Asset Allocation Investment Strategy for Terminated Agency Pool

Asset Allocation/Actuarial Office/
Affiliate Investments Program Division
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Background

- The Terminated Agency Pool is composed of employers that have chosen to leave or have been terminated by CalPERS. If an agency terminates, but wants CalPERS to continue as the plan administrator, the terminated agency's plan assets and liabilities enter the Terminated Agency Pool.
- Assets in the Terminated Agency Pool are used to pay the agency's employee benefits when they retire.
- The concept of adopting a more conservative asset allocation strategy for this fund was recommended by the Chief Actuary and adopted by the Board on August 15, 2011.
- Should the Terminated Agency Pool become underfunded, CalPERS has limited recourse against terminated agencies. By investing funds of the Terminated Agency Pool more conservatively, member benefits are protected.

Background (cont.)

- The current funded ratio of the Terminated Agency Pool is 189% .
  - Asset value: $172 million
  - Present value of liability: $91* million
- Present Terminated Agency Pool Composition

Group	% of Term Pool Beneficiaries	Working Status	Wages Growing with Inflation	Currently Drawing Benefits
Group I	16%	Working	Yes	No
Group II	17%	Separated from service	No	No
Group III	67%	Retired	No	Yes

* All estimates of liabilities and benefit payments are obtained from the CalPERS Actuarial Office.

Asset Allocation Objectives

- The goal is to recommend a policy portfolio for the Terminated Agency Pool which meets the following objectives:
  - Minimize likelihood of underfunding;
  - Match projected future benefit payments.
    - Significant challenges in matching future benefit payments:
      - There are uncertainties in any inflation forecast.
      - Maturities of available US Treasury securities are from 1 year to 30 years; duration of liabilities is significantly longer than 30 years.
      - Actuarial risks remain due to assumptions such as mortality and salary increases.
      - Large employers or a group of small employers may enter the Terminated Agency Pool and dilute the funded status.

Recommendation

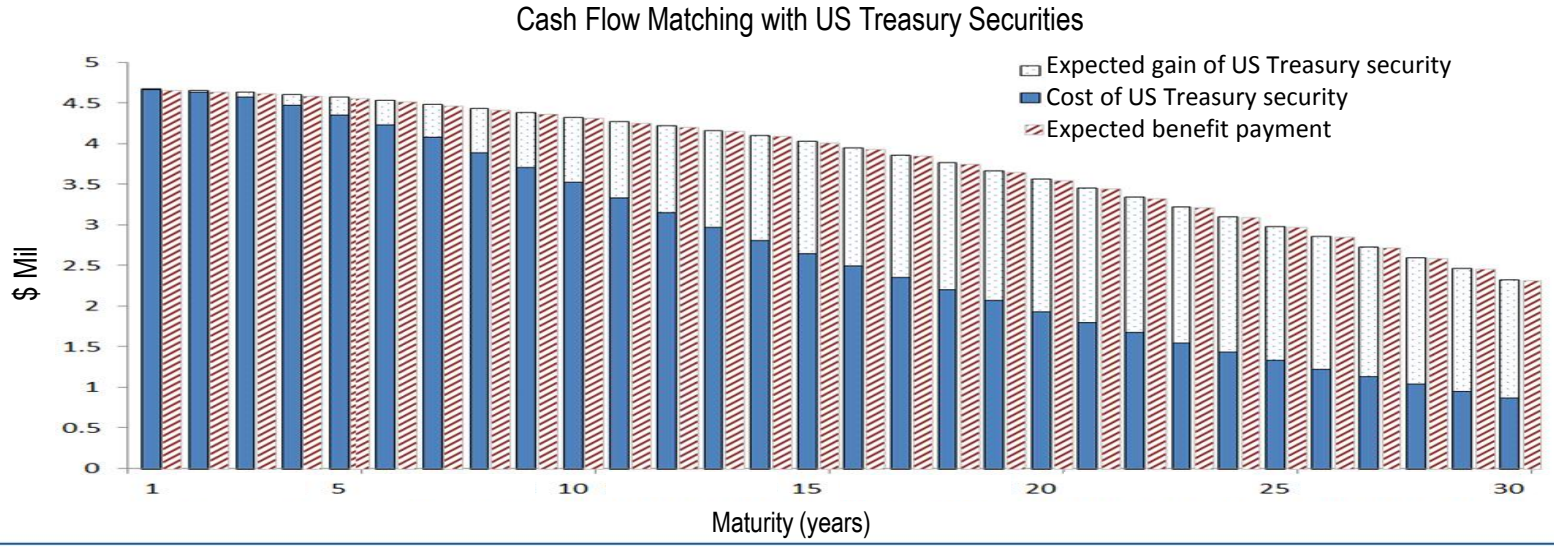
- We recommend a portfolio for the Terminated Agency Pool with the following asset mix:

