

INVESTMENT AND ACTUARIAL PERSPECTIVES

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Officer | Pension Reserves Investment Management (PRIM) Board

James Lamenzo, Actuary | PERAC

Hogan Conference Center

College of the Holy Cross, Worcester, MA

September 14, 2017



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Michael Trotsky PRIM



Presentation to **PERAC**

Thursday, September 14, 2017

Presented by

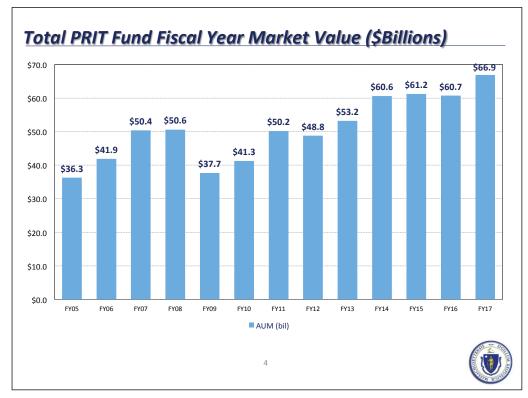
Michael G. Trotsky, CFA
Executive Director and Chief Investment Officer

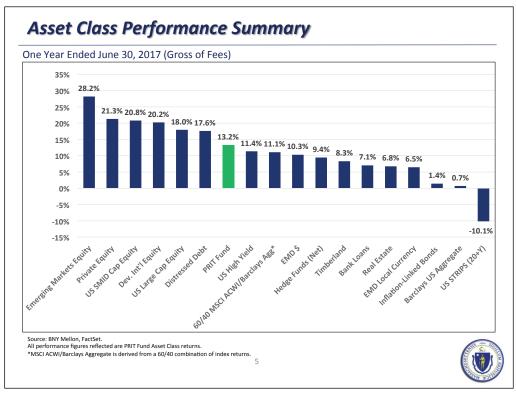
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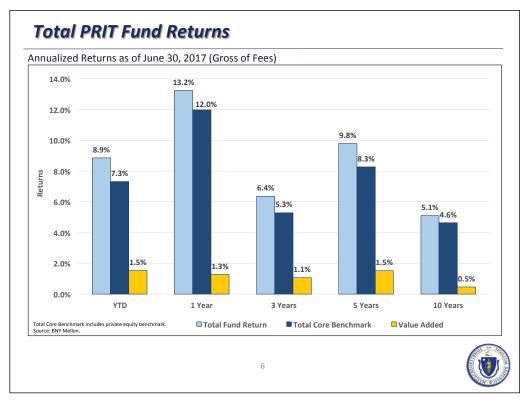


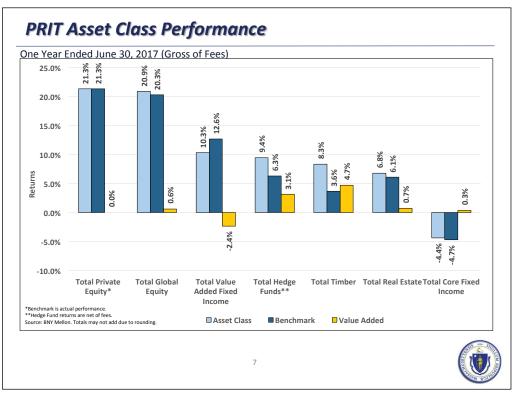
Agenda

- □ PRIM Fiscal 2017 Review.
- □ 2017 Asset Allocation Changes.
- Capital Markets Assumptions.









