Joint Board Meeting

Firefighters' Retirement System
Municipal Employees' Retirement System
Municipal Police Employees' Retirement System

Investment Return Assumptions
July 10, 2018

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LOUISIANA LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

Trustees of the Louisiana Municipal
Statewide Retirement Systems

Dear Trustees:

The office of the Louisiana Legislative Auditor (LLA) was requested by the Executive Directors of the three Louisiana municipal statewide retirement systems to present information to their respective boards of trustees similar to what the LLA staff has been presenting to the Public Retirement Systems' Actuarial Committee (PRSAC). In addition, the Directors requested that we provide our perspective on the actuarial treatment of cost-of-living adjustments and provide information on what funding solutions other retirement systems around the country employ to keep contributions stable.

Primarily, this report presents the process and duties the LLA's actuary considers when (a) he adopts the most actuarially appropriate investment return assumption for his own actuarial valuation for a given retirement system or when (b) he evaluates an investment return assumption adopted by the trustees and fiduciaries for a given system .

The LLA's actuary is pleased to present this report at the joint board meeting on July 10, 2018 and we look forward to a thorough discussion of the topics.

Sincerely,

Paul T. Richmond, ASA, MAAA, EA

Manager, Actuarial Services

Agenda and Table of Contents

Our Duties

- The LLA's actuary has certain duties when either adopting or evaluating an investment return assumption for a given retirement system.
- The LLA's actuary has a duty to the Louisiana Constitution's mandate
  - Article 10, Section 29(E)(1)
    "*The actuarial soundness of state and statewide retirement systems shall be attained and maintained . . .*"
- The LLA's actuary shares this duty with system trustees and fiduciaries.
- While the actuarial soundness of a public sector retirement system is not defined in the constitution or statutes, nor it is well-defined in actuarial literature, it should be understood to include the use of appropriate, reasonable and mainstream actuarial assumptions.

Our Duties

- The LLA's actuary has a duty to the Actuarial Standards of Practice (ASOPs) in the matter of the investment return assumption. According to ASOP No. 27 (section 3.6), an assumption is reasonable if it has the following characteristics:
  - It is appropriate for the *purpose of the measurement* (an actuarial valuation of a given plan with all its own unique demographics, expectations and plan provisions);
  - It reflects the actuary's *professional* judgment;
  - It takes into account historical and *current economic data that is relevant* as of the measurement date;
  - It reflects the actuary's *estimate of future experience*, the actuary's observation of the estimates inherent in *market data*, or a combination thereof and
  - It has *no significant bias* (i.e., it is not significantly optimistic or pessimistic), except for conservatism to recognize the possibility of adverse deviations
- Notice the duty to reflect the actuary's *professional* judgement. This does not allow for political judgement or budgetary judgement, but professional judgement; that is, the actuarial profession. Our judgement is not a license to accommodate conflicting interests. It is limited to our actuarial judgment.

Our Duties

- The LLA actuary has a duty to the plan members and beneficiaries, who should expect a reasonably high level of "benefit security". The investment return assumptions used in measuring plan liabilities and actuarially determined contributions affects the benefit security for members and beneficiaries.

  Less contributions make for less security, and more contributions make for more security, all other things being equal.

- While neither the LLA's actuary nor a board's actuary are classified as fiduciaries, we have a duty to members and beneficiaries which has certain similarities to the duty of trustees and fiduciaries.
  - R.S. 11:264.3
    *"The **basic** duty of a fiduciary is to discharge his duties with respect to the system in the **exclusive interest** of the members and beneficiaries."*
  - R.S. 11:264.4
    *"A fiduciary must discharge his duties within the law **solely** in the interest of system members and beneficiaries for the **exclusive purpose** of providing benefits to participants and beneficiaries and paying the expenses of administering the plan."*
  - Emphasis added

Our Duties

- Our duty is not to take into account budgetary pressures. These are better reflected through funding policies (including amortization policies) and benefit provisions, within the latitude granted to the boards and the legislature, not through actuarial assumptions. We have a higher duty to plan members and beneficiaries than we do to affordability.
- More narrowly framed: With respect to the selection or evaluation of investment return assumptions, the duty of the LLA's actuary:
  - Is to apply a robust and objective process to select an appropriate return assumption, which is a defensible mainstream estimate of a given portfolio's future net compound average return to be used in an actuarial valuation.
- In our opinion, if we select a return assumption which is (a) an outlier compared to the mainstream of professional forecasters or which is (b) misaligned with a plan's demographics or otherwise unresponsive to mid-term expectations, the results may have certain negative implications:
  - Actuarially insufficient contribution rates to ensure benefit security for plan members and beneficiaries in accordance with the stated financing plan;
  - Understating the liabilities for funding and the cost to taxpayers for financial reporting;
  - Compromised inter-generational equity; and
  - Lack of transparency.

Process

- Separate the process of assumption-setting from affordability.
- Address affordability through separate means, i.e., separate from the assumption-setting process. This is addressed later.
- Ten qualities of a robust and focused process for selecting inflation and investment return assumptions for pension valuation purposes:
    1. Analytical (based on math, not feelings or hopes)
    2. Recognizes asset allocation
    3. Defensible
    4. Demonstrable-transparent
    5. Forward-looking expectations
    6. Subject matter expert
    7. Several subject matter experts
    8. Consensus of experts
    9. Identify a most appropriate net return assumption for pension valuations
    10. Develop a range of reasonableness around the most appropriate assumption
- More of our details and transparency follow.

Perspective

- Where do we look for inputs into this process?
  Past vs. Future
  - Select the right ending date and length of time, and past statistics can say anything.
  - The past is no guarantee of the future; not even a good indicator.
  - The present is not like the past was.
  - The future will not be like the past was.
  - Reversion to a mean is valid only if all the conditions are the same.
  - Even if the mean were the same (which we should not count on), there is substantial variation around the mean.
  - Historical inflation and returns are interesting, but should never determine or defend current pension assumptions.
  - Pension assumptions are all about the future.
  - ➢ Forward-looking expectations are more appropriate for pension assumptions.

Perspective

- To whom do we look for inputs into this process?
  Other Retirement Systems vs. Expert Forecasters
  - The inflation and return assumptions of other retirement systems are interesting, but not instructive to us or plan trustees to discharge our respective duties to plan members and beneficiaries.
  - Pointing to the behavior of our peers is seldom a defense.
  - It is informative to know where our assumptions fit in the community of public retirement systems nationwide. However, it is best to let expert forecasters instruct us when developing our own forward-looking return assumptions.
  - Other retirement systems nationwide each have their own politics and biases.
  - ➢ Rely almost entirely on subject matter experts for inflation and investment forecasts.

- Whether a retirement system's return assumption is within the "mainstream":
  - Should not be judged in terms of the mainstream of other retirement systems, but
  - Should be judged in terms of the mainstream of independent expert forecasters.

Perspective

- Admittedly, no one knows the future
  - Expert forecasters do not know the inflation or investment future.
  - Neither do actuaries do not know the turnover, retirement or mortality in the future.
  - They are all certain to be wrong to varying degrees.

➢ But where else would we turn for inputs into this process? Who else should we rely on?

➢ Just because the forecasters do not know for sure what the future rates of inflation and investment returns will be . . .
  - That does not mean *any* assumption will do.
  - That is no reason to rely on the opinions of less qualified sources.
  - More importantly, just because forecasters do not know for sure, that is not an opportunity to let the cities' budgets drive our selection.

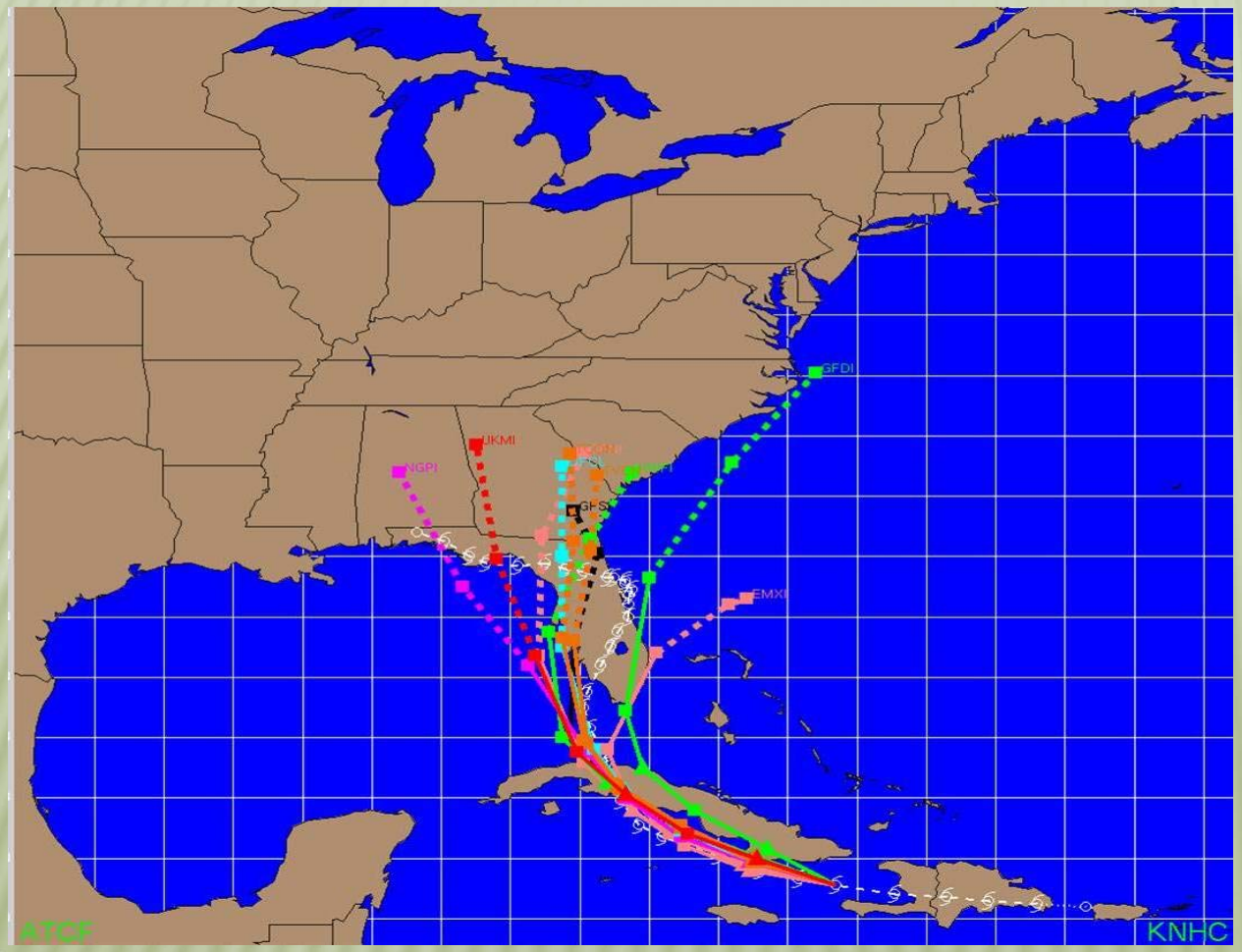
Why Rely on Expert Forecasters?

