CALSTRS

Investment Committee
Item Number 3 – Open Session

Subject: 2023 ALM Study – Capital Market Assumptions

Presenter(s): Geraldine Jimenez, Josh Diedesch

Item Type: Action

Date & Time: January 26, 2023 – 60 minutes

Attachment(s): Attachment 1 – ALM Study Asset Class Capital Markets Assumptions

Attachment 2 – ALM Study Assumptions Process

Attachment 3 – Meketa Opinion Memo

PowerPoint(s): 2023 ALM Study – Capital Market Assumptions

Item Purpose

The purpose of this item is to introduce the second step in the Investment Committee 2022-23 Asset Liability Management Study (ALM). The ALM is governed by the CalSTRS Investment Policy and Management Plan (IPMP), Teachers' Retirement Board Policy Manual, Section 1000, page A-1.

Recommendation

Staff recommends the Investment Committee approve the capital markets assumptions for the 2023 ALM Study. The assumptions recommended for approval comprise three components:

1. The expected return and expected volatility for each asset class (Table 1 below and in Attachment 1).
2. The expected correlation between each asset class (Table 3 in Attachment 1).
3. The expected inflation for investment asset modeling and the actuarial liability modeling (Table 1 below and in Attachment 1).

Table 1: Expected Return and Volatility

Asset Classes	Expected Return (Geometric)	Expected Volatility
Global Equity	8.0%	16.2%
Private Equity	9.5%	21.1%
Real Estate	6.8%	11.6%
Inflation Sensitive	6.4%	10.5%
Fixed Income[1]	5.2%	6.2%
Risk Mitigating Strategies (RMS)	5.0%	7.4%
Cash	2.8%	0.5%
Expected Inflation	2.75%	N/A

Executive Summary

This item is the second step in the 2023 Asset Liability Management (ALM) study. During the November 3, 2022 Investment Committee meeting, staff presented an overview and timeline for the ALM study. The November item discussed how this study and the resulting portfolio are expected to fund 60 percent of pension benefits and presents the greatest variable to funding retirement benefits. For this reason, the ALM study considers the role of assets in the portfolio and how different portfolios maximize the tradeoff between return and risk.

At this meeting, Staff recommends that the Investment Committee approve these capital markets assumptions for the ALM modeling.

Once approved, these assumptions form foundational building blocks for all portfolio and liability modeling in the ALM study. Attachment 1 has the proposed assumptions for approval while Attachment 3 has the consultant opinion letter. At the January meeting, Staff and consultants are available to discuss the methodology and answer questions about the assumptions.

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[1] Includes allocation to Private Direct Lending

Background

The capital markets assumptions are a key building block for constructing the long-term strategic asset allocation. These assumptions define expected return and risk across different investment opportunities, enabling the Investment Committee's decision about how best to meet the long-term obligations of the fund. They are the key inputs in subsequent portfolio modeling steps, with a time horizon of 20-30 years that aligns with the long investment and liability horizon of the fund.

Forming capital markets assumptions is as much art as it is science and is a process subject to significant uncertainty. The process of building assumptions involves considerable economic modeling and collaboration between Staff and consultants. While the assumptions involve a complex interaction of modeling, uncertainty, and collaboration, there are some important guiding principles that help ensure reasonableness:

1. Risk and return are inextricably linked: to achieve higher levels of return requires acceptance of higher risk.

2. Forward-looking returns are affected by current prices. When asset prices are higher, forward-looking returns tend to be lower (and vice versa).

3. Assets with similar drivers of risk, like public equity and private equity, tend to move together.

4. Assets that provide diversification to riskier assets tend to have lower returns.

Capital Markets Assumptions Definitions

The three quantitative metrics that define the capital markets assumptions are:

Assumption	Definition
Expected Return ("Reward")	The long-term average annual return expected from an asset.
Expected Volatility ("Risk")	The long-term annual variation in returns expected for an asset.
Expected Correlation ("Diversification")	The degree of co-movement between assets. When one asset goes up, does another asset also go up (or down)? The scale for correlation is -1 to 1: the more negative (closer to -1), the more the assets move in opposite directions or diversify one another; the more positive (closer to 1), the more the assets tend to move together.

Strategic Risk Factors Assumptions

In the first step of the ALM in November 2022, Staff introduced the notion of common economic drivers of risk and return, or strategic risk factors, that influence asset returns. By combining assets based on common economic drivers, or strategic risk factors – Economic Growth, Real Assets, Diversifying, and Credit – it's possible to get a clearer picture of risk in the portfolio. Viewing expected return, risk, and correlation through this strategic risk factor framework also reveals some important themes across the capital markets assumptions:

➢ Consistent with the ALM discussion in November, Economic Growth is expected to provide the highest level of return (and risk)

➢ Real Assets have moderately high expected risk and return, with some exposure to Economic Growth

➢ Credit offers a moderate, relatively stable source of return

CalSTRS has managed credit for many years in public Fixed Income, Private Equity, and Real Estate. Due to its distinctive characteristics, Credit as a strategic risk factor is new for the 2023 ALM cycle and combines both public and private credit asset classes in addition to adding Direct Lending to Fixed Income. Management of credit assets crosses more teams than any other strategic risk factors. Table 2 below highlights the different credit components and associated management teams.

