

Asset Liability Modeling for Pensions

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Asset Liability Modeling (ALM) for Pensions

- What is it?
- Why is it important?
- What are the current driving events and how are they affecting the process?
- How is the modeling conducted?
- What do the results look like?

What is ALM for Pensions?

- Long term strategic asset allocation
- Determines target asset mix, not specific securities or styles
- Identifies trends and probabilities
- Consider relative amounts (funded ratios, % of payroll), not absolute dollars

Why is ALM Important?

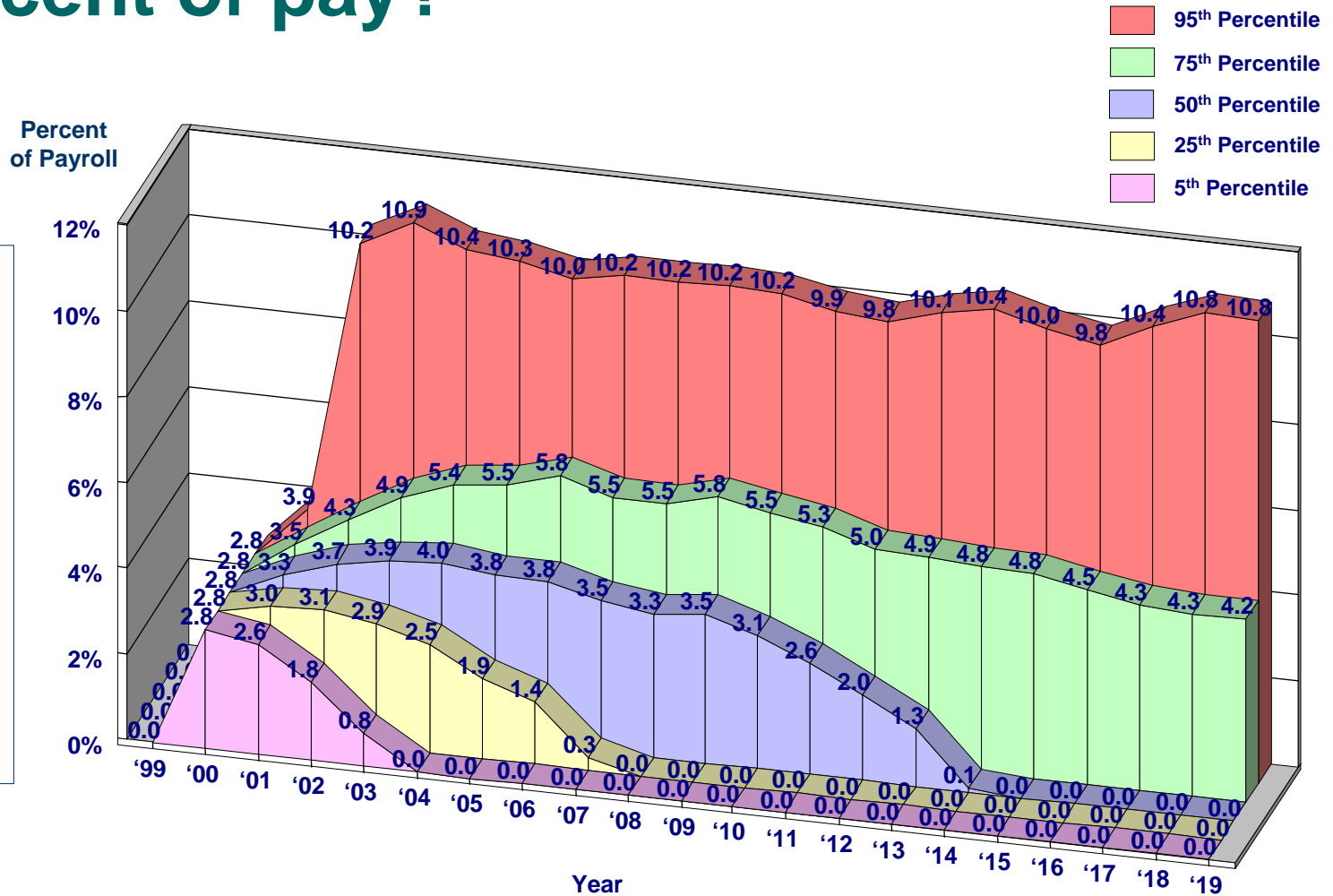
- To Plan Fiduciaries & Managers:
 - Produce quantified data to document rationale for decisions
 - Understand key cost drivers
 - Avoid “surprises”
 - Analyze long term effects of today’s decisions
 - Quantify “worst cases”
- To Plan Participants (indirectly)
 - Improve plan security

Consider ALM to Answer

- “Should I apply a smoothing method to my assets?”
- “What happens to withdrawal liability if we . . .?”
- “How does cost change with a different mix of assets?”
- “What if we have a 0% return?”

“What will the plan cost be as a percent of pay?”

The expected range of contributions is 0% to 6% of payroll over time, though there is a 5% chance of contributions as high as 10% of payroll.



Good Times for ALM Studies

- Reviewing current status of the plan
- Budgeting and planning
- Understanding risks inherent in the plan
- Making decisions
 - Changes in plan provisions
 - Changes in funding policy
 - Changes in asset allocation