- Ultimately, the board of trustees adopts the net investment return assumption for a given year's actuarial valuations – for funding and accounting purposes.
- However, forecasting the future investment performance of a pension fund requires a high level of specialized expertise. No one knows the future for certain, but reputable professional forecasters are the best place to turn for advice. A board's own investment consulting firm is a good start.
- The return assumption is not a lever simply for adjusting the contribution up or down in order to balance the cities' budgets.
- It is a reasonable and defensible mainstream estimate of a portfolio's future net compound average return, to be used in actuarial valuations.
- The reasonability of a return assumption is established based on the advice of reputable professional inflation and investment forecasters.
- Actuaries do not generally have the background or expertise to develop inflation and return forecasts for each relevant asset class. Nevertheless, the final assumption must reflect the actuary's *professional* judgment.

Why Multiple Forecasters?

- The three Louisiana municipal statewide retirements systems each have experienced and reputable investment consultants. That's a good start.
- But if we rely on only one investment forecaster, how would we know what other great minds think?
- Actuaries' research in this area has been improving:
  - Gathering capital market assumptions from numerous inflation and investment forecasters.
  - Gabriel, Roeder, Smith & Company.
  - Horizon Actuarial Services.
  - Other actuarial firms.
- Consider the National Hurricane Center. What if the NHC had only one model of the future?

Why Multiple Forecasters?



Tropical Storm Faye

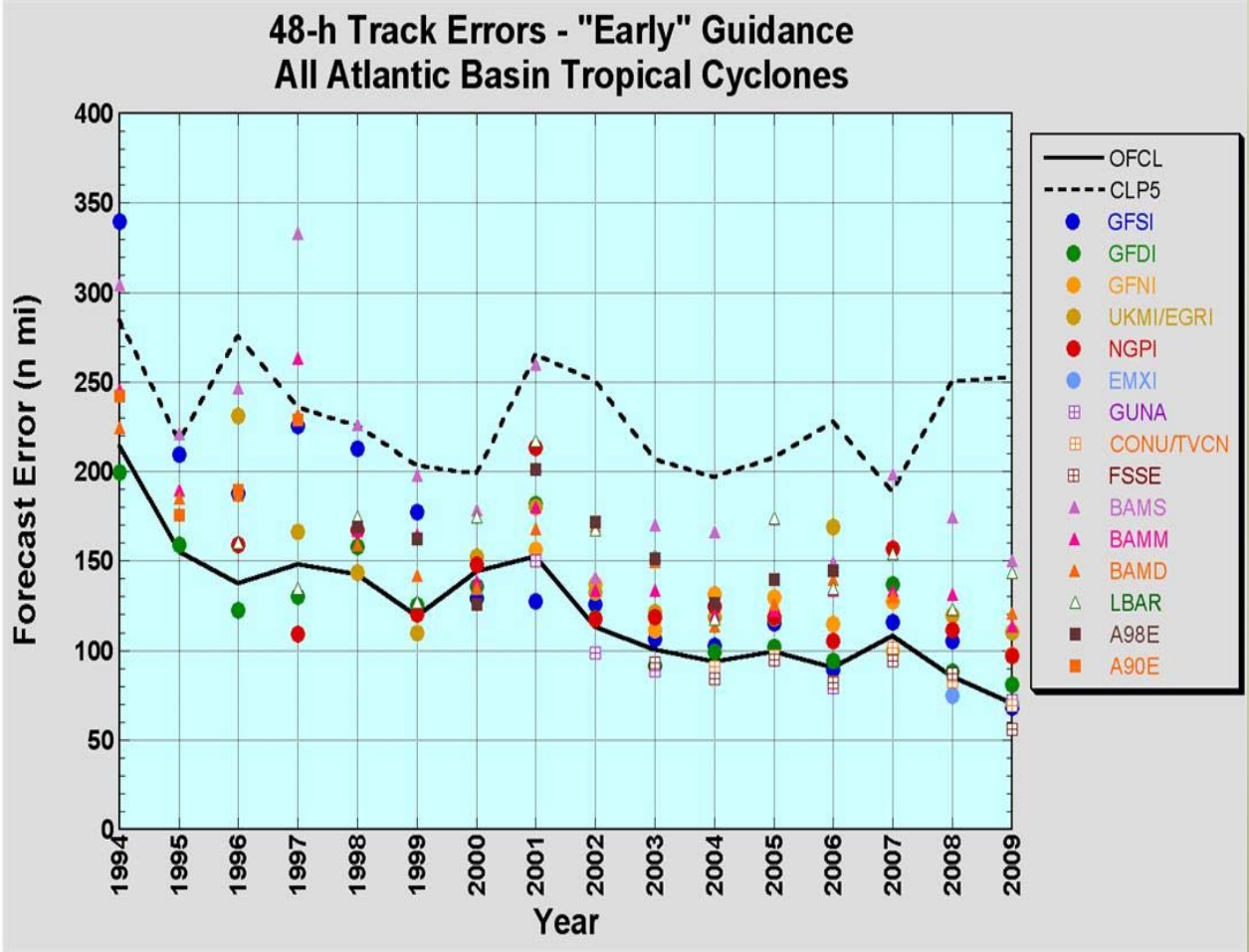
- TS Fay, captured when just below Guantanamo Bay
- White is the ultimate actual track

- What if the right-most green (or mauve) color were our only expert?
- Actuaries and trustees need to know the opinions of <u>several</u> outside experts
- Consensus is clay color

Why a Consensus of Forecasters?

- A statistical consensus is not the same as agreement among forecasters.
  - It is an “aggregation” of their respective forecasts, a measure of “central tendency”.
  - A related term is an “ensemble” of forecasts.
  - A simple average of their forecasts makes a reasonable consensus.
- Forecasters, admittedly, have biases, anchoring and incentives.
- But a consensus of forecasters is a more accurate predictor than any one forecaster.
  - The LLA’s office currently turns to 7 expert inflation forecasters
  - And 12 expert investment forecasters
- This is a well-known general principle in all fields of forecasting
  - In politics -- Elections
  - In biology -- Species distributions
  - In finance – Corporate and economic statistics, inflation, investment returns
  - In weather – Daily weather, climate cycles, hurricanes
- A consensus of multiple reputable forecasters is a more accurate predictor than any one forecaster.

Why a Consensus of Forecasters?



- Consider hurricane forecasting again.
- 2-day tracking errors of many different models over time.
- CLP5 (dotted black line), based on historical data, has the worst tracking error.
- Consensus models are grid-boxes, having the best track records.
- The NHC Official Forecast is the solid black line.

Inflation Assumption

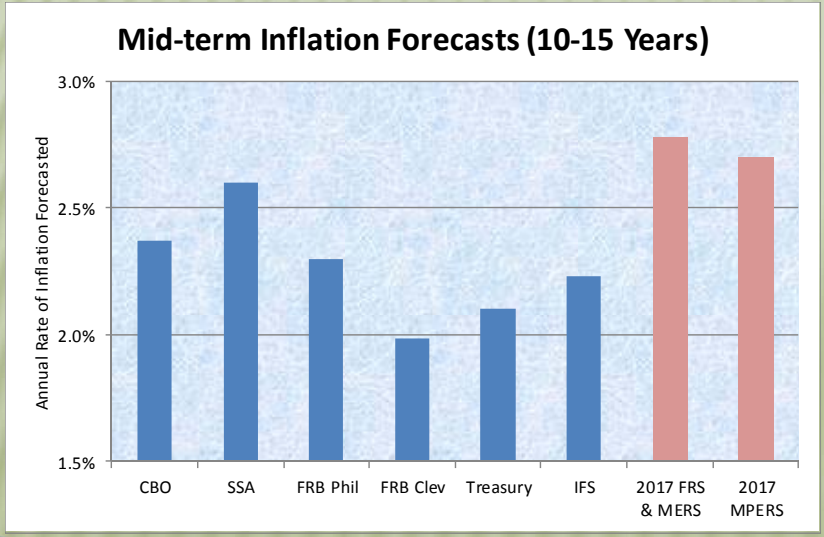
Valuation Date June 30	Assumed Annual Rate of Inflation		
	FRS	MERS (A&B)	MPERS
2018 (Scheduled)	TBD	TBD	TBD
2017	2.775%	2.775%	2.70%
2016	2.875%	2.875%	2.875%
2015	2.875%	2.875%	2.875%
2014	2.75%	3.00%	3.00%
2013	3.00%	3.00%	?
2012	3.25%	3.00%	?
2011	3.25%	3.25%	?
2010	3.25%	3.25%	?
2009		3.25%	?

- These historical inflation assumptions were taken from prior actuarial valuation reports.
- Inflation is a major component of:
  - The investment return assumption,
  - The salary increase assumption and
  - The payroll growth rate for MERS.
- A 10 basis point change in the assumed inflation rate means a 10 basis point change in these other assumptions.

Inflation Assumption

- Actuaries are not economists and not usually experts in forecasting future short-term, mid-term or long-term rates of future inflation.

Major National Inflation Forecasters	
Congressional Budget Office	Federal Reserve Bank of Cleveland
Federal Reserve Bank of Philadelphia	Federal Reserve Board
Social Security Trustees Report	U.S. Department of the Treasury
Investment Forecaster Survey (IFS)	



- The process methodology employed herein relies on several reputable inflation forecasting organizations, which represent the professional opinions of hundreds of economists with expertise in inflation forecasting.
- The preference for a mid-term horizon is discussed at length later in this presentation.

