SCERS
SACRAMENTO COUNTY
EMPLOYEES' RETIREMENT SYSTEM

Board of Retirement Regular Meeting

Sacramento County Employees' Retirement System

Agenda Item 16

MEETING DATE: **June 19, 2019**

SUBJECT: **Strategic Asset Allocation Revisions**

SUBMITTED FOR: ___ **Consent** _X_ **Deliberation and Action** __ **Receive and File**

RECOMMENDATION

Staff and Verus recommend the Board approve two revisions to the Strategic Asset Allocation (SAA):

1. Establish a 1% dedicated cash allocation, to be funded from the U.S. large capitalization segment of the Domestic Equity asset class, and to be managed through State Street's interest-bearing demand deposit account.

2. Convert the dedicated 2% Commodities allocation within the Real Return asset category into a 2% diversified Liquid Real Return allocation. As part of this second recommendation, Staff and Verus also recommend the Board:
   a. Approve the termination of the existing commodities mandate with Gresham Investment Management and SCERS' approximate $25 million investment in the firm's The TAP Fund, Ltd., and transition the proceeds into the current State Street liquid real return overlay proxy; and,
   b. Authorize Verus and Staff to evaluate the manager universe for liquid real return solutions, and come back to the Board with a recommended implementation plan.

PURPOSE

This agenda item supports the 2018-19 Strategic Management Plan objectives to review SCERS liquidity profile and develop a cash management policy.

BACKGROUND

SCERS last ran an asset liability modeling (ALM) study in 2016, with a revised SAA approved in January 2017. ALM studies are typically conducted every 3-5 years, but given the number of changes to the SAA related to the last study from 2016, Staff and Verus do not expect to conduct an ALM study for another few years.

Staff and Verus meet annually to conduct a strategic review of SCERS' investment portfolio. The current SAA was recently evaluated including the consideration for any marginal modifications to the SAA mid-cycle, between ALM studies. Two areas that were identified for further evaluation included:

1. A dedicated cash allocation in light of the recently conducted liquidity analysis, and in anticipation of the creation of a cash management policy; and
2. SCERS' dedicated commodities allocation, which is underweight to its target allocation.

CASH ALLOCATION

SCERS, like many public pension plans, is a mature plan with negative cash flows, meaning member benefit payments going out are greater than employer and employee contributions coming in on an annual basis.

The attached presentation shows projected cash flow data from SCERS' consulting actuary, Segal. The current deficit is approximately 1.76% of plan assets annually, or $166 million. This deficit is projected to grow over time, reaching 2.5% annually in 10 years, or $369 million. Investment earnings, including net investment income is assumed to fill this gap.

SCERS' annualized actuarial rate of return is 7%. The current strategic asset allocation emphasizes diversification across market segments to reduce volatility and portfolio downside risk, reduce the range of outcomes that the portfolio is subjected to, and generate increasing levels of cash flows. However, in a stressed market environment, SCERS' assets can experience negative returns, which would make earning the actuarial rate of return challenging. Falling short of the actuarial rate of return over an extended period could put pressure on SCERS' ability to meet benefit payment and funding obligations, which emphasizes the need for maintaining sufficient liquidity within the investment portfolio.

SCERS has not historically maintained a dedicated cash allocation. While SCERS can hold varying amounts of cash at a given time, any current cash is invested by the Overlay Program managed by State Street Global Advisors in a manner which replicates SCERS' policy target strategic asset allocation, and is exposed to market risks.

Given SCERS' negative cash flow position, Staff and Verus recommend a dedicated 1% cash position, which would equate to approximately $95 million, based on plan assets of approximately $9.5 billion as of March 31, 2019. A dedicated cash allocation would serve as an additional liquidity tool, and would better ensure liquidity is available to meet SCERS' pension obligations, particularly in a stressed market environment. The dedicated cash allocation would help close the gap between annual benefit payments and contributions in an environment where investment earnings fall short of target.

The recommendation includes a policy range of 0-2%; however, a dedicated cash allocation would be rebalanced by the Overlay Program to maintain a 1% allocation on an ongoing basis. The Overlay Program would not invest the dedicated 1% cash allocation within the broader asset categories of SCERS' SAA, specifically the Growth, Diversifying, or Real Return asset categories. Therefore, the cash account would not be exposed to market risks, such as equity, credit, interest rate, duration, and currency risks.

Funding Source

The proposed source of capital to fund a 1% cash allocation is U.S. large capitalization equities, with U.S. large capitalization equities moving from 19% to 18%. The passive U.S. large capitalization mandate managed by Alliance Bernstein represents the most efficient approach to reducing the allocation, because it is less concentrated across the U.S. large cap universe than the active mandates. However, Staff and Verus will determine which mandates to rebalance, including passive and/or active, to stay in line with asset class target allocations. The proportionate share within the Domestic Equity asset class will not change, meaning U.S. large cap passive, U.S. large cap active, and U.S. small cap will still represent 54%, 36%, and 10% of the Domestic Equity asset class, respectively.

As demonstrated in the attached presentation, reducing U.S. large cap equities in favor of cash reduces the expected return of SCERS' plan from 6.84% to 6.81%, but also reduces volatility (as measured by standard deviation), from 11.14% to 11.00%.

The Sharpe Ratio, which is a measure of risk adjusted returns, remains at 0.47. The tradeoff of moving from equities to cash is not as meaningful as it was in the past, as Verus' capital market assumptions forecast a 10-year return for U.S. large cap equities of 5.8%, versus an expected return of 2.8% for cash. Over the past couple of years, return expectations for U.S. equities have decreased and cash is yielding greater than 2% off of rising interest rate policy from the Federal Reserve. There is risk for cash yields to drop if the Federal Reserve becomes more dovish and reduces interest rates in the future.

