

# Asset Allocation Investment Strategy for Terminated Agency Pool

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## Background – Historical Purpose

- The Terminated Agency Pool (TAP) exists to provide benefit payments to members who are employees of agencies that have terminated their contract with CalPERS.
- Assets in the TAP are used to pay the terminated agency's employees' benefits when the employees retire.

## Background – Assets and Liability

- When a contracting agency terminates its CalPERS contract, the associated assets and liabilities of that agency are transferred into the TAP.
  
- CalPERS has limited recourse against terminated agencies if the Terminated Agency Pool becomes underfunded.

## Background – TAP Investment Strategy

- The TAP currently exists within, and is subject to the same investment strategy as, the Public Employees' Retirement Fund (PERF).
- The concept of adopting a more conservative asset allocation strategy for the TAP was recommended by the Chief Actuary and adopted by the Board on August 15, 2011.

## Background – Funded Status & Composition

- The current funded ratio of the Terminated Agency Pool is 261% as of 06/30/2011.
  - Asset value: \$184 million\*
  - Present value of liability: \$71 million\*

Present Composition of the TAP				
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

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# Asset Allocation Goal

## TAP Asset Allocation Goal

- Recommend a policy portfolio for the TAP which best meets both of the following objectives:
  - Match projected future benefit payments
  - Minimize the likelihood of underfunding

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# Investment Strategy Analysis

Staff analyzed four varied investment strategies in the course of developing an asset allocation recommendation.

They are as follows:

## Strategy A

- Mixed maturities of STRIPS, Direct Inflation Linked Securities, and cash

## Strategy B

- Mixed maturities of TIPS, Direct Inflation Linked Securities, and cash

## Strategy C

- Mixed maturities of high quality corporate bonds, Direct Inflation Linked Securities, and cash

## Strategy D

- Short-term high quality corporate bonds, Direct Inflation Linked Securities, and cash

# Investment Strategy Analysis

The table below displays key characteristics of each strategy across common criteria (A-D):

Strategy	Purpose	Asset	Weight	Nominal Yield	Interest Rate Duration <sup>†</sup>	Cash Flow Matching Risk	Inflation Risk	Underfunding Risk
A	Cash Flow Matching	STRIPS (mix of maturities)	49%	1.3%	9	Low	Medium	Low
	Inflation Protection	Direct Inflation Linked Securities*	46%					
	Unanticipated Liability Payment	Cash	5%					
B	Cash Flow Matching	TIPS (mix of maturities)	56%	1.1%	9	Medium**	Low	Low
	Inflation Protection	Direct Inflation Linked Securities	39%					
	Unanticipated Liability Payment	Cash	5%					
C	Cash Flow Matching	Corporate Bonds (AA and above, mix of maturities)	52%	1.7%	9	Medium***	Medium	Low
	Inflation Protection	Direct Inflation Linked Securities	43%					
	Unanticipated Liability Payment	Cash	5%					
D	Low Interest Rate Risk	Corporate Bonds (AA and above, 1 year maturity)	49%	0.7%	4	High****	Medium	Low
	Inflation Protection	Direct Inflation Linked Securities	46%					
	Unanticipated Liability Payment	Cash	5%					

<sup>†</sup> Interest rate duration measures the price sensitivity of a bond to changes in interest rates.

\* TIPS are used as a representative for direct inflation linked securities. The nominal yields of TIPS are calculated by adding a 2% assumed inflation rate.

\*\* due to (1) implementation risk and (2) reinvestment risk.

\*\*\* due to (1) default risk and (2) reinvestment risk.

\*\*\*\* due to lack of cash flow matching.

## Investment Strategy Analysis – Staff Comparison

Compared to Strategy A, staff does not recommend strategies B-D for the following considerations:

### Strategy B

- Has less certainties of cash flow matching caused by higher reinvestment risk, and
- Has higher implementation risk\*.

### Strategy C

- Has default risk,
- Has higher reinvestment risk, and
- Has higher monitoring requirements for staff.

### Strategy D

- Is an asset-only approach,
- Has higher reinvestment risk, and
- Has the highest implementation risk because staff lacks resource and monitoring framework to determine when to replace short term corporate bonds with other assets such as STRIPS.