Inflation Assumption

Forward-looking Annual Inflation Forecasts March 2018 (Table 1 of 2) (From Professional Experts in the Field of Forecasting Inflation)	
Federal Reserve Board's Federal Open Market Committee	
Current Long-run Price Inflation Objective Objective since Jan 2012; Personal Consumer Expenditures (PCE)	2.00%
Consumer Price Index Inflation Objective (CPI = PCE + approx 40 bps)	2.40%
Congressional Budget Office: *The Budget and Economic Outlook*	
Overall Consumer Price Index April 2018; Ultimate)	2.40%
Overall Consumer Price Index (April 2018; 10 Years)	2.37%
Personal Consumer Expenditures (April 2018; Ultimate)	2.00%
Personal Consumer Expenditures (April 2018; 10Years)	2.01%
2018 Social Security Trustees Report	
CPI-W 15-Year Intermediate Assumption	2.60%
CPI-W 30-Year Intermediate Assumption	2.60%
GDP Deflator 15-Year Intermediate Assumption	2.20%
GDP Deflator 30-Year Intermediate Assumption	2.20%

Inflation Assumption

Forward-looking Annual Inflation Forecasts March 2018 (Table 2 of 2) (From Professional Experts in the Field of Forecasting Inflation)	
Quarterly Survey of Professional Forecasters	
2Q2018 Federal Reserve Bank of Philadelphia 10-Year Forecast	2.30%
Federal Reserve Bank of Cleveland	
10-Year Expectation on April 1, 2018	1.98%
20-Year Expectation on April 1, 2018	2.15%
30-Year Expectation on April 1, 2018	2.26%
U.S. Department of the Treasury	
10-Year Breakeven Inflation	2.10%
20-Year Breakeven Inflation	2.12%
30-Year Breakeven Inflation	2.17%
50-Year Breakeven Inflation	2.20%
100-Year Breakeven Inflation	2.23%
Investment Consultants and Forecasters	
2018 GRS Survey major national investment forecasters and consultants	
Median expectation among 12 firms (averaging a 10-year horizon)	2.23%
Median expectation among 3 firms (averaging 27-year horizon)	2.31%

Inflation Assumption

- The 2017 inflation assumptions for FRS, MERS and MPERS were 2.775%, 2.775% and 2.75%, respectively.
- It is hard to defend 2.775% or even 2.50%, considering the current expectations of the 7 inflation forecasting organizations above. Even the long-term inflation forecasts average well below 2.50% and 2.775%.
- This is not new. Economists have had low inflation forecasts for several years, over the mid-term and longer-term horizons.
- Consider the summary table below.
- The preferable inflation assumption is 2.25% for 2018, which is used in the balance of this presentation.

2018 Forward-looking Forecasts of CPI Inflation		
Horizon	**Average**	**Sources**
27 - 30+ yrs	2.33%	7
20 yrs	2.22%	2
10 -15 yrs	2.26%	7

Asset Allocation

- Asset allocation is also a strong driver of an appropriately set return assumption,
- And should also be explicitly incorporated into the process.

Risk-oriented Assets			
	Current Asset Allocation*		
Target Asset Classes	FRS	MERS	MPERS
Large Cap U.S. Equities	16%	14%	16%
Small to Mid-Cap U.S. Equities	6%	14%	8%
International Equities (Developed)	16%	12%	20%
Emerging Markets Int'l Equities	6%	10%	8%
Global Equities	10%		
Private Equity	4%	2%	5%
Real Estate	6%	4%	8%
Real Assets			2%
Hedge Funds			5%
Global Tactical Asset Allocation	5%		6%
Risk Parity	5%		
Infrastructure		3%	
Natural Resources		3%	
Total Risk-Oriented	**74%**	**62%**	**78%**

Fixed Income Assets			
	Current Asset Allocation*		
Target Asset Classes	FRS	MERS	MPERS
Core Fixed Income	18%	18%	14%
U.S. TIPS	3%	7%	
High Yield		5%	2%
Bank Loans			2%
Foreign Bonds		5%	
Emerging Market Debt	5%		4%
Private Debt		3%	
Total Fixed Income	**26%**	**38%**	**22%**
GRAND TOTAL	100%	100%	100%

** Per most recent Investment Policy Statements:*
FRS 5/10/18; MERS 6/29/2017; MPERS 2/21/2018

Forecasters' Expectations

- Investment Forecaster Survey (GRS) obtained the 2018 forecasts from 12 major national investment consultants and managers.

Participating Investment Forecasters			
Aon/Hewitt[IC]	BNY/Mellon[IM]	Callan[IC]	J.P. Morgan[IM]
Marquette[IC]	Mercer[IC]	NEPC[IC]	PCA[IC]
RVK[IC]	Summit[IC]	VOYA[IM]	Wilshire[IC]

[IC] Designates the forecaster is an investment consultant and is among the top 25 largest investment consultants, according to the most recent survey from P&I.

[IM] Designates the forecaster is an investment manager and is among the top 75 largest investment managers, according to the most recent survey from P&I/WTW.

- These forecasting firms were selected based on their size and staffing depth, experience with public sector retirement systems, reputation, availability of their capital market assumptions and, for the investment managers, their institutional and retail markets.
- Therefore, the investment return forecasts presented herein are not those of the LLA, the LLA's Actuary or GRS. They represent the opinions of 12 reputable expert investment forecasters, and 7 reputable expert inflation forecasters.

Forecasters' Expectations

Investment Forecaster	50th Percentile of Expected Mid-Term Compound Average Return		
	FRS	MERS	MPERS
1	4.77%	4.61%	5.15%
2	5.59%	5.36%	5.80%
3	5.62%	5.16%	5.86%
4	5.75%	5.16%	6.01%
5	5.77%	5.35%	6.09%
6	5.91%	5.55%	6.15%
7	5.94%	5.59%	6.18%
8	6.03%	5.59%	6.19%
9	6.07%	5.54%	6.29%
10	6.13%	5.73%	6.55%
11	6.48%	5.66%	6.70%
12	7.24%	6.78%	7.60%
Consensus Average of 12	**5.94%**	**5.51%**	**6.21%**
Scheduled Assumption	**7.30%**	**7.28%**	**7.20%**

- After mapping each system's target asset allocation to the forecasters' asset classes,
- These are the forecasters' expectations of each of the system's own portfolio . . .
- Over the next decade – longer horizons are addressed later.
- Consider the individual forecasters' expectations, compared to the systems' scheduled 2018 assumptions.
- Consider the consensus average expectation, compared to the systems' scheduled 2018 assumptions.
- It is apparent that #1 and #12 are outliers.

Forecasters' Expectations

Investment Forecaster	50th Percentile of Expected Mid-Term Compound Average Return			Probability of Exceeding Scheduled Valuation Assumption over 10 Years		
	FRS	MERS	MPERS	FRS 7.30%	MERS 7.275%	MPERS 7.20%
1	4.77%	4.61%	5.15%	25.70%	23.46%	30.62%
2	5.59%	5.36%	5.80%	33.59%	26.58%	37.05%
3	5.62%	5.16%	5.86%	30.52%	28.81%	34.75%
4	5.75%	5.16%	6.01%	31.78%	29.11%	36.27%
5	5.77%	5.35%	6.09%	34.33%	30.68%	39.17%
6	5.91%	5.55%	6.15%	36.38%	29.98%	39.33%
7	5.94%	5.59%	6.18%	34.86%	30.99%	38.83%
8	6.03%	5.59%	6.19%	38.26%	31.71%	40.97%
9	6.07%	5.54%	6.29%	37.15%	32.29%	40.65%
10	6.13%	5.73%	6.55%	39.56%	32.45%	44.96%
11	6.48%	5.66%	6.70%	41.39%	34.05%	44.83%
12	7.24%	6.78%	7.60%	49.33%	43.96%	54.39%
Consensus Average of 12	**5.94%**	**5.51%**	**6.21%**	**36.07%**	**31.17%**	**40.15%**

- Probabilities of achieving a compound return over the next decade . . .
- Of at least the scheduled assumption is . . .
- Well below a 50-50 chance.
- Consider the optics of this:
- The board's assumption has much less than a 50-50 chance of being achieved over the next decade.
- Consider the consensus average expectation (50th percentile; 50-50 chance) as a board policy.

Forecasters' Expectations

Investment Forecaster	50th Percentile of Expected Mid-Term Compound Average Return		
	FRS	MERS	MPERS
1	4.77%	4.61%	5.15%
2	5.59%	5.36%	5.80%
3	5.62%	5.16%	5.86%
4	5.75%	5.16%	6.01%
5	5.77%	5.35%	6.09%
6	5.91%	5.55%	6.15%
7	5.94%	5.59%	6.18%
8	6.03%	5.59%	6.19%
9	6.07%	5.54%	6.29%
10	6.13%	5.73%	6.55%
11	6.48%	5.66%	6.70%
12	7.24%	6.78%	7.60%
Consensus Average of 12	**5.94%**	**5.51%**	**6.21%**
Scheduled Assumption	**7.30%**	**7.28%**	**7.20%**

- Three of the 12 Investment Forecasters also provide longer-term forecasts.
- While longer-term forecasts may not be actuarially appropriate, for the reasons elucidated below, they are presented here for information purposes.
- Do the mid-term and longer-term consensus forecasts "feel" too low?

50th Percentile of Expected Longer-Term Compound Average Return			
Investment Forecaster	FRS	MERS	MPERS
1	6.33%	5.98%	6.56%
2	6.59%	6.06%	6.94%
3	6.91%	6.51%	7.01%
Consensus Average of 3	**6.61%**	**6.18%**	**6.84%**

Forecasters' Expectations

- Again, this is not the opinion of the LLA's Actuary.
- This presents the opinions of:
  - 12 major national investment forecasting organizations and
  - 7 major national inflation forecasting organizations,
  - Representing hundreds of professional inflation and investment forecasting experts.
- Consider the individual forecasters' expectations.
- Consider the consensus average expectation.
- The spreads for each system are inputs to further analysis.