Verus modeled forecasts for both a 1% and 2% cash allocation to demonstrate the impact of various levels of a dedicated cash allocation on SCERS' risk/return profile. Because higher levels of cash have a greater impact on expected plan returns, Staff and Verus recommend a 1% cash allocation. Any further increases in a dedicated cash allocation could be considered in the future as part of a broader ALM study.

Implementation

In evaluating the best approach toward implementation, Staff and Verus focused on short duration government bonds and cash management funds offered by the investment management universe. Cash management funds have the potential to generate marginally higher yields than short duration government bonds (i.e., 2.8% versus 2.4%), but also come with some exposure to market risks including duration, interest rate, and credit risk. The more prudent approach is to invest the cash allocation in short duration government bonds (i.e., 90-day Treasury Bills, which are generally considered risk-free), or an interest rate tied to overnight LIBOR rates. SCERS' existing fixed income managers, or State Street, could fulfill that mandate at a low cost.

LIBOR represents the average interest rate that banks charge one another to lend funds, and its rate tends to be highly correlated to 90-Day Treasury Bills. SCERS' custodian, State Street, offers a demand deposit account (DDA) that pegs itself to overnight LIBOR rates. Overnight LIBOR currently yields approximately 2.38%, which is in line with 90-day Treasury Bills. Staff and Verus believe that managing the cash allocation through SCERS' custodial relationship with State Street creates greater efficiencies than managing a dedicated 90-day Treasury Bill allocation by one of SCERS' fixed income managers. Therefore, Staff and Verus recommend that a cash allocation be implemented through State Streets' DDA. State Street does not charge a management fee for DDA exposure.

Liquidity Analysis Update

Verus conducted a liquidity analysis in December 2018 and presented a Modified Liquidity Ratio (MLCR), which measures whether a plan would need to sell "risky" liquid assets (i.e., public equities and high yield credit) to cover cash outflows in the 5 years after a major market dislocation. In December 2018, Verus reported a liquidity ratio of 1.58, showing SCERS in a healthy liquidity position, especially given the system's meaningful footprint within the illiquid private markets.

Verus conducted a revised liquidity analysis for SCERS, adjusting for updated actuarial assumptions from Segal and current cash levels. In the process, Verus identified a miscalculation in the December number, related to underestimating the projected capital calls and distributions within the private markets. This brought the updated liquidity ratio down to 1.18. This means that SCERS has 1.18x coverage on assets that SCERS would be comfortable selling (U.S. Treasuries and core plus fixed income) to cover liquidity needs over the 5 years following a market dislocation, and should not find itself in a position of needing to sell any "risky" assets to meet planned obligations. Verus believes that a reading greater than 1.0 represents a sufficient liquidity ratio.

The adjusted reading of 1.18 is lower than presented in December yet still sufficient; however, SCERS now has a lower margin of error when it comes to liquidity than previously evaluated, further validating a dedicated cash allocation.

COMMODITIES ALLOCATION

SCERS Strategic Asset Allocation has a dedicated 2% target Commodities allocation with a range 0-3%. The Board added a Commodities allocation as part of the Strategic Asset Allocation in 2008, and implemented two long-only commodities mandates: the Blackstone Resources Select Fund and the Gresham Strategic Commodities Fund (which transitioned into Gresham's The TAP Fund in December 2018).

Both managers—and the commodities universe as a whole—have generated negative returns since inception, and across nearly all measurable time periods. SCERS' since inception (May 2008) return in Commodities as of March 31, 2019 is -6.2%.

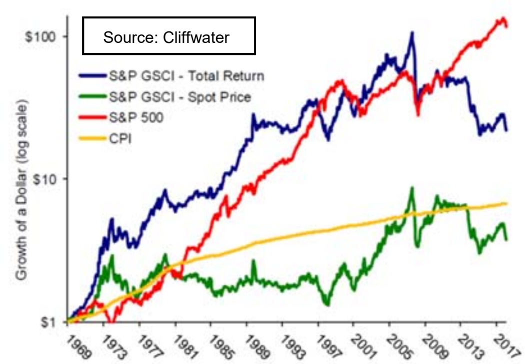
The Blackstone fund wound down in 2017, due to challenges investing within the commodities markets. With the closure of the Blackstone fund, and the meaningful underperformance of commodities compared to other asset classes, SCERS' actual commodities allocation currently stands at 0.3%, well below the 2% target but within the approved range. The underweight to commodities is covered mostly through the Overlay Program's liquid real return proxy, managed by State Street Global Advisors (SSGA), as shown in the Verus presentation.

The SSGA real return proxy is a custom diversified portfolio of liquid exposures designed specifically for SCERS, across the real return universe, including commodities, REITs (real estate investment trusts), global infrastructure stocks, natural resource equities, Treasury Inflation Protected Securities (TIPS), and floating rate notes. It is a well-diversified mix of assets that provide a balance across real return equity-like, fixed income-like, and commodity-like exposures.

Commodity Historic Returns

Commodity markets have struggled over the past 10 years, led by negative returns in the energy markets. Commodities' total return can be broken up into three components:

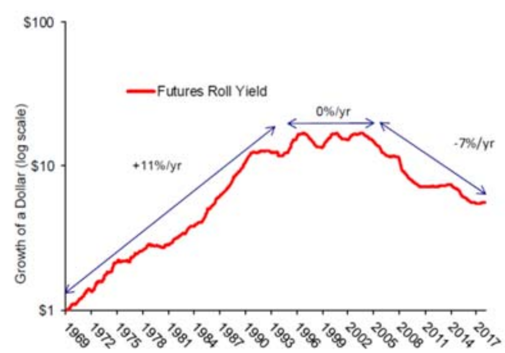
1. *Spot price*: the current price of a commodity that can be bought or sold for immediate delivery.
2. *Roll yield*: profit that can be earned when investing in the futures markets due to the price difference between futures contracts with different expiration dates.
3. *Collateral yield*: the interest earned on collateral set aside when owning a futures contract.