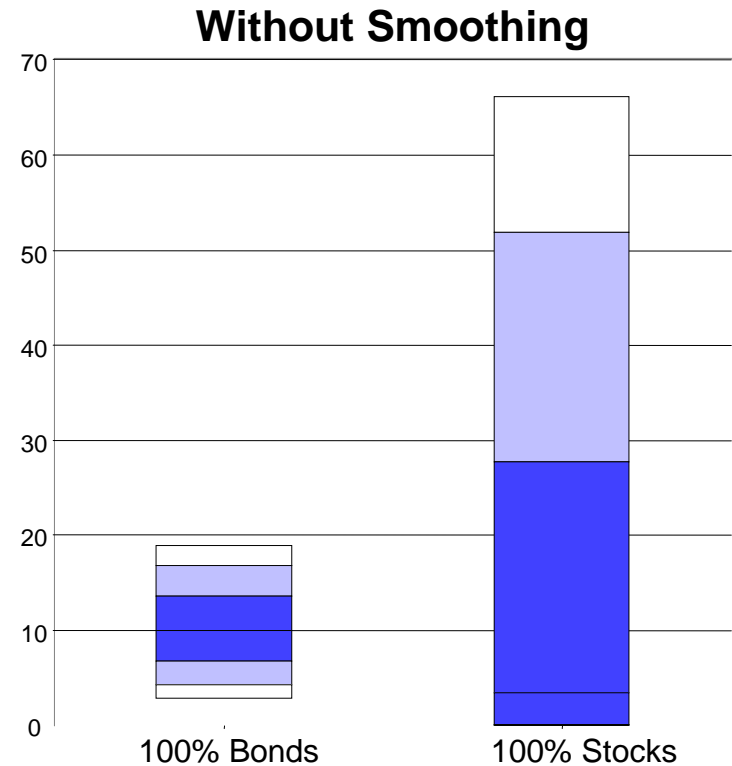
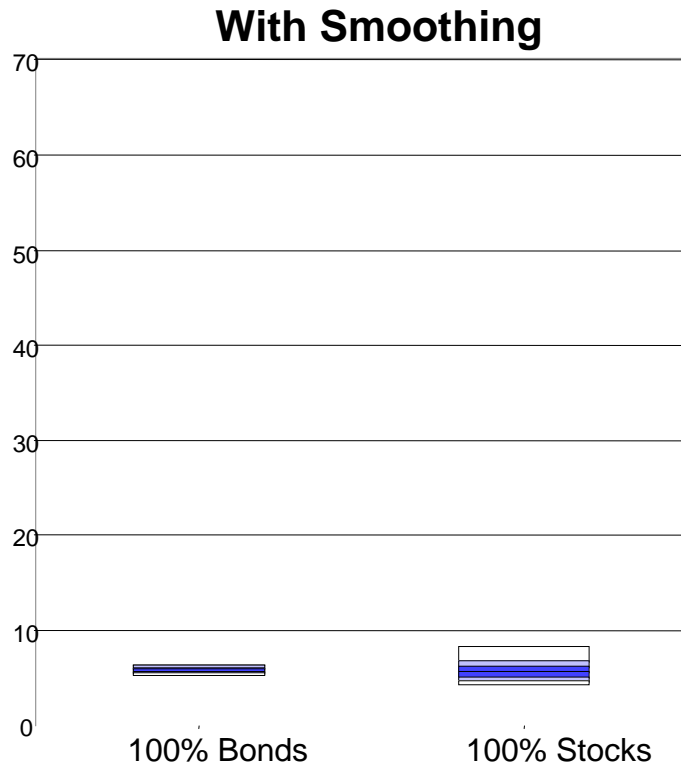
What is Driving Now?

- Poor stock market returns
- Low interest rates
- Movement for “transparent accounting”
- “Great Pension Controversy”

Assertion: Smoothing Creates Bias in Asset Allocation

- Smoothing options considered:
 - Actuarial value of assets: 5 year smoothing of gains/losses
 - Minimum required contributions: 5 year amortization of asset & liability gains/losses
 - Constant versus market interest rate (except for Current Liability)

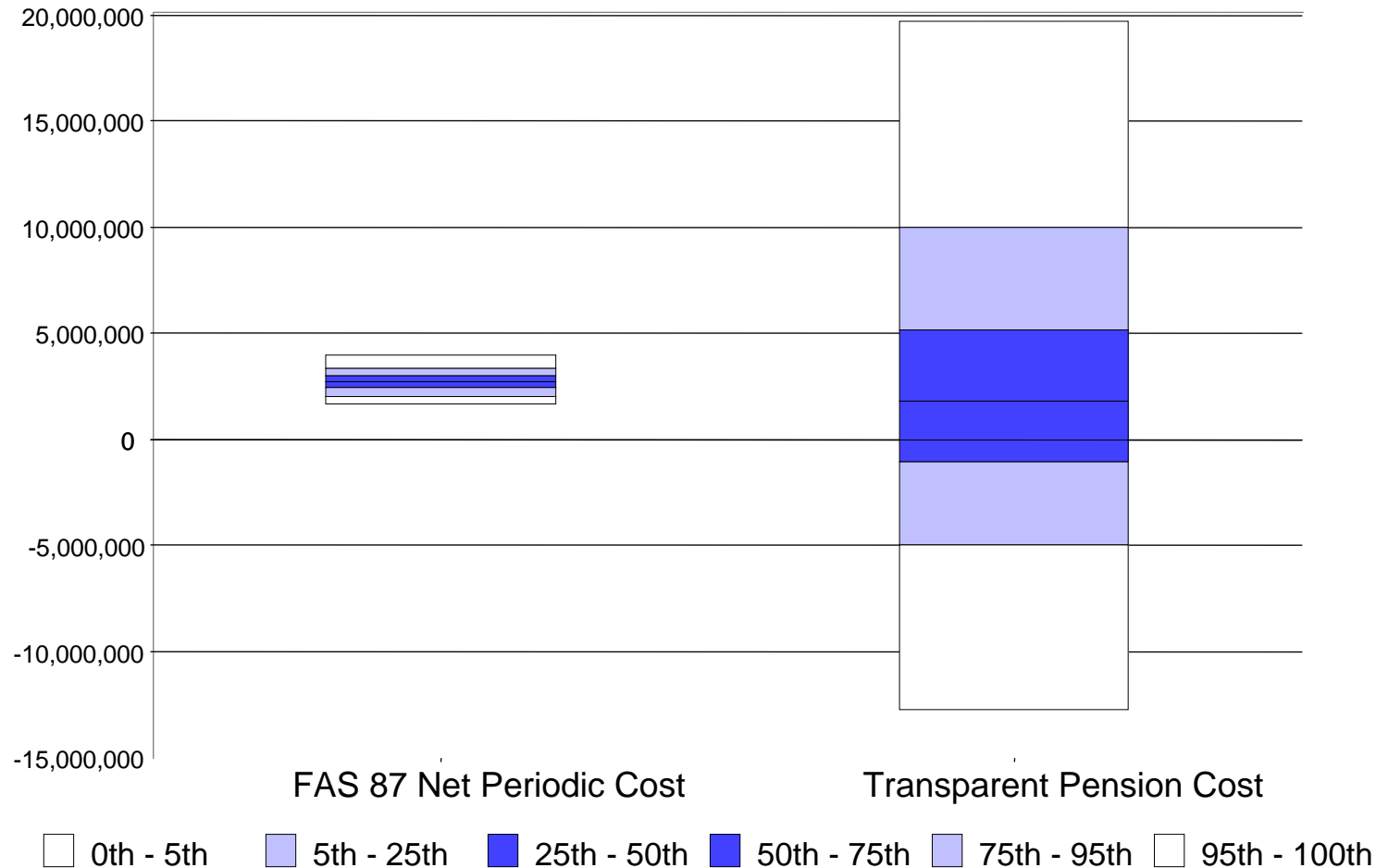
Employer Contributions (% Pay)