50th Percentile of Expected Compound Average Return									
Investment Forecaster	Longer-term Horizon (Avge 27 years)			Mid-Term Horizon (Avg 10 Years)			Mid-term to Longer-term Spread		
	FRS	MERS	MPERS	FRS	MERS	MPERS	FRS	MERS	MPERS
1	6.33%	5.98%	6.56%	6.07%	5.59%	6.29%	0.26%	0.39%	0.27%
2	6.59%	6.06%	6.94%	5.77%	5.16%	6.15%	0.82%	0.90%	0.79%
3	6.91%	6.51%	7.01%	5.91%	5.35%	6.09%	1.00%	1.16%	0.92%
Consensus Average of 3	**6.61%**	**6.18%**	**6.84%**	**5.92%**	**5.37%**	**6.17%**	**0.69%**	**0.82%**	**0.66%**

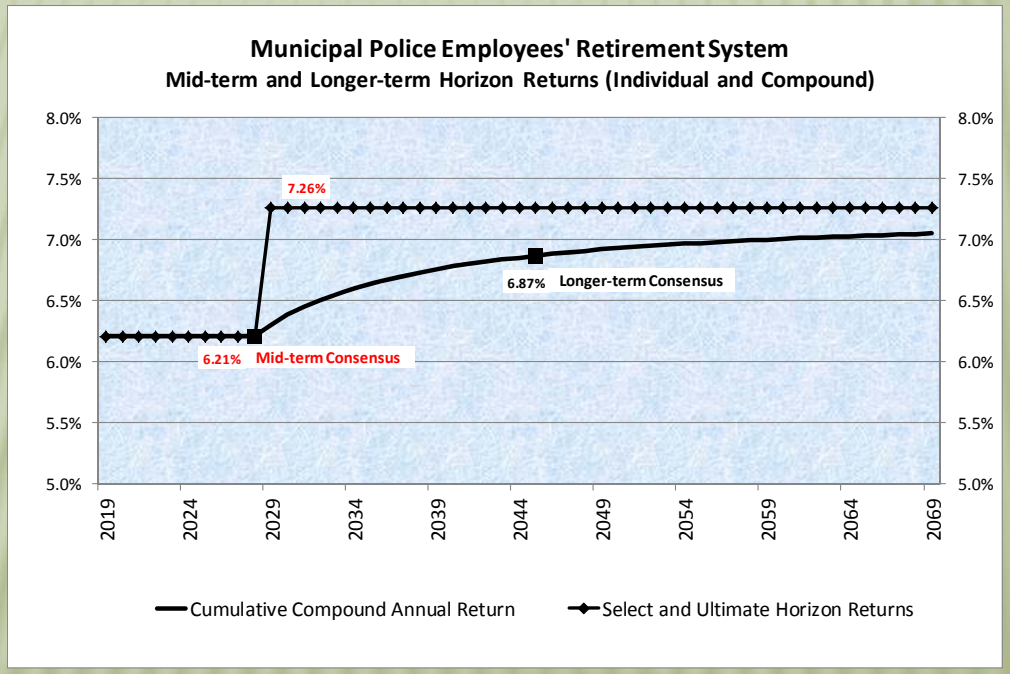
Forecasters' Expectations

- So the average spreads of the longer-term forecast over the mid-term forecast for the three forecasters that provided both are: 69 basis points for FRS, 82 basis points for MERS, and 66 basis points for MPERS
- If the consensus of the 12 forecasters is right . . .
- There is a 50-50 chance of achieving at least the annual compound return indicated in the table below:
  - Years 1-10 shown in Row (A) and (D).
  - In order to reach the 50th percentile compound rate over the longer term, Row (C), . . .
  - Years 11-27 must be higher to make up for the lower returns in the mid-term [Row (E)]

Row		FRS	MERS	MPERS
(A)	Avg Over Mid-term (10 Years): Average of 12	5.94%	5.51%	6.21%
(B)	Avg Spread: Average of 3	0.69%	0.82%	0.66%
(C)	Avg Over Longer-term (27 Years): (A) + (B)	6.63%	6.33%	6.87%
(D)	Return Each Year for: Years 1-10	5.94%	5.51%	6.21%
(E)	Years 11-27: Solve for X to achieve (C) over all 27	7.04%	6.82%	7.26%
(F)	Years 28+: Assume same as (E)	7.04%	6.82%	7.26%

Forecasters' Expectations

- This is not the opinion of the LLA's Actuary,
- But the consensus opinion of 19 subject matter expert forecasting organizations.
- The final answer may be somewhere in between the mid-term (MT) forecast and the longer-term (LT) forecast, to account for the demographic adjustment (more on this follows),
- But the final answer should lean toward the mid-term consensus for the reasons that follow.



Mid-term vs. Longer-term

- "A pension plan is a long-term proposition." This has been a common saying of advocates of return assumptions expected over long-term horizons rather than mid-term horizons.
- Certainly, most public sector pension plans are expected to have perpetual lives, especially in jurisdictions where there is no Social Security coverage.
- Investment returns expected over the long-term have been higher than over the mid-term. This makes them attractive and appealing for those desiring to keep contribution rates in check.
- However, that characteristic of perpetual life does not necessarily imply that the actuarial assumptions for future inflation and investment return forecasted over the long-term are more appropriate than the mid-term.
- Many institutions that are "long-term propositions" must keep an eye on the short-term and mid-term. To do otherwise exposes the institution to serious mid-term risks, while waiting and hoping for the long-run to be vindicated.

Mid-term vs. Longer-term

- Following are five compelling reasons to select a pension return assumption that is at or near the mid-term consensus of the 50th percentile expectation, rather than the longer-term. The first three are expanded in the following pages.
  1. Recognize the plan-specific **demographics and benefit timing (details follow)**.
  2. We live in the **meantime**.
  3. Relative uncertainty and **unreliability** of longer-term forecasts.
  4. Longer-term forecasts often rely heavily on the notion that future returns will gravitate back to historical norms over the long term, in a **reversion to the mean** of past returns. Since future economic conditions will not be like the past, relying on the past "too heavily" is questionable. Mid-term forecasts, generally, use different methodologies. All forecast methodologies have uncertainties. Some more than others.
  5. There are **fewer** credible investment return forecasters willing to make 30-year forecasts. More reputable professional forecasters is better than fewer.

Demographics & Benefit Timing

- While the analysis and development in the previous pages recognizes market expectations of inflation and investment forecasters by asset class and applies them to the systems' own respective asset allocation . . .
- So far, it does not recognize the systems' own respective demographics.
  - Are the current plan assets going to be used mostly to pay benefits coming due in the short-term and mid-term?
  - Or used mostly to pay benefits coming due only until the long-term?
  - Or some of both?
- The forecast horizons (mid-term vs. longer-term) should be different for :
  - Mature systems with benefit payments mostly coming due in the short-term and mid-term as compared to
  - New systems with benefit payments mostly not coming due until 20 or 30 years have passed.
- Mature systems should favor mid-term forecasts for demographic reasons.

Demographics & Benefit Timing

Ratio of Actives to Inactives+DROPs			
Year Ending June 30*	**FRS**	**MERS**	**MPERS**
2017			
Number of Actives	4,429	7,062	5,663
Number of Inactives+DROPs	3,131	8,924	6,508
Ratio	**141%**	**79%**	**87%**
2016			
Number of Actives	4,362	7,054	5,666
Number of Inactives+DROPs	3,016	8,661	6,327
Ratio	**145%**	**81%**	**90%**
2015			
Number of Actives	4,192	7,126	5,535
Number of Inactives+DROPs	2,909	8,423	6,254
Ratio	**144%**	**85%**	**89%**
2014			
Number of Actives	4,098	7,062	5,468
Number of Inactives+DROPs	2,793	8,188	6,146
Ratio	**147%**	**86%**	**89%**

- There are a few statistics that measure the level of a system's maturity. Three are presented herein.
- Consider the ratio of actives to inactives.
- Employee and employer contributions are based on active payroll.
- So the active population's payroll supports the contributions to the plan (for actives and inactives)
- By this measure, MERS and MPERS are "more mature" than FRS. All three are becoming more mature.

Demographics & Benefit Timing

- Duration is a second way to measure a plan's maturity.
- The "duration" of the accrued benefit cash flow out is the average length of time until each future benefit payment comes due. It can be thought of as a weighted average length of time until benefits are paid, where each future year is weighted with the present value of that year's benefits.
- The "MacCauley Duration" for MPERS is 11.01 years.
- The "Modified Duration" is 10.3 years.
- Each year's projected annual benefit has its own present value. Duration can be described in similar ways:
  - It measures the average horizon of the present value of projected annual benefits.
  - It measures the proximity of the benefit burden; how quickly payments are demanded.
  - It measures the average length of time the present (or discounted) value of benefits has until the benefit obligation comes due.
  - It measures the average remaining length of time (horizon) the present value has to accumulate earnings until the benefit obligation comes due.
- With MPERS' duration at 10-11 years, the forecast horizon is far better suited at the mid-term, rather than the long-term.

Demographics & Benefit Timing

- A third measure of a plan's maturity is whether fund disbursements exceed contributions. This is directly pertinent to how mid-term horizon forecasts should influence the final return assumption.
- By this measure, all three are "mature" (MERS and MPERS being "more mature").

