Office of the Treasurer of The Regents

University of California

I-2
UCRP Asset Allocation Review and Recommendations

Committee on Investments/
Investment Advisory Group
February 26, 2013

Outline of Presentation

- **Defined Benefit Plan Investment Policy**
- **Objectives**
- **Portfolio Selection Process**
- **Recommendations**
- **Implementation**
- **Appendix**

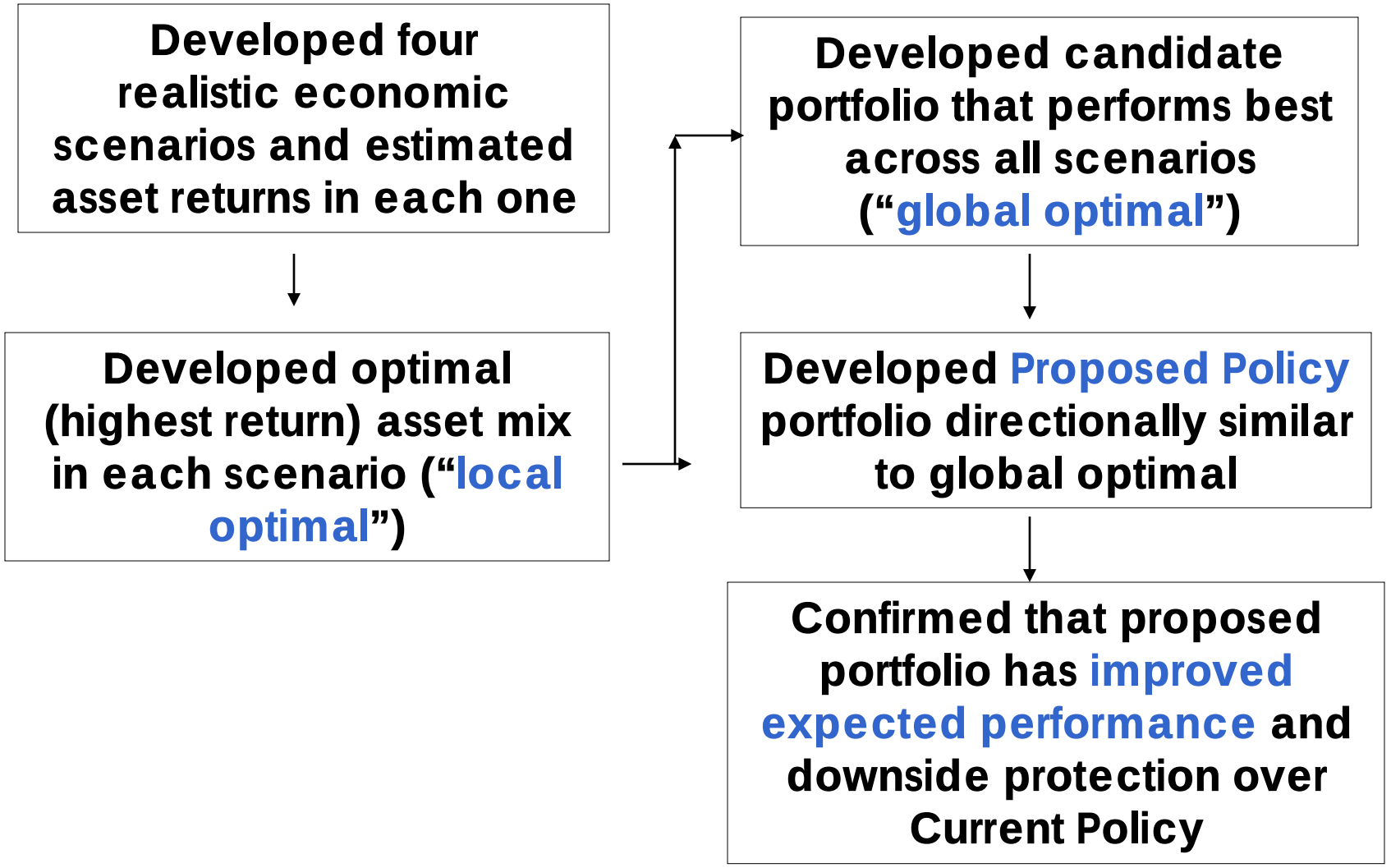
Three Pillars of Pension Financial Health

- **Regents are responsible for the three types of policies that determine the health of a Defined Benefit Plan:**
  - **Benefit Policy: Cash flow out of the Fund**
    - **Plan benefits and eligibility requirements**
  - **Funding Policy: Cash flow into the Fund**
    - **When and what amount of contributions will be made, and by whom**
  - **Investment Policy: Level / type of investment risk**
    - **Risk tolerance / preference of plan fiduciaries**
- **Investment Policy is the primary subject at this meeting**

