



UNIVERSITY OF CALIFORNIA

Office of the Chief Investment Officer

Pension

Investment Review as of June 30, 2018

Growing Portfolios. Building Partnerships.

UC Investments



UC Pension

1. Asset Allocation
2. Performance
3. Asset Classes
4. Risk

Investment Objective

- Maximize real, long-term total returns (income plus capital appreciation adjusted for inflation), while assuming appropriate levels of risk
- Maximize the probability of meeting the Plan's liabilities, subject to the Regents' funding policy



Office of the Chief Investment Officer

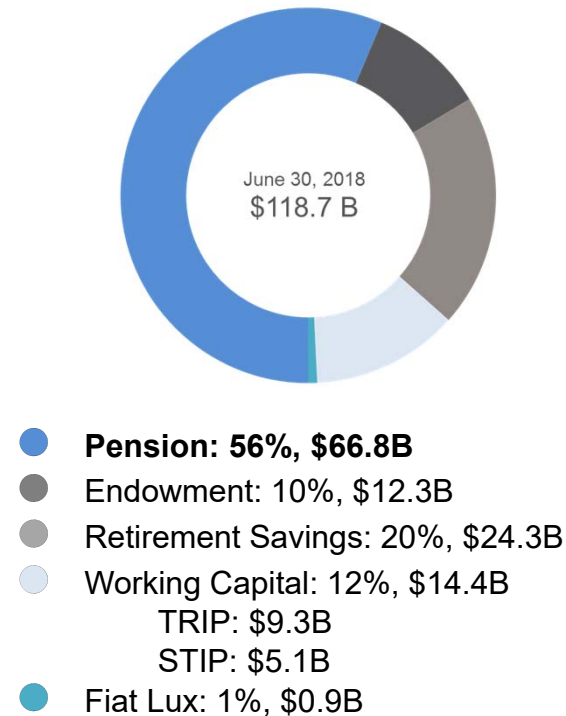
Mission

Growing Portfolios. Building Partnerships.
Delivering value through values.

Investment Products

- ▶ **Pensions** assets: \$66.8 billion (as of 6/30/18)
- ▶ Investing **Endowment** assets since 1933 (85 years)
- ▶ Investing **Pension** assets since 1961 (57 years)
- ▶ Investing **Retirement Savings** assets since 1967 (51 years)
- ▶ Investing **Working Capital** since 1976 (42 years)
- ▶ Investing **Captive Insurance** assets since 2016 (2 years)

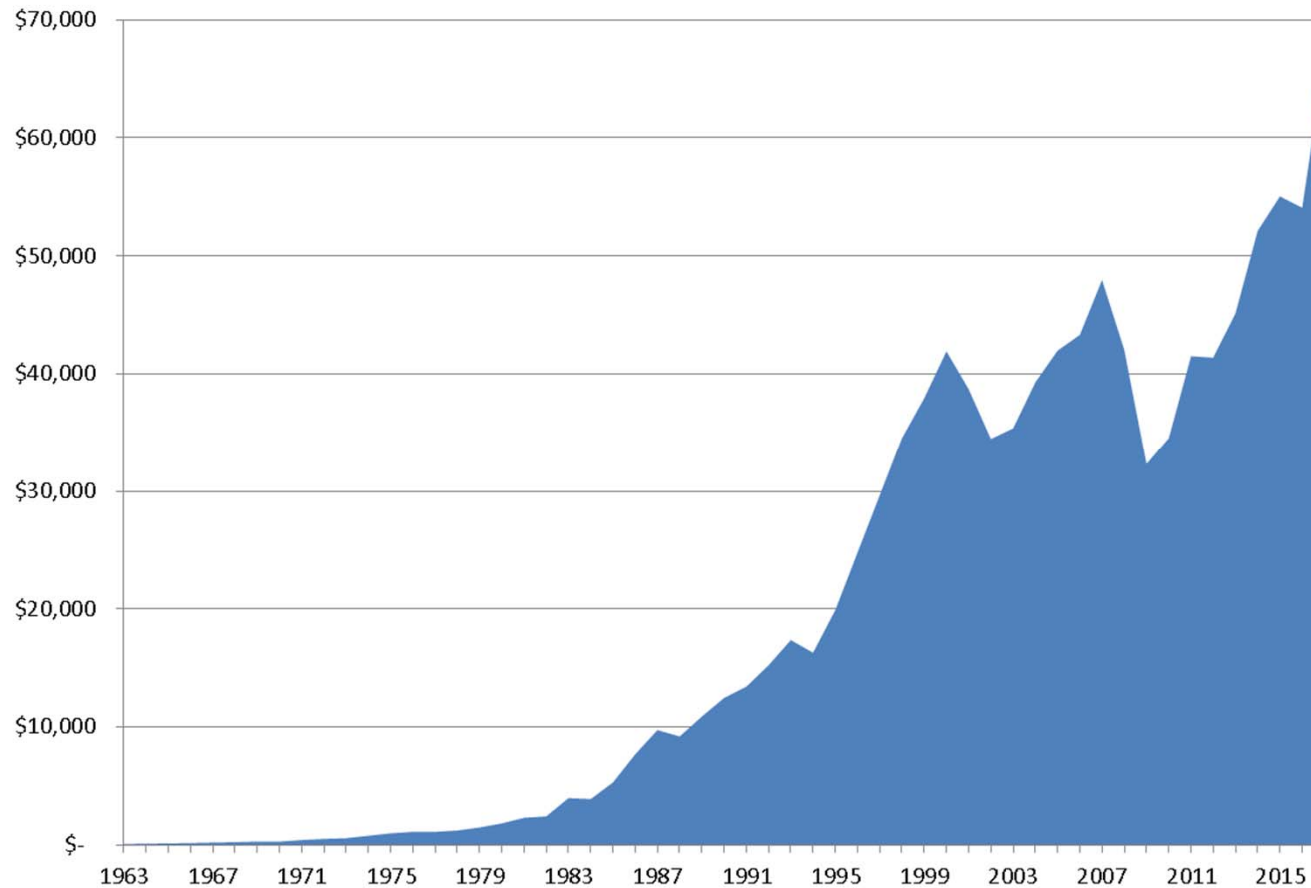
\$118.7 billion across 6 products





Pension Asset Growth

UCRP Assets 1963 - 2018



5 Year Growth

June 30, 2018
\$66.8 billion

1 Year ago
\$61.6 billion

5 Years ago
\$45.1 billion

As of June 30, 2018







Assets Under Management

June 30, 2017	\$61.6 billion
Market Gains	\$5.2 billion
Value Added	(\$0.3 billion)
Net Cash Flow	\$0.3 billion
June 30, 2018	\$66.8 billion