Table 2. Credit Strategic Risk Factor Components and Management

Asset Class	Sub-Asset Class	Management Team
Public Credit	Investment-Grade Corporate	Fixed Income
	High Yield	
	Commercial MBS	
Private Credit	Direct Lending (new)	
	Distressed & Special Situations	Private Equity
	Real Assets Credit	Inflation Sensitive
	Real Estate Credit	Real Estate

Private Credit is a broad-based asset class that consists of several sub-asset classes A brief description of these sub-asset classes where CalSTRS is currently active is provided below.

➢ **Direct Lending** - Most commonly refers to first lien loans made to middle-market companies by non-bank creditors

➢ **Distressed & Special Situations** - Provides credit facilities to borrowers with good cash generation capacity but short-term liquidity issues

➢ **Real Assets Credit** - Senior loans & financing instruments backed by physical assets

➢ **Real Estate Credit** - Senior loans & financing instruments backed by real estate

NOTE: For more detailed discussion and Board education on Private Credit, Staff is scheduling a Zoom educational session on February 8, 2023, with industry experts to provide information and offer the Board an opportunity to ask questions.

For a high-level summary, Table 3 below highlights expected return and risk, aggregated by strategic risk factors.

Table 3. Strategic Risk Factors Expected Return and Risk

| Strategic Risk Factors	Expected Geometric Return	Expected Volatility (Risk)	Composition
Economic Growth	8.5%	16.5%	Public Equity & Private Equity
Real Assets	6.9%	9.8%	Real Estate & Inflation Sensitive
Credit	6.4%	8.7%	Public & Private Credit
Diversifying	5.0%	5.4%	Fixed Income Rates, RMS & Cash
Inflation Assumption	2.75%		

Table 4 below highlights that, although Diversifying assets are expected to provide the lowest levels of risk and return, they also diversify Economic Growth and Real Assets as evidenced by the low correlations between 0.1 to 0.3.

Table 4. Strategic Risk Factor Correlations

	Economic Growth	Real Assets	Credit	Diversifying
Economic Growth	1	0.4	0.5	0.1
Real Assets		1	0.4	0.1
Credit			1	0.3
Diversifying				1

Figure 1 below illustrates the relationship between risk and return, highlighting the important theme that earning higher levels of return requires accepting higher levels of risk. It also shows that Economic Growth is expected to be the source of the highest levels of risk and return.

Figure 1. Strategic Risk Factor Risk and Return
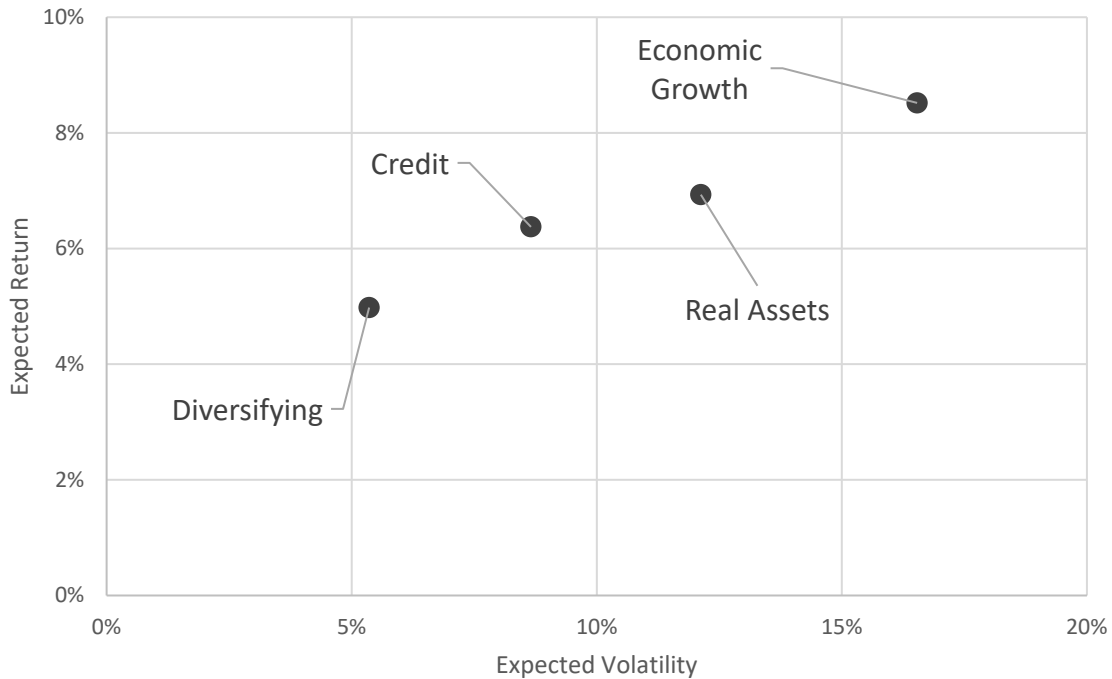
Key Assumptions

