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AGENDA ITEM 5

TO: MEMBERS OF THE INVESTMENT COMMITTEE

I. SUBJECT: Asset Liability Management Update

II. PROGRAM: Asset Allocation / Risk Management

III. RECOMMENDATION: Information

IV. ANALYSIS:

Introduction

The purpose of this item is to provide the Investment Committee (Committee) with an update on the Asset Liability Management (ALM) process and the progress of preparations for the November 2010 tri-annual ALM Workshop. Staff will review three key areas: Capital Market Assumptions (CMA), Alternative Asset Classification and ALM Process and Methodology. Opinion letters from Board consultants (PCA and Wilshire) are included as Attachments 1 and 2.

1. Capital Market Assumptions

Staff presented the initial CMA to be used in the 2010 ALM review at the June 2010 Committee meeting. Since that presentation, the financial markets have witnessed a substantial decrease in fixed income yields as the outlook for medium term growth and inflation has moderated.

At the time initial CMA were presented on June 14, 2010, the yield to maturity on the Fixed Income long liability benchmark portfolio was 4.36%. This provided the primary input for the 4.5% assumed 10 year return assumption for Fixed Income. As of August 19, 2010, the yield to maturity

on the Fixed Income benchmark had fallen to 3.66%. Over the same interval, the yield to maturity on the 10 year Treasury note declined from 3.25% to 2.6%. As a result of these changes in the market, an adjustment in the expected 10 year return for Fixed Income is recommended at this time from 4.5% to 3.75%.

A summary of CMA presented to the Committee in June 2010 and the recommended adjustment is presented in Table 1 below.

Table 1
Updated 10 Year Annual Geometric Return Assumptions
Using Current CalPERS Policy Weights

	Current Target Allocation	6/14/2010 Consensus	Update Reflecting Change in FI Benchmark YTM
Fixed Income	***20%***	***4.50%***	***3.75%***
Public Equities	***49%***	***7.75%***	***7.75%***
Private Equity (AIM)	***14%***	***9.00%***	***9.00%***
Real Estate	***10%***	***7.00%***	***7.00%***
ILAC*	***5%***	***6.00%***	***6.00%***
Cash	***2%***	***3.25%***	***3.25%***
Inflation	**-**	***3.00%***	***3.00%***
Expected Nominal Geometric Return		**7.53%**	**7.37%**
Expected Real Geometric Return		**4.53%**	**4.37%**

Since the June 14, 2010 presentation of CMA previously referenced, measured inflation and market expectations for 10 year inflation have also decreased. At this time, no additional revisions are recommended to CMA given the high level of uncertainty surrounding the future path of growth and inflation.

In light of the lower expected return for Fixed Income, staff will be using a minimum constraint for the Fixed Income allocation in the optimization as pointed out by Wilshire.

2. Alternative Asset Classification

Staff presented an alternative asset classification at the March 2010 Committee meeting based on analysis of the fundamental characteristics and performance of the various asset classes in the CalPERS portfolio under different economic regimes. This classification (Attachment 3) grouped the assets into six categories:

- Government Bonds
- Income
- Growth
- Inflation
- Market Neutral
- Liquidity

This alternative classification was presented as an informational item to discuss the role of asset classes in the strategic asset allocation. Staff presented analysis which showed that:

a. The CalPERS portfolio had a high degree of single factor risk measured by exposure to economic growth regime (rising GDP growth) and, therefore was not adequately diversified across exposure to other economic regimes such as disinflation, rising inflation, and low growth.

b. CalPERS did not have a strategic allocation to Nominal Government Bonds (NGB) which have acted as the most effective hedge for market risks during times of crisis among the assets in the CalPERS portfolio. Additionally, NGB tend to perform better than most assets in slow growth regimes. The allocation to Government Bonds in CalPERS Fixed Income portfolio could vary widely with a minimum of 0%, which was reset to 10% in August 2010. During the market crisis of 2008-2009, CalPERS Fixed Income portfolio showed rising correlation with equities.

