

# Teachers' Retirement System of the State of Illinois

## Review of Investment Return Assumption

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# Agenda

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- Overview
- Economic Assumptions
  - Inflation
  - Investment Return
  - Salary Increase
  - Tier 2 COLA and Pay Cap
- Cost Impact

# Overview: Purpose of an Experience Study

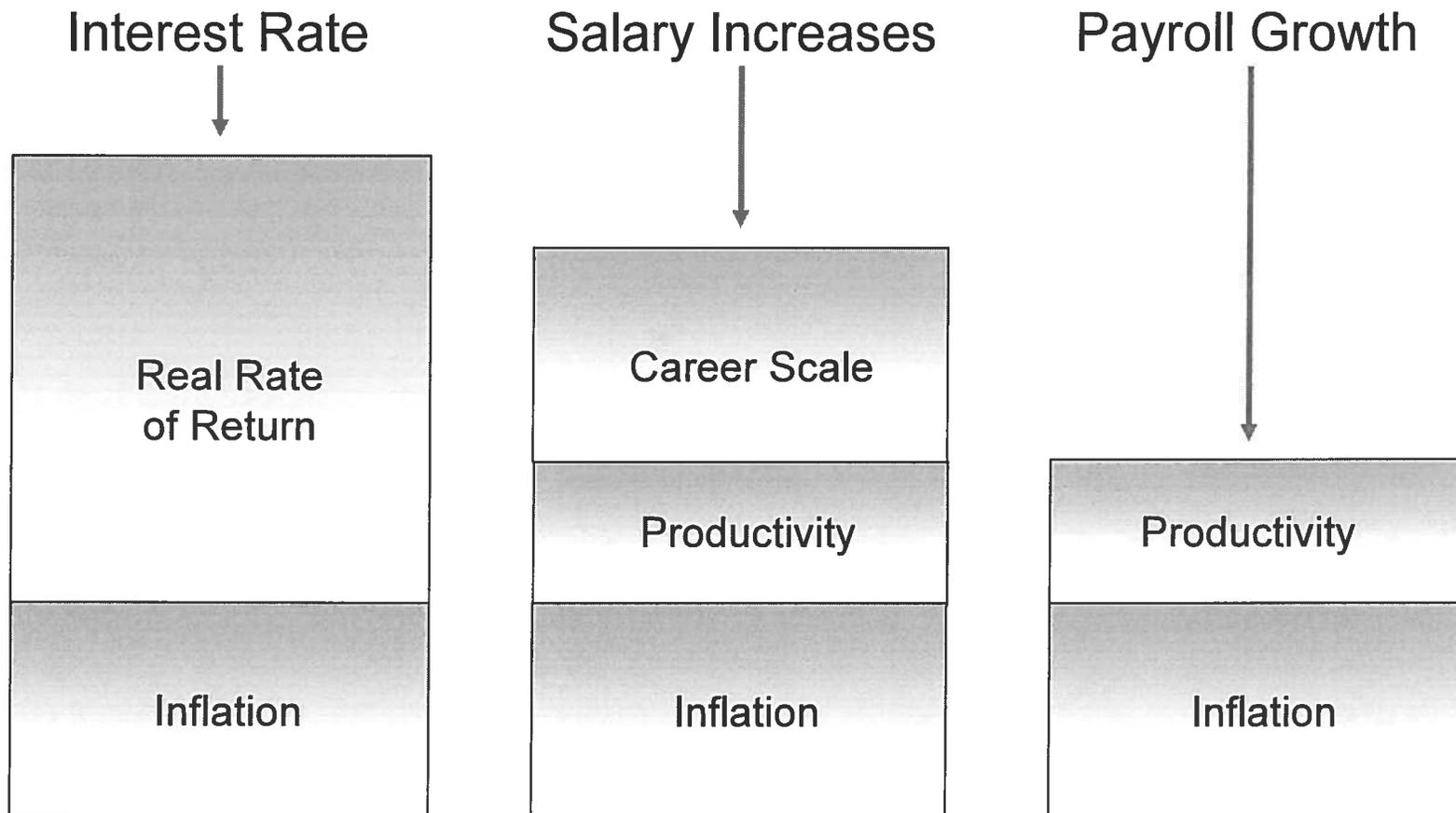
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- An experience study provides the basis for developing recommended assumptions to be used in the annual actuarial valuation
  - Performed on a periodic basis
  - Last full experience study was conducted in 2015 for the 3-year period ending June 30, 2014
  - The State Actuary recommends an annual review of the investment return assumption
- Actuarial Standards of Practice #27 provide guidance on best practices for performing economic assumption-setting analysis
  - Each assumption should be the actuary's best estimate
- Segal's role is to make appropriate "best estimate" recommendations to the Board
  - The assumptions are the Board's assumptions and the Board can adopt all, none, or some of the recommendations of the actuary