Source: S&P Dow Jones, S&P GSCI, Bureau of Labor Statistics

The spot price and roll yield are the most meaningful sources of return. The spot price has been volatile over time, and has generated negative returns since 2005. The difference between the total return and the spot price in the chart to the right, is mostly reflected by the roll yield. The roll yield has been flat to negative over the past 15 years, averaging a negative 7% annually return since 2005, as shown in the chart below.

Positive roll yield is generated when the market is in *backwardation* – meaning, the futures price of an asset is below the expected futures spot price. Negative roll yield is generated when the market is in *contango*, or when the futures price of the asset is above the expected futures spot price. Markets have been in *contango* for extended periods recently, which has contributed to negative roll yield, and negative total commodity returns.



Source: S&P GSCI, Cliffwater calculations

Source: Cliffwater

The performance of a diversified liquid real return strategy that includes investments such as those in the SSGA real return proxy, and which includes commodities, has generated much stronger returns and lower volatility than commodities over multiple time periods. For the past 10 years as of March 31, the SSGA diversified real return strategy has generated a positive annual return of 6.3% with a standard deviation of 6.5%, compared to the Bloomberg Commodity Index return of -2.6%, with a standard deviation of 12.0%.

For these reasons, Staff and Verus do not recommend allocating capital back to a dedicated commodities manager to bring the current Commodities allocation of 0.3% to the 2.0% target. Since the underweight to Commodities is currently being invested within the SSGA liquid real return overlay proxy, Staff and Verus instead recommend formalizing the existing structure—converting the 2% Commodities allocation within SCERS' strategic asset allocation, to a 2% Liquid Real Return allocation, with a continued range of 0-3%.

A Liquid Real Return allocation also provides flexibility to manage the broader Real Return asset category, which includes Real Estate and Real Assets asset classes. For example, SCERS has been maintaining an overweight to the Real Estate target allocation of 7% (currently at 9.4%, but in the process of being rebalanced to 8.5%), while the Real Assets asset class is built out over the next few years (current Real Asset allocation is 5.2% versus a 7.0% target allocation). A liquid real return strategy would help better manage the overall Real Return asset allocation to its 16% target allocation from its current position of 14.9% (not including the SSGA real return proxy).

Implementation

Staff and Verus recommend terminating SCERS' approximate $25 million investment in Gresham's The TAP Fund, the lone allocation within the Commodities asset class. The proceeds would move into the SSGA Liquid Real Return proxy. With the Gresham proceeds, the SSGA Liquid Real Return proxy will have approximately $166 million in capital, which translates to an approximate 1.8% allocation, close to the 2.0% target. The management fee for the SSGA Liquid Real Return proxy is 24 bps, which is lower than the TAP Fund management fee of 75 bps.

While the SSGA Liquid Real Return proxy represents an attractive solution for SCERS, Staff and Verus believe it is prudent to also conduct a manager search for alternative solutions that could potentially complement the SSGA proxy. The universe of liquid real return strategies has grown significantly. Staff and Verus will come back to the Board with a recommended implementation plan, whether it includes the SSGA proxy, an active investment manager, or a combination of both.

Expected Returns

Verus forecasted risk and return metrics when converting the 2% Commodities allocation to a 2% Liquid Real Return allocation (using the SSGA real return proxy allocations as a benchmark).

Liquid Real Return has a 10-Year expected return of 5.9%, with a standard deviation of 9.7%, while Commodities has a 10-Year expected return of 4.2%, with a standard deviation of 15.7%. A Liquid Real Return allocation therefore offers potentially higher returns with less volatility, translating to a higher risk adjusted return, as reflected in a Sharpe Ratio of 0.39 versus 0.20.

The impact on SCERS' total plan is reflected in a 6.86% expected total plan return with a standard deviation of 10.93% for the addition of a Liquid Real Return allocation, versus a total plan expected return of 6.84% with a standard deviation of 11.14% for the current asset allocation, which includes Commodities.

OVERALL FUND IMPACT

Verus forecasted the risk and return metrics for the combined cash and liquid real return recommendations. The revised Strategic Asset Allocation reflects a total plan expected return of 6.84%, which falls in line with the current asset allocation's expected return of 6.84%. The standard deviation drops slightly from 11.14% to 10.93%, and the overall Sharpe Ratio drops slightly, but when rounding, maintains at 0.47. Therefore, the lower returns from adding cash and reducing equities is offset by the higher return potential of a liquid real return strategy over commodities, slightly dropping overall portfolio risk.

Verus also ran a "Barra" analysis, which stress tests SCERS' risk exposures across different market environments. The asset allocation adjustments marginally add equity risk to SCERS' overall plan—because the liquid real return proxy has a higher equity risk profile than commodities—and therefore could bring slightly more underperformance in a severe market downturn.

NEXT STEPS

If the Board approves the 1% cash recommendation, Staff and Verus will reduce the U.S. large capitalization equity portfolio by 1% (relative to SCERS' total plan assets), and transition the proceeds to an interest-bearing demand deposit account with State Street. Staff will determine if it is more cost-effective and efficient to use a transition manager to sell assets, or have SCERS' investment managers within the U.S. large capitalization equity portfolio sell the assets.