PRIT Asset Class Performance

Annualized Returns as of June 30, 2017 (Gross of Fees)

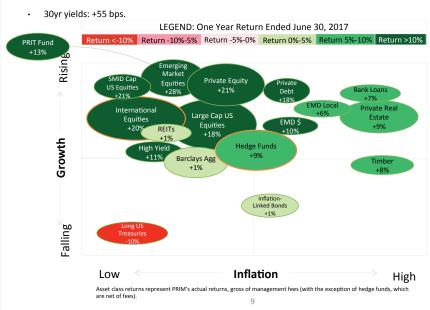
1 Year	3 Year	5 Year	10 Year
PRIVATE EQUITY 21.3%	PRIVATE EQUITY 16.3%	PRIVATE EQUITY 17.9%	PRIVATE EQUITY 13.4%
GLOBAL EQUITY 20.9%	REAL ESTATE 10.3%	REAL ESTATE 11.4%	VALUE-ADDED FIXED INCOME 6.7%
VALUE-ADDED FIXED INCOME 10.3%	TIMBER 6.1%	GLOBAL EQUITY 11.3%	REAL ESTATE 6.5%
HEDGE FUNDS (NET OF FEES) 9.4%	GLOBAL EQUITY 5.4%	TIMBER 7.4%	TIMBER 6.1%
TIMBER 8.3%	CORE FIXED INCOME 4.7%	HEDGE FUNDS (NET OF FEES) 6.0%	CORE FIXED INCOME 5.3%
REAL ESTATE 6.8%	VALUE-ADDED FIXED INCOME 2.8%	VALUE-ADDED FIXED INCOME 5.1%	GLOBAL EQUITY 4.2%
CORE FIXED INCOME (4.4%)	HEDGE FUNDS (NET OF FEES) 2.4%	CORE FIXED INCOME 3.9%	HEDGE FUNDS (NET OF FEES) 2.8%

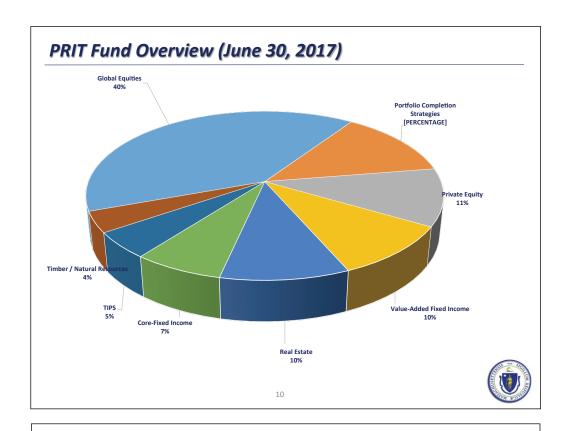
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Asset Classes & Regimes – One Year Ended June 30, 2017

- GDP Growth: +2.1%.
- · Core CPI: +1.7%.





Asset Class	2016	2017	Change
Global Equities	40%	40%	
U.S. Large Cap	14.5%	14.5%	
U.S. SMID Cap	3.5%	3.5%	
Developed International	16%	16%	
Emerging Markets	6%	6%	
Core Fixed Income	13%	12%	-1%
STRIPS	5%	2%	-3%
Barclays Agg	5%	5%	
Inflation-Linked Bonds	3%	5%	+2%
Value-Add Fixed Income	10%	10%	
High Yield	1.5%	1.5%	
Bank Loans	1.5%	2.5%	+1%
EMD \$	1%	1%	
EMD Local	2%	0%	-2%
Distressed Debt	4%	3%	-1%
Other Credit Opportunities	0%	2%	+2%
Private Equity	10%	11%	+1%
Real Estate	10%	10%	
Timber	4%	4%	
Hedge Funds	9%	400/	
Portfolio Completion Strategies*	4%	13%	-

NOTES:

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Asset Class	2016	2017	Change
Global Equities	40%	40%	-
U.S. Large Cap	14.5%	14.5%	
U.S. SMID Cap	3.5%	3.5%	
Developed International	16%	16%	
Emerging Markets	6%	6%	

Theme 1:

Maintain Global Equity Allocation at 40%, but evaluate alternative equity hedging strategies in portfolio completion strategies bucket.

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2017 Asset Allocation Changes

Asset Class	2016	2017	Change	
Core Fixed Income	13%	12%	-1%	
STRIPS	5%	2%	-3%	Theme 2
Barclays Agg	5%	5%		
Inflation-Linked Bonds	3%	5%	+2%	

Theme 2:

Reposition Core Fixed Income to mitigate inflation risk.