Objectives

- **Update asset allocation policy in light of current economic and market conditions**
  - **Near term outlook is still uncertain**
  - **Asset markets will remain volatile**
  - **Asset allocation requires flexible approach**
- **Recommend changes to Long-term Policy**

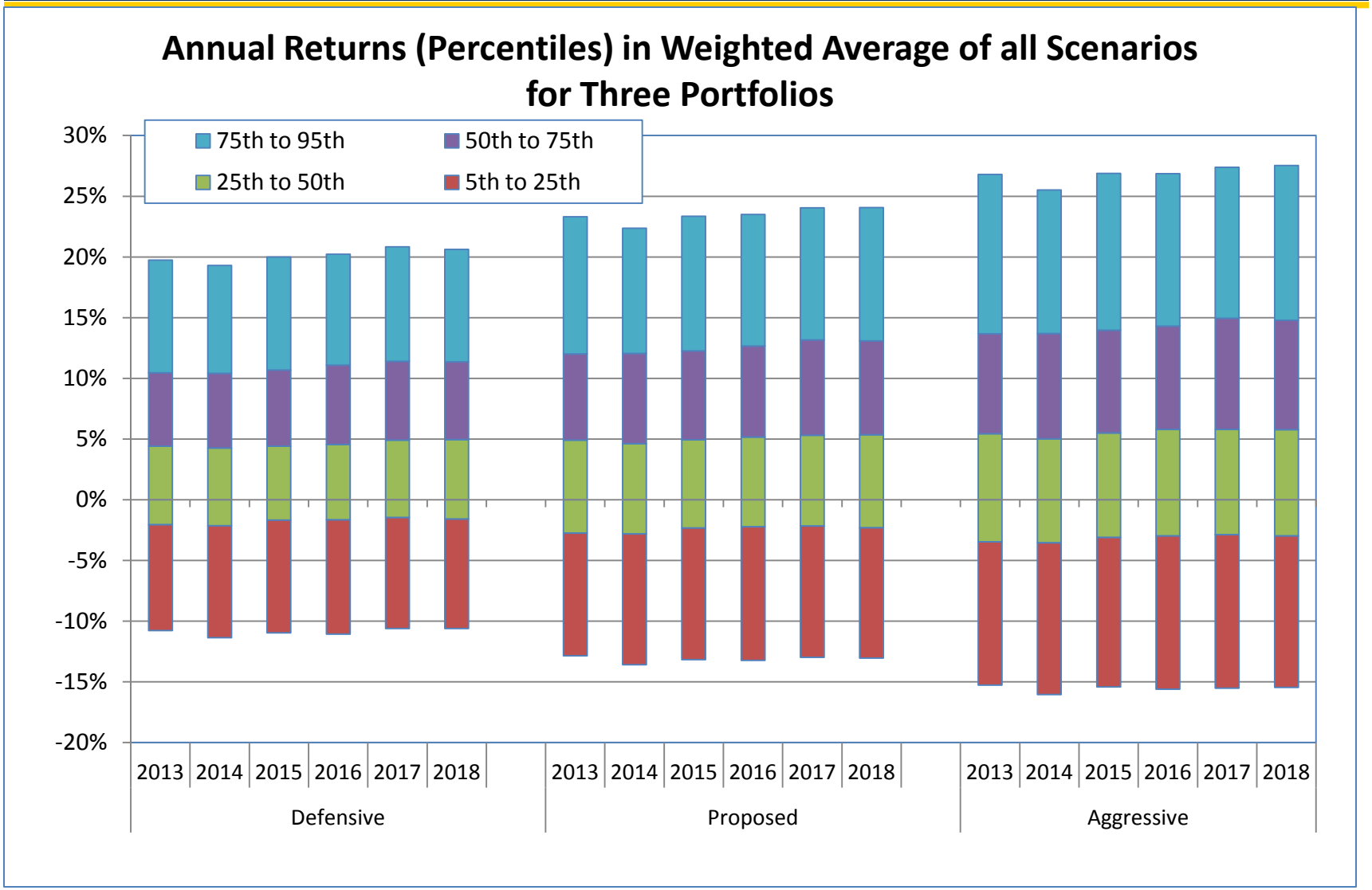
Policy Portfolio Selection Process



Proposed Changes to Long Term Policy

	Long-Term Policy Weights			
UCRP Asset Allocation	Proposed (%)	Current (%)	Change vs Proposed (%)	Notes
Developed Equity	28.50	41.50	(13.00)	-5.5% US Eq; -5.5% Non US Eq; -2% Global Eq
Emerging Market Equity	11.00	7.00	4.00	roughly 2X its wt in global market capitalization
Fixed Income	20.00	25.00	(5.00)	Reduce TIPS from 8% to 3%
Liquid Alternatives	22.50	8.50	14.00	+ 6% Cross Asset Class; +8.5% Opportunistic Equity
Illiquid Alternatives	18.00	18.00	-	
TOTAL	100.00	100.00	-	

