

Global Fixed Income Annual Review - Supplemental Report

Period Ending June 30, 2017

Investment Objective

The role of Global Fixed Income is to serve as an economic diversifier to equity risk and be a reliable source of income.

- CalPERS ALM Workshop (2013)

The Fixed Income team actively manages CalPERS assets in various fixed income instruments, including commercial real estate mortgages, corporates, residential mortgages, sovereigns, non-dollar bonds, treasuries, agencies and others

Global Fixed Income serves as an economic diversifier to equity risk and a reliable source of income.

Asset Class Characteristics

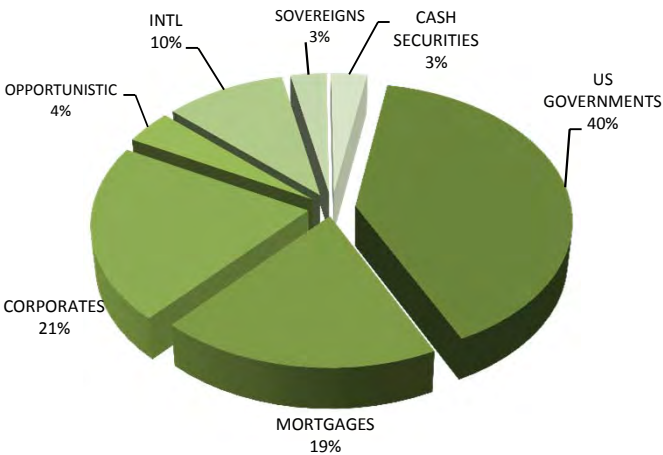
Managing Investment Director: Curtis D. Ishii

Assets: \$62.9 Billion

Benchmark: 90% Barclays Long Liabilities + 10% Barclays International Fixed Income Index GDP Weighted ex-U.S.

- The Investment Office staff manages about 93% internally, with a portion of the high yield and international fixed income allocation being managed externally.
- CalPERS long-term investment horizon allows staff to generate alpha by shifting sector risks during an economic cycle.

Asset Allocation



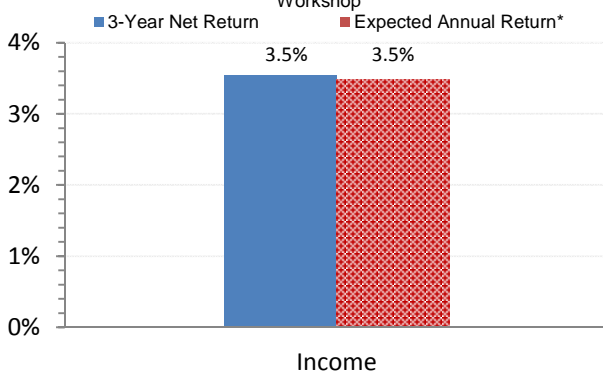
Class Allocation

Class Allocation	Income
Interim Strategic Target Range %	15-25%
Interim Strategic Target %	20%
Actual Investment %	19.4%
Variance % (Strategic vs. Actual)	(0.6%)
Interim Strategic Target \$	\$ 64.7 Billion
Actual Investment \$	\$ 62.9 Billion
Variance \$ (Interim Strategic vs. Actual)	\$(1.9 Billion)

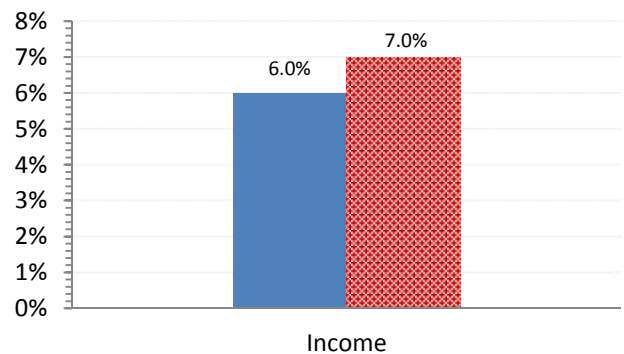
Note: Interim Strategic Target effective October 1, 2016