Staff and Verus will also continue developing a cash management policy that will be presented to the Board at an upcoming meeting. The objectives of a cash management policy are to:

1. Ensure that member benefit payment and funding obligations are met without interruption regardless of market conditions;
2. Provide a process for oversight and management of cash during normal and stressed market conditions; and
3. Oversee liquidity risk and maintain appropriate liquidity profiles within SCERS' plan.

The cash management policy will identify sources of liquidity, which include those assets that SCERS would most likely be comfortable selling in a stressed market environment, including cash within the recommended dedicated 1% cash allocation.

If the Board approves the Commodities recommendation, Staff will redeem SCERS' approximate $25 million investment in Gresham's The TAP Fund and move the proceeds to the SSGA liquid real return proxy. Staff and Verus will then conduct a manager search for alternative solutions to the SSGA liquid real return proxy and come back to the Board with a recommended implementation plan, whether it includes the SSGA proxy, an active investment manager, or a combination of both.

ATTACHMENT

Verus Policy Allocation Adjustment presentation

Prepared by:	Reviewed by:
/S/	/S/
Steve Davis Chief Investment Officer	Eric Stern Chief Executive Officer

Verus

PERSPECTIVES
THAT DRIVE
ENTERPRISE
SUCCESS

JUNE 2019

SCERS

Policy Allocation Adjustment

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Verus

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Introduction

- Verus and Staff conducted a strategic review of SCERS' investment portfolio
- Areas of evaluation included:
  - A dedicated cash allocation in light of the recently conducted liquidity analysis, and in anticipation of the creation of a cash management policy
  - SCERS' dedicated commodities allocation, which is underweight to its target allocation
- Recommendation of modifications to SCERS' strategic asset allocation prior to next asset liability modeling study
  - Next study will not be for two to three years

I. Cash Allocation

SCERS' Pension Cash Flows

Calendar Year	Beginning of Year Market Value of Assets	Total Contributions	Total Benefit Projection	Total Administrative Expenses	Net Cash Flow %	Net Cash Flow ($)
2019	9,482,467,660	383,420,180	542,510,871	7,704,386	-1.76%	-166,795,076
2020	9,972,635,515	414,701,620	571,620,644	8,106,520	-1.65%	-165,025,544
2021	10,499,042,336	432,003,484	604,283,828	8,534,821	-1.72%	-180,815,165
2022	11,046,064,911	443,949,593	638,374,413	8,976,194	-1.84%	-203,401,013
2023	11,607,908,826	456,902,603	673,991,112	9,430,643	-1.95%	-226,519,151
2024	12,185,151,519	464,420,487	710,670,798	9,896,464	-2.10%	-256,146,775
2025	12,772,144,983	470,875,117	748,194,952	10,368,784	-2.25%	-287,688,618
2026	13,367,497,998	481,474,329	786,555,193	10,848,604	-2.36%	-315,929,469
2027	13,975,210,227	494,074,139	825,374,304	11,339,181	-2.45%	-342,639,347
2028	14,597,760,687	507,259,125	864,508,865	11,841,825	-2.53%	-369,091,565

SCERS has a 1-2% cash flow deficit each year, excluding investment earnings

Deficit is projected to grow overtime, reaching 2.5% in 10 years

SCERS Liquidity Ratio - MLCR

Liquidity Available	Treasury + Core Fixed Income Assets	$	1,528,626,194.00
	Distributions from Illiquids	$	2,661,111,175.71
	Employer + Employee Contributions	$	2,130,977,480.78
	Investment Income	$	922,486,918.20
Liquidity Needs	Benefit Payments	$	3,030,780,867.13
	Capital Calls	$	3,059,364,635.00
	Plan Expenses	$	42,752,563.06
	UAAL Amortization	-	
MLCR			**1. 18**

MLCR = 1.18

1.18x coverage on assets that you would want to sell to cover liquidity needs over the next 5 years

Assets included in MLCR are Treasuries, Cash and Core Fixed Income

SENSITIVITY TO CAPITAL CALL AND DISTRIBUTION CHANGES

Capital Call / Distribution Sensitivity Analysis

Distribution Reduction	Capital Call Reduction: 5.0%	15.0%	25.0%	35.0%	45.0%	55.0%	65.0%
5.0%	1.19	1.25	1.32	1.40	1.49	1.60	1.71
15.0%	1.14	1.20	1.27	1.35	1.44	1.54	1.65
25.0%	1.10	1.16	1.22	1.30	1.38	1.48	1.58
35.0%	1.05	1.11	1.17	1.24	1.33	1.42	1.52
45.0%	1.01	1.06	1.12	1.19	1.27	1.36	1.46
55.0%	0.96	1.02	1.07	1.14	1.21	1.30	1.39
65.0%	0.92	0.97	1.03	1.09	1.16	1.24	1.33
75.0%	0.88	0.92	0.98	1.03	1.10	1.18	1.26
85.0%	0.83	0.88	0.93	0.98	1.05	1.12	1.20
95.0%	0.79	0.83	0.88	0.93	0.99	1.06	1.14