Annual Return Outcomes – Wtd. Avg. Scenarios



Recommended Long-Term Policy Portfolio

	Long-Term Policy Weights			Current Policy
UCRP Asset Allocation	Existing Long Term Policy	**Proposed** Long-Term Policy	Change	Current Policy as of Jan 1, 2013
US Equity	20.50	15.00	(5.50)	25.00
Non-US Developed Equity	19.00	13.50	(5.50)	19.00
Emerging Market Equity	7.00	11.00	4.00	6.75
Global Equity	2.00	-	(2.00)	2.00
Public Equity	48.50	39.50	(9.00)	52.75
US Core Fixed Income	12.00	12.00	-	12.00
High Yield Debt	2.50	2.50	-	2.50
Emerging Market Debt	2.50	2.50	-	2.50
US TIPS	8.00	3.00	(5.00)	8.00
Fixed Income	25.00	20.00	(5.00)	25.00
Private Equity	8.00	8.00	-	7.75
Absolute Return	6.50	6.00	(0.50)	6.00
Cross Asset Class	2.00	8.00	6.00	2.00
Opportunistic Equity	-	8.50	8.50	-
Real Assets	3.00	3.00	-	1.75
Real Estate	7.00	7.00	-	4.75
Alternatives	26.50	40.50	14.00	22.25
Liquidity	-	-	-	-
TOTAL	100.00	100.00	-	100.00

Recommended Rebalancing Ranges

		PROPOSED			
	Current Policy Weights as of April 2013	Lower Bound	Upper Bound	Lower Range	Upper Range
US Equity	25.00	20.00	30.00	(5)	5
Non-US Developed Equity	19.00	14.00	24.00	(5)	5
Emerging Market Equity	6.75	4.75	8.75	(2)	2
Global Equity	2.00	1.00	3.00	(1)	1
Public Equity	52.75	42.75	62.75	(10)	10
US Core Fixed Income	12.00	9.00	15.00	(3)	3
High Yield Debt	2.50	1.50	3.50	(1)	1
Emerging Market Debt	2.50	1.50	3.50	(1)	1
US TIPS	8.00	6.00	10.00	(2)	2
Fixed Income	25.00	20.00	30.00	(5)	5
Private Equity	7.75	4.75	10.75	(3)	3
Absolute Return	6.00	1.00	11.00	(5)	5
Cross Asset Class	2.00	-	5.00	(3)	3
Opportunistic Equity	-	-	3.00	(3)	3
Real Assets	1.75	0.75	2.75	(1)	1
Real Estate	4.75	1.75	7.75	(3)	3
Alternatives	22.25	15.25	29.25	(7)	7
Liquidity	-	-	10.00	-	10
TOTAL	100.00				

Implementation

- **New Long-term policy targets effective April 1, 2013**
- **Current Policy weights will remain as the basis for the total fund performance benchmark in the interim**
- **CIO will move to Long-term targets as market conditions warrant, and as investment opportunities are available**
- **Consultant approves performance benchmark changes prior to new investments**
- **Policy benchmark for Opportunistic Equity: MSCI All Country World Index (ACWI) net dividends**