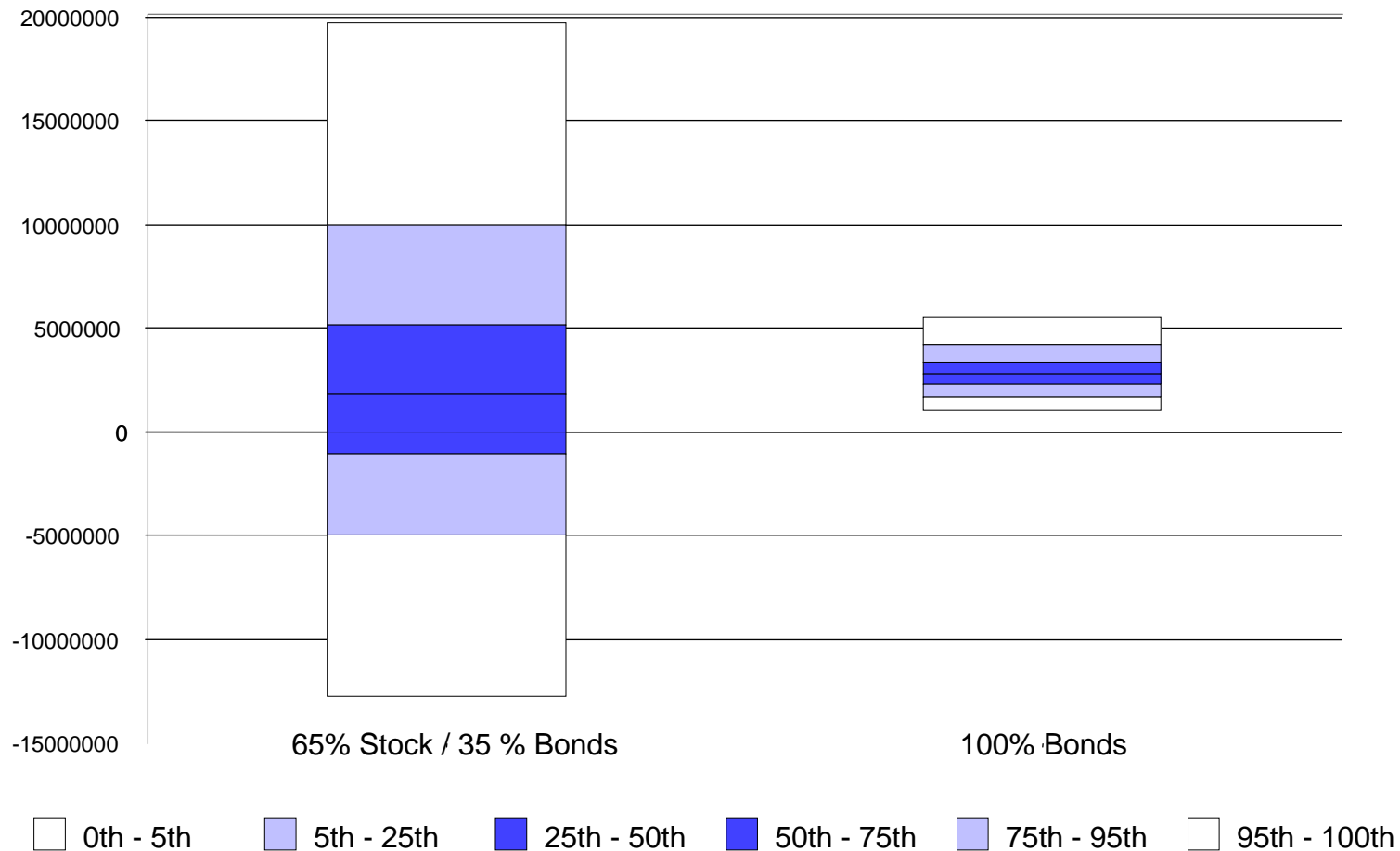
5th - 10th 10th - 25th 25th - 50th 50th - 75th 75th - 90th 90th - 95th

FAS 87 vs. “Transparent Accounting”

65% Stock / 35% Bonds



Transparent Expense Volatility Addressed with Bonds



How do you do ALM?