Asset Liability Management Expectations

*Capital markets assumptions used in the November 2013 ALM Workshop

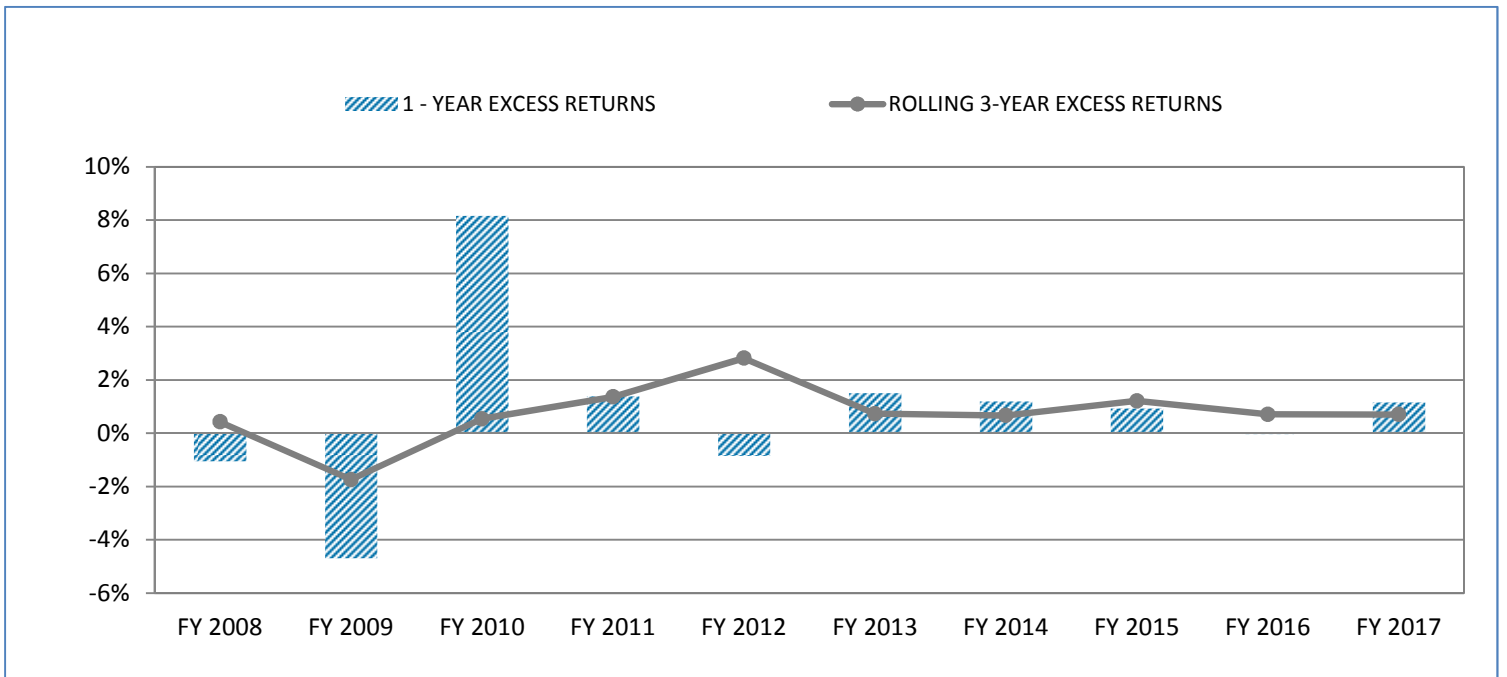
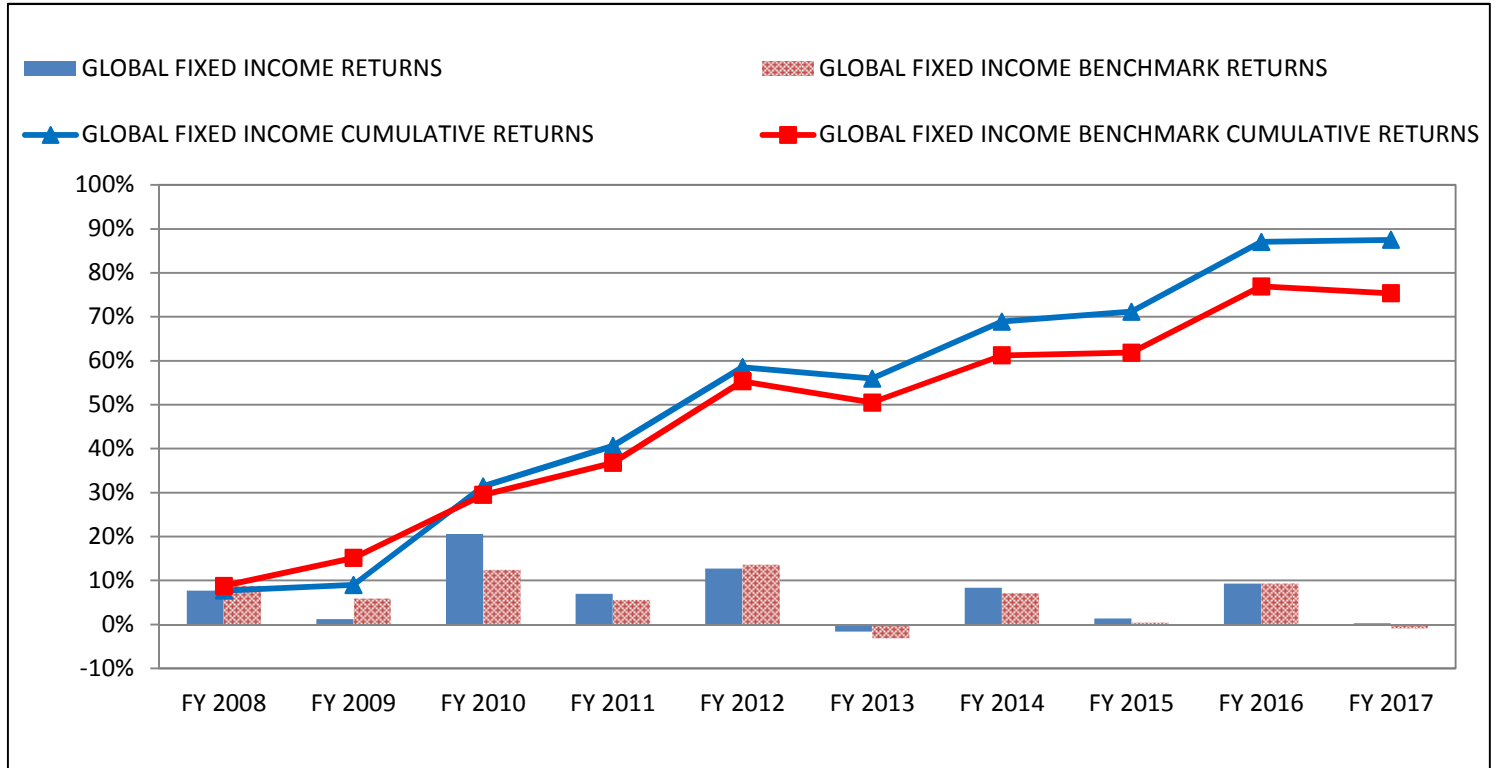


■ 1-Year Projected Standard Deviation ■ Expected Standard Deviation*



GLOBAL FIXED INCOME PERFORMANCE

MONTH ENDING JUNE 30, 2017		FYTD		3-YR		5-YR		10-YR	
Asset Class	Ending Market Value	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS
GLOBAL FIXED INCOME	\$ 62.9 Billion	0.3%	115	3.5%	70	3.4%	96	6.5%	71
DOMESTIC FIXED INCOME	\$ 56.4 Billion	0.3%	119	4.3%	73	3.9%	102	6.8%	70
INTERNATIONAL FIXED INCOME	\$ 6.5 Billion	0.1%	118	(2.6%)	76	(0.9%)	65	3.8%	103



Inflation Annual Review - Supplemental Report

Period Ending June 30, 2017

Investment Objective

The role of Inflation Assets is to provide liquid and strong protection against inflation.

- CalPERS ALM Workshop (2013)

The role of Inflation-Linked Bonds is to provide a direct hedge against inflation using liquid securities and to be a partial liability hedge with some income yield. Inflation-linked bonds are internally managed and represent approximately 75% of the program.

Commodities is also internally managed and represents approximately 25% of the program. Commodities is managed through an unlevered exposure to a diversified group of commodity futures or their investment equivalents.