For each of the strategic risk factors, there are key components driving the assumptions as shown in Table 5. Attachment 2 (Capital Market Assumption Modeling Process) further details the approach to the major assumptions for each Strategic Risk Factor.

Table 5. Key Strategic Risk Factor Assumptions

Strategic Risk Factor	Key Assumption	Major Driver of Assumption
Economic Growth	Global Equity return	Equity Risk Premium – the excess return over cash for accepting company ownership risk
Real Assets	Real Estate return	Expected income from Real Estate & other assets
Credit	Credit Spread	The excess yield, or income return, over government bonds for accepting credit risk
Diversifying	Fixed Income return	The yield, or income return, from government bonds

The Opportunities portfolio was mentioned in the November 2022 ALM discussion but has been omitted in this document. The Opportunities portfolio has a 0% strategic target and therefore, no associated capital market assumptions. Assumptions for the Private Credit sub-classes are, however, being modeled within the portfolio's asset classes as highlighted in Table 2. Credit Strategic Risk Factor Components and Management.

Market Variation from Expectations

Uncertainty and volatility are inherent in the estimation of future expected returns. The relationship between market returns and the metrics used for forecasting is imperfect. Estimates of some of the important metrics are themselves subject to uncertainty – things like growth in future earnings, changes in interest rates, and the future path of inflation are all fraught with uncertainty.

The natural volatility present in markets can itself lead to results that differ from expectations for long periods of time. For example, the long-term expected return recommended for Global Equity is 8.0%, with an expected volatility of 16.2%. The expected volatility of returns in Global Equity means that in a single year, there's a 25% chance that equities return about negative 2% or worse. Over a 20-year horizon, there's a 25% chance that Global Equity could experience a

return of 5.7% or less, highlighting the risk of long periods of returns that differ meaningfully from expectations.

It's important to note that this could result from nothing more than typical market volatility over time and is consistent with historical experience. Figure 2 below shows the rolling 20-year performance for the S&P 500 from 1871 through 2022. There are periods during which 20-year returns fell below 5% and other periods where 20-year returns exceeded 10%.

Figure 2. Historical 20-Year S&P 500 Performance
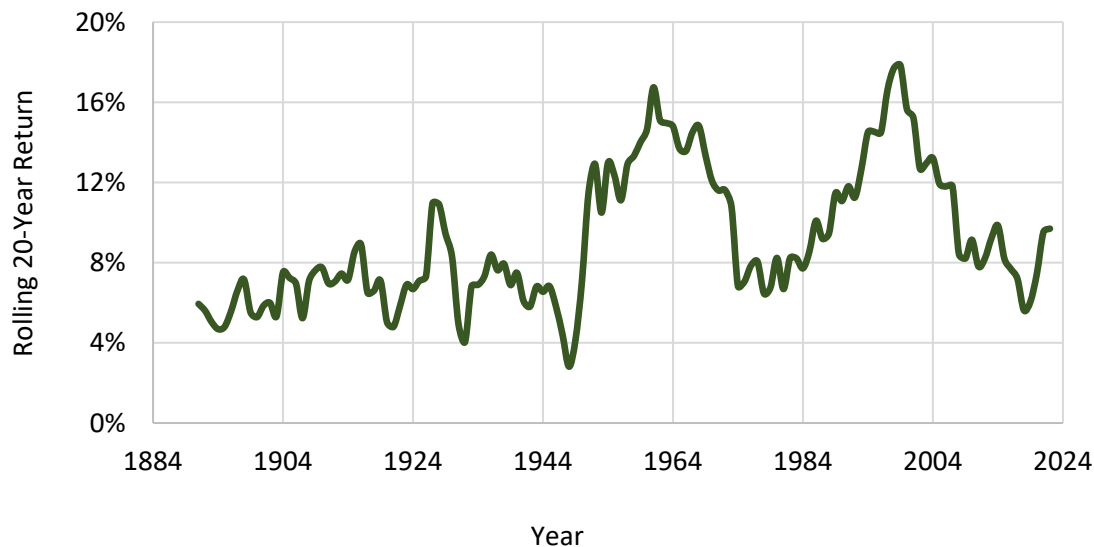
CalSTRS Programs - Cash Balance Benefit Program