Purpose	Asset Class	Weight
Cash flow matching	US Treasury securities	49%
Inflation protection	Direct inflation linked securities	46%
Pay unanticipated liability	Cash	5%

- This recommendation assumes 2% inflation rate, which is close to present economic conditions.
- The recommended portfolio meets the two objectives:
  - Minimize likelihood of underfunding;
  - Match projected future benefit payments.
- The recommended portfolio has nearly zero probability of being underfunded in various inflation stress tests.

Cash Flow Matching

- Cash flow matching involves investing in certain assets so that investment earnings, at maturity, will provide funds for expected future liability payments.
- US Treasury securities are included in the portfolio to match forecasted future benefit payments.



Cash Flow Matching (cont.)

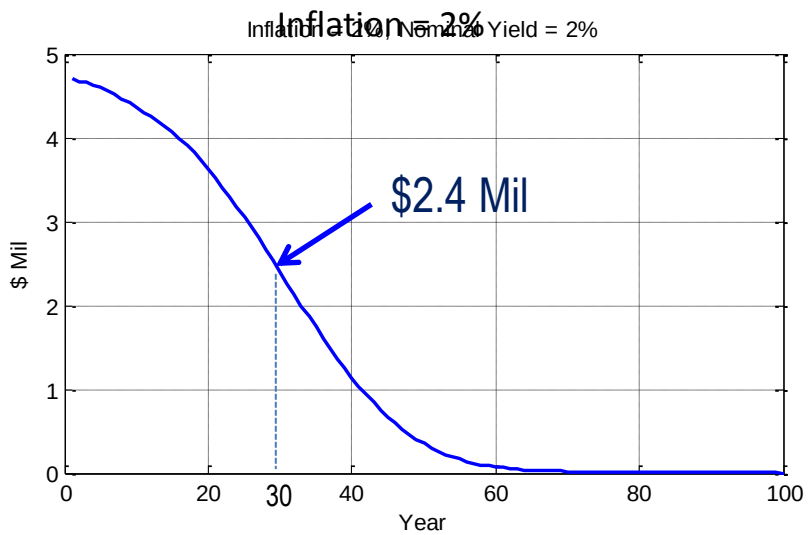
- US Treasury STRIPS* will be used to match the cash flows of the Terminated Agency Pool.
  - STRIPS are fixed income securities sold at a discount to face value, offer no interest payments and mature at par.
  - A STRIPS portfolio can be constructed to match annual future benefit payments.
  - The annual forecasted benefit payment is met by the matured STRIPS in the portfolio. As this occurs, the strategy is to replace the matured security with newly issued STRIPS. For instance, once the STRIPS matching benefit payment in year one mature, a newly issued STRIPS will be purchased to match the forecasted benefit payment of the 31st year. This process will continue annually.

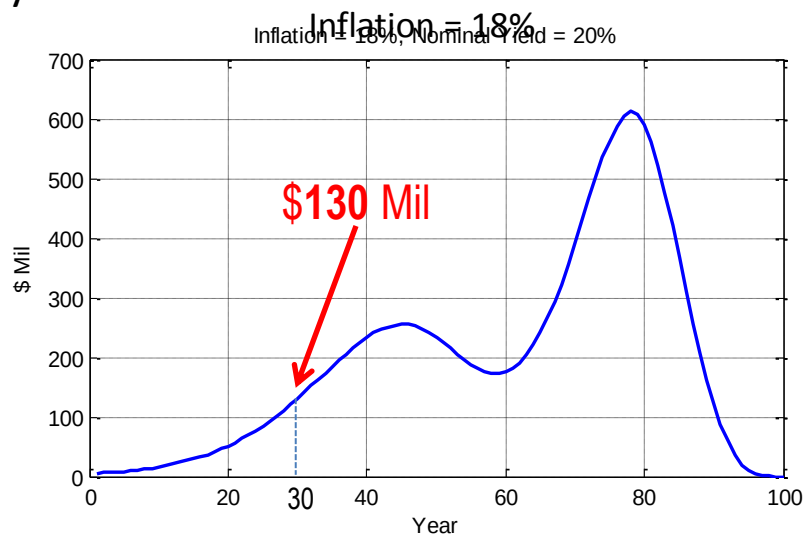
* STRIPS is an acronym for "Separate Trading of Registered Interest and Principal of Securities."