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Asset Class	2016	2017	Change	
Value-Add Fixed Income	10%	10%	- 7	
High Yield	1.5%	1.5%		
Bank Loans	1.5%	2.5%	+1%	Theme 3
EMD \$	1%	1%		✓
EMD Local	2%	0%	-2%	
Distressed Debt	4%	3%	-1%	
Other Credit Opportunities	0%	2%	+2%	

Theme 3:

Restructure Value-Add Fixed Income allocation: introduce Other Credit Opportunities, increase Bank Loans and eliminate EMD Local.

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2017 Asset Allocation Changes

Asset Class	2016	2017	Change	
Private Equity	10%	11%	+1%	
Real Estate	10%	10%		Theme 4
Timber	4%	4%]	

Theme 4:

Increase Private Equity; maintain Real Estate and Timberland.



Asset Class		2016	2017	Change	
Hedge Funds		9%	13%		Theme 5
Portfolio Completio	on Strategies*	4%	13%		

Theme 5:

Combine Hedge Funds and Portfolio Completion Strategies (PCS) into single allocation to focus on diversify in assets uncorrelated to equities.



2017 Asset Allocation Changes

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Asset Class	2016	2017	Change	
Global Equities	40%	40%		
U.S. Large Cap	14.5%	14.5%		
U.S. SMID Cap	3.5%	3.5%	>	Theme 1
Developed International	16%	16%		
Emerging Markets	6%	6%		
Core Fixed Income	13%	12%	-1%	
STRIPS	5%	2%	-3%	Theme 2
Barclays Agg	5%	5%	- [•
Inflation-Linked Bonds	3%	5%	+2%	
Value-Add Fixed Income	10%	10%		
High Yield	1.5%	1.5%		
Bank Loans	1.5%	2.5%	+1%	
EMD \$	1%	1%	>	Theme 3
EMD Local	2%	0%	-2%	
Distressed Debt	4%	3%	-1%	
Other Credit Opportunities	0%	2%	+2%	
Private Equity	10%	11%	+1%	
Real Estate	10%	10%		Theme 4
Timber	4%	4%	لـ ـ	
Hedge Funds	9% —	13%		Theme 5
Portfolio Completion Strategies*	4% ——	13%	-	

- •Theme 1: Maintain Global Equity Allocation at 40%, but evaluate alternative equity hedging strategies.
- •Theme 2: Reposition Core Fixed Income to mitigate inflation risk.
- •Theme 3: Restructure Value-Add Fixed Income allocation: introduce Other Credit Opportunities, increase Bank Loans and eliminate EMD Local.
- •Theme 4: Increase Private Equity; maintain Real Estate and Timberland.
- •Theme 5: Combine Hedge Funds and Portfolio Completion Strategies (PCS) into single allocation to focus on diversifying assets uncorrelated to equities.



Capital Market Assumptions 2011 – 2017

NEPC Capital Market Assumptions	2011	2012	2013	2014	2015	2016	2017
U.S. Large Cap	7.00%	7.25%	6.75%	6.25%	6.00%	6.00%	5.75%
U.S. Small/Mid Cap	7.00%	7.50%	7.00%	6.25%	6.00%	6.25%	6.00%
International	7.00%	7.75%	7.75%	7.25%	7.00%	7.32%	7.30%
Emerging Markets	9.00%	9.75%	9.75%	9.50%	9.00%	9.82%	9.59%
Total Global Equity							
Core Bonds	2.73%	2.88%	2.04%	2.53%	2.30%	2.46%	2.65%
20+ Year Treasury STRIPS			2.00%	3.00%	2.50%	2.00%	1.50%
Inflation-Linked Bonds	1.25%	1.75%	1.50%	2.50%	2.25%	2.50%	3.00%
Total Core Fixed Income							
High Yield	6.25%	7.00%	5.00%	4.50%	4.00%	5.25%	4.75%
Bank Loans	6.25%	7.00%	5.00%	5.00%	4.50%	5.50%	5.25%
EMD (Dollar Denominated)	5.25%	5.75%	4.00%	5.00%	4.50%	4.75%	4.75%
EMD (Local Currency)	6.25%	6.75%	5.00%	5.75%	5.50%	6.50%	6.75%
Private Debt	9.25%	9.50%	8.50%	8.00%	7.50%	8.27%	8.02%
Total Value Added Fixed Income							
Private Equity	9.50%	9.75%	9.00%	8.75%	8.50%	8.50%	8.25%
Real Estate	5.50%	6.00%	6.00%	6.25%	6.50%	6.50%	6.00%
Timber	4.50%	4.75%	5.00%	6.38%	7.06%	6.76%	6.00%
Hedge Funds	7.00%	7.25%	6.50%	5.50%	5.75%	5.75%	
Portfolio Completion Strategies				5.53%	5.56%	5.74%	5.92%