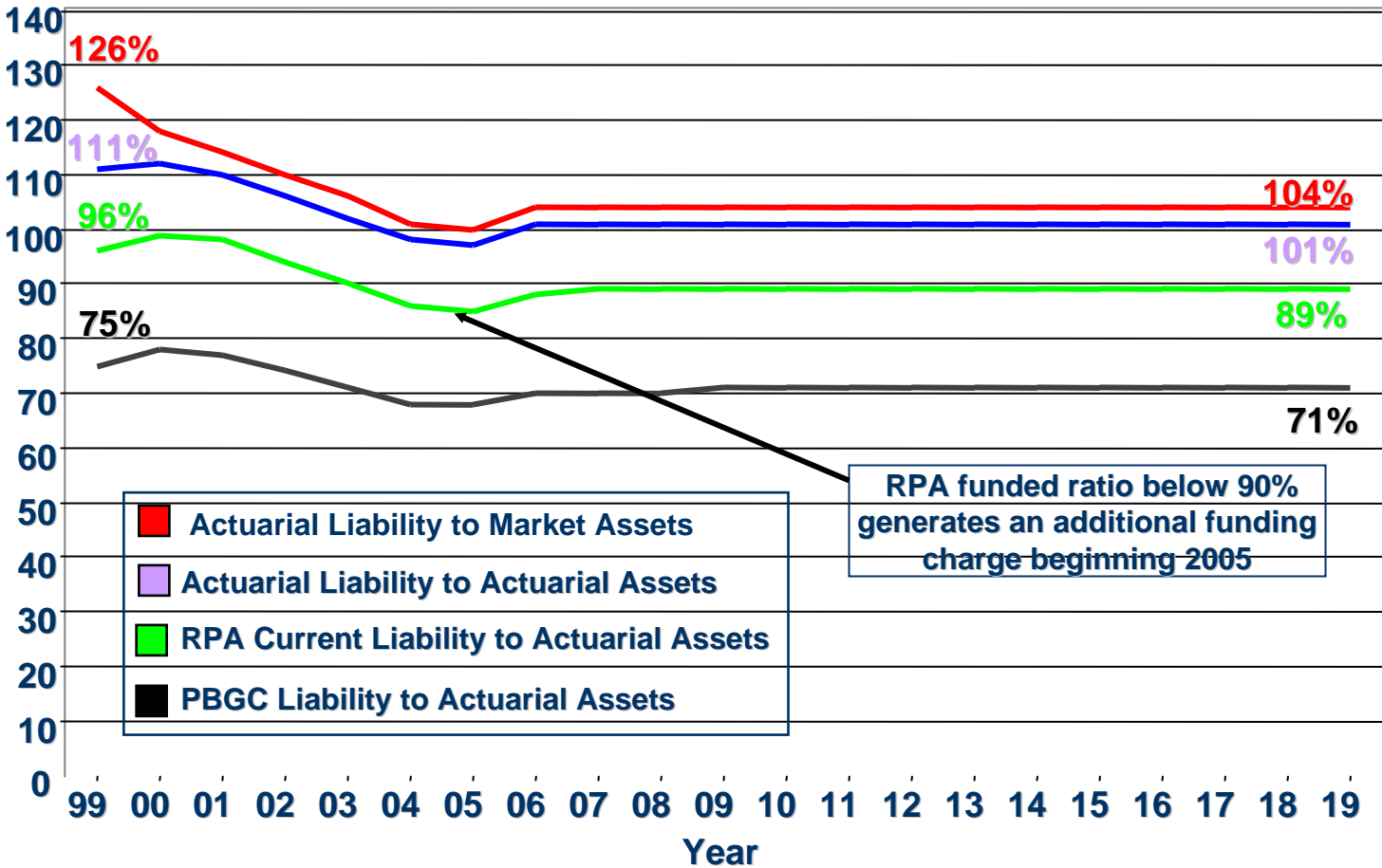
- Project plan liabilities, considering
 - Future plan amendments
 - Experience vs. valuation decrement assumptions
 - Potential for lump sum payouts
 - Population growth & profile of new entrants
 - Economic relationships

How do you do ALM? (cont'd)

- Test plan with Deterministic Forecasts of specific scenarios
 - What is the expected trend in plan costs, pension expense, funded ratios?
 - How sensitive is the plan to changes in assumptions?