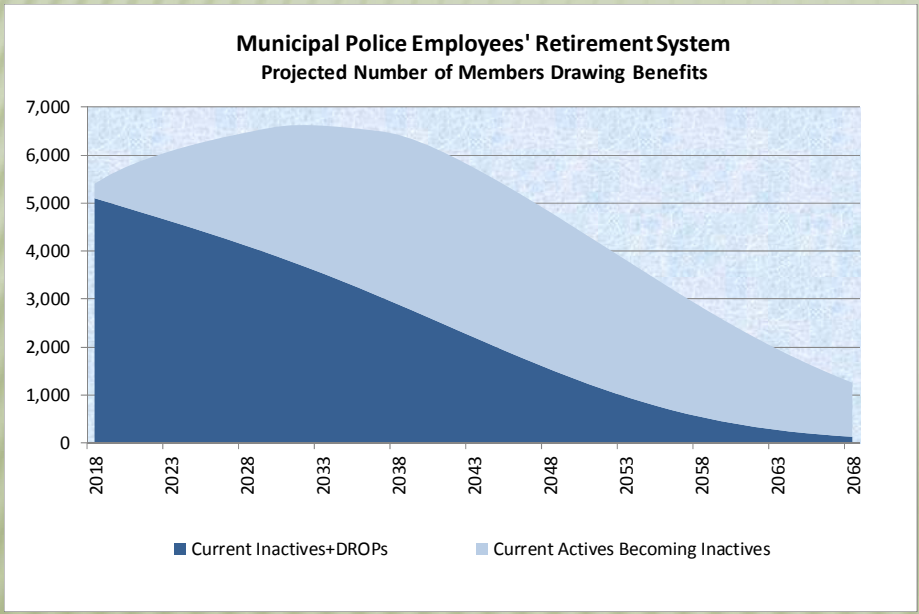
2017 Disbursements vs. Contributions			
Year Ending June 30*	**FRS**	**MERS**	**MPERS**
2017			
Contributions	$ 109,315,892	$ 79,840,472	$ 143,416,371
Disbursements	$ 105,707,768	$ 85,305,684	$ 159,652,458
Excess	$ 3,608,124	$ (5,465,212)	$ (16,236,087)
2016			
Contributions	$ 109,879,997	$ 72,173,555	$ 128,605,522
Disbursements	$ 96,902,514	$ 80,592,277	$ 156,473,698
Excess	$ 12,977,483	$ (8,418,722)	$ (27,868,176)

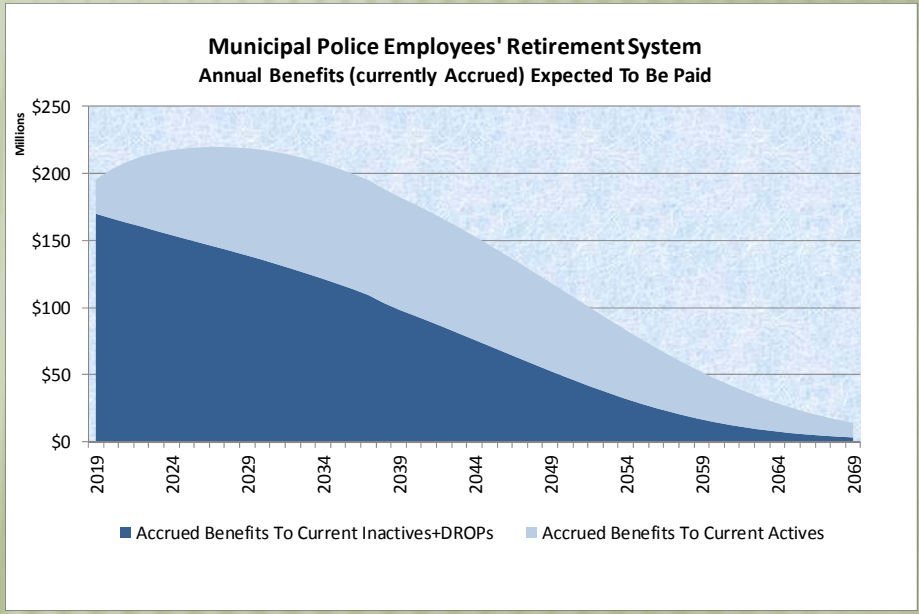
* Per Comprehensive Annual Financial Reports.

- Mature plans should consider mid-term horizons for investment return forecasting. The following pages illustrate this actuarially, for MPERS.

Demographics & Benefit Timing

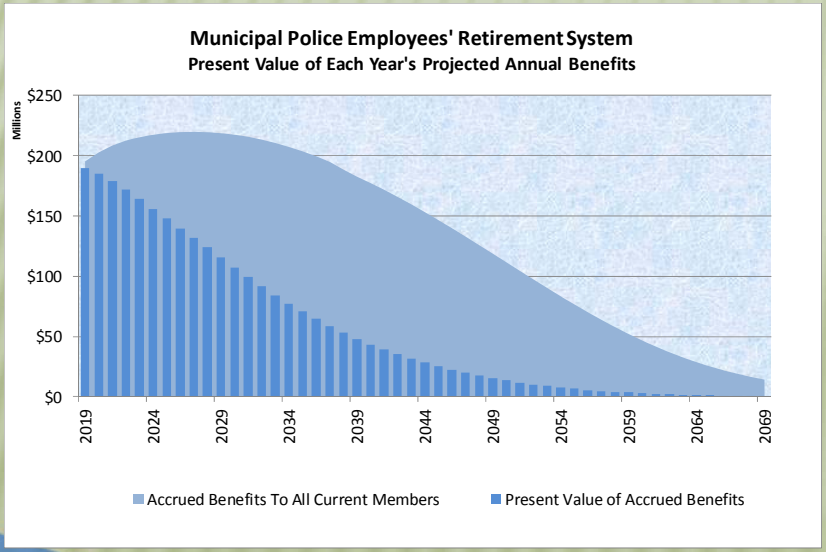
- The LLA's Actuary replicated the results of 2017 actuarial valuation for MPERS.
- The next 50 years are shown below:
  - Projected number of members and beneficiaries drawing benefits.
  - Projected amount of annual accrued benefits to be paid out of the fund.

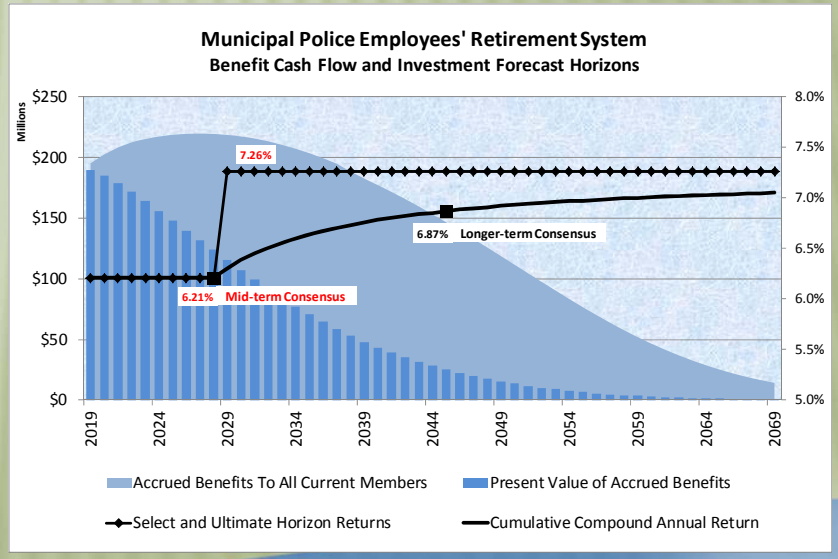




Demographics & Benefit Timing

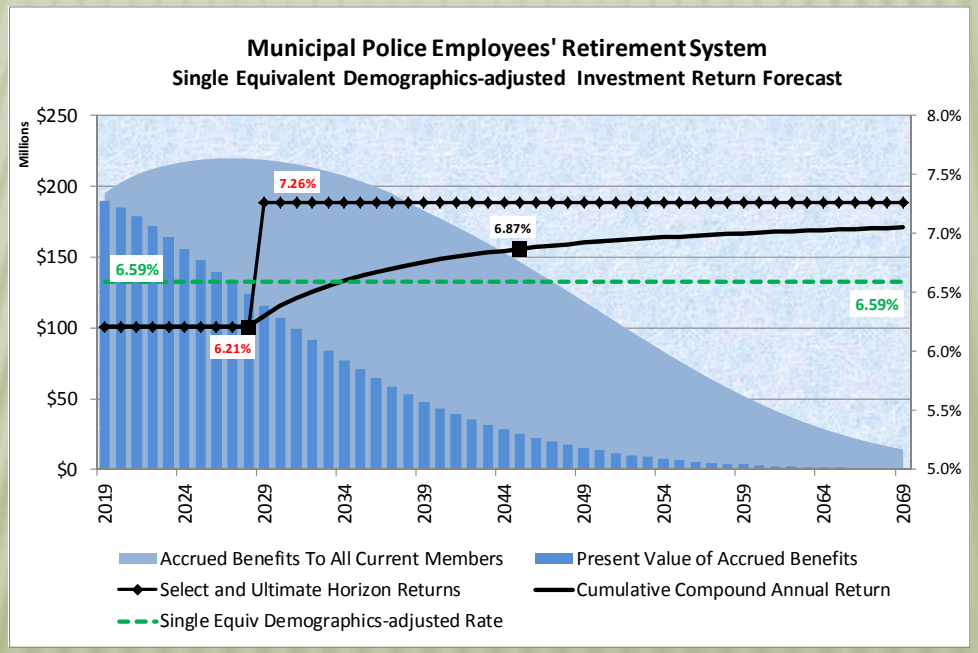
- The assets used to pay the benefits in the earlier years will not be around to earn the higher rate of return expected during the later years; hence, the mid-term expectation has a greater weighting on the final answer.
- Furthermore, the assets used to pay the benefits in the later years will be earning a lower rate of return during the mid-term years, again, dragging down the final answer.
- The present value of each of year's benefit payments illustrates the stronger effect the earlier benefits have on the final answer. The darker blue bars below shift the weighting to the left in the graphs below, where the mid-term forecasts are most impactful.





Demographics & Benefit Timing

- By recognizing the system's own demographic distribution and expected benefit timing, it is reasonable to adopt a *demographics-adjusted return assumption* (a single equivalent return assumption) –
  - Somewhere between the mid-term (MT) horizon and the longer-term (LT) horizon.
  - Mature plans should not blindly use long-term forecasts of returns.



Mid-term vs. Longer-term

- Following are five compelling reasons to select a pension return assumption that is at or near the mid-term consensus of the 50th percentile expectation, rather than the longer-term:
  1. Recognize the plan-specific **demographics** and benefit timing.
  2. We live in the **meantime (details follow)**.
  3. Relative uncertainty and **unreliability** of longer-term forecasts.
  4. Longer-term forecasts often rely heavily on the notion that future returns will gravitate back to historical norms over the long term, in a **reversion to the mean** of past returns. Since future economic conditions will not be like the past, relying on the past "too heavily" is questionable. Mid-term forecasts, generally, use different methodologies. All forecast methodologies have uncertainties. Some more than others.
  5. There are **fewer** credible investment return forecasters willing to make 30-year forecasts. More reputable professional forecasters is better than fewer.