5-7 Year Expected Return	7.7%	7.9%	7.4%	7.1%	6.8%	6.8%	6.8%
30 Year Expected Return	9.1%	8.4%	8.2%	8.2%	7.9%	7.8%	7.8%
Risk (Std. Deviation)	11.9%	12.1%	12.8%	12.3%	12.5%	12.2%	12.2%
Sharpe Ratio	0.48	0.55	0.52	0.46	0.41	0.39	0.39

Source: NEPC 18



NOTES:			



Actuarial Perspectives —

Putting On My Actuarial Hat (Then and Now)



James Lamenzo
PERAC

MACRS Presentation October 2010

Probably remembered more for my "actuarial hat"

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2010 Presentation Focused on Investment Return Assumption

- Question is 8.0% still reasonable?
- Answer Yes
 - But generally reduced to:
 - 0 7.75% (1/13)
 - 0 7.5% (1/16)

NOTES:			

Update to 2017

■ Question — Is 7.50% still reasonable?



Investment Analysis — My Non-Actuarial Hat

Caveats -

- I am not an Investment Professional!
- I am an observer of the market
- I don't know the future!
- Non-actuarial opinions are strictly my own

NOTES:			

2010 MACRS Audience Survey

- For next 10 years, average S&P 500 return
 - a) 0% 5%
 - b) 5% 10%
 - c) Greater than 10%

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Results of Survey (Very Rough!)

- About 50% chose (a)
- About 50% chose (b)
- Lamenzo chose (c) after no takers
 - Contrarian selection

NOTES:			

Contrarian View — My Theory

- Need a good reason for selection
- If you are right, people remember
- If you are wrong, people forget
 - **UNLESS** you are wrong too much

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My Greatest Sports Upset Prediction

- 1983 NCAA Men's Basketball Championship
 - North Carolina State vs Houston

Video clip from ESPN Films 30 for 30

NOTES:			

Basis for S&P 10%+ Prediction

- Contrarian view my good reason
- Hays Advisory April 2009
 - "there have been only 4 other times since 1825, when stock returns over the trailing 10 years were this low.
 ...the stock market experienced a powerful rally following each of these four troughs, returning approximately 14.5% per year over the following ten years..."

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"Recent Bias"

- Optimism late 1990s
 - "We're going to earn 15% every year."
- Still some optimists early 2002
 - "We've had two bad years in a row. We can't have a third."



NOTES:			

"Recent Bias" (Continued)

- Pessimism 2001 2002 (and beyond)
 - Negative pension articles begin
- Optimism 2007
 - First positive pension article I had seen in 5+ years
- Pessimism 2008
 - Unprecedented loss (for pension funding)

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Despite actual returns since 2009 greater than investment return assumption, pessimism has continued



NOTES:			

The Liability Side of the Equation

Investment Return Assumption

- Decrease of 25 basis points
 - Increases actuarial liability about 2.5%
- Most systems reduced this assumption 50-75 basis points since 2012
 - 5.0% 8.0% increase in actuarial liability

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The Liability Side of the Equation (Continued)

Mortality Assumption

- Systems have adopted mortality improvement since 2011 (longer life expectancy)
 - Extend projected mortality improvement
 - Adopt fully generational assumption
 101 systems
 - 3.0% 5.0% increase in actuarial liability

NOTES:			

Impact of the Assumption Changes

Roughly 8.0% - 13.0% increase in Actuarial Liability (AL)

	2011 Assumptions	AL 1 8.0%	AL 1 13.0%
Actuarial Liability	100	108	113
Assets	60	60	60
UAL	40	48	53
Percent Increase UAL from 2011		20.0%	32.5%
Funded Ratio	60%	55.6%	53.1%

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So How Did I Do With My Prediction?