Pension Asset Allocation

Relative Weight		Market Value in \$ Billions	Percentage	Over/Underweight Relative to Policy	Policy Weight
	Public Equity	36.3	54.4%	2.2%	52.2%
	Liquidity (Fixed Income)	13.4	20.1%	(1.4%)	21.5%
	Core	8.1	12.2%	(1.2%)	13.4%
	High Yield	2.0	3.0%	0.1%	2.9%
	Emerging Market Debt	1.6	2.3%	(0.1%)	2.4%
	TIPS	1.7	2.6%	(0.2%)	2.8%
	Other Investments	11.1	16.6%	(6.9%)	23.5%
	Absolute Return	3.7	5.6%	(1.7%)	7.3%
	Private Equity	3.1	4.6%	(2.9%)	7.5%
	Real Estate	3.1	4.7%	(1.6%)	6.3%
	Real Asset	1.2	1.7%	(0.7%)	2.4%
	Cash	6.0	8.9%	6.1%	2.8%
	Total	\$66.8	100.0%	0.0%	100.0%



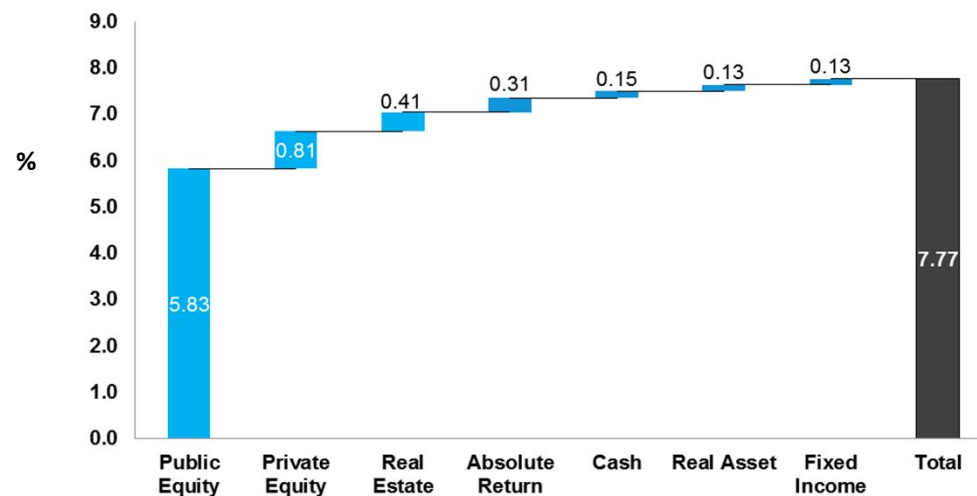
Pension Performance

Net Returns (%) As of June 30, 2018	Annualized Returns							
	3 Month	1 Year	3 Year	5 Year	7 Year	10 Year	20 Year	25 Year
UC Pension	0.4	7.8	6.5	8.2	7.5	6.4	6.0	8.3
UC Pension Benchmark	1.0	8.4	6.6	7.7	6.9	5.8	5.6	8.0
<i>Value Added</i>	<i>(0.6)</i>	<i>(0.6)</i>	<i>(0.1)</i>	<i>0.5</i>	<i>0.6</i>	<i>0.6</i>	<i>0.4</i>	<i>0.3</i>

Net Returns (%) As of June 30	One Year Returns										
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
UC Pension	7.8	14.5	(2.0)	4.5	17.4	11.7	0.4	22.4	12.7	(18.8)	(5.7)
UC Pension Benchmark	8.4	12.7	(0.8)	2.2	17.1	10.7	(0.6)	21.6	11.6	(18.9)	(4.7)
<i>Value Added</i>	<i>(0.6)</i>	<i>1.8</i>	<i>(1.2)</i>	<i>2.3</i>	<i>0.3</i>	<i>1.0</i>	<i>1.0</i>	<i>0.8</i>	<i>1.1</i>	<i>0.1</i>	<i>(1.0)</i>

* The Policy Benchmark is a weighted average of investment policy targets.

Fiscal YTD Contribution to Return





Pension Attribution – FY 2017/18

As of June 30, 2018	Average Weight	Average Active Weight	Allocation Attribution	Selection Attribution	Total Attribution
Public Equity	54.7	2.5	0.2	(0.2)	0.0
Fixed Income					
Core	12.5	(0.9)	(0.1)	0.0	(0.1)
High Yield	3.2	0.3	0.0	0.0	0.0
Emerging Market Debt	2.3	(0.1)	0.0	0.0	0.0
TIPS	2.6	(0.2)	0.0	0.0	0.0
Other Investments					
Absolute Return	4.9	(2.4)	0.0	0.0	0.0
Private Equity	4.3	(3.2)	(0.3)	0.1	(0.2)
Real Estate	4.6	(1.7)	0.0	0.1	0.1
Real Asset	1.5	(0.9)	(0.1)	(0.1)	(0.2)
Cash	9.4	6.6	(0.2)	0.0	(0.2)
Total	100%	+0.0%	(0.5%)	(0.1%)	(0.6%)