CMA Forecasts

	SCERS Policy	Add 1% Cash	Add 2% Cash	CMA's (10 Yr) Return (g)	St Dev	Sharpe Ratio
US Large	19.0	18.0	18.0	*5.8*	*15.6*	*0.31*
US Small	2.0	2.0	2.0	*5.4*	*21.3*	*0.25*
International Developed	16.0	16.0	15.0	*7.7*	*17.8*	*0.39*
Emerging Markets	4.0	4.0	4.0	*8.6*	*26.1*	*0.36*
High Yield Corp. Credit	1.0	1.0	1.0	*5.7*	*11.5*	*0.37*
Bank Loans	1.0	1.0	1.0	*5.9*	*10.2*	*0.42*
Private Equity	9.0	9.0	9.0	*8.8*	*25.6*	*0.37*
Private Credit	4.0	4.0	4.0	*7.7*	*10.2*	*0.60*
Hedge Fund Growth	3.0	3.0	3.0	*6.3*	*6.4*	*0.65*
Total Growth	***59.0***	***58.0***	***57.0***			
Core Plus Fixed Income	10.0	10.0	10.0	*4.1*	*8.4*	*0.27*
US Treasury	5.0	5.0	5.0	*2.7*	*6.7*	*0.12*
Global Credit	3.0	3.0	3.0	*2.1*	*7.5*	*0.04*
Hedge Fund Diversifying	7.0	7.0	7.0	*4.9*	*3.3*	*0.73*
Total Diversifying	***25.0***	***25.0***	***25.0***			
Commodities	2.0	2.0	2.0	*4.2*	*15.7*	*0.20*
Core Real Estate	5.0	5.0	5.0	*6.1*	*12.9*	*0.37*
Value Add Real Estate	2.0	2.0	2.0	*8.1*	*19.4*	*0.40*
Private Real Assets	7.0	7.0	7.0	*8.7*	*15.8*	*0.48*
Total Real Return	***16.0***	***16.0***	***16.0***			
Cash	0.0	1.0	2.0	*2.8*	*3.6*	*0.22*
Total Allocation	**100**	**100**	**100**			

	SCERS Policy	Add 1% Cash	Add 2% Cash
Mean Variance Analysis			
Forecast 10 Year Return	***6.84***	***6.81***	***6.76***
Standard Deviation	11.14	11.00	10.84
Return/Std. Deviation	*0.6*	*0.6*	*0.6*
1st percentile ret. 1 year	*-13.8*	*-13.49*	*-13.09*
Sharpe Ratio	0.47	0.47	0.47

Cash Allocation

RECOMMEND ADDING A CASH ALLOCATION OF 1%

- Strategic cash allocation of 1% with a policy range of 0-2%
- Cash allocation will be rebalanced back to 1% periodically, most likely by the overlay manager
- Cash allocation is meant to ensure liquidity is available to meet pension obligations
- Cash currently yields ~2.5% which is attractive on a risk-adjusted basis in fixed income. If cash yields fall back to levels seen more recently, we could reassess the cash allocation

Domestic Equity Structure

	Policy	Benchmark	Allocation	Manager
Russell 3000	100.0%			
LC Passive (R1000)		54.0%	54.0%	
AB				54.0%
LC Active (R1000)		36.0%	36.0%	
Eagle Capital				12.0%
130/30 Manager – DE Shaw				6.0%
130/30 Manager - JPMorgan				6.0%
Multi-Factor Manager – AQR				12.0%
SCV (R2000V)		5.0%	5.0%	
DGHM				5.0%
SCG (R2000G)		5.0%	5.0%	
Weatherbie				5.0%

- 1% cash allocation will be funded from a mix of large cap passive equities and large cap active strategies
- Staff will ultimately determine where the best source of cash should come from depending on position over/underweights and liquidity within the large cap portfolio

II. Commodities Allocation

CMA Forecasts

	SCERS Policy	Eliminate Commodities	CMA's (10 Yr) Return (g)	Standard Deviation	Sharpe Ratio
US Large	19.0	19.0	*5.8*	*15.6*	*0.31*
US Small	2.0	2.0	*5.4*	*21.3*	*0.25*
International Developed	16.0	16.0	*7.7*	*17.8*	*0.39*
Emerging Markets	4.0	4.0	*8.6*	*26.1*	*0.36*
High Yield Corp. Credit	1.0	1.0	*5.7*	*11.5*	*0.37*
Bank Loans	1.0	1.0	*5.9*	*10.2*	*0.42*
Private Equity	9.0	9.0	*8.8*	*25.6*	*0.37*
Private Credit	4.0	4.0	*7.7*	*10.2*	*0.60*
Hedge Fund Growth	3.0	3.0	*6.3*	*6.4*	*0.65*
Total Growth	***59.0***	***59.0***			
Core Plus Fixed Income	10.0	10.0	*4.1*	*8.4*	*0.27*
US Treasury	5.0	5.0	*2.7*	*6.7*	*0.12*
Global Credit	3.0	3.0	*2.1*	*7.5*	*0.04*
Hedge Fund Diversifying	7.0	7.0	*4.9*	*3.3*	*0.73*
Total Diversifying	***25.0***	***25.0***			
Commodities	2.0	0.0	*4.2*	*15.7*	*0.20*
Core Real Estate	5.0	5.0	*6.1*	*12.9*	*0.37*
Value Add Real Estate	2.0	2.0	*8.1*	*19.4*	*0.40*
Private Real Assets	7.0	7.0	*8.7*	*15.8*	*0.48*
Liquid Real Return*	0.0	2.0	*5.9*	*9.7*	*0.39*
Total Real Return	***16.0***	***16.0***			
Total Allocation	**100**	**100**			

	SCERS Policy	Eliminate Commodities
Mean Variance Analysis		
Forecast 10 Year Return	***6.84***	***6.86***
Standard Deviation	11.14	10.93
Return/Std. Deviation	*0.6*	*0.6*
1st percentile ret. 1 year	*-13.8*	*-13.28*
Sharpe Ratio	0.47	0.47

*Liquid Real Return	Allocation %
TIPS	30.0%
Infrastructure Equities	25.0%
REITs	15.0%
Floating Rate Notes	10.0%
Natural Resource Equities	10.0%
Commodities	10.0%