## Investment Strategy Analysis - Simulated Underfunding Probabilities

- Under most circumstances of low and moderate inflation, all strategies have nearly zero simulated underfunding probabilities, and Strategy B is better in an extreme case of hyperinflation for a prolonged period of time.
- However, in addition to inflation risk, other risks such as reinvestment and implementation risks need to be considered.

Simulated Underfunding Probabilities in 30 Years

Strategy	Inflation Assumptions		
	2%	6%	18%
A	0%	0%	5%
B	0%	0%	0%
C	0%	0%	7%
D	0%	0%	5%

# Investment Strategy Analysis - Summary of All Strategies

Strategy	Asset Allocation	Nominal Yield	Interest Rate Duration	Risk						
				Cash Flow Matching	Under-funding	Interest Rate	Inflation	Credit	Reinvestment	Implementation
<b>A</b>	49% STRIPS (mixed maturities) 46% Direct Inflation Linked Securities 5% Cash	1.3%	9	Low	Low	Medium	Medium	Low	Low	Low
<b>B</b>	56% TIPS (mixed maturities) 39% Direct Inflation Linked Securities 5% Cash	1.1%	9	Medium	Low	Medium	Low	Low	Medium	High
<b>C</b>	52% Corporate Bonds (AA and above, mixed maturities) 43% Direct Inflation Linked Securities 5% Cash	1.7%	9	Medium	Low	Medium	Medium	High	Medium	Medium
<b>D</b>	49% Corporate Bonds (AA and above, 1 year maturity) 46% Direct Inflation Linked Securities 5% Cash	0.7%	4	High	Low	Low	Medium	High	High	High

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# Asset Allocation Recommendation

## Meeting the Asset Allocation Goal

- Staff recommends an asset-liability management approach, (i.e., cash flow matching as closely as possible).

## Staff's Recommendation – Strategy A

- Staff recommends an investment strategy with the following characteristics:
  - Explicitly matched forecasted benefit payments
  - Low implementation risk
  - Low staff monitoring requirement

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# Next Steps

The Investment Office will implement the TAP investment strategy upon approval by the Investment Committee.

The Investment Office and Actuarial Office will continue to collaborate to monitor the funded status of the Terminated Agency Pool and rebalance the recommended portfolio annually.

The standard policy requires a review of the asset allocation of the Terminated Agency Pool at least once every three years, or sooner if there is a material change of funded status.

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- Stress Testing Assumptions
- Simulated Funded Ratio
- Historical Inflation

## Stress Testing Assumptions

- To be consistent with actuarial methodology, nominal yield is used as the discount rate for liability calculations in stress testing. Nominal yield refers to the prevailing rate of interest offered on fixed income securities and currently is about 2% on a 10 year US Treasury Note.
- Historically, the nominal yield is usually about 2% above the inflation rate.

## Stress Testing Assumptions (continued)

- The expected investment return of TIPS is inflation rate plus a marginal rate. Currently, the marginal rates of majority TIPS are negative.
- Securities for cash flow matching are held-to-maturity (not marked-to-market); securities for inflation protection are marked-to-market.

Number of Years Projected	Sample Paths	Liability Discount Rate	Fund Admin Fee (bps)	Trading Cost (bps)	Expected Asset Return				Asset Return Volatility			
					Cash Flow Matching Securities	Corp. Bonds (1 year maturity)	Inflation Protection Securities	Cash	Cash Flow Matching Securities	Corp. Bonds (1 year maturity)	Inflation Protection Securities	Cash
30	100,000	Nominal Yield	20	20	Yield to Maturity	0.5%	Inflation - 0.5%	0%	0%	1%	6%	0%

# Simulated Funded Ratio - Assuming A Moderate Inflation Rate (6%)

- All strategies avoid underfunded status for 30 years in simulations; however, Strategy D is expected to have a lower funded ratio because of lower nominal yields.