Pension Policy Benchmark

Asset Class	Policy Benchmark Component	Target	Allowable Ranges	
			Min	Max
Total Public Equity	MSCI All Country World Index Net IMI Tobacco Free	52.2%	40.0%	60.0%
Total Fixed Income				
U.S. Core Fixed Income	Barclays U.S. Aggregate Bond Index	13.4%	10.0%	16.0%
High Yield Debt	Merrill Lynch High Yield Cash Pay Index	2.9%	0.0%	5.0%
Emerging Market Debt	JP Morgan Emerging Markets Bond Index Global Diversified	2.4%	0.0%	5.0%
TIPS	Barclays U.S. TIPS	2.8%	0.0%	4.0%
Total Other Investments				
Private Equity	Russell 3000 + 1.5%	7.5%	5.0%	15.0%
Absolute Return	HFRI Fund of Funds Composite	7.3%	0.0%	20.0%
Real Estate	NCREIF ODCE Index	6.3%	2.0%	12.0%
Real Assets	Actual Real Asset Portfolio Returns	2.4%	2.0%	6.0%
Cash		2.8%	0.0%	10.0%

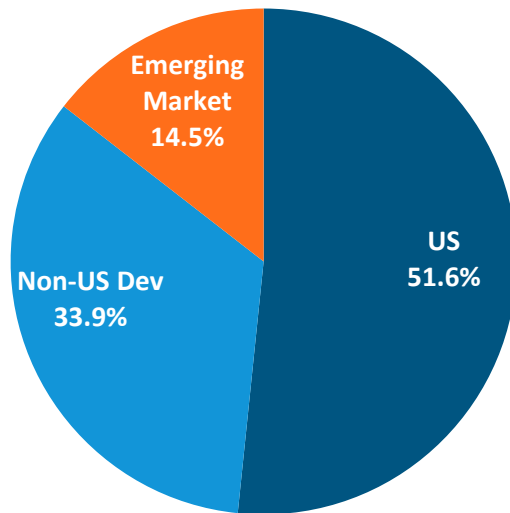


Public Equity

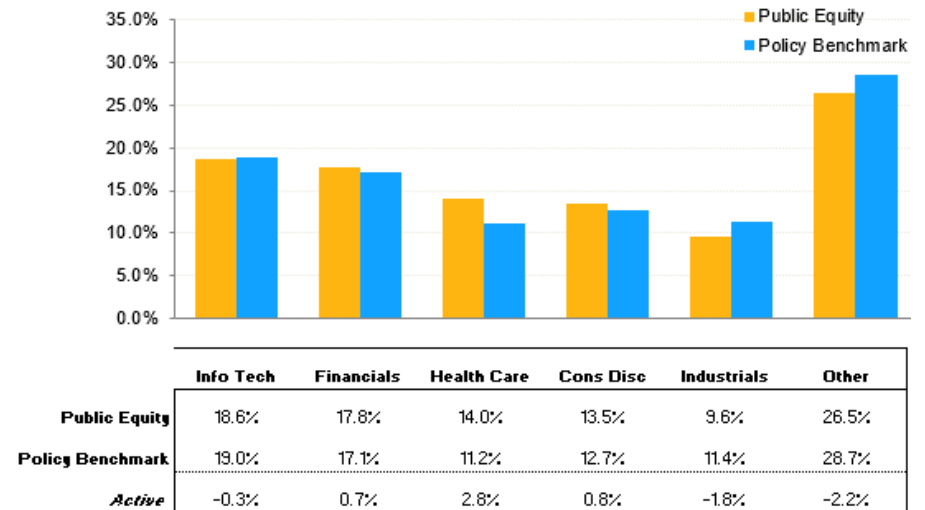
Net Returns (%) As of June 30, 2018	Market Value		Annualized Returns						
	(\$ Million)	% Allocation	3 Month	1 Year	3 Year	5 Year	7 Year	10 Year	20 Year
Public Equity	36,326	100.0%	(0.2)	10.7	8.2	10.2	8.9	6.8	5.5
MSCI All Country World Index Net - IMI - Tobacco Free			0.8	11.6	8.4	9.7	8.3	6.4	5.2
<i>Value Added</i>			<i>(1.0)</i>	<i>(0.9)</i>	<i>(0.2)</i>	<i>0.5</i>	<i>0.6</i>	<i>0.4</i>	<i>0.3</i>

* Prior to July 1, 2016, the total public equity benchmark was an aggregate of benchmarks for underlying equity portfolios.

Regional Exposure



Sector Exposure



As of June 30, 2018



Fixed Income (Liquidity) and Cash

Net Returns (%) As of June 30, 2018	Market Value (\$ Million)	% Allocation	Annualized Returns						
			3 Month	1 Year	3 Year	5 Year	7 Year	10 Year	20 Year
Fixed Income	13,419	100%	(0.4)	0.6	2.8	3.0	3.5	4.8	5.5
Policy Benchmark			(0.4)	(0.1)	2.5	2.8	3.3	4.6	5.2
<i>Value Added</i>			<i>0.0</i>	<i>0.7</i>	<i>0.3</i>	<i>0.2</i>	<i>0.2</i>	<i>0.2</i>	<i>0.3</i>
Core	8,135	61%	(0.3)	0.1	2.3	2.7	3.1	4.4	5.1
Barclays U.S. Aggregate Bond Index			(0.2)	(0.4)	1.7	2.3	2.6	3.8	4.9
<i>Value Added</i>			<i>(0.1)</i>	<i>0.5</i>	<i>0.6</i>	<i>0.4</i>	<i>0.5</i>	<i>0.6</i>	<i>0.2</i>
High Yield	2,016	15%	0.9	2.8	5.4	5.6	6.5	8.0	-
Merrill Lynch High Yield Cash Pay Index			1.0	2.5	5.5	5.5	6.2	8.0	-
<i>Value Added</i>			<i>(0.1)</i>	<i>0.3</i>	<i>(0.1)</i>	<i>0.1</i>	<i>0.3</i>	<i>0.0</i>	<i>-</i>
Emerging Market Debt	1,538	11%	(3.5)	(1.3)	3.7	3.4	3.5	5.6	-
JP Morgan Emerging Markets Bond Index Global Diversified			(3.5)	(1.6)	4.6	5.1	4.8	6.6	-
<i>Value Added</i>			<i>0.0</i>	<i>0.3</i>	<i>(0.9)</i>	<i>(1.7)</i>	<i>(1.3)</i>	<i>(1.0)</i>	<i>-</i>
TIPS	1,730	13%	0.8	2.3	2.1	1.8	2.3	3.3	-
Barclays U.S. TIPS			0.8	2.1	1.9	1.7	2.1	3.0	-
<i>Value Added</i>			<i>0.0</i>	<i>0.2</i>	<i>0.2</i>	<i>0.1</i>	<i>0.2</i>	<i>0.3</i>	<i>-</i>