Funded Ratios

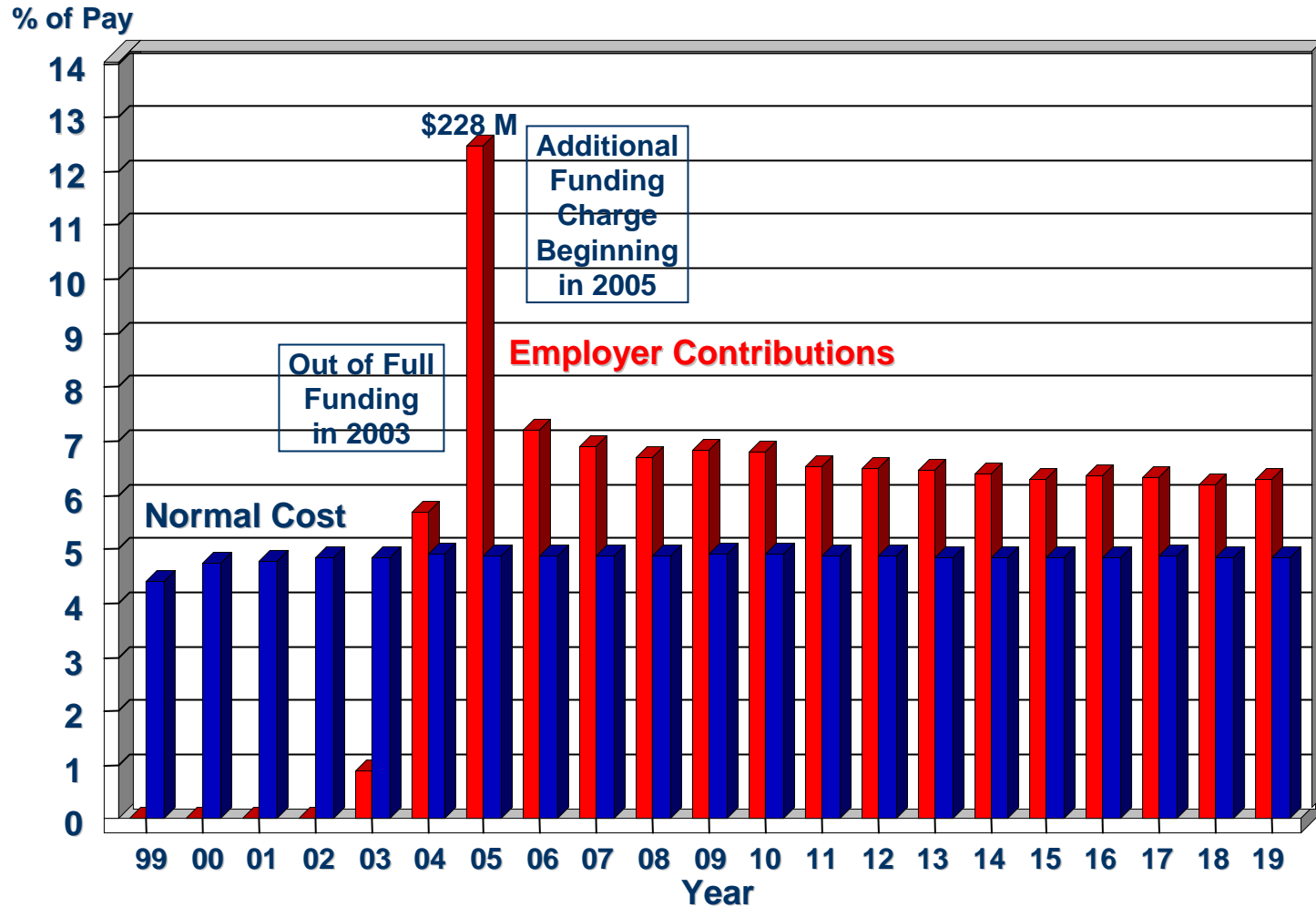
Funded %



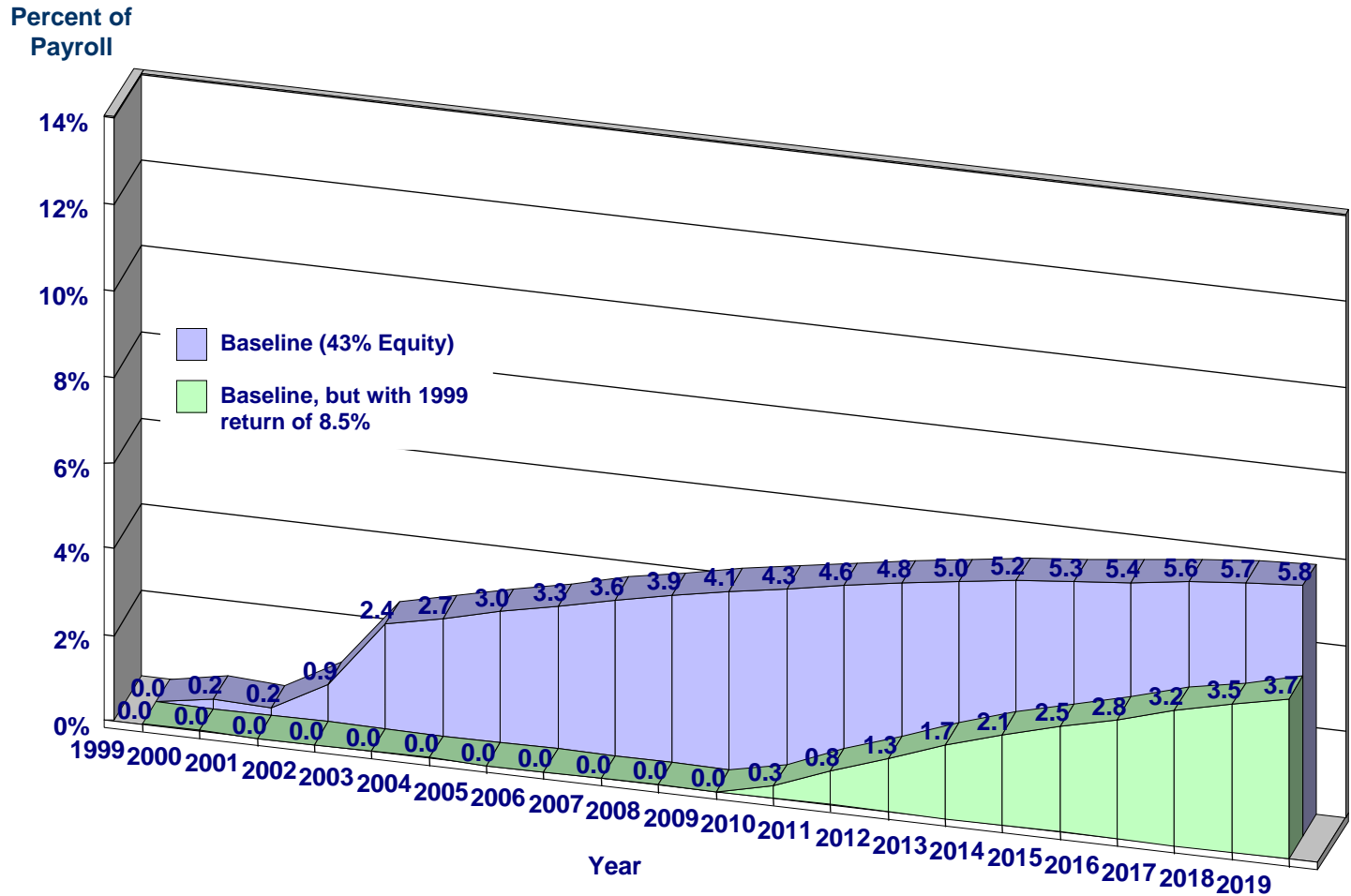
Funded Ratios

- The plan is at the ERISA full funding limit for the entire forecast
- The RPA funded ratio below 90% generates an additional funding charge beginning 2005
- When contributions are required, the RPA funding ratio is the applicable full funding limit
- Thus, the plan is virtually fully controlled by RPA interest rate, not the funding interest rate

Employer Contributions



Projected Contributions



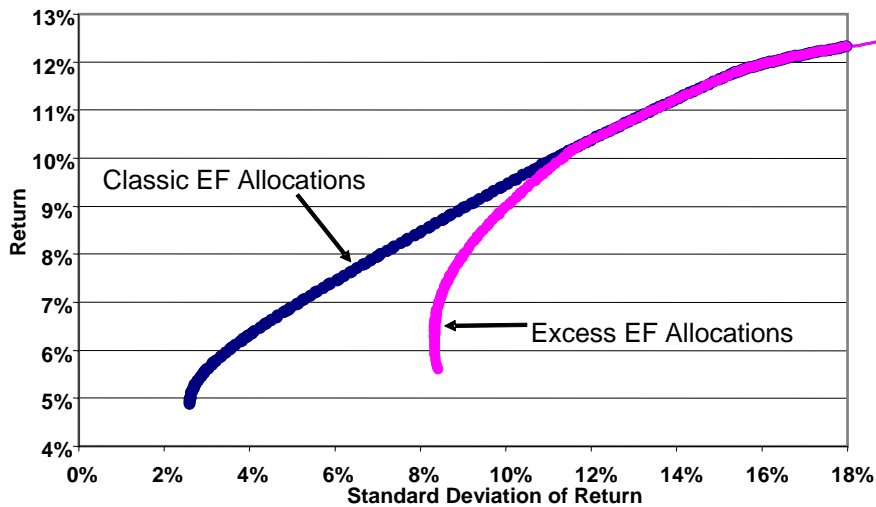
The 1999 market asset return of 0.34% eliminates a decade of \$0 contributions.