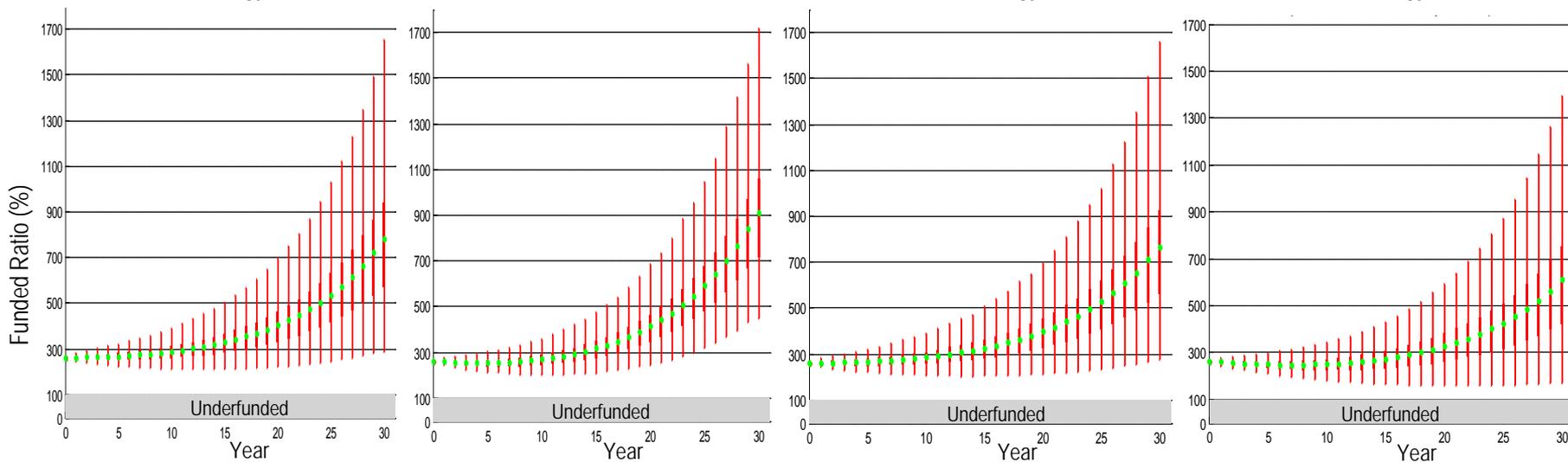
Funded Ratio Distributions (mean, 1<sup>st</sup>, 25<sup>th</sup>, 75<sup>th</sup>, 99<sup>th</sup> percentile)

Strategy A

Strategy B

Strategy C

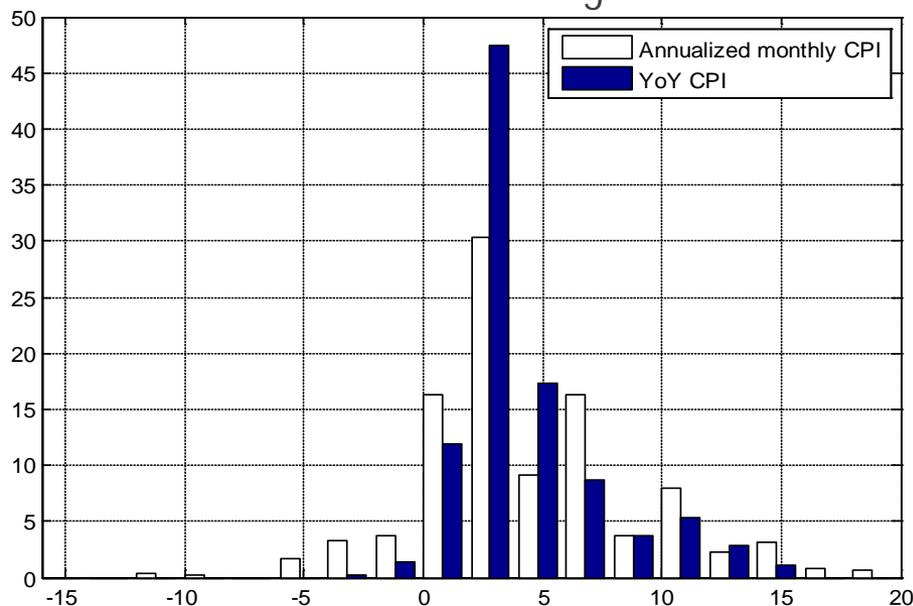
Strategy D



# Historical Inflation

- Year over Year CPI is more centered in the middle compared with annualized Month over Month CPI.

Histogram of Historical Inflation Rates



Inflation Rate	Probability (Annualized monthly CPI)	Probability (YoY CPI)
Above 10%	15%	9%
Between 2% and 10%	60%	76%
Below 2%	25%	15%

# Historical Interest Rate in Japan

- The benchmark interest rate in Japan has remained low (below 0.5%) for 17 years since 1995.

