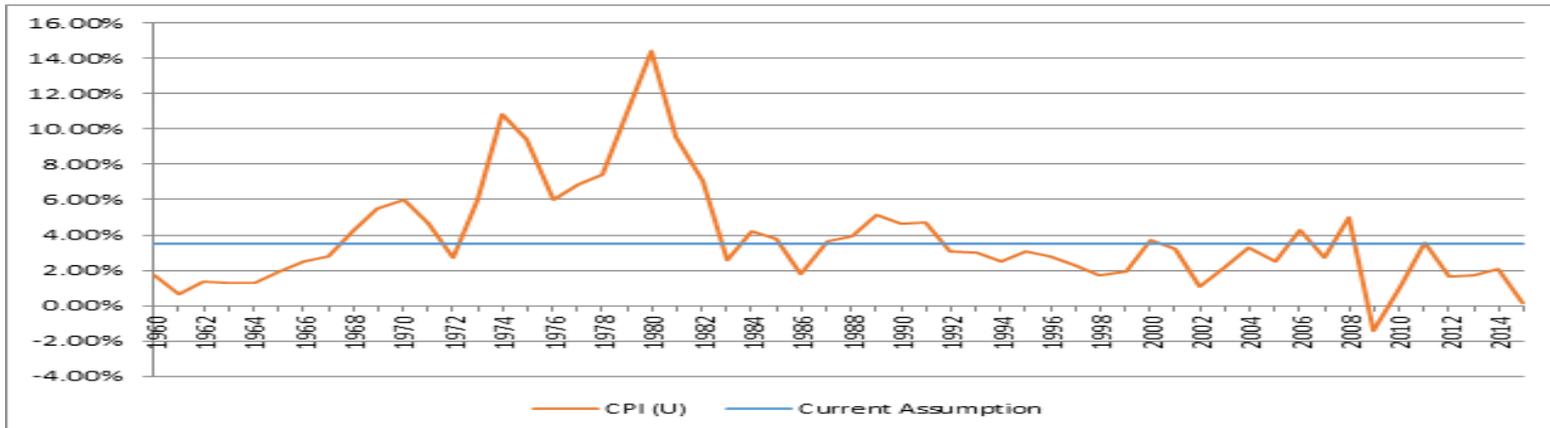
Economic Assumptions

Price Inflation

from 2015 Experience Study



- Current assumption: 3.50%
- Historical data: Annual CPI (U) Increases



- Recommendation:

Price Inflation Assumption	
Current	3.50%
Reasonable Range	1.70% - 3.70%
Recommended	3.00%

Economic Assumptions Investment Return

from the 2015 Experience Study



➤ Recommendation:

- ASOP No. 27 building block approach using investment consultant's capital market assumptions and target asset allocation adopted by Board of Trustees

Item	25 th Percentile	50 th Percentile	75 th Percentile
Real Rate of Return	3.34%	4.56%	5.79%
Inflation	3.00%	3.00%	3.00%
Net Investment Return	6.34%	7.56%	8.79%

Investment Return Assumption		
	Current	Recommended
Real Rate of Return	4.00%	4.50%
Inflation	3.50%	3.00%
Net Investment Return	7.50%	7.50%

Economic Assumptions

Wage Inflation

from the 2015 Experience Study



- Current assumption: 4.00%, which is 0.50% above current price inflation
- Social Security Administration data

Period Ending 12/31/2014	Average Annual Rate of Wage Inflation	Average Annual Rate of Price Inflation	Average Annual Rate of Real Wage Increase
5 Years	2.7%	1.7%	1.0%
10 Years	2.7%	1.8%	0.9%
20 Years	3.4%	2.2%	1.2%
30 Years	3.6%	2.7%	1.1%
50 Years	4.8%	4.1%	0.7%

- Recommendation: 0.50% above price inflation, or 3.50%

Potential Causes of UAL

- Granting initial benefits or granting benefit increases for service already rendered
- Actual experience which is less favorable than assumed:
 - Higher salary increases
 - Earlier retirement age
 - Lower death rates (people living longer)
 - Lower rates of investment earnings
 - Lower rates of non-death terminations
- Contributing less than the full actuarial contribution rate
- Changes in actuarial assumptions or methods

Amortization of UAL

- Amortization of UAL has become a major component of actuarial contribution rate in recent years

- Amortization policy decisions
 - One base or multiple bases
 - Amortization period open or closed
 - Length of amortization period
 - Payment is level dollar or level percent of pay

Amortization Policy

- Amortization Payment Methodology
 - Level dollar
 - Like home mortgage with constant dollar amount of payment
 - Each payment covers interest on UAL and payment on principal
 - More conservative as it pays down the UAL faster
 - Level percent of pay
 - Lower initial payment but increases each year
 - More consistent with budgeting of costs based on payroll
 - Payment may be less than interest on UAL (negative amortization)