Living in the Meantime

- We live in the meantime.
  - If the consensus of forecasters is right, during the next decade, we will underperform against the longer-term forecast. Sometimes the mid-term vs. longer-term spread has been (and will be) wider than at other times.
  - Trustees have been (and likely will be) in an awkward position, always hoping and explaining that in the long run they will make up for current shortfalls.
- In *The Tract on Monetary Reform*, in 1923, John Maynard Keynes wrote:
  - *"The long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is past the ocean is flat again."*
- By adopting a longer-term forecast for pension valuations:
  - There is a low probability of meeting that assumption over the next decade.
  - But in the long run someone else will have to deal with this problem.

Living in the Meantime

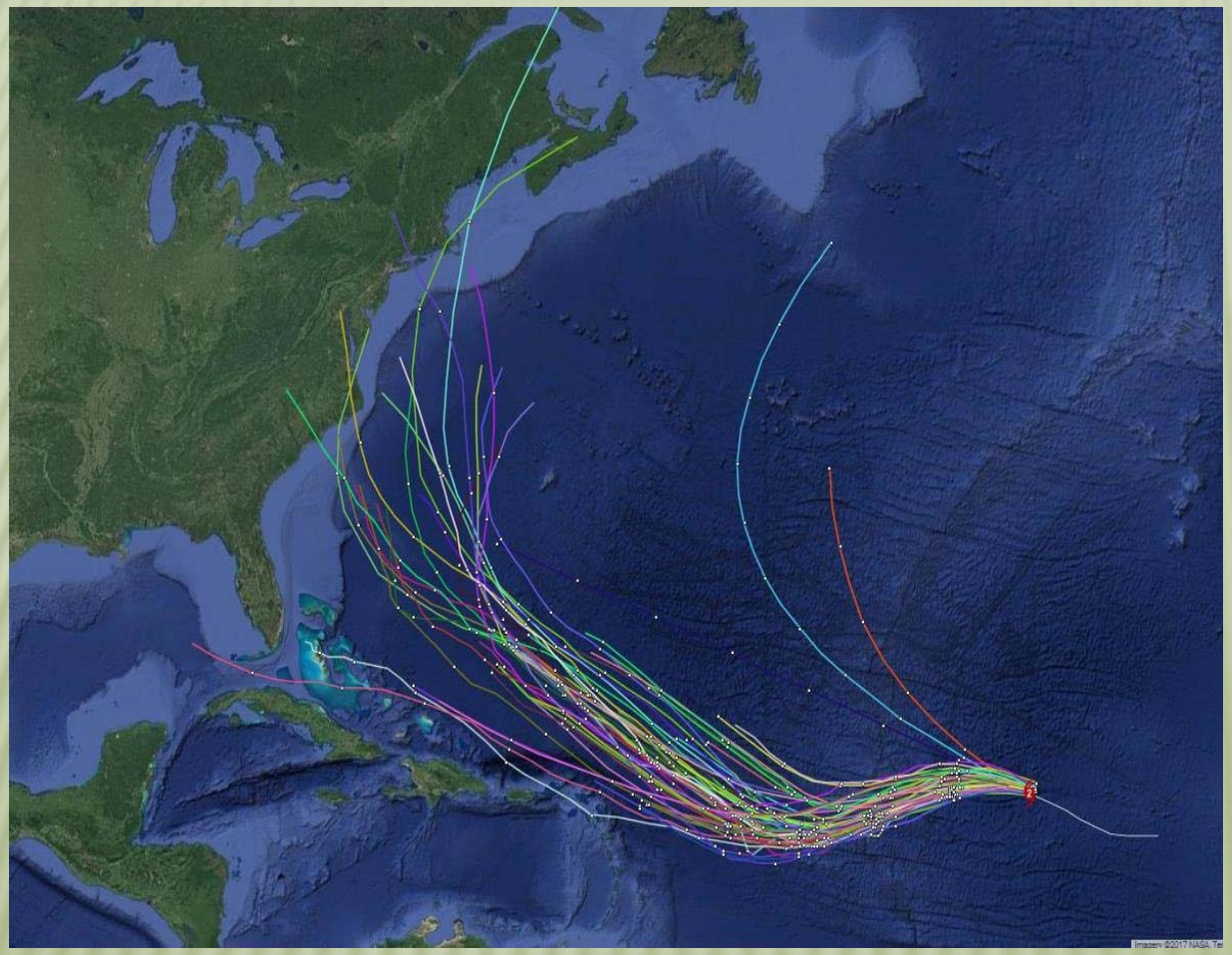
- On the national landscape, multi-employer private sector plans have been struggling. A host of circumstances have put several high-profile multi-employer plans in jeopardy. Throughout their working years and retirement years, members have been counting on an actuarially sound plan to make good on the lifetime promise of a pension.
- Several years ago Congress enacted the Multiemployer Pension Reform Plan Act of 2014 with a process for approving proposals by such plans for relief from certain otherwise-required benefit and funding requirements.
- In correspondence dated May 6, 2016, the U.S. Treasury Department denied the application of the Board of Trustees of the Central States, Southeast and Southwest Areas Pension Plan for rolling back benefits under the Multiemployer Pension Reform Plan Act of 2014 in order to avoid insolvency. One of the reasons given in the ruling[1] was that the 7.5% and other embedded return assumptions were "significantly optimistic" and were "not reasonable". More specifically, the ruling stated that (1) the return assumptions used to the support the application were not reasonable or appropriate for the purpose of the measurement, (2) did not take into account relevant current economic and investment forecast data, and (3) had significant bias by being significantly optimistic.
- This three-fold denouncement was made primarily on the basis of the assumption's failure to recognize the lower expected returns in the first 10 to 20 years of the longer term horizon.
- What happens in the mid-term matters.

[1]https://www.treasury.gov/services/Responses2/Central%20States%20Notification%20Letter.pdf

Mid-term vs. Longer-term

- Five compelling reasons to select a pension return assumption that is at or near the mid-term consensus of the 50th percentile expectation, rather than the longer-term:
  1. Recognize plan-specific **demographics** and benefit timing.
  2. We live in the **meantime**.
  3. Relative uncertainty and **unreliability** of longer-term forecasts **(details follow)**.
  4. Longer-term forecasts often rely heavily on the notion that future returns will gravitate back to historical norms over the long term, in a **reversion to the mean** of past returns. Since future economic conditions will not be like the past, relying on the past "too heavily" is questionable. Mid-term forecasts, generally, use different methodologies. All forecast methodologies are questionable. Some more than others.
  5. There are **fewer** credible investment return forecasters willing to make 30-year forecasts. More reputable professional forecasters is better than fewer.

Longer-term Unreliability

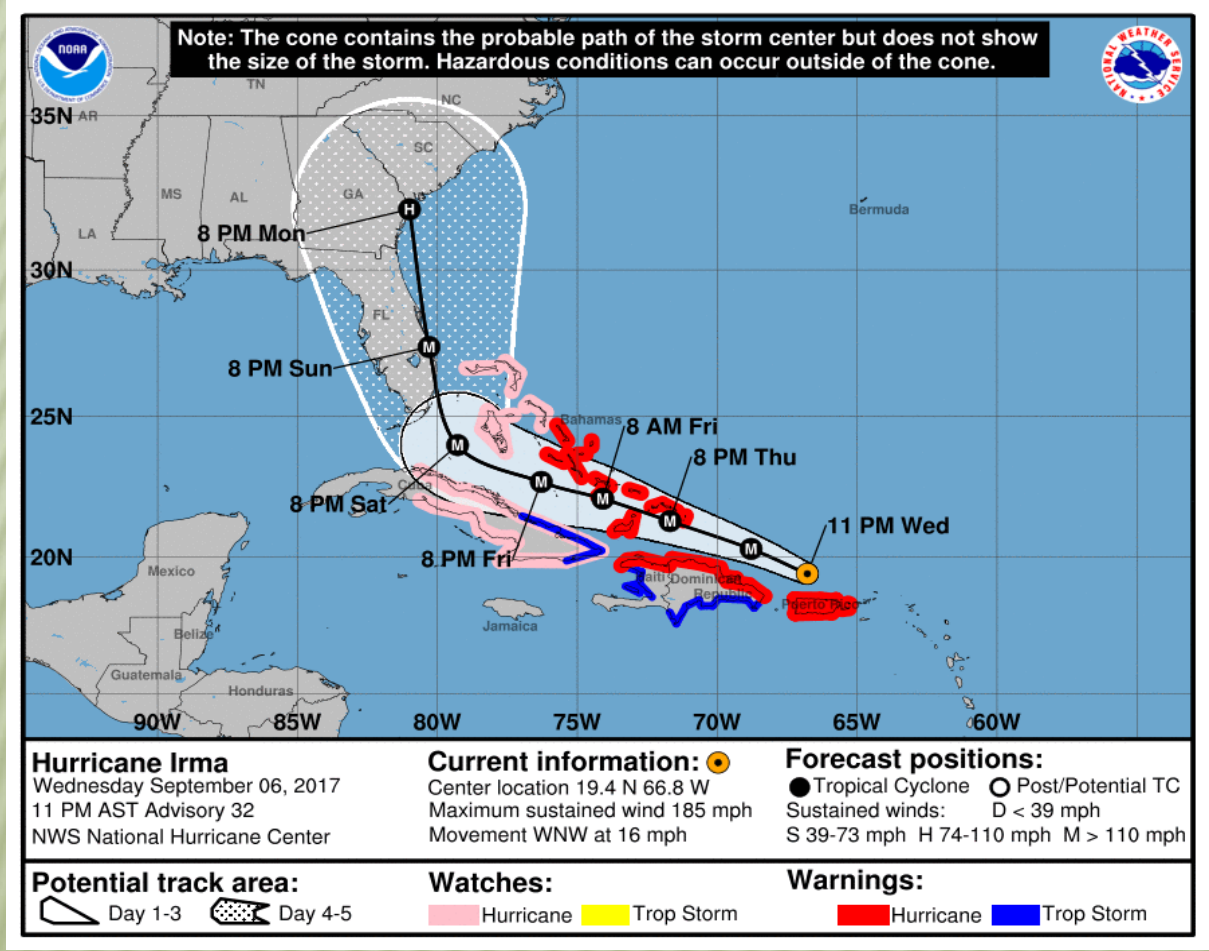


- In other fields, it is often accepted that longer-term forecasts are less reliable than near-term or mid-term forecasts.

