Asset Liability Management Objectives and Review

Actuarial Office
Asset Allocation/Risk Management

November 12, 2013

Today's Objective

Conduct the Asset Liability Management (ALM) Workshop

- Evaluate potential policy portfolios that best balance the long-term investment objectives, risk tolerances, and liquidity constraints of the Public Employees' Retirement Fund (PERF)

Prepare for December Action Item – Policy Portfolio Selection

- Using feedback gathered from the Investment Committee (IC) at today's ALM Workshop, staff will conduct additional analyses and prepare a recommendation on the strategic asset allocation targets and ranges for adoption at the December 16, 2013 IC meeting

ALM Objectives Reflect Investment Beliefs

All investment decisions must be grounded in our Investment Beliefs

Investment Belief 1: Liabilities must influence the asset structure

- Ensuring the ability to pay promised benefits by maintaining an adequate funding status is the primary measure of success for CalPERS

Investment Belief 6: Strategic asset allocation is the dominant determinant of portfolio risk and return

- CalPERS will aim to diversify its overall portfolio across distinct risk factors / return drivers

ALM Objectives Reflect Investment Beliefs *continued*

All investment decisions must be grounded in our Investment Beliefs

Investment Belief 7: CalPERS will take risk only where we have a strong belief we will be rewarded for it

- An expectation of a return premium is required to take risk; CalPERS aims to maximize return for the risk taken

Investment Belief 9: Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error

- CalPERS shall develop a broad set of investment and actuarial risk measures and clear processes for managing risk

2013 ALM Approach

The pursuit of the direct liability-matching portfolio is prevented by:

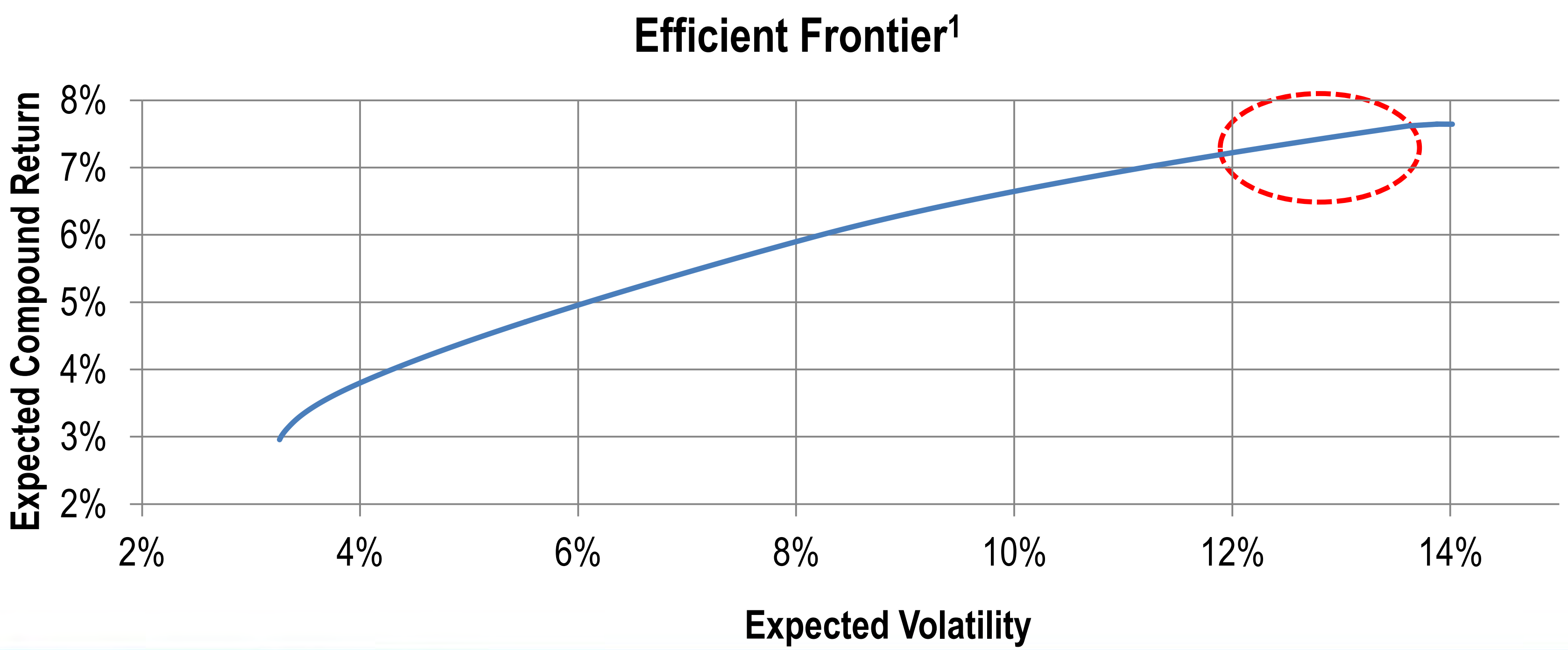
- Current funded status shortfall
- Current low interest rate environment