How do you do ALM? (cont'd)

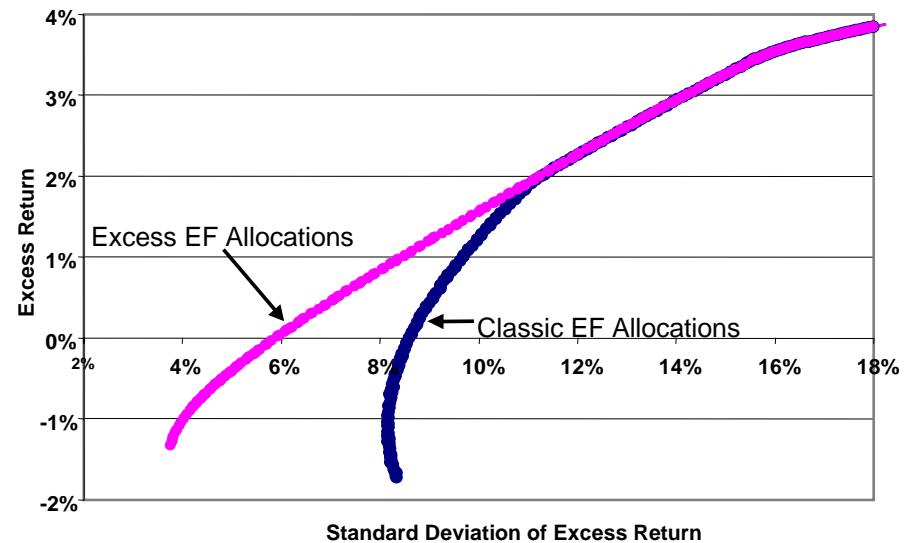
- Determine expected returns and risk for asset classes in question
- Perform a Capital Market Simulation
- Generate an Efficient Frontier
 - Reflect plan liabilities
 - Determine appropriate risk level

Alternative Efficient Frontiers: Risk versus Return

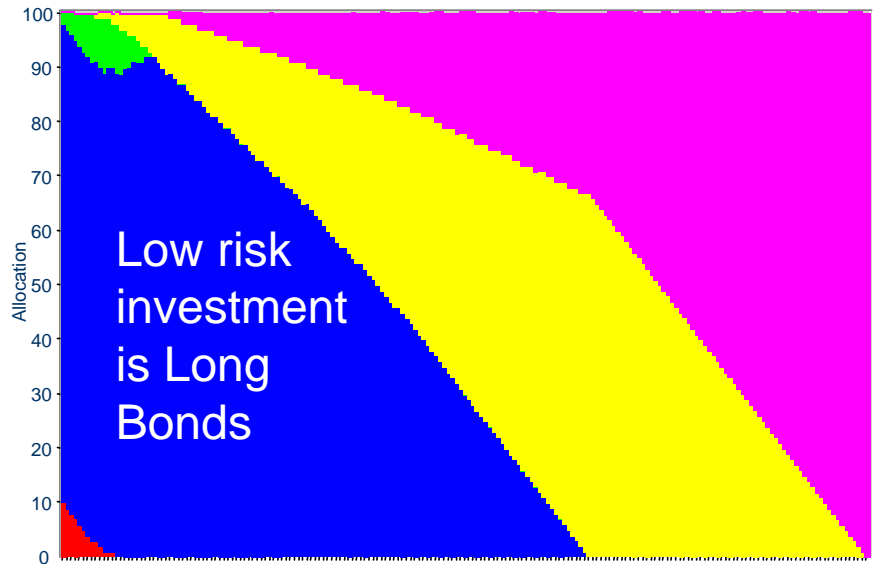
Classic Efficient Frontier



Excess Efficient Frontier

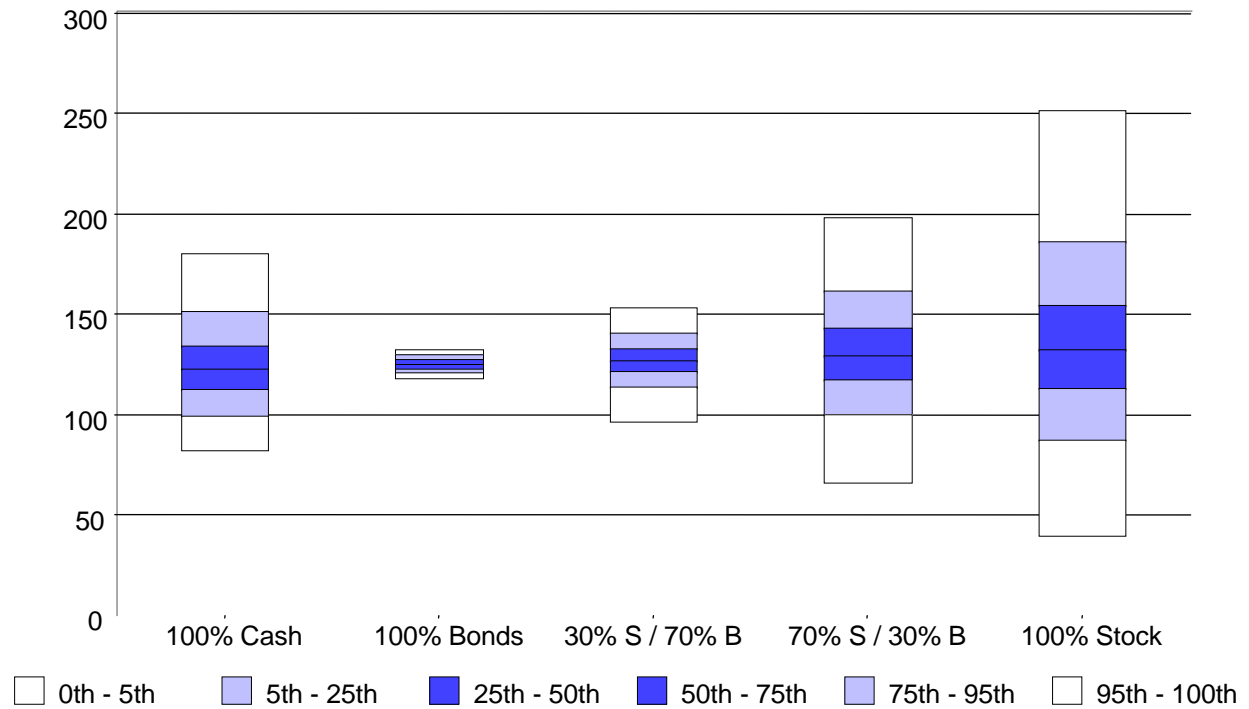


Alternative Efficient Frontiers: Asset Allocation



ABO Funded Ratio

While cash is usually considered a low risk investment, it does a terrible job of protecting the funded ratio.