At the time, staff pointed out that certain asset types could be classified differently and the Board consultants also suggested as much. Hence, additional work was required before a final version could be proposed.

Subsequently, there have been further discussions at the staff Investment Strategy Group (ISG) resulting in the following proposed classification:

- Liquidity: Nominal Government Bonds including short term
- Growth: Public Equity / AIM
- Income: Fixed Income
- Real Assets: Real Estate, Infrastructure, Forestland
- Inflation: Inflation Linked Bonds, Commodities

This classification (Attachment 4) incorporates the following changes:

- Liquidity has been expanded to include NGB of varying maturities as well as short term Treasuries; hence, it is a combination of the Government Bond and Liquidity classes under the prior classification.
- Real Assets is proposed as a combination of Real Estate, Infrastructure and Forestland. These assets have some commonalities, such as ownership in illiquid real properties or assets with income orientation and partial inflation hedging properties over the longer term. However, it is noted that real estate is cyclical and tends to be linked to economic growth. For this reason, it was previously classified under Growth.
- Inflation consists of Inflation-Linked Bonds and Commodities, which are both tradable assets. Forestland and Infrastructure have been shifted from the Inflation-Linked asset class (ILAC) to Real Assets.
- Market Neutral will not be a separate category. It is proposed that the RMARS portfolio continue to exist as an active investment strategy with allocation primarily coming from Equities and Fixed Income based upon a risk framework to be developed. In this case, the Global Equity benchmark, which currently includes 5% RMARS, will have to be reviewed and possibly changed to an equity only benchmark.
- Growth will consist of Global Equities and AIM (Private Equity) with Real Estate being shifted to Real Assets and High Yield Bonds to Fixed Income. Any new allocations to AIM above the 14% limit will be funded from Global Equity.
- Income will consist of the current Fixed Income portfolio.

In this construction there will be some growth exposure from Real Assets and Income (High Yield) and there will be income related exposures in Real Assets. Liquidity and Income will include NGB. So, it is a less strict construction than the previous classification, however, it still preserves the main advantages of a) having a strategic allocation to NGB (Liquidity) as a hedge for market risks, deflation and liabilities (duration) and b) an Inflation hedge (ILB/Commodities). Staff believes this classification provides a framework to achieve better risk diversification.

Staff intends to provide optimized asset mixes for the current asset classes as well as the proposed alternative classification above at the November ALM Workshop.

At the March Committee Meeting, Wilshire recommended that Real Estate be split into Core and Non-Core, with Core being classified as Income and Non-Core as Growth and stated that the Committee "should have an opportunity to weigh in on the mix of Core and Non-Core Real Estate assets." Staff is currently reviewing this as part of the role of Real Estate and will be presenting recommendations to the Committee at a later date.

Wilshire recommends that the allocation to RMARS be considered by the Committee as part of the asset allocation process. The consensus at the staff ISG discussion was that RMARS is not a separate strategic asset class, but an active strategy. Hence, staff believes that allocation to RMARS could come from a mix of Equity and Fixed Income based upon the underlying strategies and risk exposures. This risk based approach is preferred by many sophisticated plans.

3. <u>ALM Process and Methodology</u>

Objective

The goal is to select a strategic asset allocation that improves the health of the plan over time as measured by the funded ratio with an acceptable level of risk. At the same time, it is not desirable to take undue risks that increase the probability of further declines in the funded ratio and excessive increases in contribution rates. This objective requires careful balancing of risk and return expectations. It is useful to look at the components of the funded ratio to understand the key drivers of the ALM process. The components of the funded ratio can be described in terms of this simplified plan balance sheet. Plan assets are measured at market value, while the plan liability is measured at actuarial value. Future funded ratios are calculated as forecast market value of assets divided by forecast actuarial value of the plan liability.

Plan Assets	Plan Liability
+ Market value existing assets + Forecast investment returns + Forecast contributions − Benefit payments	+ Current actuarial value of plan liability + Forecast growth in liability net of benefit payments
Forecast market value of assets	Forecast actuarial value of plan liability

The ALM process will provide relevant information and a transparent process for the Board to use in determining the appropriate expected risk and return for the fund. Since all estimates are uncertain, the process will identify areas of uncertainty and communicate a range of possible outcomes.