Diversified portfolio constructed through the Modern Portfolio Theory (MPT) process of Mean-Variance Optimization (MVO)

- We continue to apply the traditional MVO approach to construct portfolios at a fund appropriate risk level with the expressed understanding that there are limitations to this approach

Limitation of Traditional MVO Approach

Given the current market conditions and our funding requirements, we are limited in the available portfolio choices



[1]Based on 2013 Capital Market Assumptions

2013 ALM Cycle – Enhancements and New Concepts

Introducing new ideas and laying the foundation for future ALM workshops

- Integrated Asset Liability Decision-Making Framework
- Factor-Based Investing
- Liquidity and Cash Yield Considerations
- Low-Volatility Equity Strategy

Important Topics

Other important subjects to be explored in depth in the future:

- What are the roles of benchmarks?
- What is an effective risk governance structure that improves CalPERS ability to manage the multi-faceted risk?
- What is active management (alpha versus beta)?
- What is the right frequency to set Strategic Asset Allocation?

Summary

- Several enhancements and concepts have been developed to address the theoretical and practical shortcomings in traditional MVO

- Risk tolerance to the various risk considerations will determine the appropriate policy portfolio

- New tools will help in selecting an optimal portfolio that meets the principal needs of the PERF

Next Steps: December 2013 through 2014

2013

- Formal Action on Asset Allocation Policy Portfolio (December)
- Initial Recommendation on Actuarial Assumption Changes (December)

2014

- Adopt New Demographic and Economic Actuarial Assumptions (February)
- Further develop de-risking, if directed by the Board (spring/summer)

Appendix

- Traditional ALM Approaches
- Ongoing ALM Process Enhancements
- Asset Liability Decision-Making Framework
- Modified Distribution
- Factor-Based Analysis of Asset Returns
- Steps to Obtain a Policy Portfolio with Additional Enhancements

Traditional ALM Approaches

- Liability-Matching Portfolio
  - Proxy with 30% Nominal Government Bonds (Long Treasuries) and 70% Inflation-Linked Bonds
  - Expected returns are much lower than the current assumed rate; unrealistic contribution increases to meet funding goals
- MVO Diversified Portfolio
  - Equity centric portfolio with limited diversification among risky assets
  - Higher expected return can potentially improve funding prospects, but downside funding risk is significant