* Total fixed income policy benchmark is an aggregate of underlying portfolio benchmarks.

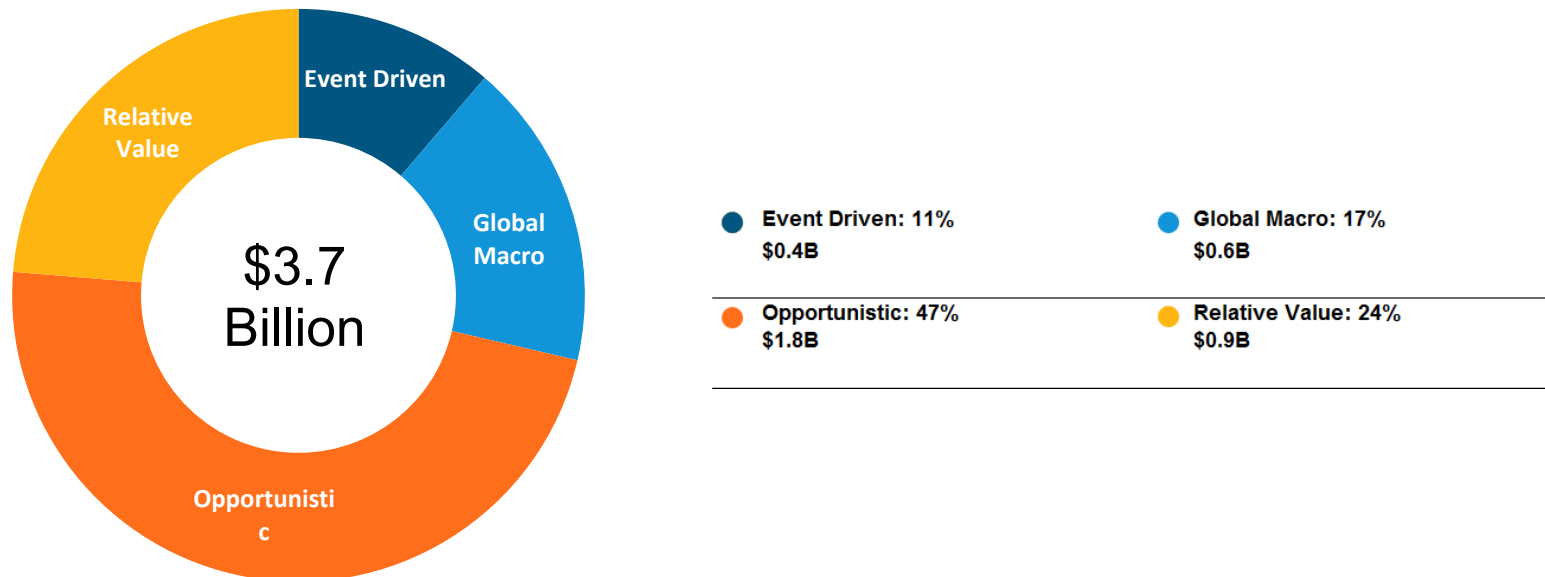
Net Returns (%) As of June 30, 2018	Market Value (\$ Million)	% Allocation	Annualized Returns				
			3 Month	1 Year	3 Year	5 Year	7 Year
Cash	5,946	100%	0.5	1.6	1.3	1.5	2.1



Absolute Return

Net Returns (%) As of June 30, 2018	Market Value		Annualized Returns					
	(\$ Million)	% Allocation	3 Month	1 Year	3 Year	5 Year	7 Year	10 Year
Absolute Return	3,715	100%	1.3	6.4	2.0	5.4	4.8	4.0
Custom Absolute Return Index			0.8	5.5	0.6	2.1	0.9	2.1
<i>Value Added</i>			<i>0.5</i>	<i>0.9</i>	<i>1.4</i>	<i>3.3</i>	<i>3.9</i>	<i>1.9</i>
Event Driven	417	11%	1.6	9.9	2.9	5.7	6.1	6.0
Global Macro	641	17%	1.6	(0.4)	0.0	1.5	1.3	1.1
Opportunistic	1,759	48%	1.3	7.8	-	-	-	-
Relative Value	876	24%	1.2	11.4	8.0	7.4	6.9	6.9

* Inception date for Absolute Return was July 1, 2007. Prior to March 1, 2009, the portfolio benchmark was 1 Month T-Bill+4.5%; thereafter it was 50% HFRX Absolute Return/50% HFRX Market Directional, until February 2016 when it became HFRX Absolute Return. As of July 2016, the benchmark is HFRI Fund of Funds Composite.