Inflation Protection and Benefit Payment Sensitivity

- The Terminated Agency Pool benefit payments are very sensitive to future inflation. For example, if inflation were to increase from 2% to 18%, the projected benefit payment would increase at year 30 from $2.4 million to $130 million (reflected in charts below).

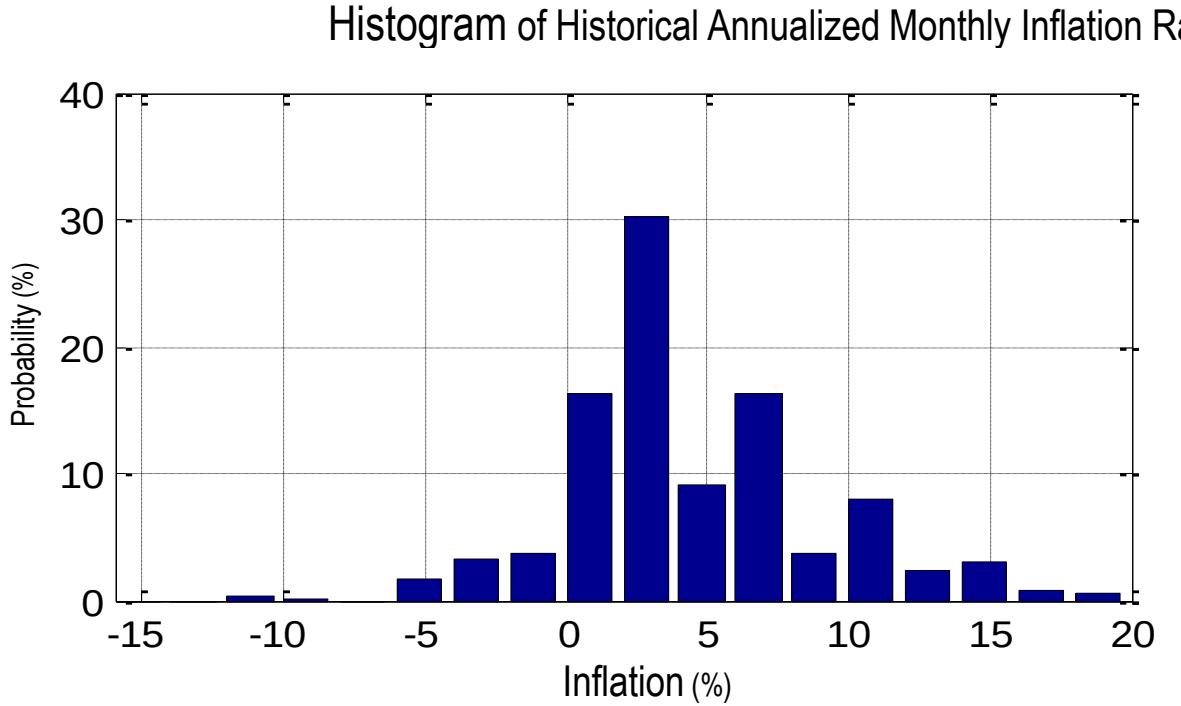
Estimated Future
Benefit Payments





Historical Inflation Probabilities

- Historical inflation has varied significantly with a 15% probability that inflation exceeded 10% in a month.



Inflation Rate	Probability
Above 10%	15%
Between 2% and 10%	60%
Below 2%	25%
Sample Size	**481 months**

Monthly inflation data from Bloomberg (US CPI Urban Consumers MoM NSA Index from 01/1971 to 02/2012). Inflation rates are annualized.

Direct Inflation Linked Securities Provide the Best Inflation Hedge

- We recommend direct inflation linked securities, such as inflation linked bonds, to hedge inflation risk and minimize probability of underfunding in any inflation scenario.