Asset Class Characteristics

Managing Investment Director: Curtis D. Ishii

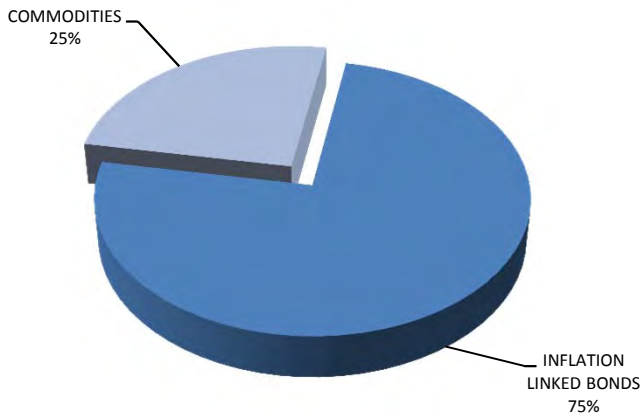
Assets: \$25.3 Billion

Benchmark: 75% Global ILB Custom Index + 25% Standard & Poor's GSCI Total Return Index

*Global ILB Custom Index : Blend of 67% Barclays Global Inflation-Linked U.S. and 33% Barclays Universal Government Inflation Linked Bond Index ex-US

- The Inflation Program was initiated in 2007 and is comprised of 2 main components
 - Inflation-Linked Bonds
 - Commodities
- Inflation assets provide strong liquid inflation protection
 - Liquidity
 - Moderate growth risks
 - Low Cash yield

Asset Allocation



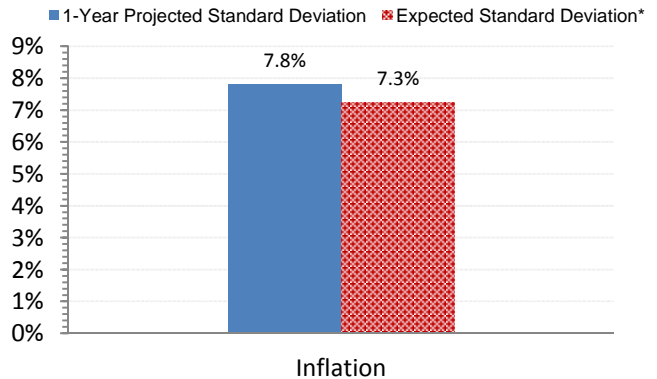
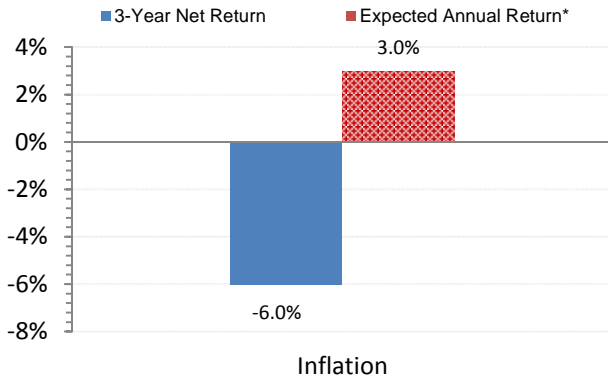
Class Allocation

Class Allocation	Inflation
Interim Strategic Target Range %	6-12%
Interim Strategic Target %	9%
Actual Investment %	7.8%
Variance % (Strategic vs. Actual)	(1.2%)
Interim Strategic Target \$	\$ 29.1 Billion
Actual Investment \$	\$ 25.3 Billion
Variance \$ (Interim Strategic vs. Actual)	\$(3.8 Billion)