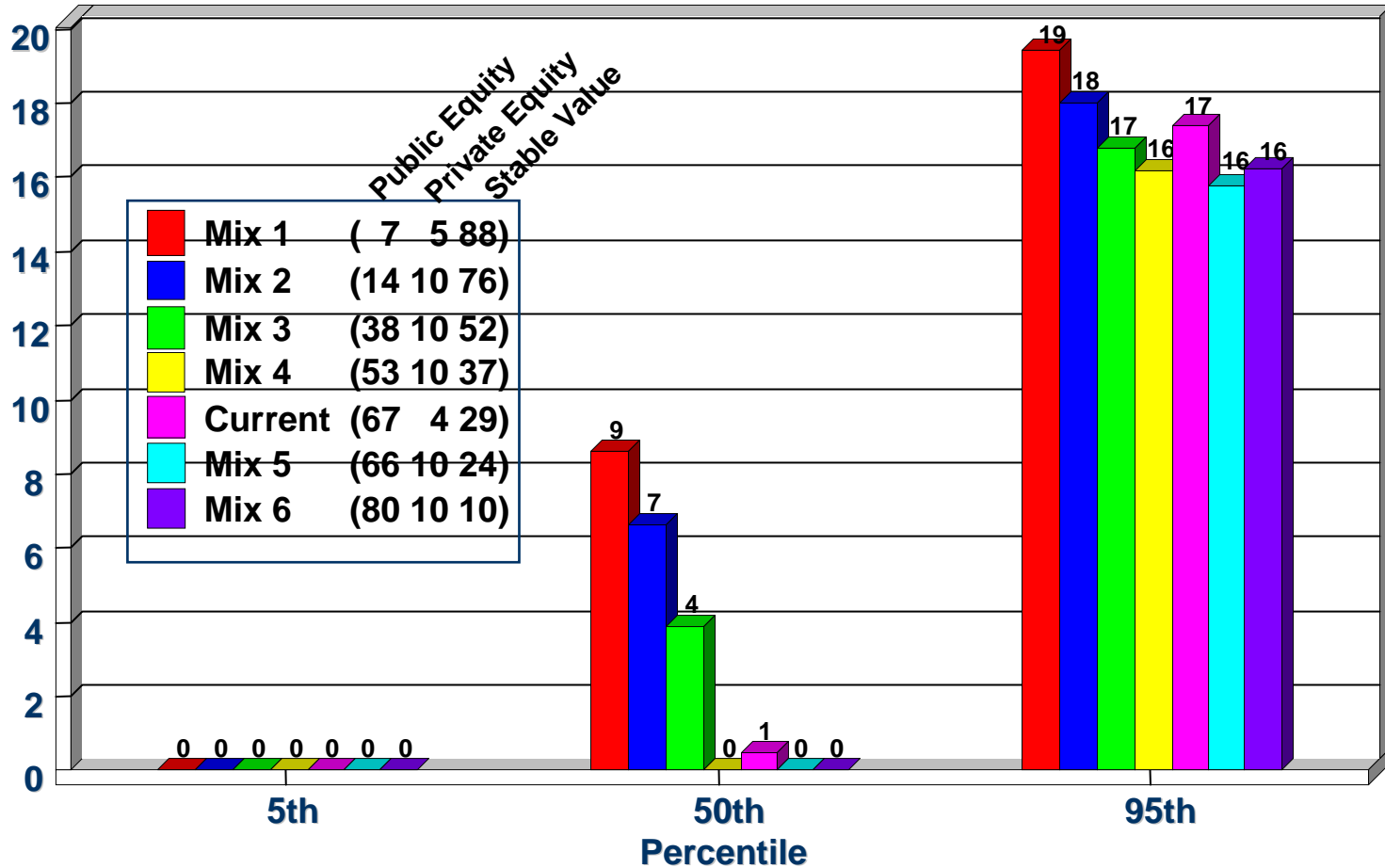


Review the Results

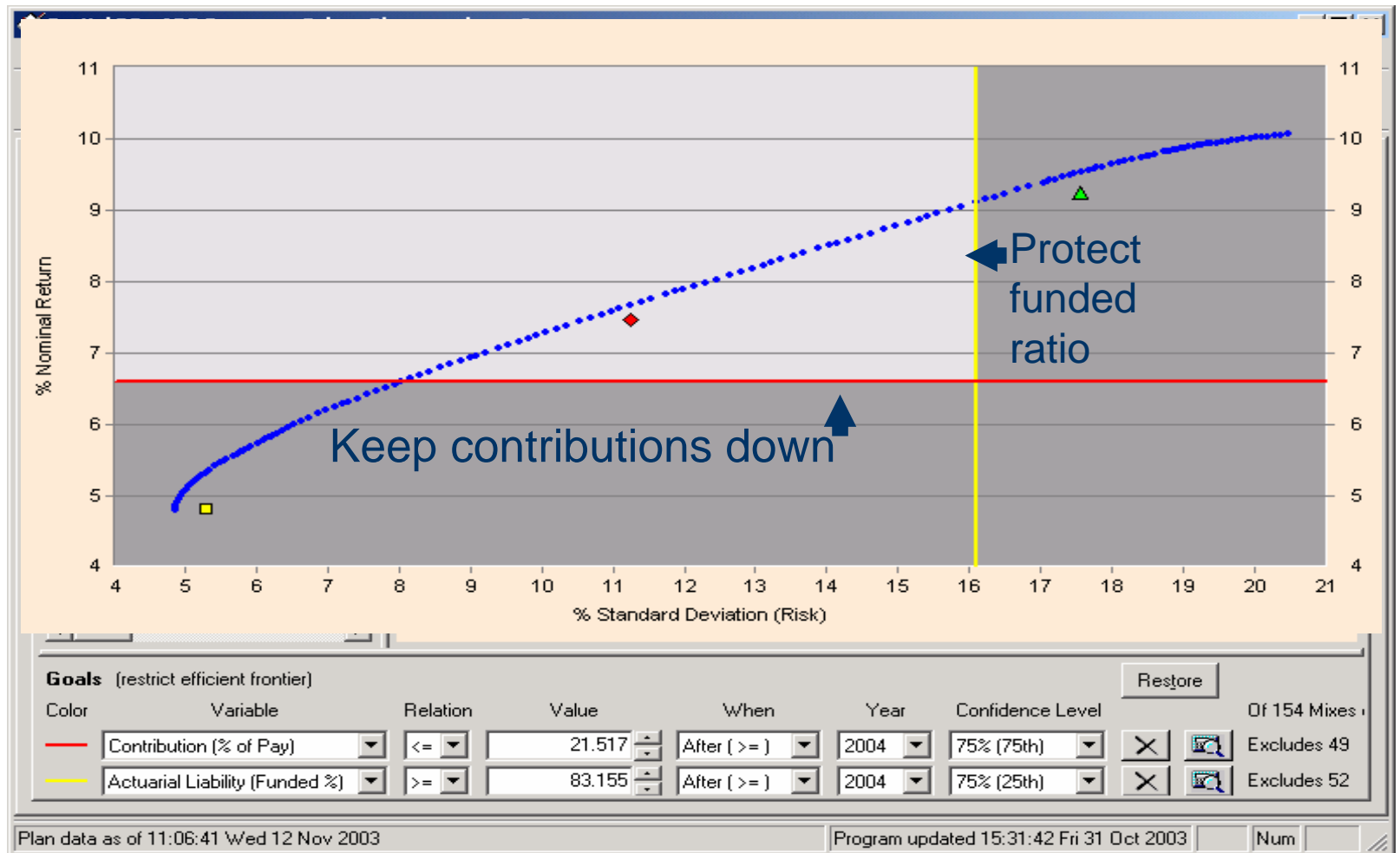
- View pension costs, funding status as moving targets
- Random variables are inflation, asset returns, and interest rates
- Generate distribution of outcomes based on random sampling
- Study the mean, variance and the outliers of each distribution