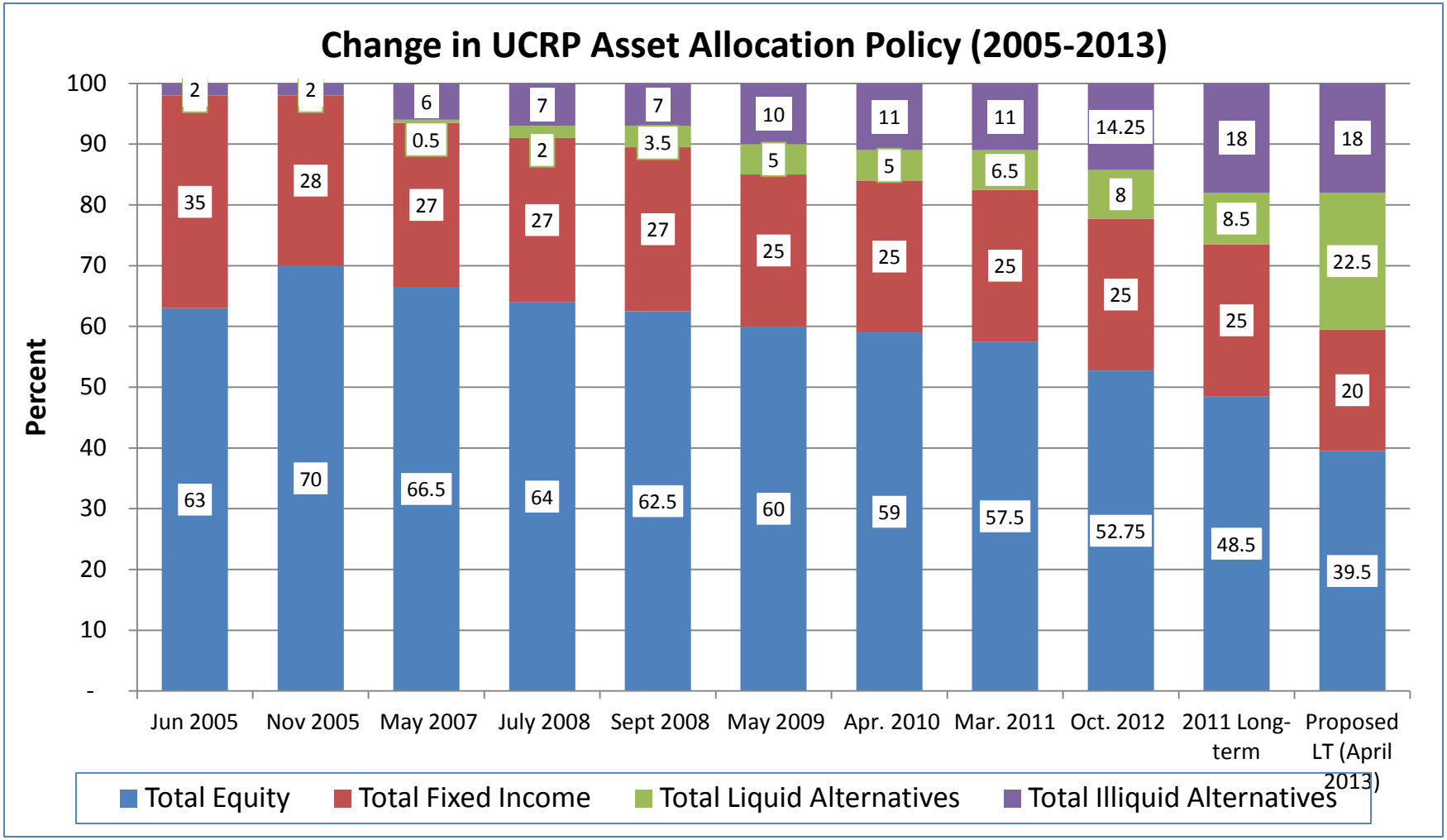
APPENDIX

- **Pension Investment Objectives**
- **UCRP Asset Allocation History**
- **Summary of Asset Allocation Process**
- **Development and evaluation of optimal and proposed portfolios**