Consider Hurricane Irma

- This set of 10-day forecast models was captured on Sep 1 (Fla Keys landfall was Sep 10)
- In hurricane forecasting, 4-5 day forecasts are considered long-term and 10-day forecasts have not been published by NHC

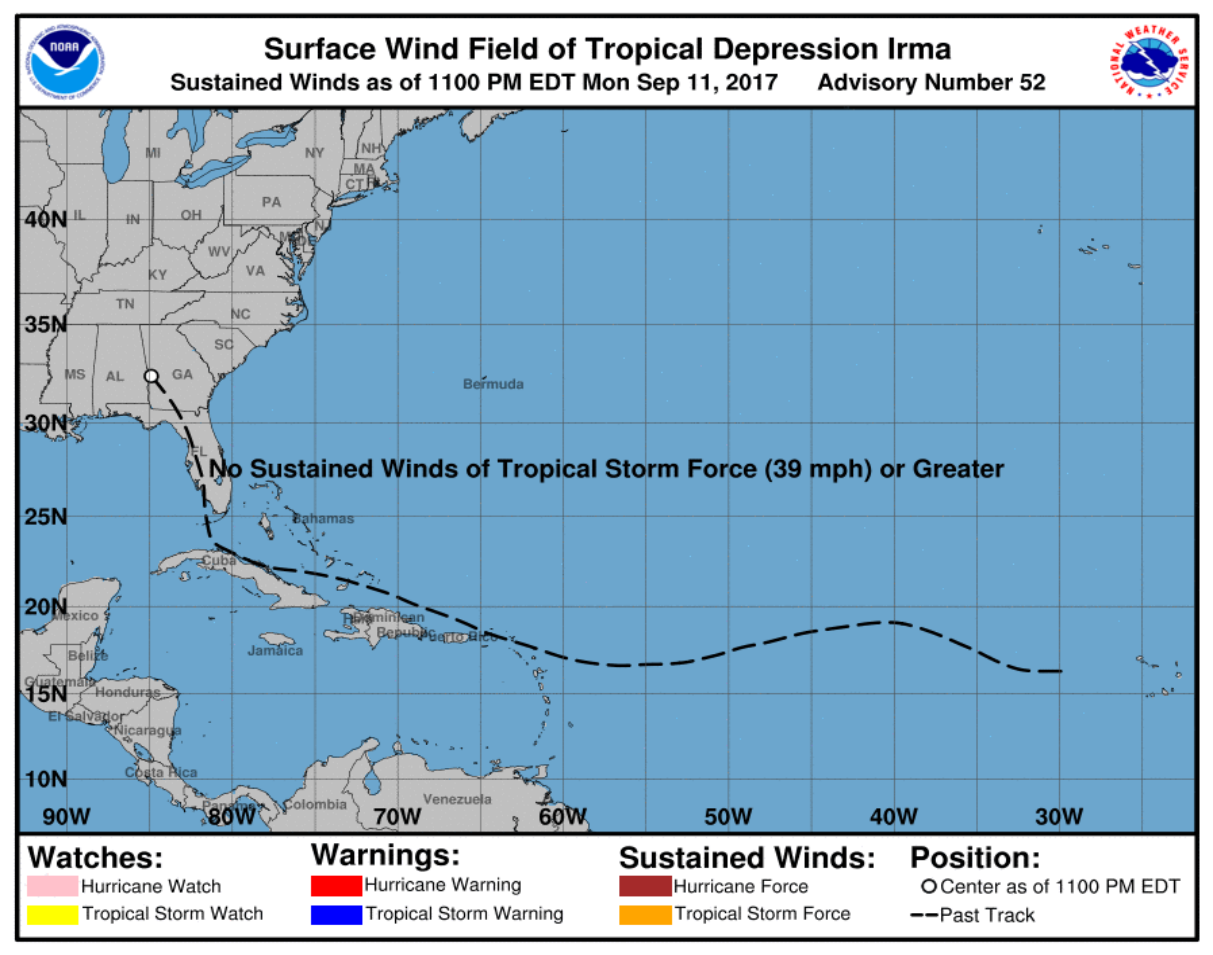
Longer-term Unreliability



More on Hurricane Irma:

- This is NHC's cone of uncertainty and its Official Forecast, captured Sep 6
- The 3-day forecast is white-shaded cone; 5-day forecast (long-term) is dotted cone
- The center of the 5-day forecast cone has it making landfall at Miami-FtLaud (turned out wrong)

Longer-term Unreliability



- Remember, Irma made U.S. landfall on Sep 10 in Florida Keys
  - Long-term hurricane forecasts are less reliable than mid-term
  - Consider the typical weather forecasts (hourly, daily and weekly). The further out you go, the less reliable the forecast is.
  - The same is true of investment forecasters. Longer-term forecasts are, naturally, less reliable than mid-term.

Mid-term vs. Longer-term

- Following are five compelling reasons to select a pension return assumption that is at or near the mid-term consensus of the 50th percentile expectation, rather than the longer-term:
  1. Recognize the plan-specific **demographics** and benefit timing.
  2. We live in the **meantime**.
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  4. Longer-term forecasts often rely heavily on the notion that future returns will gravitate back to historical norms over the long term, in a **reversion to the mean** of past returns. Since future economic conditions will not be like the past, relying on the past "too heavily" is questionable. Mid-term forecasts, generally, use different methodologies. All forecast methodologies have uncertainties. Some more than others.
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A Range of Reasonableness

Investment Forecaster	50th Percentile of Expected Mid-Term Compound Average Return		
	FRS	MERS	MPERS
1	4.77%	4.61%	5.15%
2	5.59%	5.36%	5.80%
3	5.62%	5.16%	5.86%
4	5.75%	5.16%	6.01%
5	5.77%	5.35%	6.09%
6	5.91%	5.55%	6.15%
7	5.94%	5.59%	6.18%
8	6.03%	5.59%	6.19%
9	6.07%	5.54%	6.29%
10	6.13%	5.73%	6.55%
11	6.48%	5.66%	6.70%
12	7.24%	6.78%	7.60%
Consensus Average of 12	**5.94%**	**5.51%**	**6.21%**

- Back to setting the return assumption.
- A range of reasonableness around the mid-term consensus could be plus/minus <u>50 bps</u> to:
  - Allow for mapping error.
  - Allow for movement in future forecasts, without having to change the assumptions every year.
  - Allow for uncertainties in forecasts. Although, for investment finance and other fields of endeavor, when there are uncertainties, decision-makers usually become more conservative, not more aggressive.
  - Allow for all but the two outlier forecasters (#1 and #12). Although, one might argue for less than 50 bps so as not to be hugging the top end.
  - Allow for the demographics-adjusted single equivalent return assumptions. Although, mid-term has compelling reasons to be preferred, over long-term.

Optics

- Many retirement systems (large and small) have been lowering their return assumptions, several by significant margins.
- Following are press clippings of quotes over the last couple years from responsible parties concerning reductions in return assumptions by other retirement systems (mostly large state or statewide systems).
- These press clippings illustrate how others have recognized these reductions as positive moves for the sake of the systems and their members and beneficiaries.
- There are numerous positive statements issued for public consumption.

➢ Officials of FRS, MERS and MPERS could consider these various positive statements and formulate their own, to explain and announce positive reasons for the respective Boards' decisions to make any significant reduction in their return assumptions.

New Jersey

The New Jersey Pension Fund's assumed rate of return has been reduced to 7% from 7.65% by state Treasurer Ford M. Scudder, the second rate cut he has enacted this year. Mr. Scudder had cut the rate to 7.65% from 7.9% in February 2017.
"Given the current elevated level of asset values across the board, long-run expected returns have diminished, so it is appropriate to lower the assumed rate of return," Mr. Rijksen wrote [Willem Rijksen, a Treasury Department spokesman]. "Our actuaries have suggested doing so, and it is the unmistakable trend in public pension plans across the country."
Pensions and Investments Online (pionline.com), 12/22/17

The move increases the pension tab for state and local governments by more than $800 million for the fiscal year that begins in July, according to an NJ Advance Media analysis of state actuary reports released Tuesday.
The change was praised by the pension fund actuaries, who say a 7 percent assumed rate of return is in line with other large funds and is a more conservative estimate of what pension investments can achieve over the long term.
In contrast, assuming the investments will earn a high rate makes the pension fund look healthier than it really is and doesn't reflect the reality of the state's investment outcomes, actuaries say.
The state contributes less than what's recommended by actuaries. This year, it's expected to kick in about $2.5 billion, or half of what's recommended, and it is on track to contribute 60 percent next year.
NJ.com, New Jersey Online, 12/22/17

Notice a couple observations: (1) Down from 7.9% to 7.65% to 7.0% in 10 months, (2) The change will increase the contribution requirement by more than $800 million and (3) NJ is roughly tied (with Kentucky) for the worst-funded pension system in the country (30.9% in 2016) and has been contributing only about half the actuarially required contribution under their previously high return assumption, yet they did the “appropriate” thing and lowered the return assumption from 7.9% to 7.0%.
Notice the positive statements about this decision: (1) “a 7 percent assumed rate of return is a more conservative estimate of what pension investments can achieve” (2) "Given the current elevated level of asset values across the board, long-run expected returns have diminished, so it is appropriate to lower the assumed rate of return."

Kentucky

Since the last actuarial valuation the Board adopted changes to certain economic assumptions for KERS, CERS and SPRS. Specifically, the Board decreased the price inflation assumption to 2.30% for all funds. The assumed rate of return was decreased to 5.25% for two of its pension funds, and to 6.25% for the three other pension funds and all the insurance funds associated with the systems.
2017 Actuarial Valuation Report

He admonished, “We need to use real numbers . . . We need to use actual data. We need to use true rates of return, and not hypothetical ones.”
Huffingtonpost.com, 4/4/17, quote from Gov. Matt Bevin

“The most important function of our board is to give correct numbers to the legislature,” Farris said. “If we don't do that, if we continue to rely on aggressively optimistic assumptions, then we will continue to fall behind.” Kentucky.com, 5/20/17, quote from board chairman John Farris

"We're trying to make the assumptions more realistic and from an investment standpoint, more in line with structure and expectations of the portfolios," Mr. Eager said.
pionline.com, 7/14/17, quote from Interim Executive Director David Eager

[State Budget Director John] Chilton said that Gov. Matt Bevin and state lawmakers believe it is important to embrace the revised financial assumptions. “No more pretending that everything is just fine,” he wrote. “Everyone needs to understand the severity of the situation. To do otherwise will lead to solutions that fall short of solving the problem.” Kentucky.com, 9/9/17

Note a couple observations: (1) Down from 7.5% to 6.35% for some plans and 5.25% for others and (2) KY is roughly tied (with New Jersey) for the worst-funded pension system in the country (31.4% in 2016), yet they did the “more realistic” thing and lowered the return assumption from 7.5% to 6.25% and 5.25%.
Notice the positive statements said: (1) “The most important function of our board is to give correct numbers to the legislature”, (2) "We're trying to make the assumptions more realistic and from an investment standpoint, more in line with structure and expectations of the portfolios"

New York

New York State Common Retirement Fund, Albany, is lowering its assumed rate of return to 7% from 7.5%. "Lowering the assumed rate of return is fiscally prudent and will better position the state pension fund for the future. This strategic decision is consistent with the tougher investment climate ahead."
pionline.com, 9/9/15, quote from Thomas DiNapoli (State Comptroller and sole trustee)

Notice the positive statements: (1) Lowering it is fiscally prudent, (2) Lowering the return assumption will put the state pension fund in a better position for the future."