- 10 years
 - I meant 2009 2018
 - Market bottom March 2009
- Presentation made October 2010
 - Maybe intent not clear (no slides!)

NOTES:			

Annual Returns

Year	S&P*	PRIT
2009	25.9%	17.6%
2010	14.8%	13.6%
2011	2.1%	0.2%
2012	15.9%	13.9%
2013	32.2%	15.2%
2014	13.5%	8.2%
2015	1.4%	1.1%
2016	11.7%	8.0%

_	2017 of 6/30)	9.2% (est.)	8.8%
_	of 6/30)	9.2% (est.)	8.8%

^{*}Including dividends

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Average Returns

Average Return	S&P*	PRIT
1/09 - 1/17 (8 years)	14.3%	9.6%
1/11 - 1/17 (6 years)	12.3%	7.6%

^{*}Including dividends

But have not reached 10 years yet!

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S&P Much Longer History

S&P Historical Returns

Year	S&P*
1928-2016	9.5%
1967-2016	10.1%
2007-2016	6.9%

^{*}Including dividends

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S&P Historical Returns

Year	S&P*
1928-1936	4.2%
1937-1946	3.6%
1947-1956	18.4%
1957-1966	9.2%
1967-1976	6.7%
1977-1986	13.6%
1987-1996	15.2%
1997-2006	8.3%
2007-2016	6.9%

^{*}Including dividends

NOTES:		

Putting On My Actuarial Hat (Now)

Is a 7.50% investment return assumption still reasonable?

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PERAC Guidance - PRIT Systems

2004	8.50% too high
2010	8.25% too high
2013	8.00% reduced to 7.75%
2015	recommend reduce 7.75%
2016	recommend 7.50%
2 017	recommended range 7.25% - 7.50%

NOTES:			

Investment Return Assumption

Long term assumption

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Development Of Long Term Assumption

- Rely on investment professionals
 - Forward looking projections
 - Expected return by asset class
 - Target allocation

NOTES:			

Investment Professional Analysis

- Numerous asset classes
- Develop expected return by asset class
- Stochastic analysis
 - Numerous simulations
 - o Range of possible outcomes

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Expected Return - Simple Example

	Target Allocation	Expected Return	Total Return
Equities	60%	9.0%	5.4%
Fixed Income	40%	5.0%	2.0%
			7.4%

NOTES:		

NEPC Study for PRIT

	Average Expected Return					
	2014 2015 2016 2017					
5-7 Years	7.1%	6.8%	6.9%	6.8%		
30 Years	8.2%	7.9%	7.8%	7.8%		

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Investment Expenses

- Investment return assumption generally net of investment expenses
- PERAC Annual Report shows gross returns
 - PRIT 2016 return 8.0%
 - If 50 basis points, PRIT net return 7.5%
- NEPC 30 year expected return 7.8%
 - Surmise 7.3% assumption on this basis (7.8% .5%)

NOTES:				
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NEPC View (My Understanding)

- Indexed or entirely passive investing
 - Negligible fees
- Active management
 - historically at least offset fees
 - should continue to do so
- On this basis, expected return already net of investment expenses

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PERAC View

- Actuarial Standards of Practice (ASOPs)
 - ASOP 27- guidance for selecting investment return assumption
 - "Anticipating superior... performance may be unduly optimistic"
 - o Implies avoiding such practice

NOTES:			

PERAC View (Continued)

"actuary should not assume that superior or inferior returns will be achieved net of investment expenses from an active investment management strategy compared to a passive management strategy unless the actuary believes... that such superior or inferior returns represent a reasonable expectation..."