Uncertainty

In particular, forecasting investment returns at a ten year or any horizon is difficult. Even when applying basic principles we can expect different returns under different economic scenarios. Future contributions are also uncertain in value but can be forecast because they are the source of funds to provide for benefits not funded by investment returns. We focus on the employer portion of the contributions. The forecast value of the plan liability is also uncertain because of many estimates including annual benefits and wage inflation.

The range of uncertainty in future funded ratios is shown in Attachment 5 and is discussed in a later section.

Simulations

The uncertainty in the process is captured by creating 1,000 simulated annual return paths across time for each of the efficient portfolios created by the surplus optimization. A distribution of returns is created for each portfolio based on its expected return and standard deviation. The 1,000 simulated annual return paths for each portfolio are created by repeatedly sampling from the distribution; 1,000 times for each year into the future.

The entire ALM Process and Methodology is summarized in Attachment 6. Efficient portfolios are created based on the CMA for both the traditional asset classes and new building block structures using surplus optimization. The 1,000 return simulations are then created for each portfolio. EFI calculates an employer contribution value corresponding to each return simulation value. If returns are higher (lower) than expected, contributions will be correspondingly lower (higher). The range of outcomes captured by the simulations is calculated based on the proposed decision factor definitions in Attachment 7. These decision factors are calculated based on simulated values for the next ten years.

The decision factor outcomes are used to evaluate the risk and return tradeoff for each portfolio. Return focused outcomes are reflected as Improve Funding (DF1) and Minimize Employer Contributions (DF2). Risk managed outcomes are reflected as Avoid Low Funding (DF3) and Stabilize Employer Contributions (DF4). The variables x and y will be defined by staff for each decision factor to highlight the tradeoff between risk and return for all of the efficient portfolios. The Committee can use the decision factor outcomes to select a portfolio that balances risk and return. In other words, improve the funded ratio over time without taking on too much risk that the funded ratio may instead decline or that employer contribution rates may rise to unacceptable levels.

This information is provided to the Committee to enable a dialog to determine which of the efficient portfolios should be considered for the next strategic asset allocation. The Committee may consider portfolios developed from the traditional asset classes and/or from the alternative asset classes. Staff will take the Committee's input and recommend a new strategic asset allocation for the Committee's consideration at the December 2010 meeting.

VI. DECISION PROCESS:

The current context of diminished return expectations, lower funded ratio (around 64%) and budgetary constraints facing plan sponsors, limits the options available for portfolio choice to meet the long term objectives. A portfolio with much lower risk than the current portfolio means much higher contributions that may be unacceptable. A portfolio with much higher risk means a greater probability of having an unacceptable low funded ratio in the future (downside risk.)

Asset Allocation staff in consultation with the Actuarial staff has generated an illustrative chart (Attachment 5) showing the path of future funded ratio assuming investment return of 7.75% with standard deviation of 13.1%. The middle line shows the path of funded ratio at the expected rate of return (7.75%) and indicates an expected funded ratio of 69% at the end of 10 years. The range of funded ratios within a plus or minus (+/-) one standard deviation and +/- two standard deviations are also shown.

The probability of having 80% or higher funded ratio is less than 32%. The probability of having a funded ratio of 40% or lower is greater than 18%.

This range of outcomes for the funded ratio illustrates the impact of portfolio risk on funded ratio. The ALM process will determine in more detail the range of future funded ratios and associated employer contribution rates for each portfolio being considered. Then this information will be used in the decision factors for portfolio selection.

V. STRATEGIC PLAN:

This item addresses Strategic Plan Goals VIII, manage the risk and volatility of assets and liabilities to ensure sufficient funds are available, first, to pay benefits and second, to minimize and stabilize contributions; and IX, achieve long-term, sustainable, risk adjusted returns.

VII. RESULTS/COSTS:

This item is for information only.

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