Note: Interim Strategic Target effective October 1, 2016

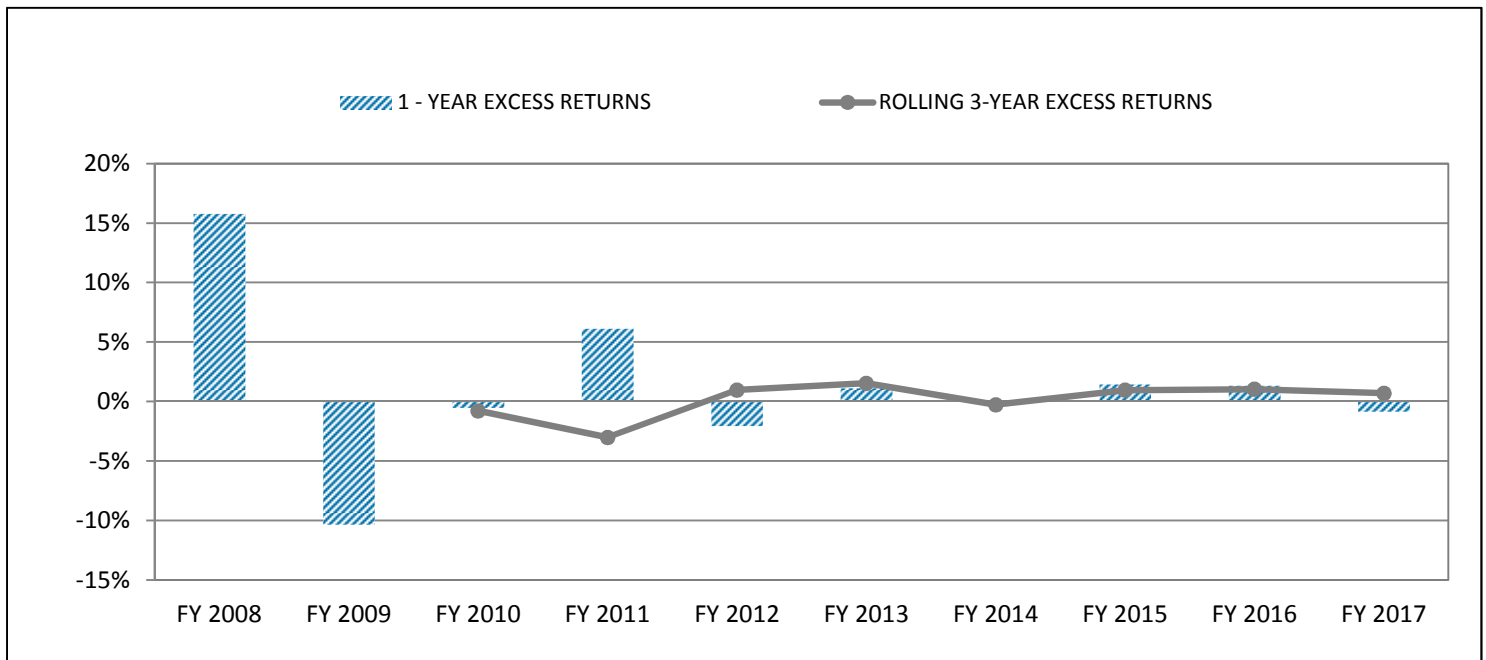
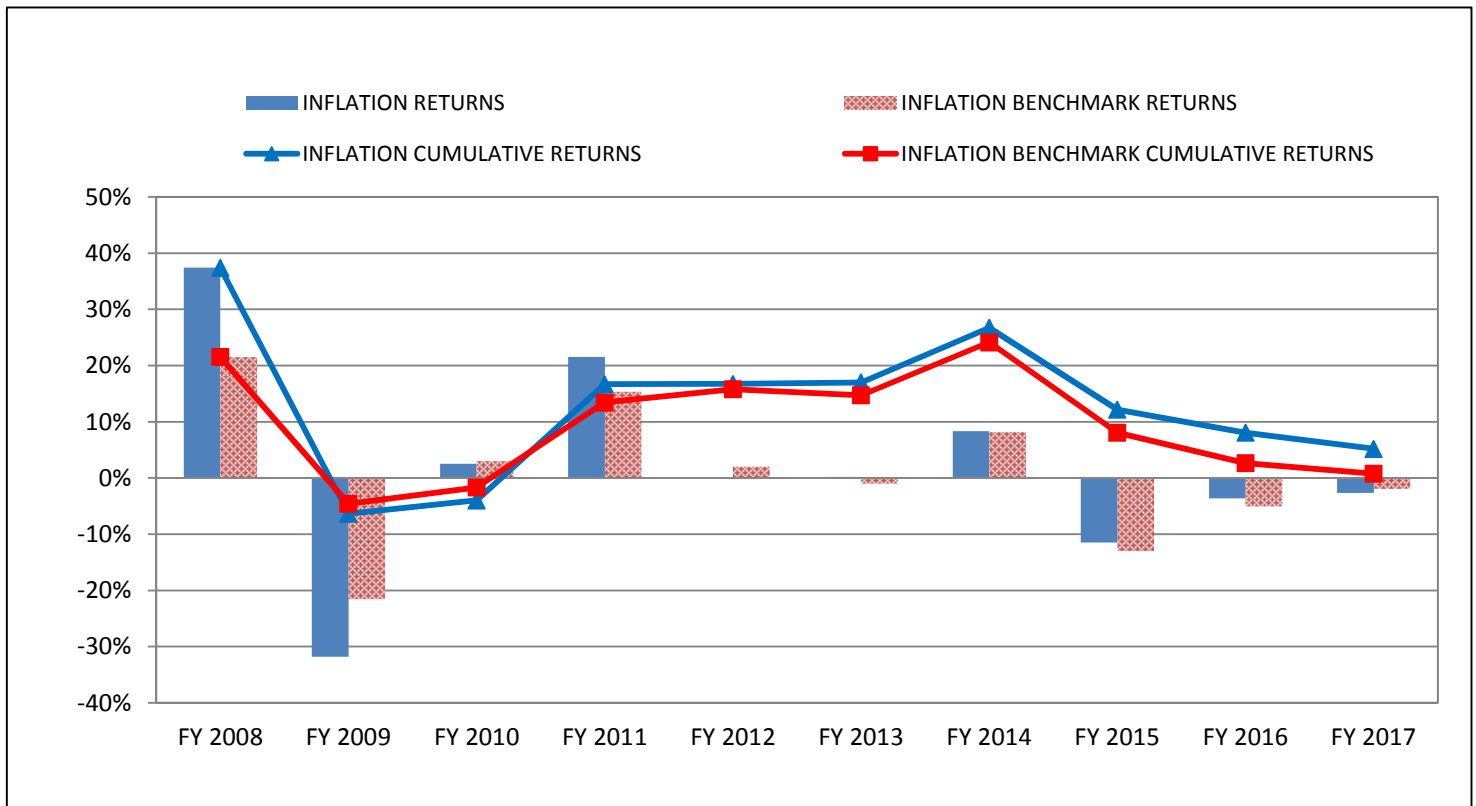
Asset Liability Management Expectations

*Capital markets assumptions used in the 2013 ALM Workshop



INFLATION PERFORMANCE

MONTH ENDING JUNE 30, 2017		FYTD		3-YR		5-YR		10-YR	
Asset Class	Ending Market Value	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS
INFLATION	\$ 25.3 Billion	(2.7%)	(83)	(6.0%)	70	(2.1%)	68	N/A	N/A
CORE INFLATION LINKED BONDS	\$ 17.0 Billion	0.5%	(2)	(0.2%)	27	1.1%	30	N/A	N/A
INTERNAL COMMODITIES	\$ 4.5 Billion	(9.2%)	(17)	(24.7%)	10	(13.9%)	(23)	N/A	N/A
TACTICAL COMMODITIES	\$ 1.9 Billion	(18.6%)	(959)	(25.6%)	(80)	N/A	N/A	N/A	N/A
TACTICAL TIPS	\$ 1.9 Billion	(0.8%)	(16)	0.5%	(14)	N/A	N/A	N/A	N/A



Liquidity Annual Review - Supplemental Report

Period Ending June 30, 2017

Investment Objective

The role of Liquidity is to exhibit safety and capital preservation properties as well as to provide effective risk protection during a financial crisis.

- CalPERS ALM Workshop (2013)

The liquidity program is composed of a single short-term portfolio which is internally managed. The liquidity program seeks to provide liquid assets that could be converted to cash with little market impact.

Asset Class Characteristics

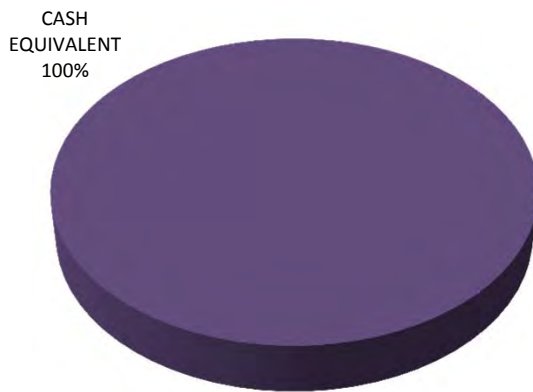
Managing Investment Director: Curtis D. Ishii

Assets: \$15.5 Billion

Benchmark: 91-Day Treasury Bill

- The Liquidity Program was initiated in 2011 and is comprised of 1 short-term portfolio.