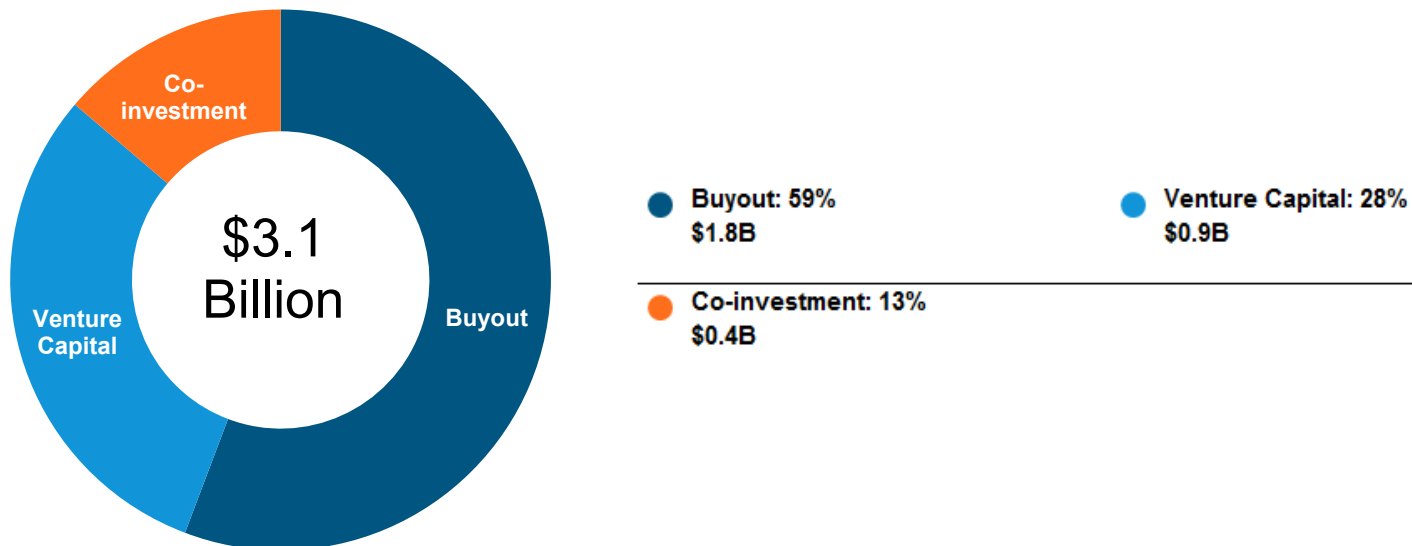
As of June 30, 2018



Private Equity

Net Returns (%) As of June 30, 2018	Market Value		Annualized Returns						
	(\$ Million)	% Allocation	3 Month	1 Year	3 Year	5 Year	7 Year	10 Year	20 Year
Private Equity	3,059	100%	5.4	19.1	13.0	15.2	13.4	10.4	14.9
UCRP Non-Lagged Private Eq Policy Index			4.1	16.3	12.1	14.7	13.0	10.1	8.7
<i>Value Added</i>			<i>1.3</i>	<i>2.8</i>	<i>0.9</i>	<i>0.5</i>	<i>0.4</i>	<i>0.3</i>	<i>6.2</i>
Buyout	1,798	59%	3.8	14.1	12.0	12.9	11.1	9.0	11.6
Venture Capital	868	28%	7.7	17.9	8.8	13.6	13.3	10.1	18.6
Co-investment	392	13%	8.3	49.1	29.6	38.1	34.9	-	-

* From January 2001 to November 2004, the Private Equity benchmark was Russell 3000 + 3% lagged one quarter. Prior to that, it was the S&P 500 + 5% lagged on quarter. As of July 1, 2017, the Private Equity policy benchmark is the Russell 3000 +1.5%.