- Compare distributions between scenarios to test for fit

10th Year Contributions

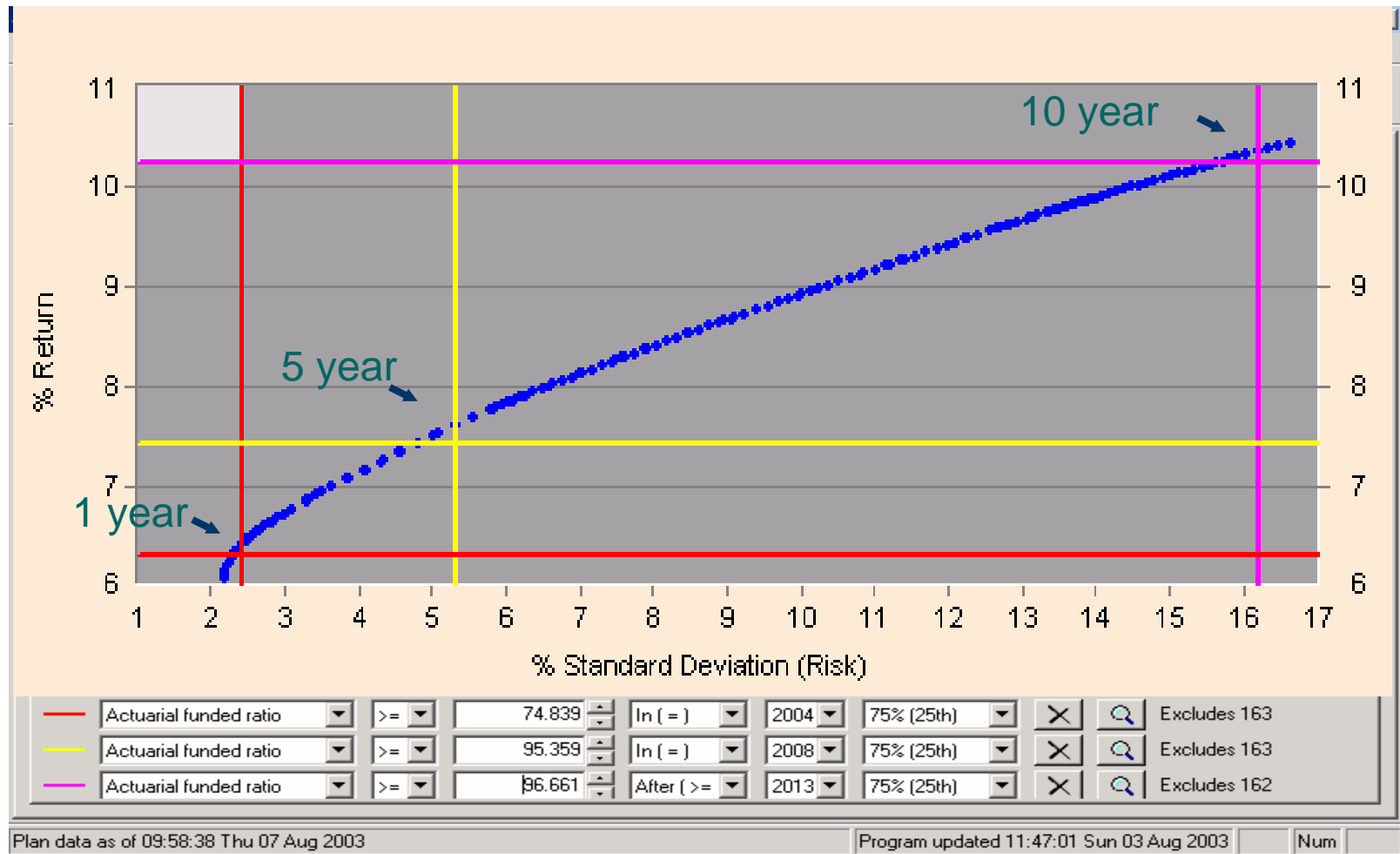
% of Pay



Consider Plan Sponsor's Specific Goals and Concerns



Consider Plan Sponsor's Time Horizon



Concluding Remarks

- ALM studies are
 - Critically important
 - More an art than a science