Probabilities of Underfunding with Various Securities

Security Type	Inflation (0% ~ 2%)			Inflation (2% ~ 10%)			Inflation (>10%)		
	Mean Return	Volatility	Underfunded Probability	Mean Return	Volatility	Underfunded Probability	Mean Return	Volatility	Underfunded Probability
Inflation Linked Bonds	6.4%	5.30%	0.0%	8.3%	5.4%	0.0%	10.0%	4.4%	0.0%
Public REITs	19.0%	14.40%	0.0%	13.5%	16.3%	0.0%	0.9%	17.4%	98.1%
Public Equity	11.0%	14.20%	0.0%	8.1%	14.4%	1.6%	-7.4%	16.1%	100.0%
Corp. Bonds (AA- above)	6.2%	4.7%	0.0%	7.9%	4.5%	0.0%	-2.6%	3.7%	100.0%

- Commodities were not considered due to high volatility and lack of income generation.

Stress Test Recommended Portfolio Under Different Inflation Scenarios*

- The recommended portfolio is stress tested in three inflation scenarios:

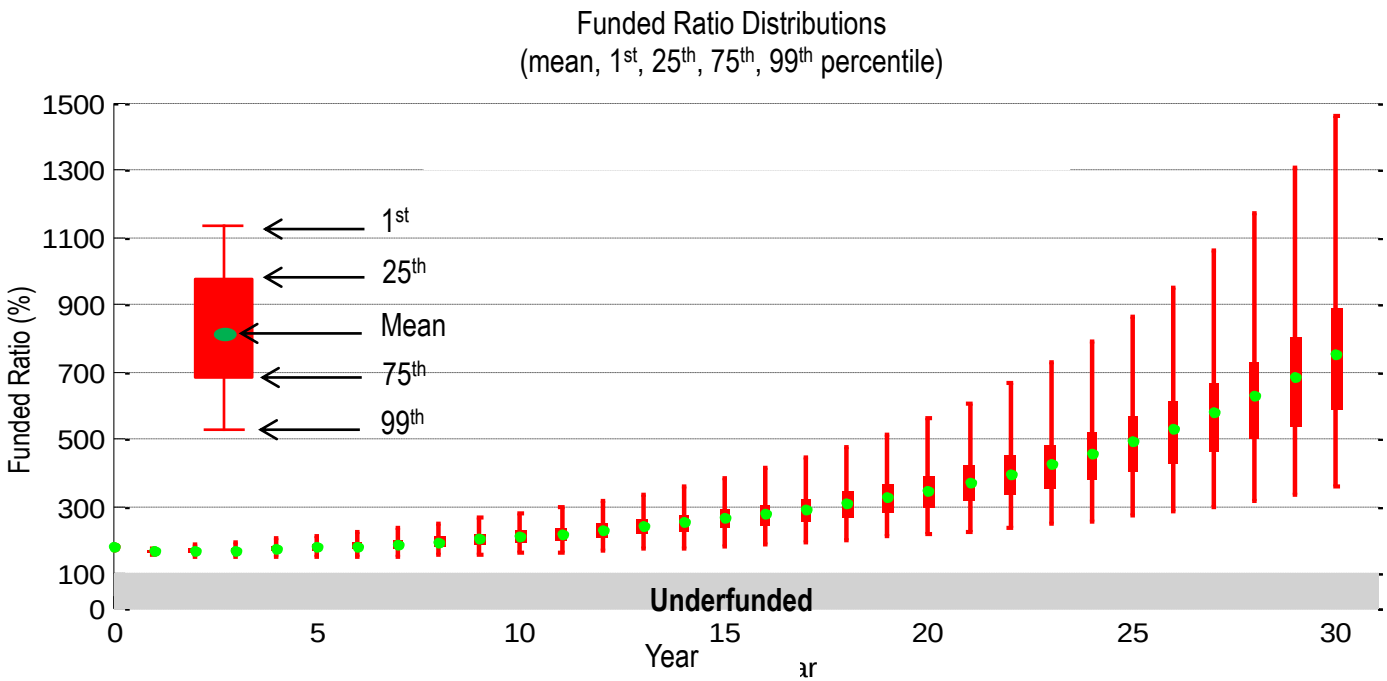
Inflation Scenario	Inflation Rate	Nominal Yield	Expected Investment Return of Inflation Linked Securities
I. Low	2%	2%	2.75%
II. Moderate	6%	8%	6.75%
III. Hyper	18%	20%	18.75%

- Under all stress testing, the recommended portfolio has less than 0.1% probability of becoming underfunded, even in the most adverse inflation scenario (18%).