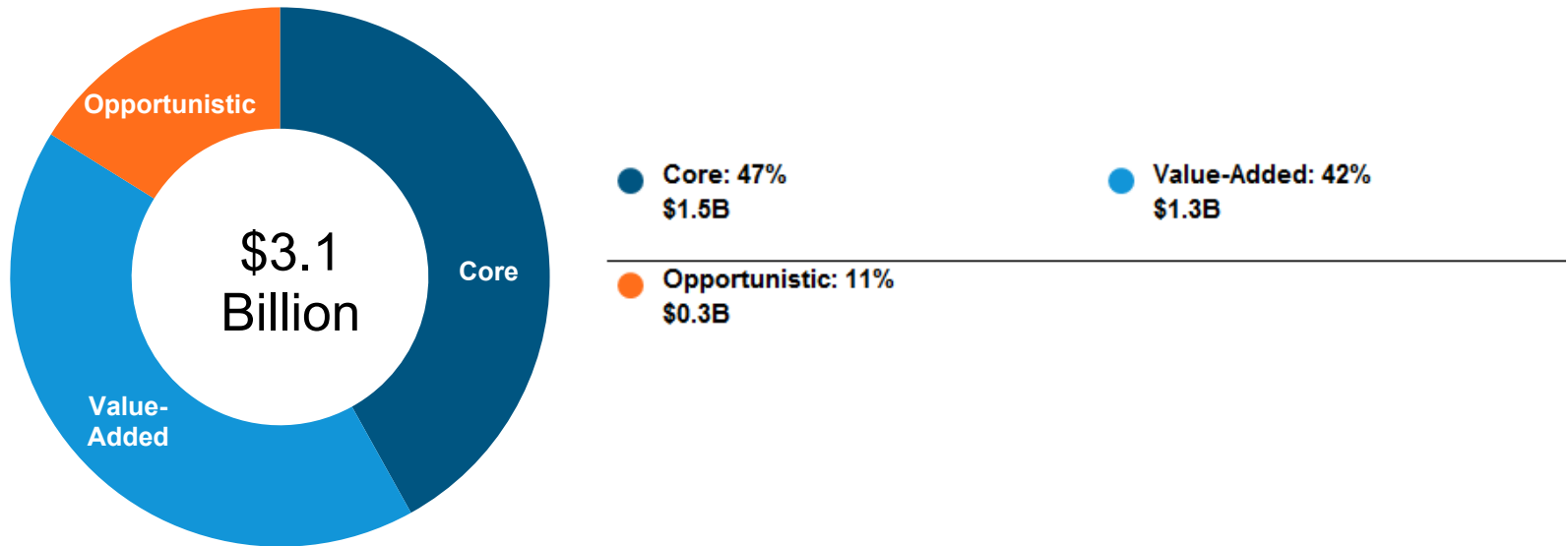
As of June 30, 2018



Real Estate

Net Returns (%) As of June 30, 2018	Market Value (\$ Million)	% Allocation	Annualized Returns					
			3 Month	1 Year	3 Year	5 Year	7 Year	10 Year
Real Estate	3,141	100%	4.5	8.8	9.4	11.8	12.0	1.3
NCREIF Funds Index-Open End Diversified Core Equity Index (lagged 3 months)			2.0	7.1	9.0	10.5	10.8	1.1
<i>Value Added</i>			<i>2.5</i>	<i>1.7</i>	<i>0.4</i>	<i>1.3</i>	<i>1.2</i>	<i>0.2</i>
Core	1,473	47%	2.5	8.1	9.5	11.2	11.7	6.8
Value-Added	1,313	42%	1.2	5.9	8.5	10.5	11.5	0.7
Opportunistic	355	11%	1.8	11.8	7.6	11.1	10.4	(0.3)

* Underlying strategy returns are calculated by an external consultant, and provided on a quarterly lag once quarterly values are finalized



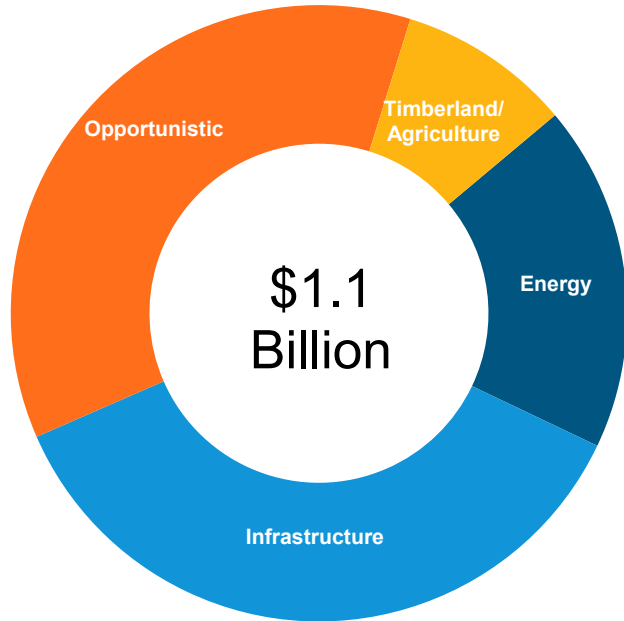
As of June 30, 2018



Real Assets

Net Returns (%) As of June 30, 2018	Market Value (\$ Million)	% Allocation	Annualized Returns				
			3 Month	1 Year	3 Year	5 Year	7 Year
Real Assets	1,146	100%	3.1	9.2	0.4	1.2	1.5
Energy	206	18%	19.4	20.8	(9.6)	(10.0)	(6.3)
Infrastructure	393	34%	0.9	20.3	9.8	12.1	10.4
Opportunistic	436	38%	-	6.9	6.0	5.9	-
Timberland/Agriculture	111	10%	(3.0)	(14.8)	(4.8)	0.4	0.6

* Inception date for Real Assets is April 1, 2010



- Energy: 18%
\$0.2B
- Infrastructure: 34%
\$0.4B
- Opportunistic: 38%
\$0.4B
- Timberland/Agriculture: 10%
\$0.1B

As of June 30, 2018



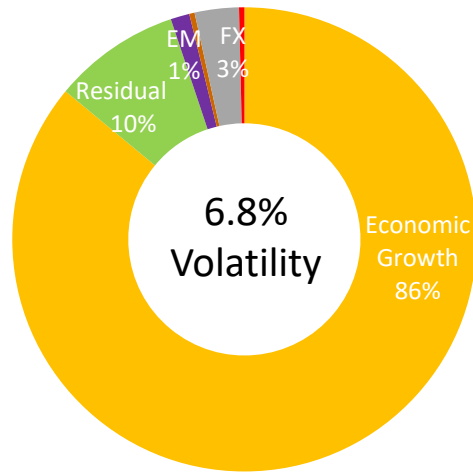
Pension Risk Measurement

Name	Beta vs Benchmark	Portfolio Risk (%)		Benchmark Risk (%)		Active Risk (%)	
	Current	Standalone Volatility	QoQ Change	Standalone Volatility	QoQ Change	Tracking Error	QoQ Change
UCRP Total		6.8	0.1	6.8	(0.3)	0.6	(0.2)
Public Equity	1.01	10.3	(0.2)	10.1	(0.2)	0.8	(0.1)
Fixed Income	0.88	2.5	0.0	2.8	0.1	0.4	(0.0)
Absolute Return	0.81	3.3	(0.1)	3.0	(0.1)	1.9	(0.5)
Private Equity	1.19	15.3	(2.0)	10.9	0.2	8.2	(1.6)
Private Real Estate	1.22	10.6	(0.1)	8.1	(0.0)	4.2	(0.0)
Real Assets ⁽¹⁾	1.00	20.2	(1.8)	20.2	(1.8)	0.0	0.0
Cash	1.41	0.2	0.1	0.1	0.0	0.2	0.1

(1) Real Assets does not have standalone (line item) tracking error as per policy, but may contribute to contribute to total portfolio Tracking Error due to strategic asset allocation over/underweights