Commodity Market Overview

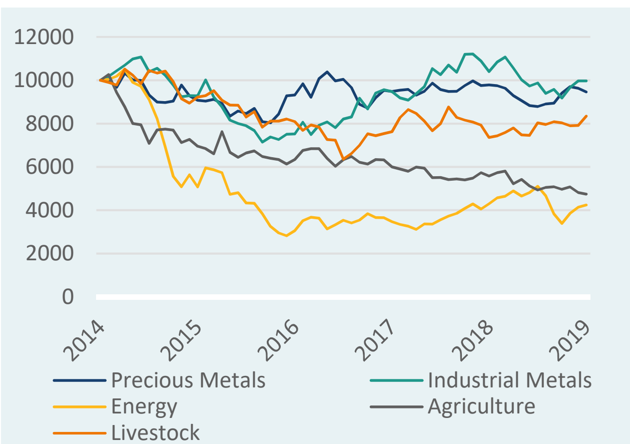
— Most commodity sectors are flat to negative over the last 5 years with energy being the worst performing sector

— Roll return was positive for certain periods in the '90s and early 2000s but has mostly trended negative in the last 15+ years

— Oil prices are in contango on the front month contracts but are backwardated farther in the future; signaling the market expects oil prices to be lower in the future

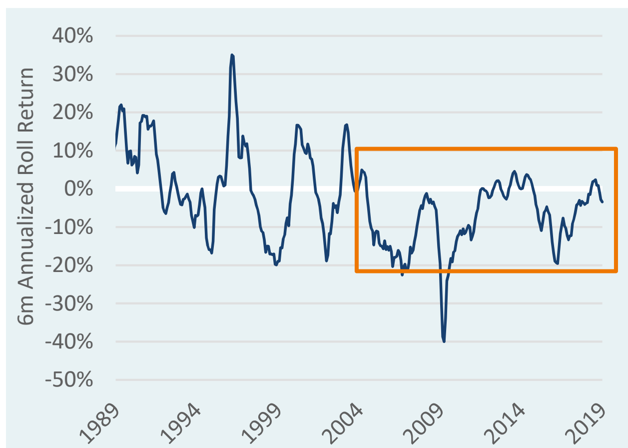
— Margin return (i.e. cash yield) has trended higher as interest rates have moved higher; negative roll yield has largely offset the return from margin

SECTOR PERFORMANCE



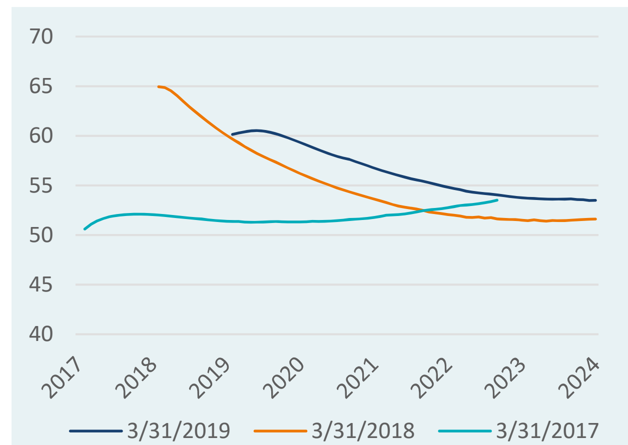
Source: Bloomberg, as of 3/31/19

ROLL RETURN



Source: Bloomberg, as of 4/12/19

CURVE SHAPE (WTI)



Source: Bloomberg, as of 3/31/19

Performance Summary – as of March 2019

	SSgA Custom Real Assets	Bloomberg Commodity Index
PERFORMANCE ANALYSIS - (5 Years)		
Alpha %	4.7	0.0
Beta	0.3	1.0
R-squared %	37.2	100.0
Sharpe Ratio	0.2	-0.8
Treynor Ratio	0.0	-0.1
Tracking Error %	9.5	0.0
Annualized Std Dev %	6.5	12.0
Information Ratio	1.2	---
Max Drawdown %	-14.2	-44.8
Calmar Ratio	0.1	-0.2
Excess Ann. Return %	11.0	0.0
	---	---
PERFORMANCE TO DATE		
1 Year	5.1	-5.3
3 Year	5.1	2.2
5 Year	2.1	-8.9
7 Year	2.7	-7.1
10 Year	6.3	-2.6
Common Inception (Jan-07)	3.2	-4.9
CALENDAR YEAR RETURNS		
2018	-5.4	-11.2
2017	9.2	1.7
2016	9.0	11.8
2015	-8.5	-24.7
2014	2.9	-17.0
2013	1.0	-9.5
2012	9.4	-1.1
2011	-0.7	-13.3
2010	10.2	16.8
2009	24.4	18.9

SSgA Real Assets historical performance is modeled from SCERS' current allocation

Diversified portfolio dramatically improves risk-adjusted return

Potential trade-off of lower inflation beta if commodities respond to domestic inflationary pressure

Commodity Allocation Alternatives

RECOMMEND SHIFTING 2% COMMODITIES ALLOCATION TO LIQUID REAL RETURN

- Inflation pressures are muted and are expected to remain so given the late stages of the current economic cycle
- Commodities have produced negative returns over each of the last 5, 7 and 10-year periods
- Verus' CMA projections for commodities have an expected **4.2%** return over the next 10 years vs. **5.9%** for diversified liquid real return
- Verus' projected risk for commodities is **15.7** vs. **9.7** for liquid real return
- Structurally, commodity futures are in contango and have been for most of the last decade. Futures trading in contango create a negative roll yield (i.e. negative carry)
- Liquid real return have a positive carry due to the portfolios exposure to inflation sensitive fixed income and publicly traded equities
- We believe SCERS would be better off holding a diversified portfolio of liquid real return which provide a more attractive risk/return, especially given the low probably of inflationary pressures