* See appendix for stress testing assumptions.

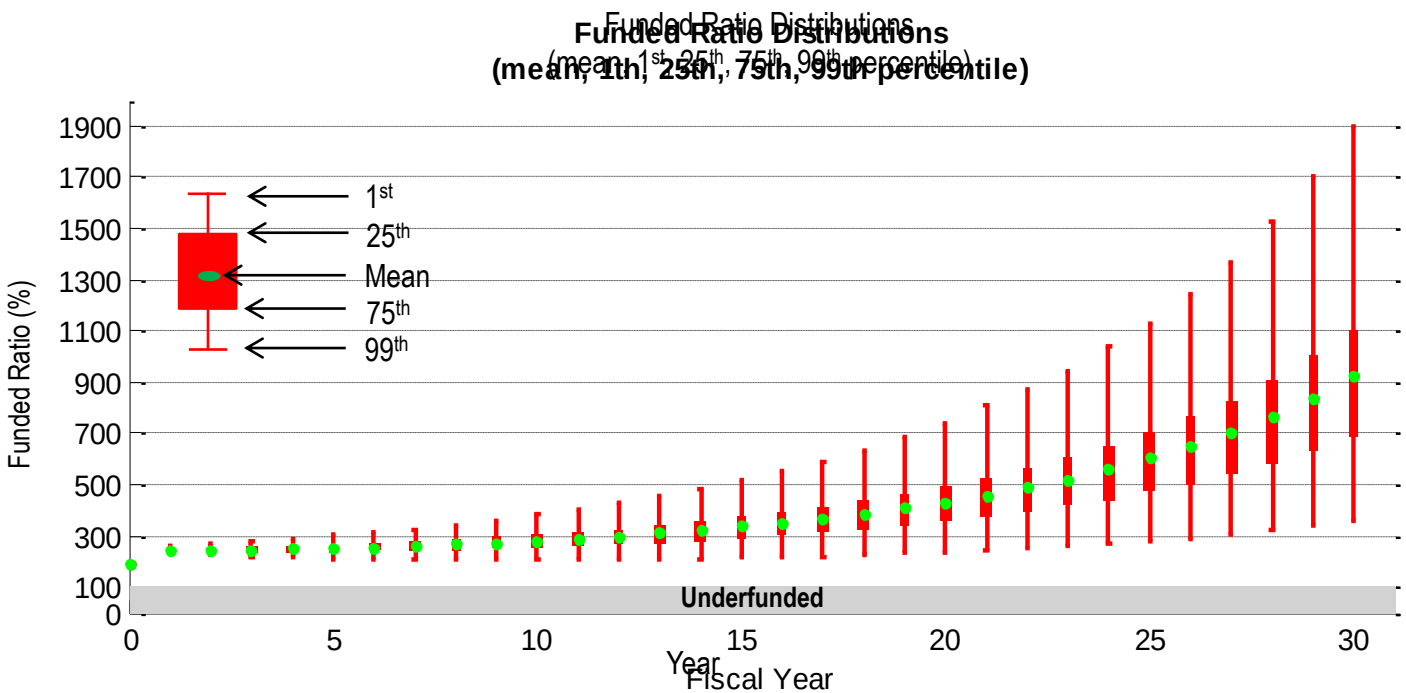
Simulated Funded Ratio Under Low Inflation:
2% Inflation, 2% Nominal Yield, and 2.75% Investment Return

- The recommended portfolio avoids underfunded status for 30 years.
  - Base of liability is shrinking.
  - Investment return exceeds inflation.