Asset Allocation

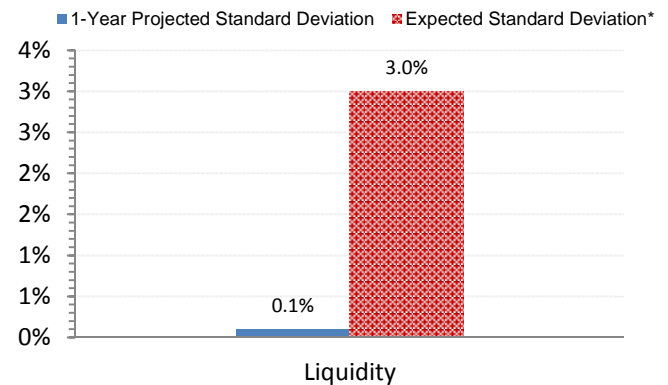
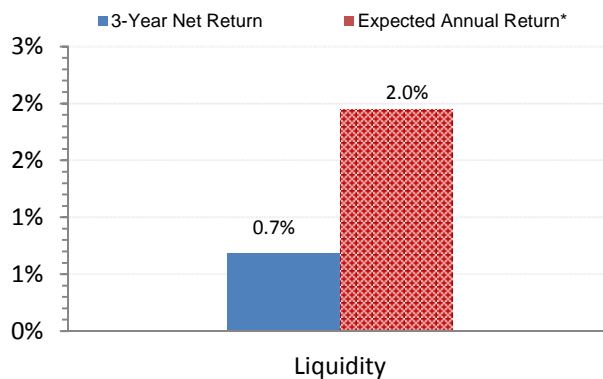


Class Allocation	Income
Interim Strategic Target Range %	-2%-10%
Interim Strategic Target %	4%
Actual Investment %	4.8%
Variance % (Strategic vs. Actual)	0.8%
Interim Strategic Target \$	\$ 12.9 Billion
Actual Investment \$	\$ 15.5 Billion
Variance \$ (Interim Strategic vs. Actual)	\$ 2.5 Billion

Note: Interim Strategic Target effective October 1, 2016

Asset Liability Management Expectations

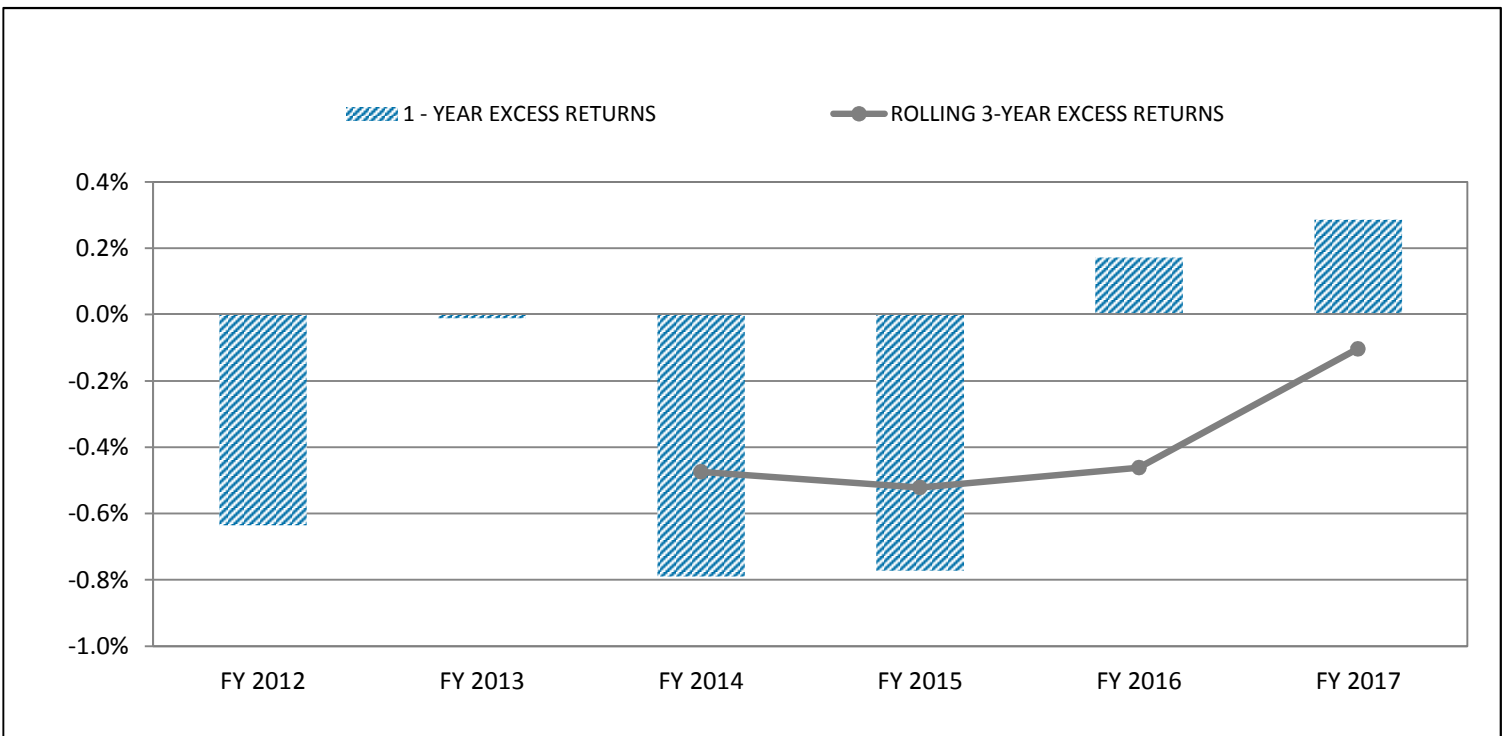
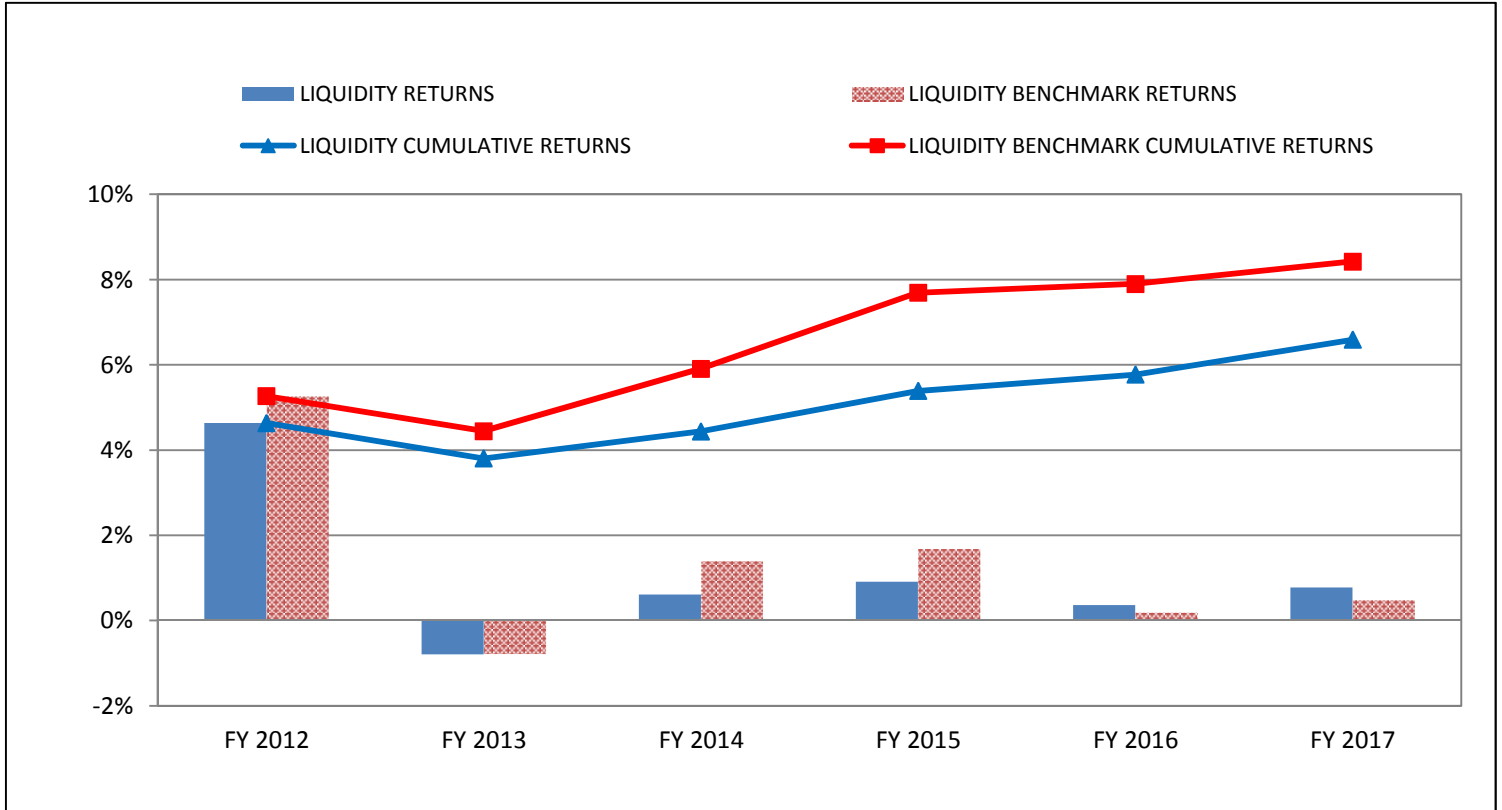
*Capital markets assumptions used in the 2013 ALM Workshop