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PERAC View (Continued)

- Gray Area
- Prefer conservatism
 - View expectations as gross, not net of investment expenses
 - o Or somewhere in between

NOTES:		

Other Considerations

- Real rate of return plus inflation
- Historical returns
- My preference projected returns

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Range of Reasonable Assumptions

- Varies by actuary
- Current assumptions
 - Ch. 32 plans 5.5% 8.0%
 - National plans 6.5% 8.5%*
- Each board ultimately responsible
 - Some more conservative

*NASRA Study, 126 large public plans

NOTES:			

Range of Reasonable Assumptions PRIT Systems 2017

- PERAC 6.75% 7.75%
 - My reasonable range
- **7.25%** 7.50%
 - My preferred/expected range
- Informal poll public sector actuaries April 2017
 - Most common assumptions 7.0% 7.75%

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Analysis for 2017 Assumption

- Maintain or reduce the 7.5% 2016 assumption?
- A case can be made for both

NOILS.		

Maintain 7.50% Assumption

- No change in NEPC long term projection
- State and Teachers reduced 3 times in 4 years
 - 2012: 8.25%
 - 2013: 8.00%
 - 2015: 7.75%
 - 2016: 7.50%
- Local Systems
 - Generally 2 or more reductions in last 6 years
- Comparable to national plan average of 7.52%

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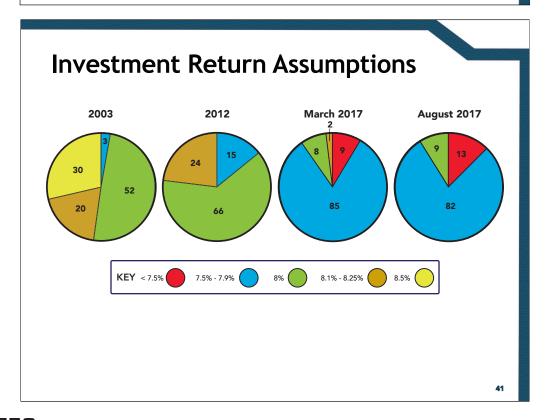
Reduce 7.50% Assumption

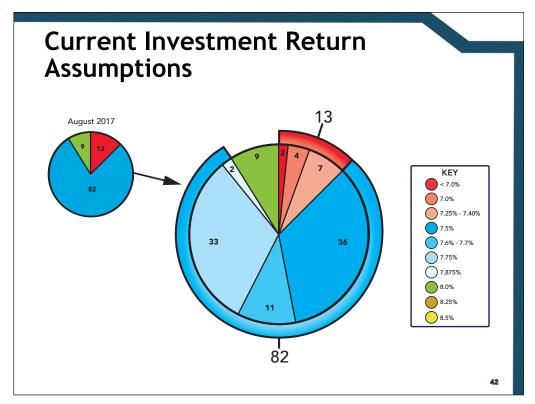
- More reliance on short term expectation
 - Between short and long term
- Other state systems announce reductions
 - CALPER 7.5% to 7.0% over 3 years
 - CALSTRS 7.5% to 7.0% over 2 years
 - North Carolina, Pennsylvania, Kentucky, Rhode Island recently announced reductions
 - If updated to 1/17, 7.52% average would be lower

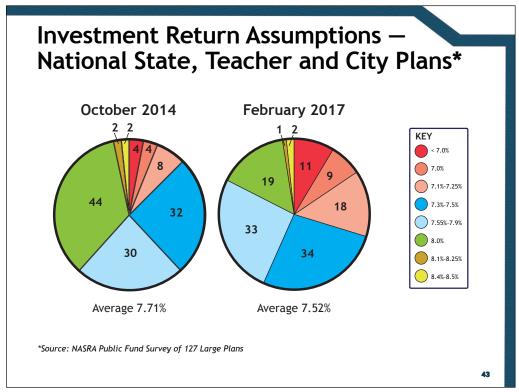
NOTES:				

Reduce 7.50% Assumption (Continued)

- 7.50% could be seen as an outlier shortly
 - Whether justified or not
- Race to the bottom?
 - Are we there yet?







NOTES:	



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