High Level Macroeconomic Risk Factors



Portfolio Standalone Risk Factor Decomposition

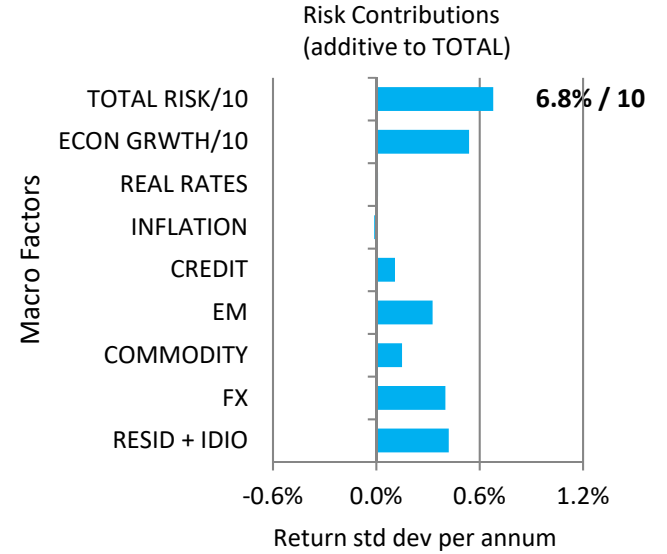
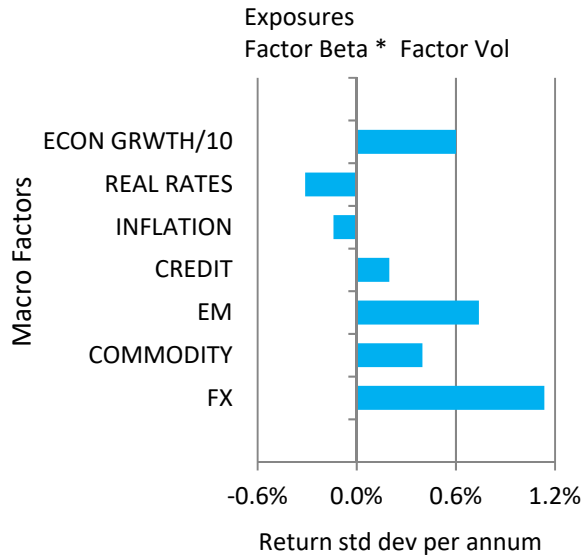
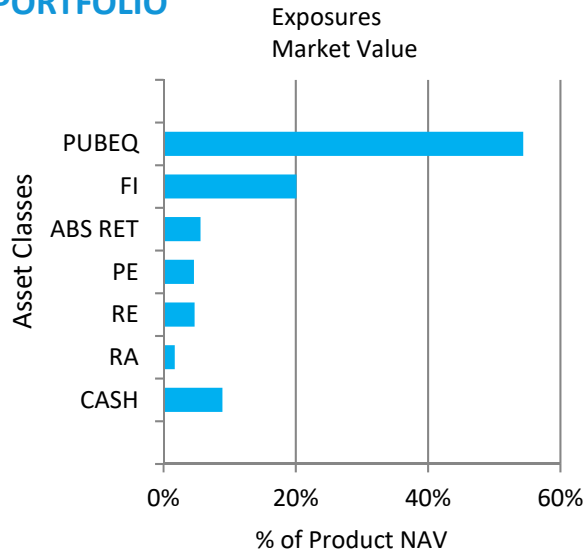
Factor Name	Factor Description
Economic Growth	Proxied by broad, developed market equity index returns
Real Rates	Inflation-linked bond returns
Inflation	Return of long nominal bonds, short inflation-linked bonds portfolio
Credit	Return of long corporate bonds, short nominal bonds portfolio
Commodity	Weighted GSCI Commodity index returns
Emerging Markets (EM)	Equally weighted basket of EM Assets

* "Residual Risk" is any risk which does not load on to the high level macro factors. This risk often corresponds to non-strategic, non-tactical level risk decisions, e.g. individual public equity manager sector tilts and stock selection decisions. This finer scale risk is captured separately, with more granular risk models.

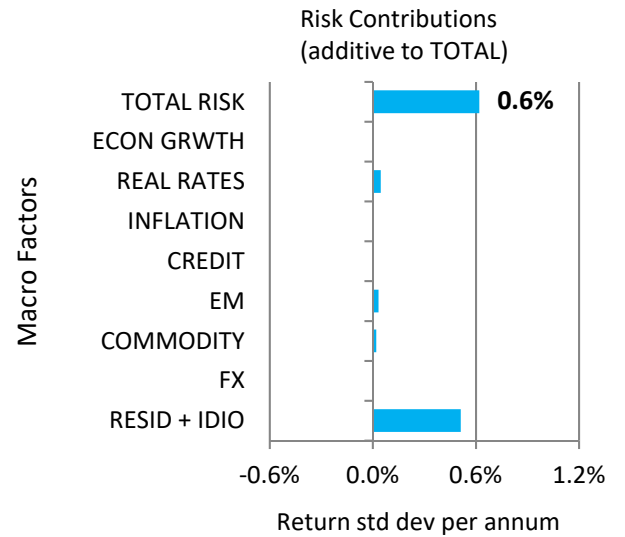
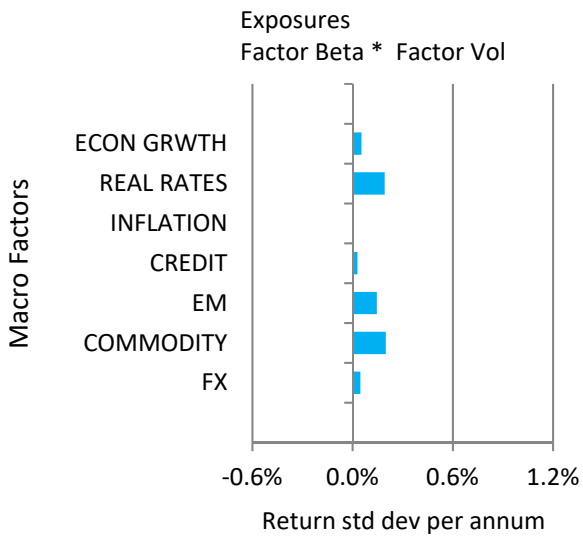
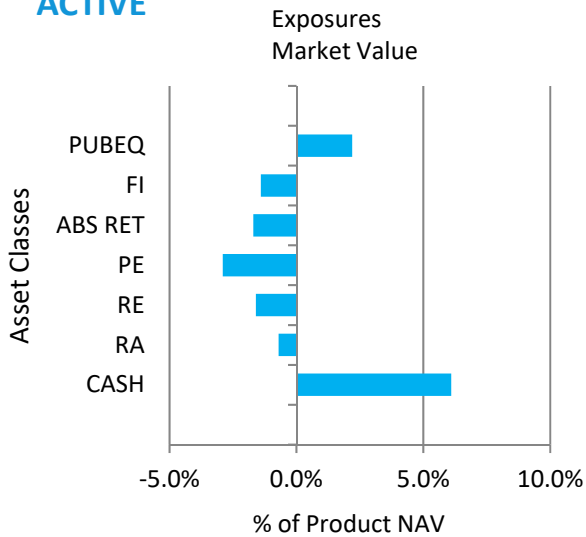