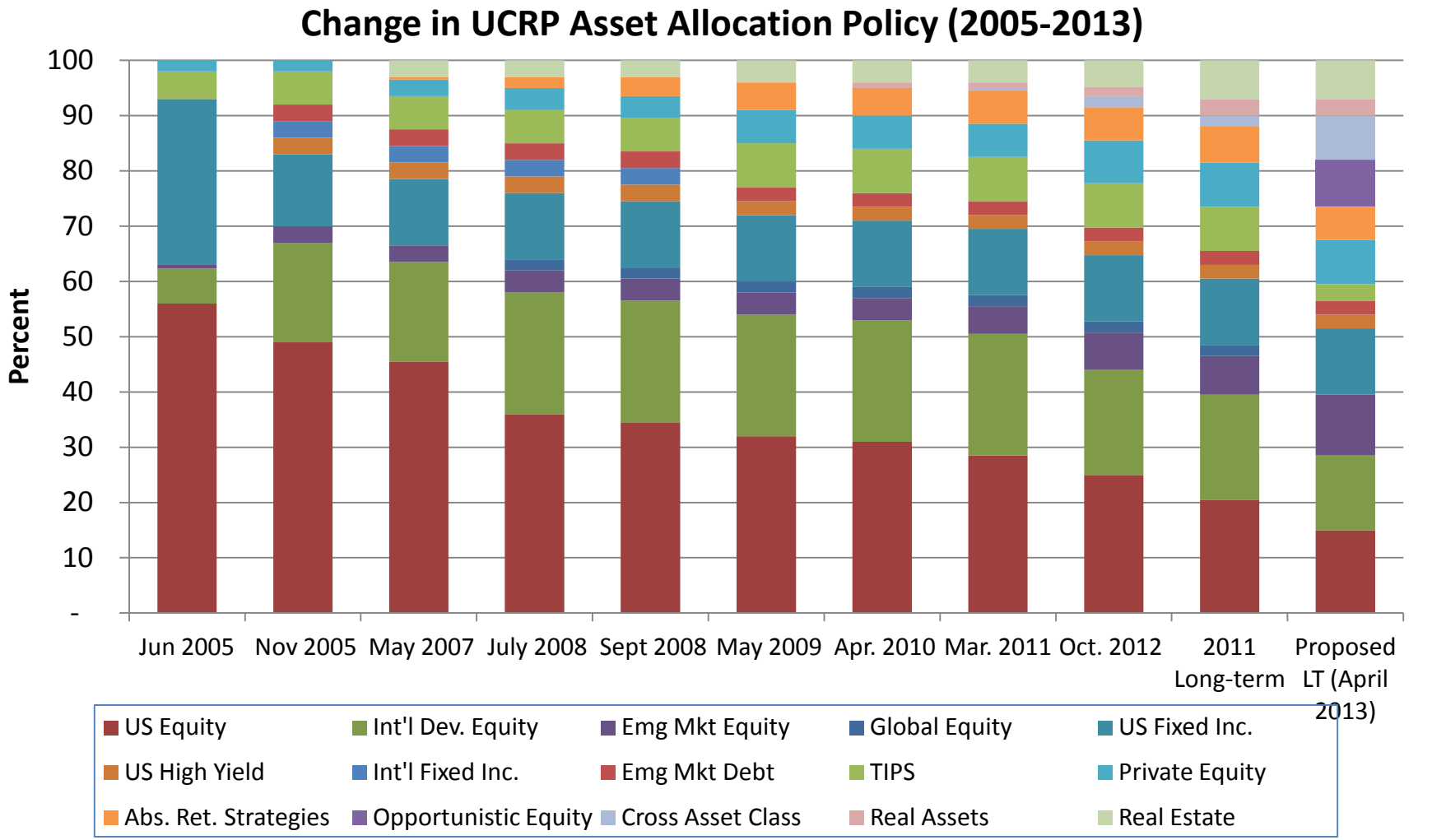
Pension Investment Objectives

- The mission of the Plan is to provide retirement benefits, as described in the Plan document, to its participants and their beneficiaries.
- The overall investment goal of the Plan is:
  - To maximize the probability of meeting the Plan's liabilities *subject to* The Regents' funding policy.
- Other goals include:
  - To maintain the ability to pay all benefits and obligations when due
  - To maximize return within reasonable and prudent levels of risk
  - To preserve the real (i.e. inflation adjusted) purchasing power of assets

UCRP Asset Allocation History



UCRP Asset Allocation History



Asset Allocation after the Great Recession

- **Four plus years after Sept 2008 crash, near term outlook is still uncertain**
- **Asset markets will remain volatile as political and policy uncertainty is resolved**
  - **Decision horizon remains short (3 years)**
- **Asset allocation requires flexible approach rather than assumed long-term equilibrium**
- **Scenario approach useful**
  - **A scenario is a range of likely outcomes, not a forecast**
  - **Aim is to examine downside within each scenario**

Summary of Asset Allocation Process

- Develop economic scenarios for 2013-2016
- Develop asset return relationships for each scenario
- Simulate asset returns in each scenario; summarize distributions with return and risk (worst case loss) values
- Develop "local" optimal portfolio for each scenario
- Develop "global" optimal portfolio across all scenarios (performs well in a variety of scenarios)
- Develop a policy portfolio that
  - recognizes investing constraints but
  - moves in the direction of the global optimal portfolio

Current Economic Environment

- **Developed world still in midst of long term de-leveraging**
  - **Difficult fiscal choices:**
    - **Balance between Austerity, Stimulus, and Quantitative Easing**
  - **Developed world real bond yields very low**
    - **Expected to rise as output gap narrows and monetary policy normalizes**
- **Emerging world increased potential as a result of relative financial strength**
- **Asset markets will remain volatile; risk aversion itself is changeable**