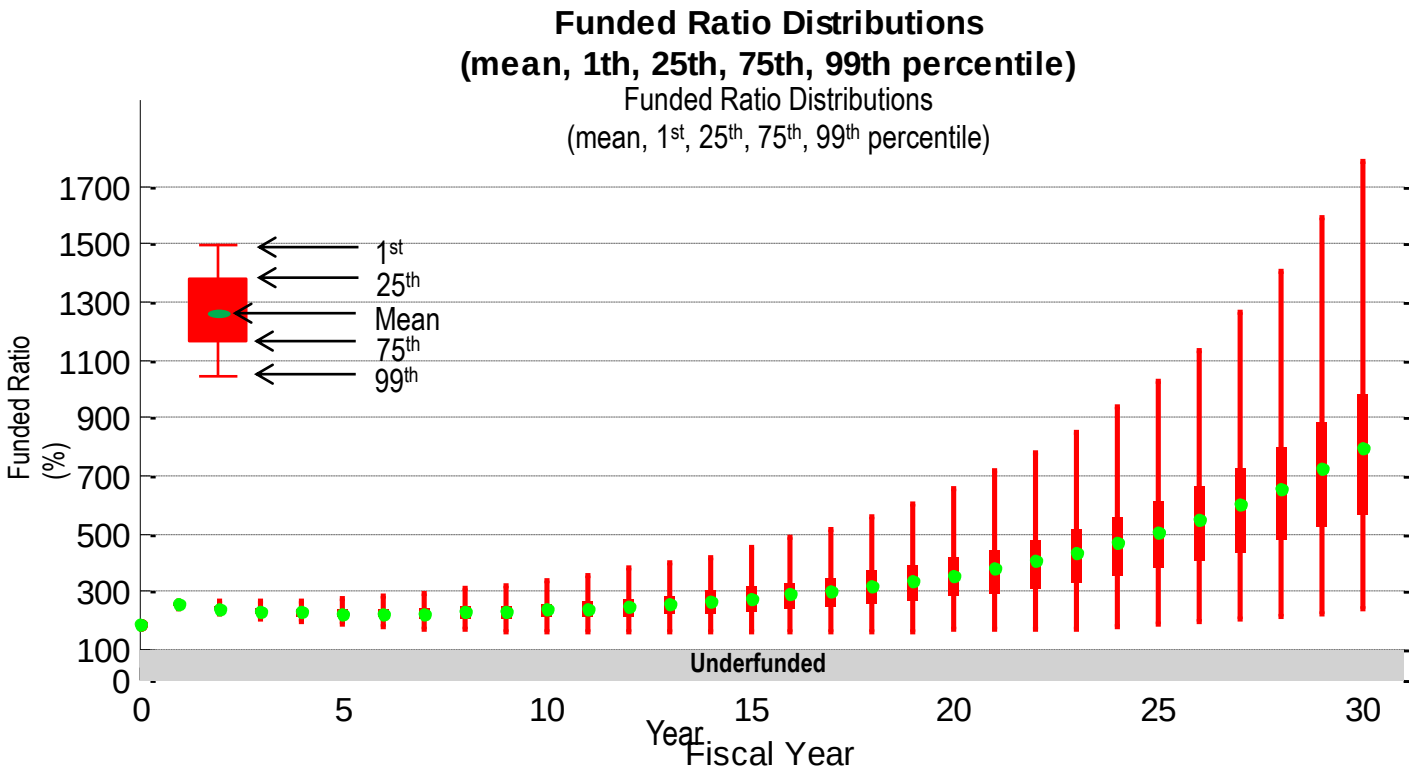
Simulated Funded Ratio Under Moderate Inflation:
6% Inflation, 8% Nominal Yield and 6.75% Investment Return

- The recommended portfolio avoids underfunded status for 30 years.
  - Base of liability is shrinking.
  - Investment return exceeds inflation.



Simulated Funded Ratio Under Hyper Inflation:
18% Inflation, 20% Nominal Yield and 18.75% Investment Return

- Recommended portfolio avoids underfunded status for 30 years.
  - Base of liability is shrinking.