# Building Block Method – Basis for Setting Economic Assumptions

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Each economic assumption has 2 or 3 components (or building blocks)



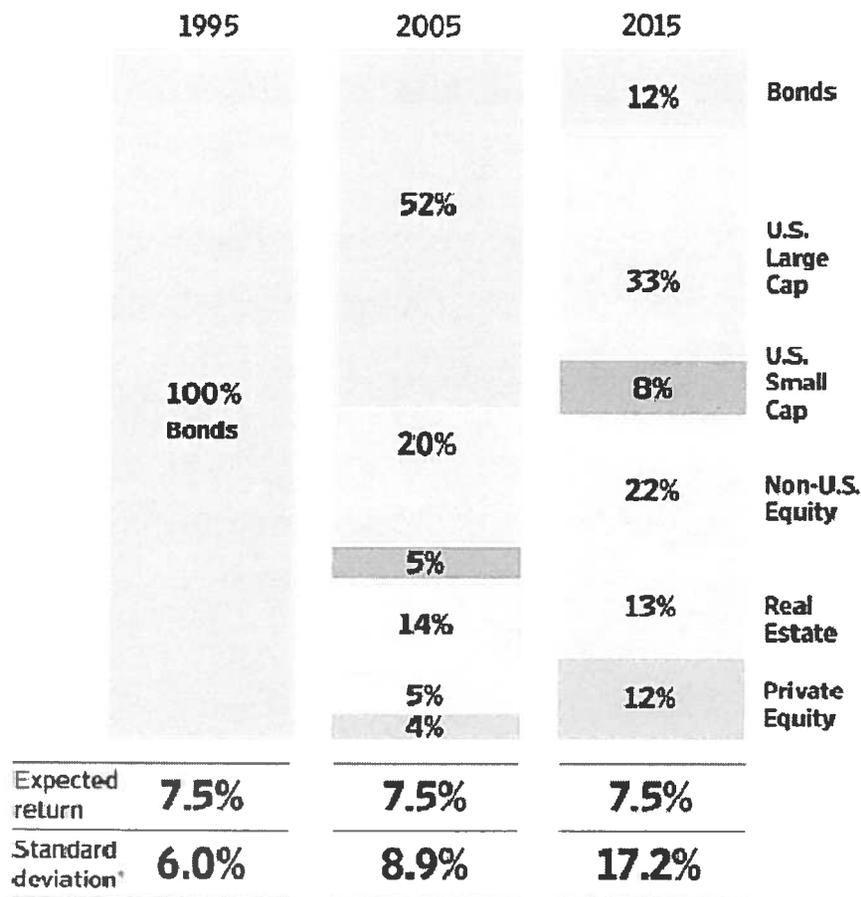
**Building blocks should be consistent across all economic assumptions, but may be adjusted for conservatism.**

# Creating a 7.5% Return Portfolio

## Rolling the Dice

Investors grappling with lower interest rates have to take bigger risks if they want to equal returns of two decades ago.

Estimates of what investors needed to earn 7.5%



\*Likely amount by which returns could vary  
Source: Cellan Associates

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- Reduced inflation expectation has reduced investment returns
- More risk is needed now to achieve 7.5% expected return
- 7.5% portfolio has standard deviation of 17% now vs. 6% twenty years ago

# Assumed Rate of Inflation

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- Inflation represents the annual increase in the cost of living
- The inflation assumption, currently 3.00%, indirectly affects the valuation
  - Inflation is a component of the following economic assumptions:
    - Investment return
    - Individual salary increases
    - Tier 2 COLA and pay cap
- As of June 30, 2016, the historical national inflation (CPI-U) averages are:
  - 5-year average is 1.32%
  - 10-year average is 1.74%
  - 20-year average is 2.18%
  - 30-year average is 2.66%
  - 50-year average is 4.10%

# Assumed Rate of Inflation *(continued)*

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- The inflation assumption used by other large public sector systems has been trending down
  - Current market expectations indicate that low inflation is expected to continue
  - Horizon's 2016 Survey of Capital Market Assumptions, which includes Segal Rogerscasey and RVK, indicates that the median inflation assumption is less than 2.50% over the next 20 years (expectations range from 2.00% to 2.80%)
- In addition to historical inflation and investment consultant forecasts, other metrics to consider are:
  - Current market expectations
  - Inflation assumptions used for similar pension plans