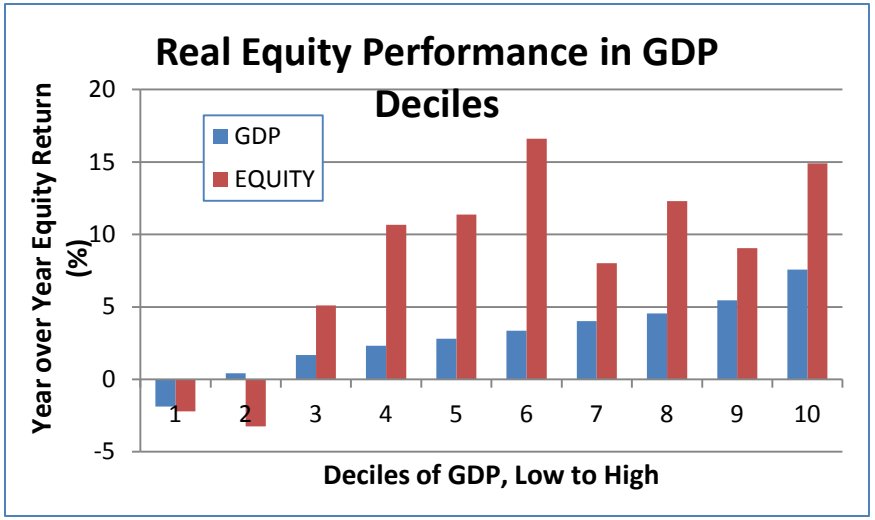
Current Economic Environment 2

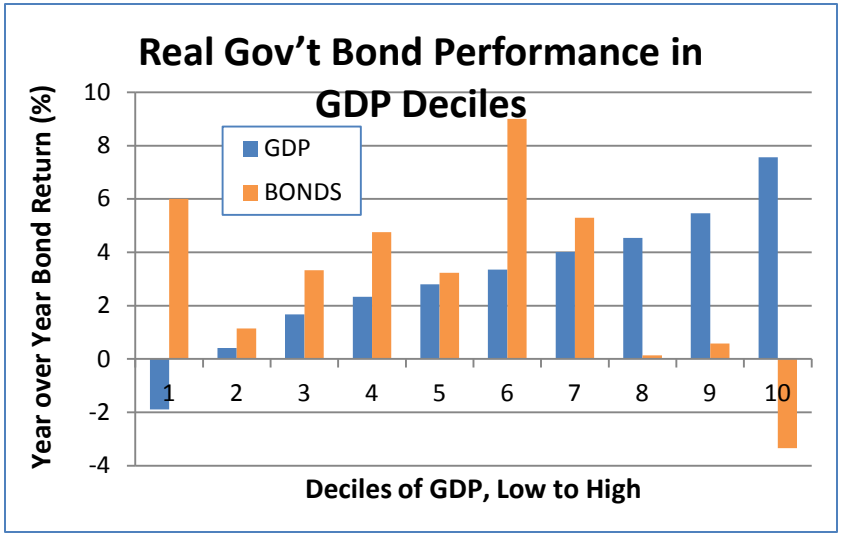
- **Global recovery uneven across regions**
  - **US: continued moderate recovery (around trend growth)**
  - **Rest of Developed world: slow growth; near term European recession; Japan reflation possible**
  - **Emerging markets (EM): continued growth; concerns about sustainability of China's economy are fading**
- **Higher inflation possible if EM growth puts pressure on commodity prices**
  - **Developed world output gap counterbalances QE**
  - **Low inflation expected in very near term**

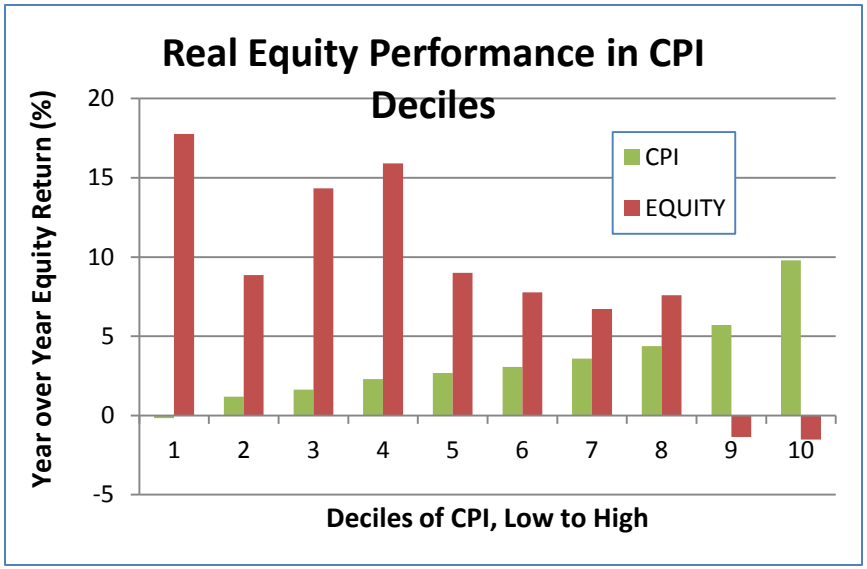
How the Scenario Framework Works

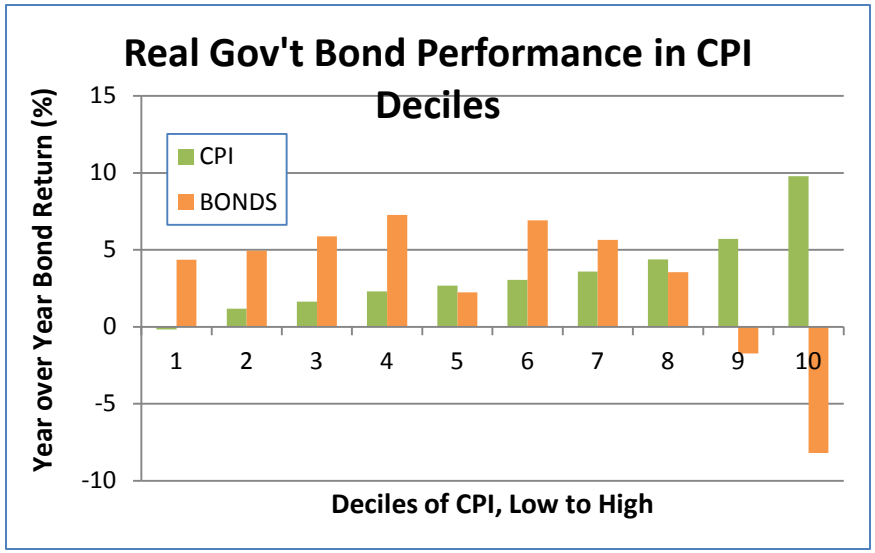
- **Assets expected to perform differently in different growth / inflation environments**
- **Key factors which impact asset returns:**
  - **Real Economic Growth (GDP)**
  - **Headline Inflation (CPI)**
- **Specified yearly paths for these and other key economic drivers, over 3-5 year span (*scenarios*, not *forecasts*)**
- **Global scenarios have potentially different regional growth/inflation paths (separate forecasts for US, Non-US Developed, Emerging regions)**
- **Generated 2000 random joint paths for each return variable for each scenario**