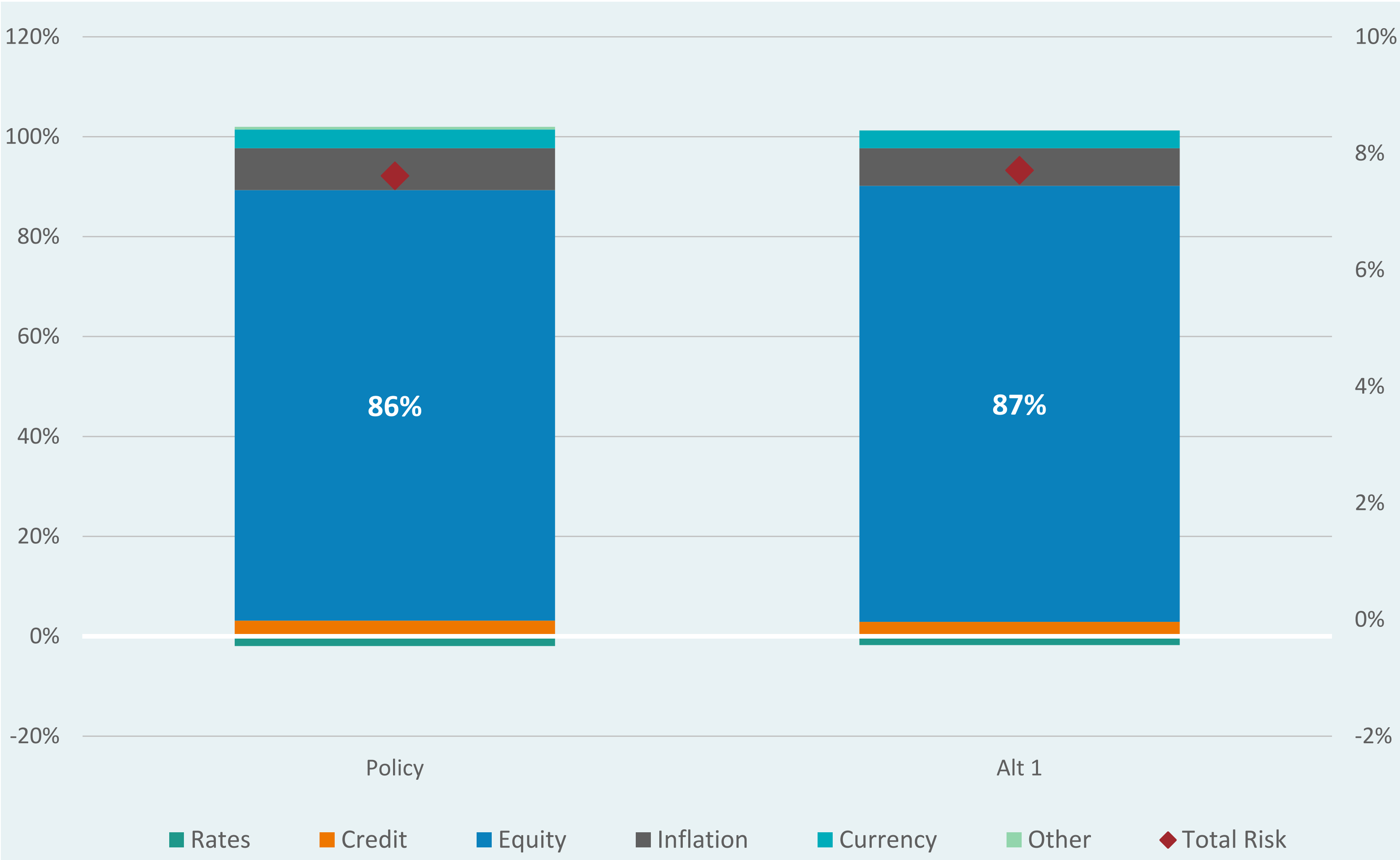
III. Recommended Policy Adjustments

CMA Forecasts

	SCERS Policy	Cash 1% + Liquid Real Return	CMA's (10 Yr) Return (g)	CMA's (10 Yr) Standard Deviation	CMA's (10 Yr) Sharpe Ratio
US Large	19.0	18.0	*5.8*	*15.6*	*0.31*
US Small	2.0	2.0	*5.4*	*21.3*	*0.25*
International Developed	16.0	16.0	*7.7*	*17.8*	*0.39*
Emerging Markets	4.0	4.0	*8.6*	*26.1*	*0.36*
High Yield Corp. Credit	1.0	1.0	*5.7*	*11.5*	*0.37*
Bank Loans	1.0	1.0	*5.9*	*10.2*	*0.42*
Private Equity	9.0	9.0	*8.8*	*25.6*	*0.37*
Private Credit	4.0	4.0	*7.7*	*10.2*	*0.60*
Hedge Fund Growth	3.0	3.0	*6.3*	*6.4*	*0.65*
Total Growth	***59.0***	***58.0***			
Core Plus Fixed Income	10.0	10.0	*4.1*	*8.4*	*0.27*
US Treasury	5.0	5.0	*2.7*	*6.7*	*0.12*
Global Credit	3.0	3.0	*2.1*	*7.5*	*0.04*
Hedge Fund Diversifying	7.0	7.0	*4.9*	*3.3*	*0.73*
Total Diversifying	***25.0***	***25.0***			
Commodities	2.0	0.0	*4.2*	*15.7*	*0.20*
Core Real Estate	5.0	5.0	*6.1*	*12.9*	*0.37*
Value Add Real Estate	2.0	2.0	*8.1*	*19.4*	*0.40*
Private Real Assets	7.0	7.0	*8.7*	*15.8*	*0.48*
Liquid Real Return	0.0	2.0	*5.9*	*9.7*	*0.39*
Total Real Return	***16.0***	***16.0***			
Cash	0.0	1.0	*2.8*	*3.6*	*0.22*
Total Allocation	**100**	**100**			