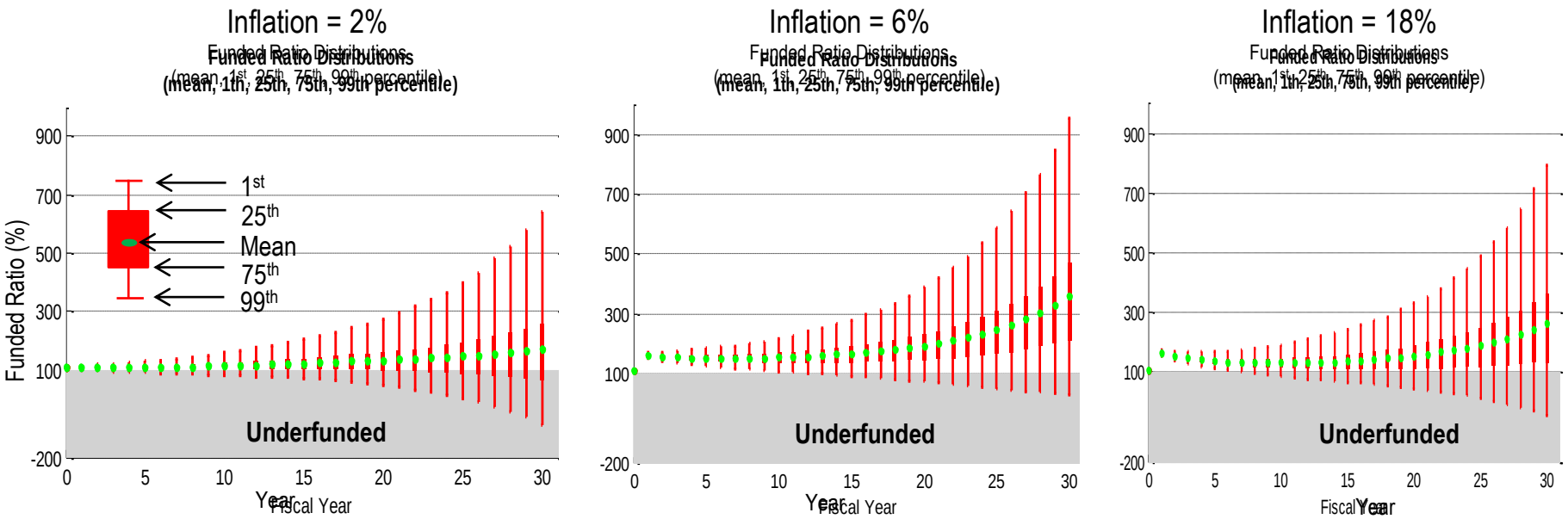


Dilution Risk

- The current requirement is that if a new agency wants to enter the Terminated Agency Pool, it must deposit assets worth 107% of liabilities. Thus, a large agency (or several smaller agencies) entering the Terminated Agency Pool may materially decrease its current funded status.
- Additional stress testing on the recommended portfolio with 107% initial funded ratio is reflected on the next slide.

Stress Testing: If the Initial Funded Ratio is Diluted due to New Entrants

- Using an initial funded ratio of 107%, the recommended portfolio has a risk of becoming underfunded in all inflation scenarios. However, the mean funded ratio is still above 100% in all inflation scenarios.
- If the funded status changes due to new entrants, we will revisit the recommended portfolio.



Next Steps

- The Affiliate Investment Programs Division will present an Investment Policy for the Terminated Agency Pool at the June 2012 Investment Committee meeting.
- The Investment Office will implement the investment strategy on July 1, 2012.
- The Investment Office and Actuarial Office will continue collaboration to monitor the funded status of the Terminated Agency Pool and rebalance the recommended portfolio annually.
- The standard policy requires review of asset allocation of the Terminated Agency Pool at the minimum of every three years, or sooner if there is a material change of funded status.