LIQUIDITY PERFORMANCE

MONTH ENDING JUNE 30, 2017		FYTD		3-YR		5-YR		*10-YR	
Asset Class	Ending Market Value	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS	Net Return	Excess BPS
LIQUIDITY	\$ 15.5 Billion	0.8%	29	0.7%	(10)	0.4%	(22)	N/A	N/A
INTERNAL SHORT TERM PORTFOLIO	\$ 15.5 Billion	0.8%	12	0.5%	11	0.3%	10	N/A	N/A

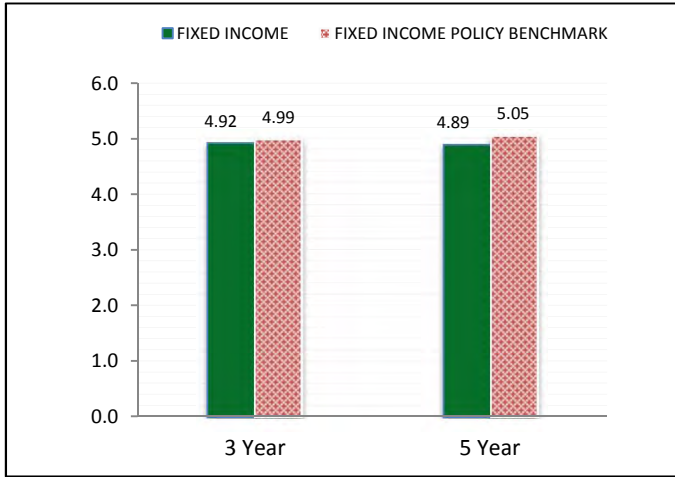
* 10-YR reporting is omitted as the current Liquidity Program Policy went into effect in July 2011. Historical Liquidity composite returns are available from June 1993.