# Assumed Rate of Inflation *(continued)*

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- By observing the difference between the yields on US Treasury bonds with and without inflation indexing, we can calculate the rate of inflation that investors expect
- As of the last week of June 2016, the yields on 30-year Treasury bonds were as follows:
  - Inflation indexed: 0.88%
  - Non-inflation indexed: 2.49%
    - The difference of 1.61% represents the financial market's current expectations of inflation over the next 30 years
- The 2016 OASDI Trustees Report uses three inflation assumptions to project its future financial status:
  - Low inflation of 2.00%;
  - Moderate inflation of 2.60%; and
  - High inflation of 3.20%

# Assumed Rate of Inflation *(continued)*

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- The Center for Retirement Research at Boston College maintains the Public Plans Data (PPD) database that includes general information on 160 public pension systems
  - The average inflation assumption for 2015 is 3.05%, compared to an average of 3.27% for 2011
- We recommend that the Board adopt an assumption that falls between:
  - The level indicated by financial market data (1.61%); and
  - The median rate used by peer retirement systems (3.05%)

**We recommend that the Board lower the inflation assumption from 3.00% to 2.50%**

# Assumed Rate of Investment Return

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- The current investment return assumption of 7.50% consists of two components:
  - Inflation: 3.00%
  - Real rate of return: 4.50%, net of 0.70% of investment expenses
    - Real return represents the excess of what the assets earn over inflation
    - Our approach is to analyze inflation and real return separately

## Assumed Rate of Investment Return *(continued)*

- The following table shows that investment expenses over the last 5 years have been about 0.72% of the average market value of assets (MVA):

Year Ended June 30	Average Market Value of Assets (\$ in Millions)	Investment Expense (\$ in Millions)	Investment Expense (% of MVA)
2011	\$ 30,780	\$ 218	0.71%
2012	36,882	235	0.64%
2013	35,907	280	0.78%
2014	39,451	300	0.76%
2015	<u>45,230</u>	<u>329</u>	<u>0.73%</u>
Total	\$ 188,250	\$1,362	0.72%

- Considering actual recent experience and expected future trends, we recommend maintaining a 0.70% reduction in the real rate of return to account for investment expenses

# Assumed Rate of Investment Return *(continued)*

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- Our analysis of the expected real rate of return is based on:
  - TRS' target asset allocation, shown below

Asset Class	Target Asset Allocation
Domestic Equities	18%
International Equities	18%
Global Fixed Income	16%
Real Estate	15%
Private Equity	14%
Real Return	11%
Absolute Return	8%

- The Horizon Survey of Capital Market Assumptions (2016 Edition)
  - This survey compiles and averages the capital market assumptions of 35 investment consultants (including RVK and Segal Rogerscasey)
  - We believe the Horizon survey is appropriate because it aggregates the capital market assumptions of most major investment consultants

# Assumed Rate of Investment Return *(continued)*

Horizon Study Asset Classes	Horizon Study 20-Year Annual Arithmetic Real Return	Target Allocation <sup>1</sup>	Weighted Real Return
US Equities Large Cap	6.94%	14.4%	1.00%
US Equities Small/Mid Cap	8.09%	3.6%	0.29%
Intl Equities Developed	7.46%	14.4%	1.07%
Emerging Markets Equities	10.15%	3.6%	0.37%
US Bonds Core	2.44%	10.7%	0.26%
Intl Debt Developed	1.70%	5.3%	0.09%
Real Estate	5.44%	15.0%	0.82%
Commodities (Real Return)	4.28%	11.0%	0.34%
Hedge Funds (Absolute Return)	4.16%	8.0%	0.46%
Private Equity	10.63%	14.0%	1.49%
<b>Total</b>		<b>100.0%</b>	<b>6.19%</b>
Adjustment to Geometric			(0.65%)
<b>Geometric Real Rate of Return</b>			<b>5.54%</b>

<sup>1</sup> Breakout based on TRS' Investment Policy

# Assumed Rate of Investment Return *(continued)*

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- A 10-year and 20-year stochastic projection of the annual real rate of return is shown below:

	10 Years	20 Years
75 <sup>th</sup> Percentile	7.32%	7.34%
Median	4.85%	5.54%
25 <sup>th</sup> Percentile	2.29%	3.76%

- Over a 20-year period, TRS is expected to earn an annual real rate of return of at least 5.54% half of the time
- The expected real rate of return is 4.84%, net of expected investment expenses of 0.70%:

Gross Real Rate of Return	5.54%
Less Investment Expenses	<u>(0.70%)</u>
Net Real Rate of Return	4.84%

- In other words, there is a 50% likelihood of earning an annual real rate of return, net of investment expenses, of at least 4.84% over a 20-year period

# Assumed Rate of Investment Return *(continued)*

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- As illustrated earlier, the risk involved with achieving higher returns is substantially more than it was 20, or even 10, years ago
- The State's Actuary has indicated a preference for the TRS Board to *"...always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method."*
- Specifically, in their December 2015 report, the State's Actuary recommended *"...that TRS consider lowering the interest rate next year and the rate be developed taking into account the negative cash flow of TRS and the anticipated future interest rate environment."*

# Assumed Rate of Investment Return *(continued)*

➤ The following table shows the components of the current and alternative investment return assumptions:

Component	Current (7.50%)	At 7.25%	At 7.00%
Inflation	3.00%	2.50%	2.50%
Gross Real Rate of Return	5.20%	5.54%	5.54%
Investment Expense	<u>(0.70%)</u>	(0.70%)	(0.70%)
Adjustment for Adverse Deviation		<u>(0.09%)</u>	(0.22%)
Adjustment for Negative CF			<u>(0.12%)</u>
Net Real Rate of Return	4.50%	4.75%	4.50%
Total	7.50%	7.25%	7.00%
Confidence Level	N/A	51%	53%

- Lowering the expected net real rate of return to 4.75% with a 9 basis point adjustment for adverse deviation will increase the likelihood of meeting the expectation over a 20-year period to 51%
- Taking into account average projected negative cash flow of 1.7% of assets results in an additional adjustment of 12 basis points
- Lowering the expected net real rate of return to 4.50% with a 22 basis point adjustment for adverse deviation increases the likelihood of meeting the expectation over a 20-year period to 53%

**We recommend that the Board lower the investment return assumption from 7.50% to 7.00%**

# Assumed Rate of Individual Salary Increases

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- Individual member salary increase components:
  - Inflation
  - Productivity
  - Merit and seniority increases
- We have not reviewed the salary increase experience related to productivity or merit and seniority
  - However, gains have occurred each of the past five years:

2011	\$ 546M
2012	1,211M
2013	413M
2014	474M
2015	469M

**Based on the recent history of salary gains, and since we recommend lowering the inflation assumption by 0.50%, we also recommend lowering the assumed individual salary increases by 0.50%**

# Tier 2 COLA and Pay Cap

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- Two benefit provisions for Tier 2 members are affected by inflation:
  - Cost of living adjustments (COLAs) are the lesser of 3% and  $\frac{1}{2}$  of CPI-U (inflation)
  - The pensionable salary cap (\$111,572 for 2016) increases at the lesser of 3% and  $\frac{1}{2}$  of CPI-U (inflation)
- Since we recommend lowering the inflation assumption by 0.50%, we also recommend lowering the assumed COLA rate and rate of pensionable salary cap increases for Tier 2 members

**Based on the 2.50% inflation assumption and accounting for the 3% maximum and 0% minimum increases, we recommend that the average COLA rate and rate of pensionable salary cap increases be 1.25%**

# Summary of Economic Assumptions

Assumption	Current	Proposed
Inflation	3.00%	2.50%
Investment Return	7.50%	7.00%
Salary Scale	Merit rates based on years of service plus inflation and productivity.	No change to merit rates. Total rates decreased by 0.50% due to lower recommended inflation.
Tier 2 COLA and Pay Cap	1.4%	1.25%

# Cost Impact (Based on the 6/30/2015 Actuarial Valuation)

Description	Current Assumptions	7.25% Return, Lower Salary Scale/Inflation	7.00% Return, Lower Salary Scale/Inflation
Actuarial Accrued Liability	\$108,122M	\$111,729M +3,607M	\$115,505M +7,383M
Actuarial Value of Assets	\$45,435M	\$45,435M	\$45,435M
Unfunded Actuarial Accrued Liability	\$62,687M	\$66,294M +3,607M	\$70,070M +7,383M
Funded Percentage	42.0%	40.7% -1.3%	39.3% -2.7%
Employer Normal Cost	\$871M	\$869M -2M	\$980M +109M
FY 2017 Statutory State Contribution*	\$3,855M	\$4,106M +251M	\$4,276M +421M
Total Statutory State Ctbs Through FY 2045*	\$186,742M	\$187,445M +703M	\$195,615M +8,873M
FY 2017 Actuarial Math 2.0 State Contribution	\$6,071M	\$6,343M +272M	\$6,665M +594M

\*Based on Segal's calculations