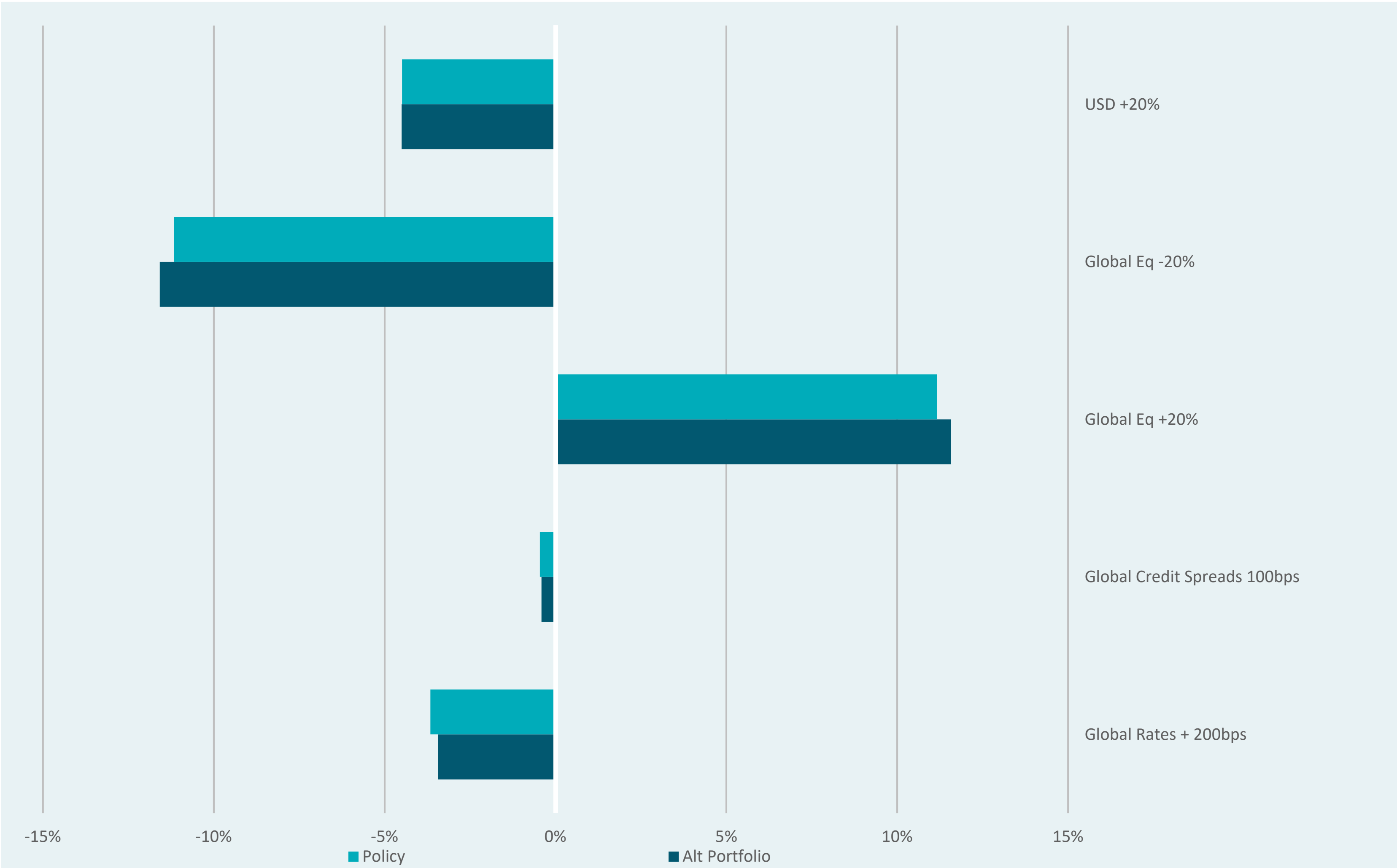
	SCERS Policy	Cash 1% + Liquid Real Return
Mean Variance Analysis		
Forecast 10 Year Return	***6.84***	***6.84***
Standard Deviation	11.14	10.93
Return/Std. Deviation	*0.6*	*0.6*
1st percentile ret. 1 year	*-13.8*	*-13.0*
Sharpe Ratio	0.47	0.47

Risk Decomposition



Barra models private equity, infrastructure, natural resources as equity risk

Stress Test



The small differences in modeled returns are statistically insignificant

Improvement in liquidity for little-to-no give up in return is the primary rational for this adjustment

Recommendation/Next Steps

IF CASH ALLOCATION IS APPROVED

- Staff and Verus recommend a 1% cash allocation with a policy range of 0-2%
- Staff and Verus will create a formal "Cash Management Policy" to be presented at a future date
- Authorize Staff to reduce the Large Cap Equity allocation by 1% by redeeming an equivalent amount from SCERS' U.S. large capitalization investment managers.
- Authorize Staff to fund a cash account with State Street. State Street has proposed a DDA (Demand Deposit Account) account that yields overnight LIBOR rates

IF A SHIFT FROM COMMODITIES TO LIQUID REAL RETURN IS APPROVED

- Redeem Gresham commodity allocation
- Gresham monies will be invested in the SSgA Real return portfolio
- Authorize Staff/Verus to conduct a search for investment alternatives within the liquid real return sector. Search may result in retaining the existing allocation to SSgA.