California Teachers

CalSTRS on Wednesday approved lowering the pension fund's assumed rate of return to 7% from 7.5% over the next two years because of diminished capital market and inflation forecasts. Milliman, the board's actuarial consultant, last month had recommended a reduction to 7.25%, but also offered the board the option of a 7% rate of return.
The plan approved by the board of the $196.4 billion California State Teachers' Retirement System would lower the rate of return to 7.25% as of July 1, and 7% as of July 1, 2018.
The vote for the more aggressive reduction came at a meeting in San Diego after a report from one of CalSTRS' investment consultants, Pension Consulting Alliance, that the pension fund had a less than 50% chance of meeting the 7.25% rate of return long term. "It's responsible," said board member Harry M. Keiley of the move to 7%. Mr. Keiley said it was necessary to ensure the long-term financial stability of the retirement system.
pionline.com, 2/4/17

"Going to 7.00% would be an acceptable alternative if the board wanted to add another level of conservatism in the actuarial assumptions by increasing the likelihood the investment assumption will be met long term," the report said.
calpensions.com, 1/28/17, quote from the Milliman actuarial experience study

Note a couple observations: (1) CalSTRS investment consultant said there was less than a 50% chance of meeting a 7.25% assumption and (2) The board's investment consultant directed attention to the probability of the compound average return over time reaching the assumption.
Notice the positive statements the Board member made about this move: (1) "It's responsible." and (2) "It was necessary to ensure the long-term financial stability of the retirement system."

Article about Alaska that mentions California

The nation's largest public employee retirement system has just cut its long-term predictions of how much it expects to earn on its investments to 6.5 percent, raising a caution flag for Alaska, which still has expectations of 8 percent returns.

The assumed long-range investment returns are a key indicator of the financial health of the state retirement programs. Pick a number that is too high and the systems give a false image of financial strength. In addition, it could force a pattern of more aggressive and risky investments.

It is generally easier to get agreement on optimistic numbers, especially when budgets are tight. The difficulty is that you never really know what returns will be until the future becomes the past.

While other states have trimmed back their long-term earnings estimates since 2008, Alaska is still using 8 percent as its target, which is on the high end of pension systems in the United States.

"Some critics of current public pension investment return assumption levels say that current low interest rates and volatile investment markets require public pension funds to take on excessive investment risk to achieve their assumption," the National Association of State Retirement Administrators said in May.

But California Gov. Jerry Brown says the new plan is irresponsible because of the slow pace in lowering expectations, a claim that the California Public Employees Retirement System denies. A more rapid reduction in investment return projections would have increased the strain on local governments, it said. But Brown, expressing more caution than his state's retirement board, said the CalPERS plan is based on "unrealistic investment returns" and assumes an "unacceptable level of risk in the coming years."

Alaska Dispatch News, 12/9/15

Oregon

The Oregon Public Employees Retirement Fund's board lowered the assumed rate of return for the $73 billion pension fund to 7.2% from 7.5%, said James Sinks, spokesman for the Oregon State Treasury, in an email. Return projections for the next 10 years are lower than in the prior decade, according to a report presented at the pension fund's July 28 meeting.

pionline.com, 8/1/17

Arkansas

The trustees last week voted to reduce the system's projected annual investment returns from 7.25 percent to 6.25 percent at the recommendation of actuary Gabriel, Roeder, Smith & Co. of Southfield, Mich., . . . [Gail Stone, executive director for the judicial retirement system,] explained that "10-year capital market predictions from a basket of 8 different public fund investment consultants did not support a 7.25 [percent investment] return, given the AJRS fund's very conservative asset allocation."

Arkansasonline.com, 8/14/15

Notice the positive statement: The executive director wanted the return assumption to be consistent with the "10-year capital market assumptions of a basket of 8 different public fund investment consultants."

Maryland

"The action taken by the Board is part of its overall strategy to increase the probability of achieving investment returns required to improve the health of the retirement System and meet its obligations to its members," says State Treasurer Nancy K. Kopp, chair of the MSRPS Board of Trustees. "Recognizing that both the inflation experience and expectations for future inflation remain lower than the rate currently assumed, the Board felt it reasonable to reduce the expected return accordingly."

plansponsor.com, 8/2/17

Notice those two positive statements about their changes.

San Mateo County

San Mateo County Employees' Retirement Association, Redwood City, Calif., lowered its assumed rate of return to 7% from 7.25%.

"In the coming years, lowering the rate will add to the financial strength and stability of the retirement fund by mitigating the effects of future returns that are lower than current expectations."

SamCERA.org News, 7/6/16

North Carolina

North Carolina Retirement Systems, Raleigh, lowered its assumed rate of return to 7%, state Treasurer Dale Folwell announced Thursday. The new rate will begin with the Dec. 31, 2017, valuation, but the impact of the change on actuarially recommended employer contribution rates will be phased in over a three-year period. [“output smoothing”]. "We need to make realistic assumptions regarding our ability to achieve expected returns in the future. We owe it to the General Assembly, taxpayers, public employees and future generations to be transparent and realistic about the true valuation of the pension plans," he said in a statement.
www.pionline.com, 5/1/18

Notice the positive statement about their change.

Iowa

Iowa Public Employees’ Retirement System, Des Moines, lowered its assumed rate of return to 7% from 7.5%, said a news release from the $28.5 billion pension fund.
Under the changes, the pension fund’s funding ratio is expected to fall by roughly four basis points to 80% and liabilities are expected to increase by $1.4 billion.
The changes follow a review of economic assumptions from actuarial firm Cavanaugh Macdonald Consulting. “Even though these changes will have a negative impact on IPERS’ funded ratio, the investment board believes that these modifications will provide a more accurate valuation of future liabilities,” IPERS said in the news release.
pionline.com, 3/28/17

Notice the positive statement about the decision “Even though these changes will have a negative impact on IPERS’ funded ratio, the investment board believes that these modifications will provide a more accurate valuation of future liabilities,”

General

"The use of such high assumptions is deceptive because it keeps the funded level looking higher than it should be," said David Crane, public policy lecturer at Stanford University who worked as an adviser to former California Gov. Arnold Schwarzenegger. "Too high a return is dishonest."
news.bna.com, 8/19/15

A lower rate of return can force issuers to face up to their funding commitments," said Tom Aaron, vice president with Moody's Investors Service.
news.bna.com, 8/19/15

Lockhart also discussed the correlation between macroeconomic growth and pension funding. He recommended that public pension funds align their overall investment return assumptions with realistic assumptions related to macroeconomic momentum and trends.
frbatlanta.org, 8/28/15, quote from Dennis Lockhart, President and CEO of Atlanta Federal Reserve Bank

Other Positive Statements about Lowering the Return Assumption

Harrisburg cannot take advantage of the Act 44 MMO reduction and does not set unrealistically high investment return assumptions which, Mr. McAneny said, has been a key factor in its success in managing its pension funds.
Scranton Times-Tribune, 7/9/15

"If we do lower that assumed rate, that would certainly be a conservative approach. And one that I think would be reasonable," he continued.
"The stock market can't stay up as high as it has forever. I think being a little more conservative would be prudent."
pension360.org, 7/24/15, quotes from Thomas DiNapoli

"But with the volatile market environment we have seen this year, and will likely see for the next several years, changing the assumed rate of return was a prudent decision," stated Chief Investment Officer Craig Husting [of Missouri's school and teacher retirement systems].
psrs.peers.org 6/17/16

The $7.8 billion pension fund's board approved the change at its June 16 meeting, Ms. Smith said, to "put the system on a path that reflects the current and expected low-return capital markets and to ensure adequate funding to pay future benefits."
pionline.com, 7/13/16, quote from Candy Smith, Spokeswoman for the Missouri State Employees' RS

"This more conservative assumption will require additional state investments into the retirement systems, helping to ensure that available funds will be sufficient to pay the benefits that have been earned," said a summary of the governor's proposed budget changes.
pionline.com, 2/10/17, Michigan Gov. Rick Snyder

COLA Benefits

- Gain-sharing cost-of-living adjustments (COLAs)
  - The Window Rule
  - "Excess" Earnings Rule
  - Requires non-traditional actuarial methods to measure (stochastic modelling of when system would be allowed to grant)
  - Pattern of granting when allowed?
  - Less frequent than state systems that have an experience account
  - The cost for FRS, MERS and MPERS may be material, but may not be.

- Funding Deposit Account (FDA) COLAs for MERS
  - Contributions in excess of the minimum credited to an FDA
  - Use FDA balances for either granting COLAs, reducing future contribution or paying down unfunded actuarial liabilities (UALs)
  - These COLA benefits present a different puzzle than gain-sharing COLA benefits, for funding and accounting.
  - Pay-as-you-go recognition of FDA COLAs may be acceptable for funding.
  - A pattern of FDA COLAs would be required for recognition in accounting valuations.

Solutions

- This presentation was all about a robust process for objectively setting an appropriate return assumption for pension valuations.
- How to make the resultant contribution requirements more affordable is a separate matter.
- Any funding policy solutions considered by for making the contribution requirements more affordable in the short-term is dependent of formally adopting an appropriate return assumption for measuring and reporting pension costs and liabilities.
- The LLA's office has prepared a separate document concerning solutions to the budgeting challenge faced by cities if and when the trustees adopt a net return assumption in line with the process described herein.