Appendix

Stress Testing Assumptions

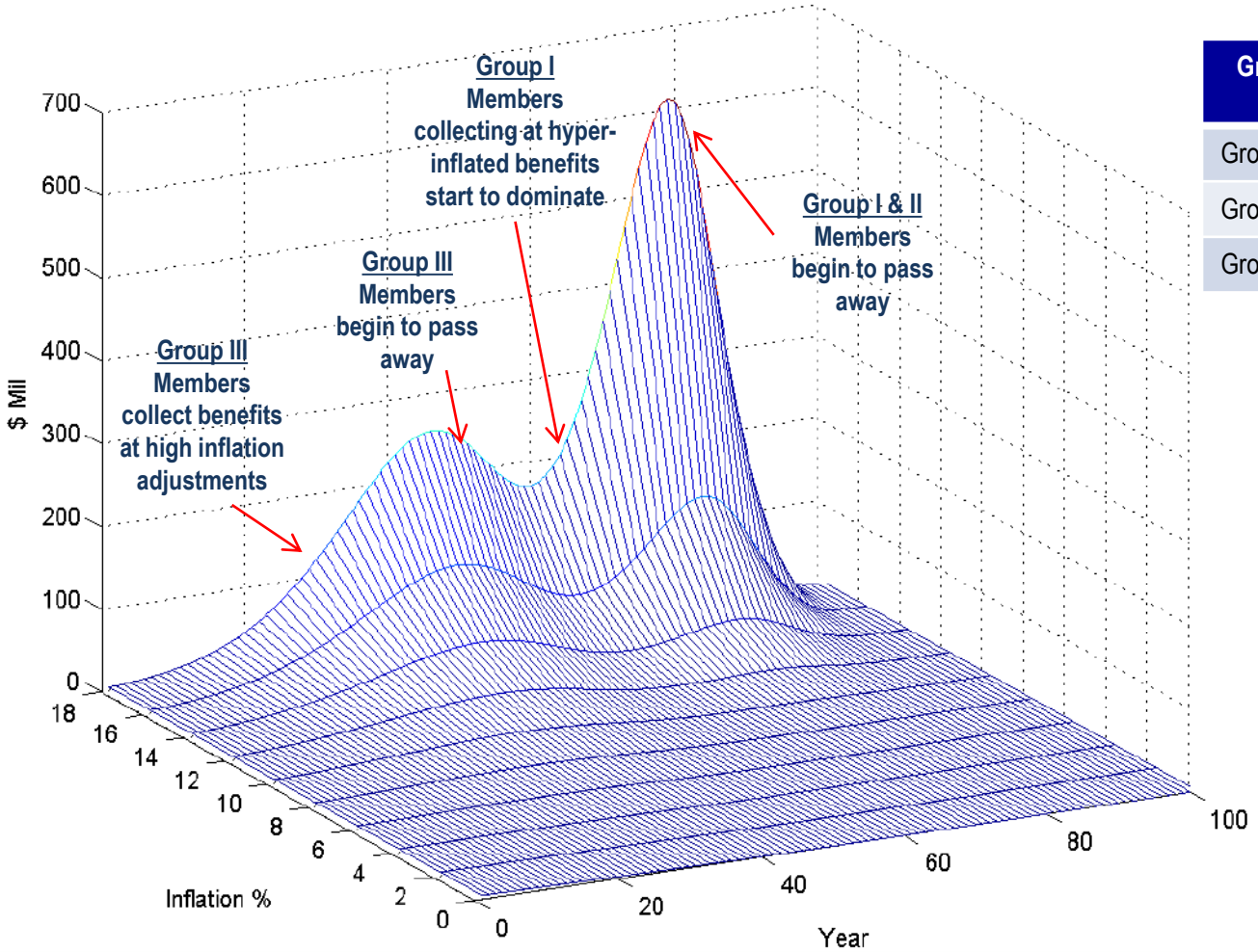
- Nominal yield refers to the prevailing rate of interest offered on fixed income securities; currently about 2% on a 10 year US Treasury Note. To be consistent with actuarial methodology, nominal yield is used as the discount rate for liability calculations in stress testing.
- Historically, nominal yield is usually about 2% above inflation rate; however, current nominal yield is close to the inflation rate of 2%.
- In stress testing, US Treasury Inflation Protected Securities (TIPS) are used to represent inflation linked securities. The expected investment returns of TIPS are inflation rate plus a marginal rate. Currently, the marginal rate is about 0.75%.

Stress Testing Assumptions (cont.)

- Only inflation linked securities are marked to market.
- Treasury Inflation Protected Securities (TIPS) with 30 year maturity represent inflation linked securities.
- US Treasury securities are held to maturity, i.e., not marked to market.
- Both trading costs and administration fees are taken out from the Terminated Agency Pool.

Number of Years Projected	Sample Paths	Liability Discount Rate	Fund Admin Fee (bps)	Trading Cost (bps)	Portfolio Weight			Expected Asset Return			Asset Return Volatility		
					US Treasury securities	TIPS	Cash	US Treasury securities	TIPS	Cash	US Treasury securities	TIPS	Cash
30	100,000	Nominal Yield	20	20	49%	46%	5%	Yield to Maturity	Inflation + 0.75%	0%	0%	6%	0%

Projected Benefit Payments Under Different Inflation



Group	Working Status
Group I	Working
Group II	Separated from service
Group III	Retired