Asset Allocation vs Macroeconomic Risk Factors

PORTFOLIO



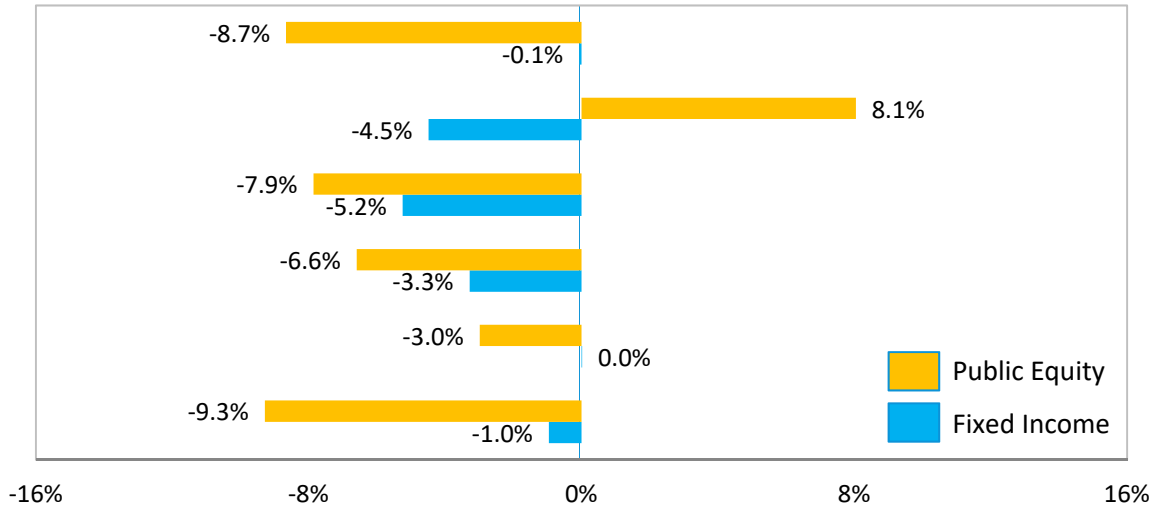
ACTIVE





Stress Tests and Scenario Analysis

PORTFOLIO



S&P -10%

US TSY +100BPS

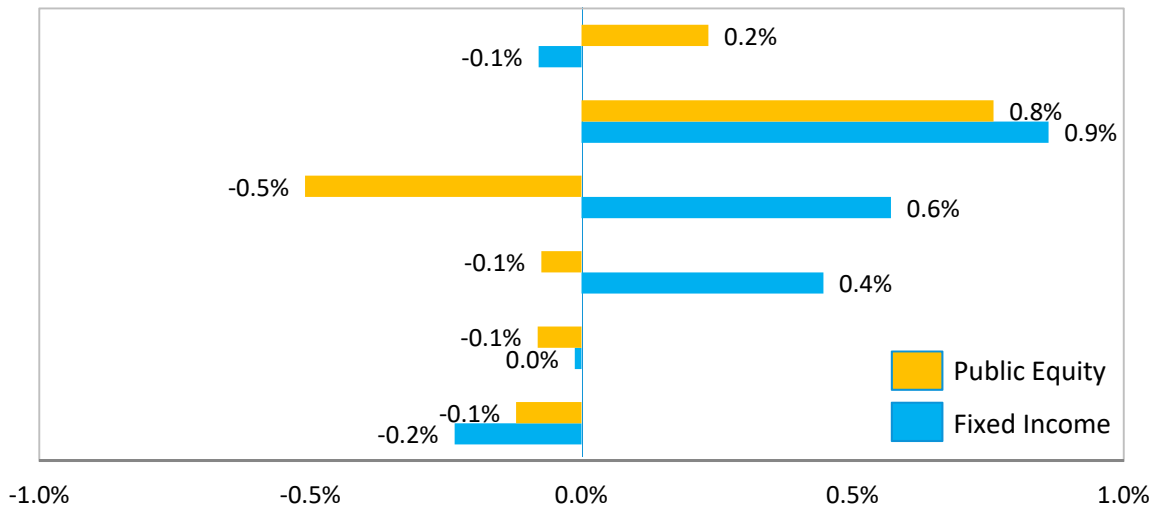
"Taper Tantrum" 2013

Volatility Regime Change (Hypothetical)

Value Reversal (Hypothetical)

China Credit Crunch (Hypothetical)

ACTIVE



S&P -10%

US TSY +100BPS

"Taper Tantrum" 2013

Volatility Regime Change (Hypothetical)

Value Reversal (Hypothetical)

China Credit Crunch (Hypothetical)