Ongoing ALM Process Enhancements

1. How do we manage our portfolio to meet the cash outflows?

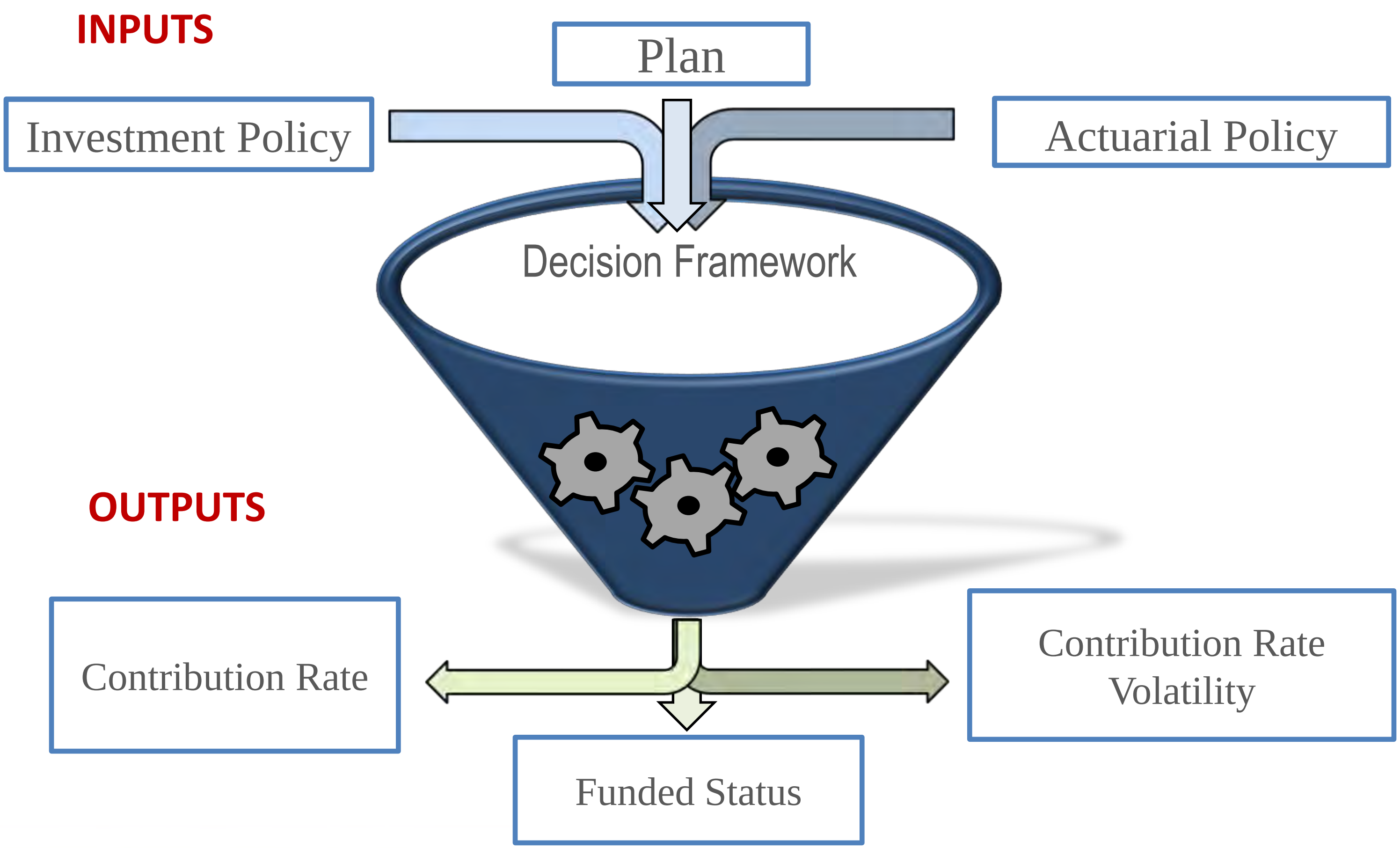
Enhancement		Action
Quantify illiquidity premium	→	Include liquidity consideration of private assets
Consider ongoing cash needs to pay benefits	→	Consider cash flow needs in the portfolio construction process
Evaluate investment in non-dollar assets	→	Examine currency hedge program's impact on cash flow volatility

Ongoing ALM Process Enhancements

2. How do we mitigate downside risks?

Enhancement	Action
Account for non-normality of investment returns	Apply modified distribution as returns have a longer left tail
Explore multi-dimensions of risk	Explicitly show how actuarial risk considerations affect our potential portfolios
Reduce growth risk	Continue developing Low Volatility capability and maintain sizeable allocation to Global Fixed Income
Address non-constant volatility and correlations	Look at portfolio by risk factors, which have more stable correlations than those of traditional asset classes