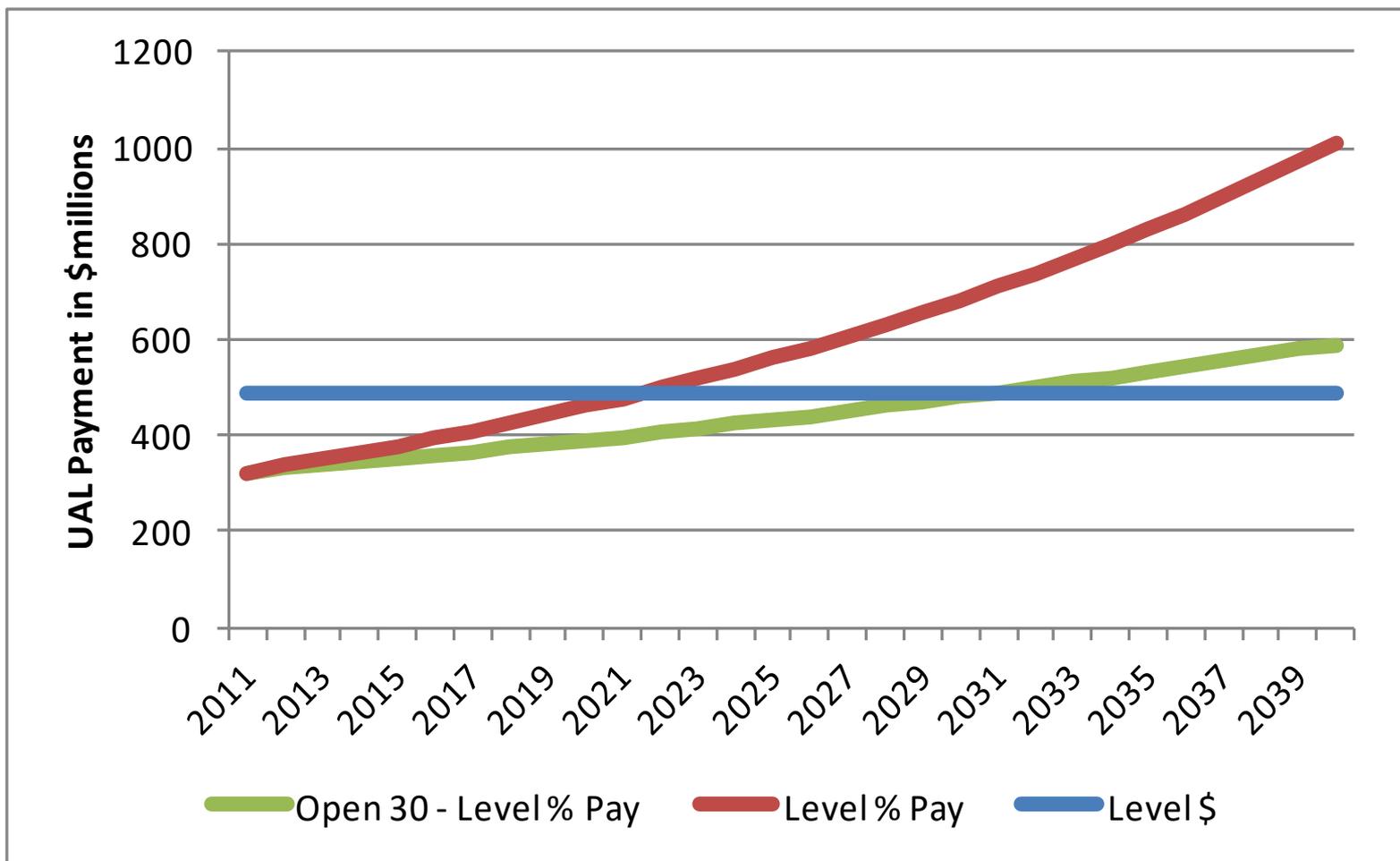
- May be influenced by other factors such as the length of the amortization period

Amortization of UAL

- Level percent of Payroll Amortization
 - Calculates a rate as a percentage of payroll which is determined to be sufficient to amortize the UAL over a fixed number of years.
 - Rate as a percent of payroll is expected to remain level as overall payroll is expected to increase.
 - Dollar amount of amortization payment increases each year as total payroll increases.

- Payroll Growth Assumption
 - Related to, but not the same as, the salary scale assumption.
 - Salary scale assumption is for the individual member while payroll growth assumption is for the overall covered payroll.

Sample of Contributions under Different Amortization Methods



Discussion