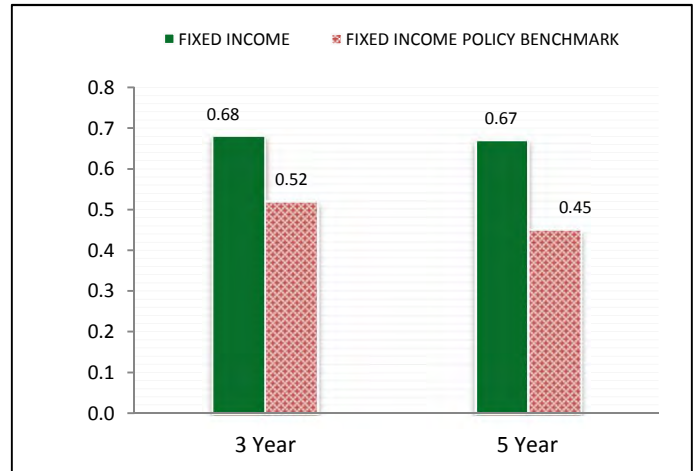
INVESTMENT RISK

Period Ending June 30, 2017

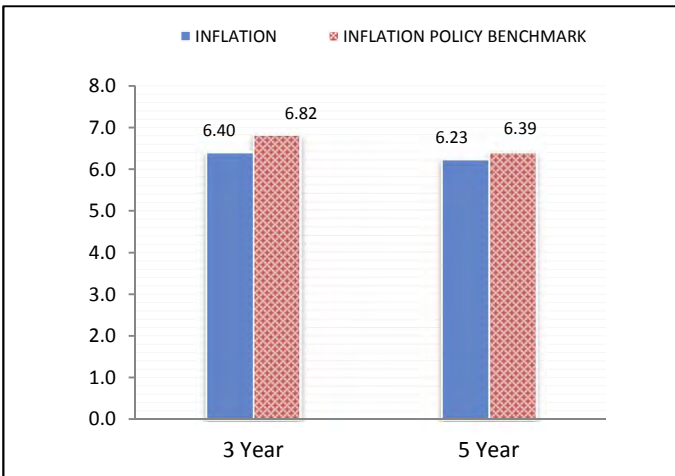
Global Fixed Income - Annualized Standard Deviation



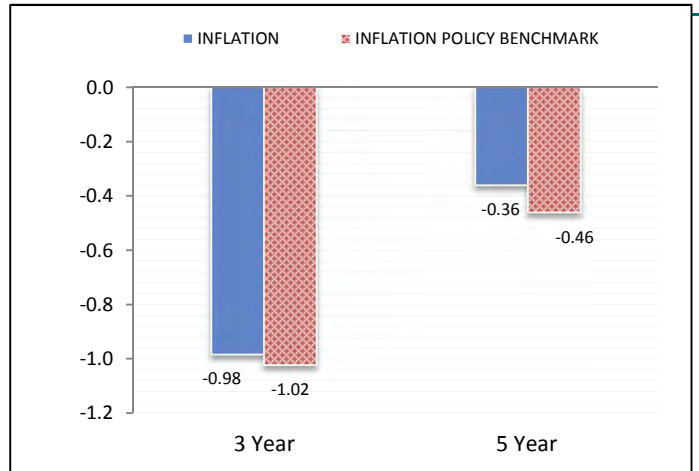
Global Fixed Income - Sharpe Ratio



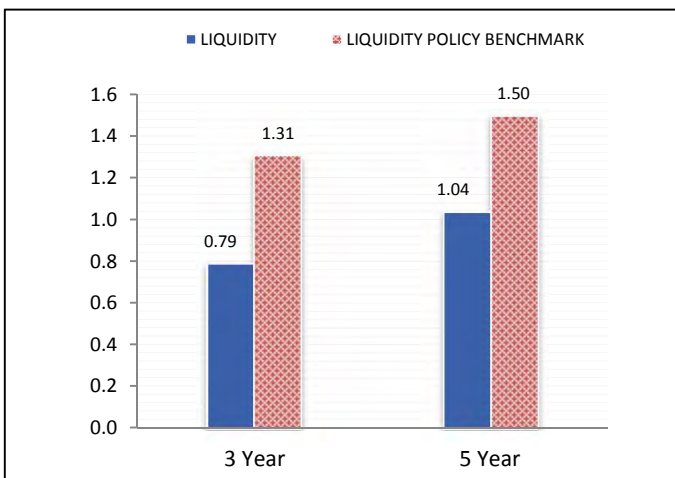
Inflation - Annualized Standard Deviation