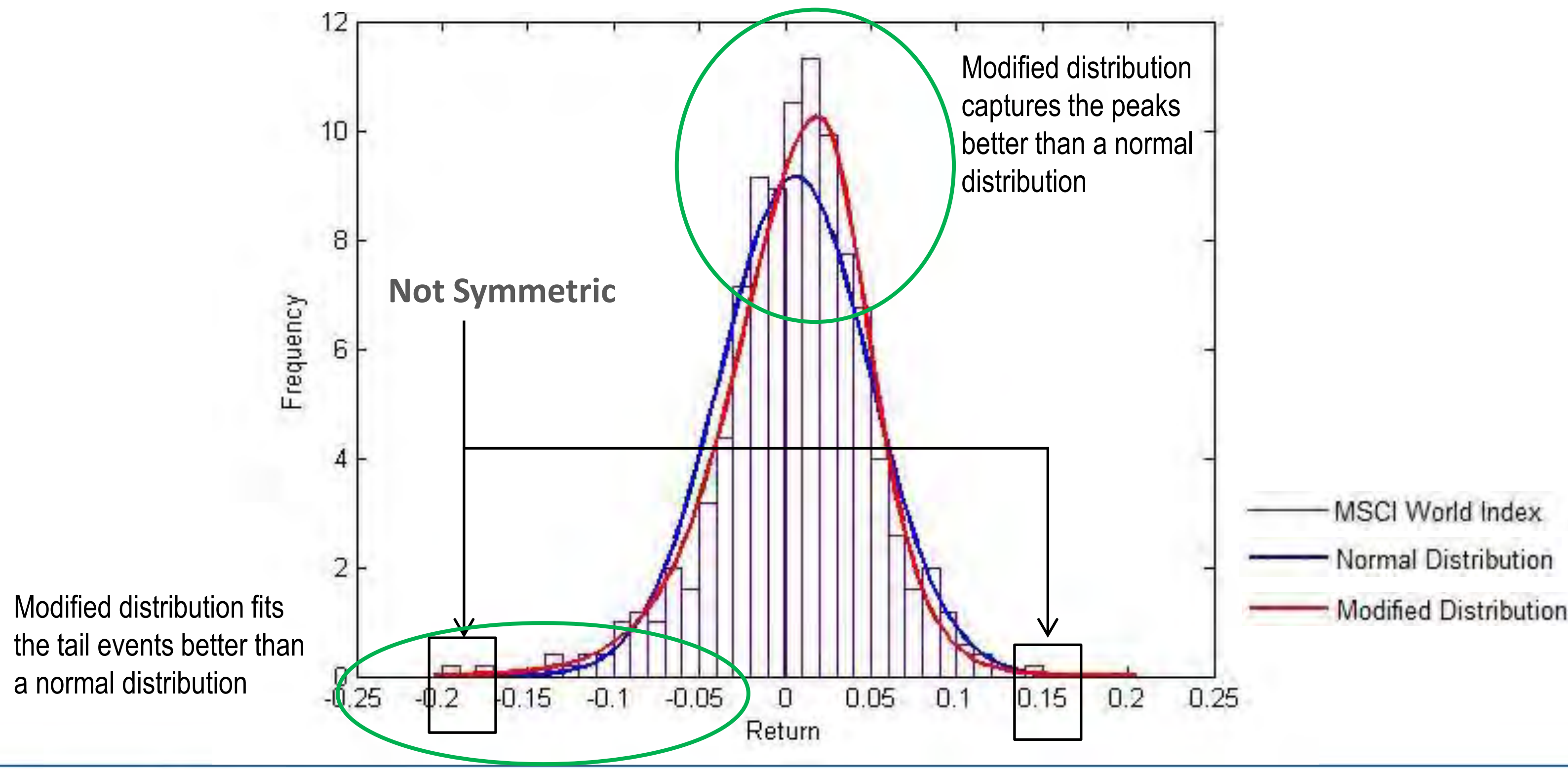
Asset Liability Decision-Making Framework



Modified Distribution

- Asset returns (e.g. MSCI World Equity Index) are fitted better with a non-normal distribution

Historical Return Distribution for MSCI World Index[1]



1. Data: MSCI World Index (monthly) since 1970.

Factor-Based Analysis of Asset Returns

- We identified the "nutrients" for our factor-based model as the following five factors:

Factor	Description
Real Interest Rate	Reflects the true growth of an investor's purchasing power
Realized Inflation Rate	Widely used in pension funds for cost of living adjustments (COLA)
Expected Inflation Rate	The component of expected return that affects purchasing power
Volatility	An indication of the level of risk in the equity market
Growth	Often viewed as the equity premium component of expected return

- These five factors can explain the majority (~84%) of our current Policy Portfolio returns

Steps to Obtain Policy Portfolio with Additional Enhancements

Modern Portfolio Theory (Steps 1–3)

	Assets	Liabilities
Step 1	Determine CMAs[1] and constraints	Forecast growth in liabilities
Step 2	Illustrate different efficient frontiers (by relaxing constraints)	
Step 3	Create distinct portfolio packages	
Step 4	Create simulated annual returns for each distinct portfolio package	Create simulated liabilities, contributions and payroll costs
Step 5	Illustrate risk factors and key risk considerations for each portfolio package	
Step 6	IC members vote to express risk preferences which will lead to the selection of the most appropriate portfolio package	
Step 7	IC chooses a portfolio based on discussions and staff recommendations	

1. Capital Market Assumptions