Risk-Factor-Based Asset Allocation and Future Portfolio Considerations

Topic Overview – June 17, 2013

Topic Summary

This topic includes an in-depth discussion of risk-factor-based asset allocation and an introduction to some of the projected conditions that may impact the CalPERS portfolio in the future, including considerations on cash yield and liquidity.

Topic Background Information

There are common aspects of investment market conditions which affect portfolio performance. These can be called “risk buckets.” In the 2010 ALM Workshop, CalPERS adopted an alternative classification that qualitatively categorized the asset classes into the following risk buckets: Growth, Income, Real, Inflation, and Liquidity. A Policy Portfolio was then constructed by appropriately allocating to these risk buckets.

The rationale for this adoption was to qualitatively group asset classes according to the fundamental drivers of their risks and returns. However, this qualitative classification may lead to a breakdown of the diversification benefits under times of market stress, since each risk bucket is exposed to the same set of risk and return drivers, as outlined in the following section. The 2010 ALM Workshop reclassification only represented the first step towards a risk-factor-based approach.

This year, as part of the 2013 ALM Process, CalPERS will continue its progression towards a risk-factor-based allocation framework through a number of quantitative enhancements as outlined in Attachment 2.

In addition to the risk-factor-based asset allocation, considerations on the Total Fund cash yield and liquidity needs are critical elements in constructing the Policy Portfolio for the System to sustainably meet its on-going liabilities.

Analysis

<u>Factor-Based Analysis of Asset Returns:</u>

For the 2013 ALM Workshop, one of the major enhancements to the CalPERS asset allocation process includes a framework that decomposes asset returns into various risk factors. This “decomposition” uses historical data to attribute the asset returns to different risk factors. These risk factors are the underlying drivers of risks and returns across all asset classes. To have a sensible explanation on the asset classes returns, the appropriate factors need to have economic intuition and possess significant explanatory power on asset class returns. The proposed risk factors are:

- Real Interest Rate
- Realized Inflation Rate
- Expected Inflation Rate
- Volatility
- Growth

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Analysis *Continued*

Using this set of risk factors, the Total Fund Policy Benchmark returns were decomposed to show that approximately 74% of the Benchmark's total risk came from two factors: Growth and Volatility, which historically have been the two most uncertain factors.

This decomposition approach will also be applied to the potential candidate portfolios for the Board during the 2013 ALM Workshop later in the year, to reveal the risk contributions of factors to each potential candidate portfolio. This enhanced approach will provide a more transparent risk and return profile of each candidate portfolio, so the selection of the Policy Portfolio can be more risk factor conscious.

Cash Yield and Liquidity Considerations

The funding gap between total deductions and contributions is projected to increase steadily in the future. Without an increase in contributions or a decrease in deductions, the funding gap can only be addressed by cash income generated from the Fund or by liquidating positions. By considering a cash yield requirement in the Total Fund asset allocation process, a higher allocation to asset classes with higher cash yield is required to satisfy the funding gap. These disproportionately higher allocations to cash yielding assets lower the expected returns for the Total Fund in the current low interest rate environment and produce allocations that may not be appropriate for the Fund.

From the approach of liquidating positions, currently 73% of the Policy Portfolio is allocated to highly liquid asset classes and can be readily liquidated to meet the funding gap. However, a comprehensive plan to liquidate illiquid assets is needed to maintain our strategic policy weights during the liquidation process. Finally, liquidity and collateral are not consistently managed and allocated across the organization. A comprehensive strategy should include a consistent policy for the management and accounting of cash within the Total Fund.

Benefits & Risks

Factor-Based Analysis of Asset Returns:

The risk-factor-based analysis of asset returns provides a quantitative framework to understand the risk and return drivers of the different asset classes.

Benefits of applying a risk-factor-based asset allocation framework are:

- A more effective approach to building a well-diversified portfolio. This is because risk factors are identified as the "cause" and asset returns are considered the "effect."
- A more transparent risk profile to better quantify the benefits of diversification.
- A more consistent evaluation framework across all CalPERS asset classes.

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Benefits & Risks *Continued*

Potential risks of applying a risk-factor-based framework are:

- The selected risk factors may have low explanatory power on certain asset returns, so more factors may be needed to obtain a better understanding on those asset classes.
- Adding too many factors to the proposed model may result in an issue of over-fitting. Over-fitting is where factors would be improperly attributed to the unexplainable elements in the asset return. This will ultimately result in an incorrect model.

<u>Cash Yield and Liquidity Considerations</u>

Considering projected cash and liquidity needs in the Total Fund asset allocation process would lead to the following benefits:

- More stable investment income from the Total Fund.
- Appropriate liquidity to satisfy the potential funding gap even during periods of market stress.
- Increasing the consistency of cash operations and policies across all asset classes within the Fund.
- Development of a tracking system of cash income for all asset classes at the Total Fund level.

Additional Information

Additional information on this topic can be found in the following attachments provided as part of this agenda item:

- Attachment 2 – 2013 ALM Process Overview
- Attachment 3 – Factor-Based Analysis of Asset Returns
- Attachment 4 – Cash Yield and Liquidity Considerations