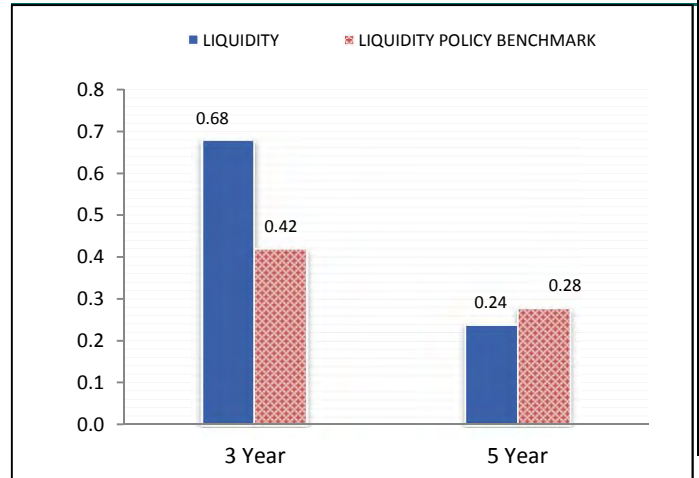
Inflation - Sharpe Ratio



Liquidity - Annualized Standard Deviation

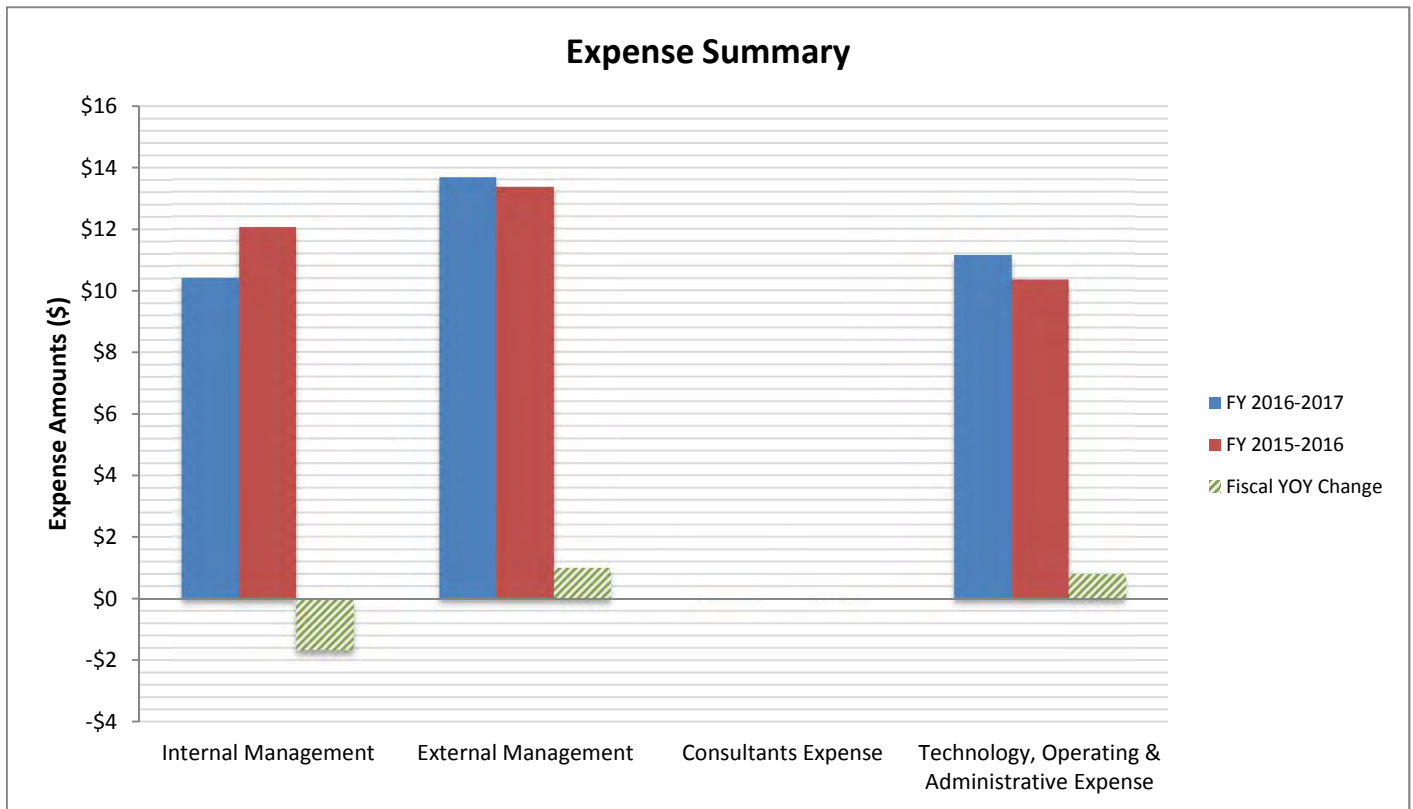


Liquidity - Sharpe Ratio



EXPENSES (includes Global Fixed Income, Inflation, and Liquidity)

Expenses	FY 2016-2017	FY 2015-2016	Fiscal YOY Change
	(\$millions)	(\$millions)	(\$millions)
Internal Management	\$10	\$12	-\$2
External Management	\$14	\$13	\$1
Consultants Expense	\$0	\$0	\$0
Technology, Operating & Administrative Expense	\$11	\$10	\$1

**STAFFING (as of 06/30/2017)**

Senior Management Team	Years with CalPERS	Years Experience
Curtis Ishii - MID	39	37
Lou Zahorak - ID	12	26
Michael Rosborough - ID	7	30
Arnie Phillips - ID	24	30
John Rothfield - ID	5	30
Investment Team	Number of Members	
Investment Managers	10	
Associate Investment Managers	3	
Investment Officers	20	

Staffing Updates

- Hired 3 IOs, 3 IMs, and 1 SC
- Lost 1 IO and 1 SC
- Promoted 3 AIMs and 1 IO
- Transferred/Promoted 1 MID and 1 ID to new Opportunistic Strategies Unit
- Transferred 1 ID, 2 IOs, 1 AA, 1 ES, 1 AGPA, 1 OT, 1 SC to new Public Assets Administrative Support Unit
- Current Vacancies
 - 1 ID
 - 1 AIM
 - 4 IO

POLICY

REVIEWED	AMEND	POLICY/DELEGATION NAME	ACTION
✓	NO	GFI MID Delegation of Authority	No changes required
✓	NO	CalPERS Total Fund Investment Policy	No changes required
✓	YES	CalPERS Total Fund Investment Policy - Liquidity Policy	Changes required
✓	YES	CalPERS Total Fund Investment Policy - Low Duration Fixed Income Program	Changes required; transferred to Opportunistic Strategies
✓	NO	CalPERS Total Fund Investment Policy - Terminated Agency Pool	No changes required
✓	NO	Global Fixed Income Program	No changes required
✓	NO	Inflation Assets Program	No changes required

CalPERS INVESTMENT BELIEFS

CalPERS Investment Beliefs

#1 Liabilities must influence the asset structure

Strong hedging characteristic to liabilities while providing income and liquidity. Benchmarks have incorporated a longer maturity bias to reflect the long liabilities.

#2 A long time investment horizon is a responsibility and an advantage

Manage risk through an economic cycle and by adding risk as premiums rise acknowledging that there can be short term underperformance but long term gain.

#3 CalPERS investment decisions may reflect wider stakeholder views, provided they are consistent with its fiduciary duty to members and beneficiaries

GFI is continuing its effort to integrate ESG related factors into its investment management process and is supportive of UNPRI

#4 Long-term value creation requires effective management of three forms of capital: financial, physical and human

GFI is continuing its effort to integrate ESG related factors into its investment management process and is supportive of UNPRI

#5 CalPERS must articulate its investment goals and performance measures and ensure clear accountability for their execution

All internal staff compensation is aligned using 3 year rolling excess returns where staff does not get paid incentive compensation when returns fall below the index.

#6 Strategic asset allocation is the dominant determinant of portfolio risk and return

By changing allocations to sector and subsectors, staff manages risk through economic cycles. Analyses of historical returns validate high allocation to higher spread sectors versus U.S. Treasuries.

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

For over 30 years, FI has managed the risk relative to the index by determining premiums and risks in markets using a long term focus on value creation.

#8 Costs matter and need to be effectively managed

Internally manage portfolios and sub-sectors when cost efficient. Have in-sourced a number of programs as opportunities to either use existing resources or acquire additional personnel expertise. 4% of programs are externally managed and there is a mix of fixed fees and rolling 3-year performance based fees.

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

Utilize and incorporate a number of risk measures both quantitative and qualitative to understand positioning of portfolio and risks and markets. Understanding and acknowledging new paradigms including the uncertainty and downside potential associated with unknowns is one of the key tenets of fixed income.

#10 Strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives

Strong process and team has been developed over the 25 years. A clear process where teams are accountable through sub-sector portfolios with appropriate performance measurements. Senior Fixed Income Team evaluates the efficacy of sub-strategy and eliminates those that are not successful.