The Teachers' Retirement Fund, which is the primary trust fund through which CalSTRS operates, is comprised of the Defined Benefit Program, the Supplemental Benefit Maintenance Account, the Defined Benefit Supplement Program and the Cash Balance Benefit Program. All programs are invested together, except the Cash Balance Benefit Program has not been invested in the private equity and real estate asset classes since the 1990s when the program was initially created. The CalSTRS Board made that decision over concerns related to cash flows and a desire to avoid investing in less liquid assets. At this time, Staff from Investments, Financial Services and Actuarial Resources believe it is prudent to review the Cash Balance Benefit Program asset mix as part of this year's ALM study and consider adopting the same asset mix for all programs, including private equity and real estate asset classes for the Cash Balance Benefit Program.

For the 2023 ALM Study, all CalSTRS programs including the Cash Balance Benefit Program will be modeled and included in the recommendations.

Project Plan & Timing

In order to help the Investment Committee reach its ultimate objective of adopting a long-term asset allocation, the ALM Study spans six Investment Committee meetings with Staff and Consultants providing research, analysis, and recommendations along the way. The six meetings are organized around the important steps needed to adopt the strategic asset allocation.

Pre-ALM Board Discussion (October 2022): Geopolitical Risk Scenarios - DONE

The presentation by Eurasia Group highlighted geopolitical scenarios from both an Enterprise (total CalSTRS organization) and Investments (Investments Branch specific) perspective and areas of overlap. Eurasia presented the following three geopolitical scenarios for discussion:

1. Long-term geopolitical scenario for a China-Taiwan war

2. Long-term likelihood of a world depression or prolonged stagflation

3. Energy transition long-term outlook

The scenarios presented will be considered when modeling portfolio risk in the 2023 ALM Study. See Step 4 below.

Step 1 (November 2022): Overview & Education - DONE

The first meeting in the ALM Study is devoted to a high-level overview of the project; education on the asset allocation process and the importance of the asset allocation decision; and a historical perspective on asset allocation at CalSTRS.

The educational component of this meeting will focus on two areas:

1. Discussion of Private Credit with Cambridge Associates and Staff covering what it is, the history of Private Credit at CalSTRS, its role in the portfolio, and the potential risk/return benefits of Private Credit in the strategic asset allocation.

2. Discussion of the Opportunities portfolio and its role at CalSTRS.

Step 2 (January): Capital Market Assumptions & Introduction to Key Decision Factors

The second meeting is dedicated to important assumptions of the ALM Study with the Capital Market Assumptions (CMA). Portfolio modeling used to evaluate different portfolio options relies on a series of important assumptions about expected returns for the strategic classes, risk, and the interrelationships between strategic classes. Staff and Consultants will provide information and recommendations on reasonable assumptions for portfolio modeling.

Special Educational Session on Private Credit (February): A Zoom educational session with industry experts to provide more information and offer the Board an opportunity to ask questions about private credit.

Step 3 (March): Preliminary Portfolio Modeling

The third meeting will provide the Investment Committee with its first look at a range of preliminary portfolios. These preliminary portfolios will span a wide range of risk and return. Starting with a wider range of portfolios facilitates a robust discussion of the trade-offs with risk, return, contribution rates, and funding. Staff and Consultants will seek guidance from the Committee to return in May with portfolios that meet the desired level of risk.

Step 4 (May): Candidate Portfolio & Risk Modeling

Using guidance from the March meeting, Staff and Consultants will provide analyses of a small number of candidate portfolios meeting the objectives of the Committee Staff and Consultants will provide additional analyses and modeling based on the Geopolitical Risks discussed at the October 2022 meeting to further support the Committee's ultimate objective of selecting a long-term asset allocation.

Step 5 (July): Adoption of Long-Term Asset Allocation

The goal for the fifth meeting of the ALM Study is for the Investment Committee to adopt a new long-term asset allocation. Staff and Consultants will provide any further desired analyses of candidate portfolios to support the Committee's decision.

Step 6 (September): Formal Adoption of Long-Term Asset Allocation

The sixth and final meeting of the ALM Study is for the Investment Committee to approve the updated Investment Policy Statement with strategic class percentages and discuss the new asset allocation implementation plan.

The next actuarial experience study will incorporate the new asset allocation targets adopted in this ALM study and will affect the adoption of new actuarial assumptions by the full Board in January 2024.

Strategic Plan Linkage: Goal 1 of the CalSTRS Strategic Plan. Trusted stewards – Ensuring a well-governed, financially sound trust fund.

Board Policy Linkage: CalSTRS Investment Policy and Management Plan

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Optional Reference Material: *(prior board items, supplemental educational materials, etc.)*

November 3, 2022 Investment Committee – ALM Study Step 1

October 5, 2022 Board Offsite – Investment Speaker - Geopolitical Risk Scenarios - Eurasia Group