Asset Returns in Different GDP/CPI Regimes

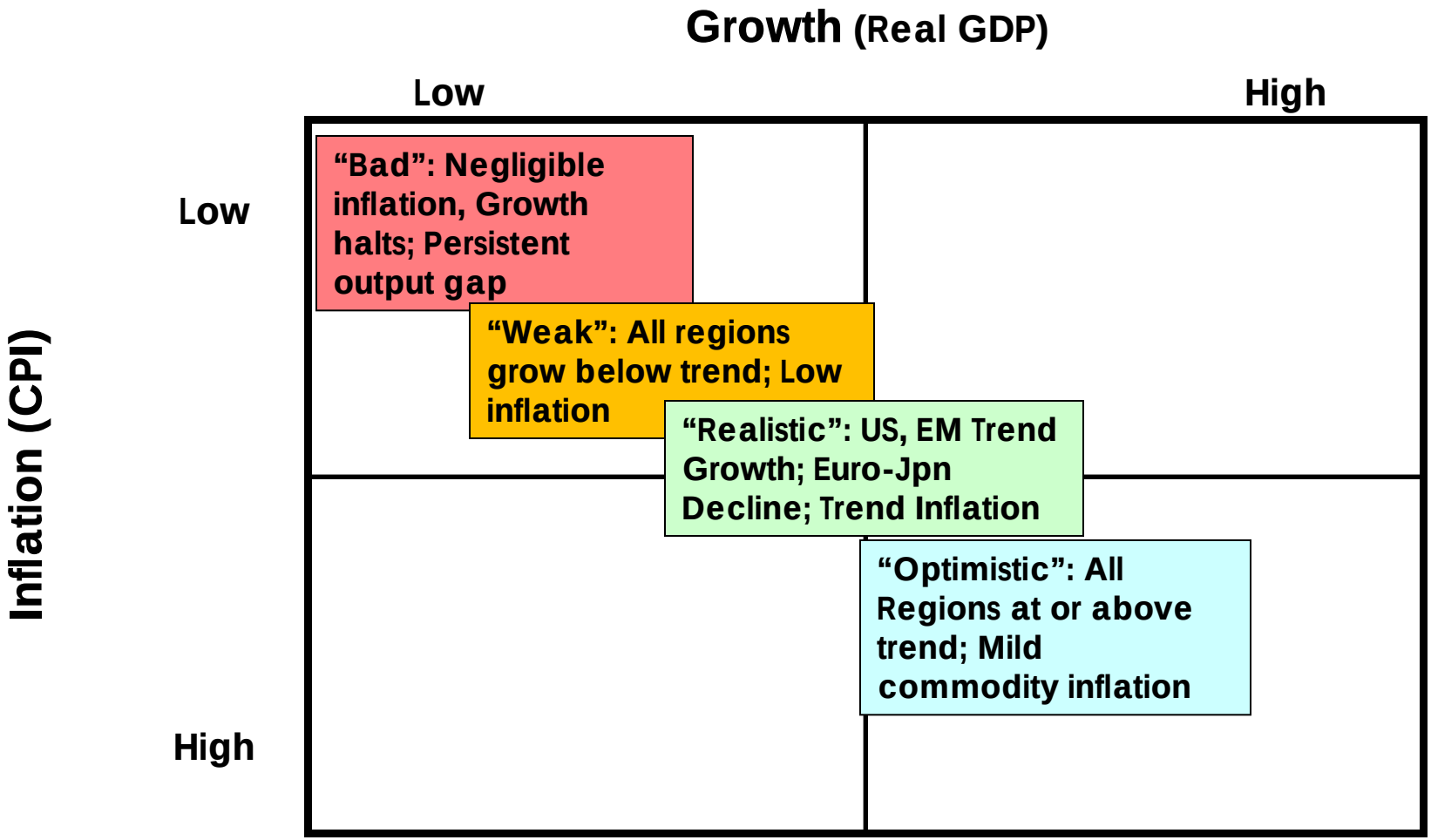




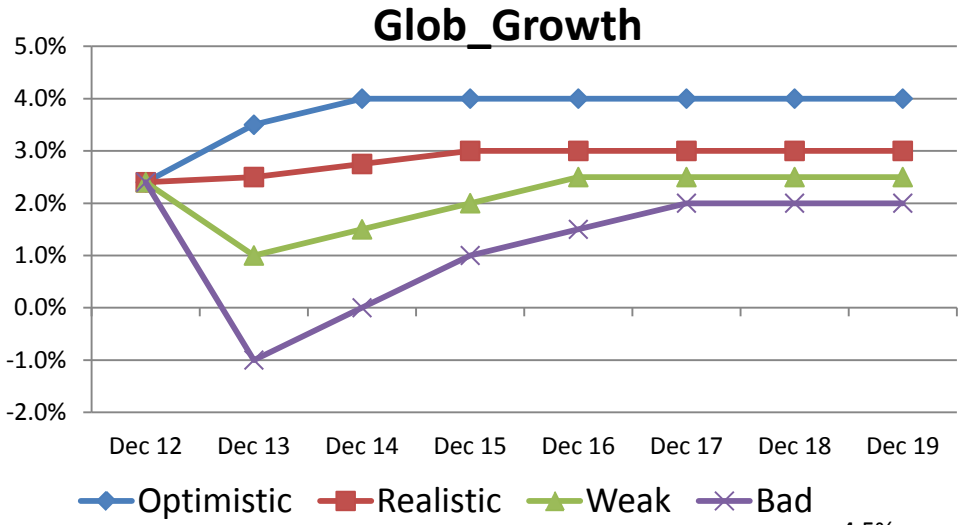




Economic Scenarios for 2013-16

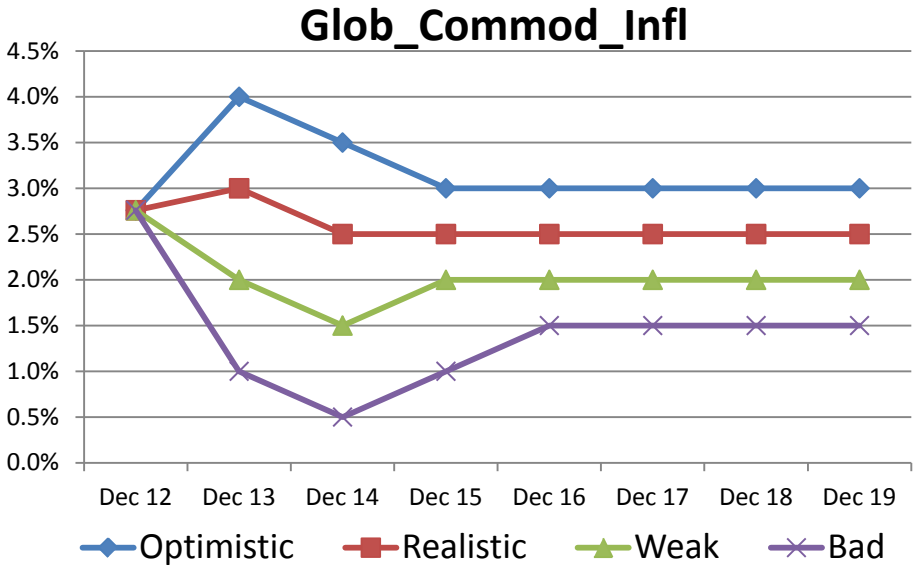


Scenarios: Key Inputs



← Real Global GDP Growth in all scenarios

Real Global Commodity Inflation in all scenarios →



Economic Drivers for Asset Returns

- **Investment returns for main asset classes linked to economic drivers**
  - **Equity returns depend on dividend yield, earnings growth (based on nominal GDP), and change in valuations**
  - **Fixed income returns based on current yield and change in yield or spread**
  - **Other assets (e.g., hedge funds, private equity, real estate) assumed to behave loosely like combinations of equity and bonds)**
- **Result: 2000 random investment returns for <u>each asset class</u> for <u>each scenario</u>**
  - **Although random, correlation of asset classes preserved**

Asset Class Returns and Risk (3 Year Horizon)

- **Return** = median of simulated three year compound returns
- **Risk** = average of worst 5% of simulated three year returns
  - Measure of worst case loss, not volatility

Scenario -->	OPTIMISTIC		REALISTIC		WEAK		BAD	
January 2013 Simulations	Median 3yr Compound Return	95% CVaR of 3yr Return	Median 3yr Compound Return	95% CVaR of 3yr Return	Median 3yr Compound Return	95% CVaR of 3yr Return	Median 3yr Compound Return	95% CVaR of 3yr Return
US_Equity	11.12%	-2.98%	8.04%	-10.10%	2.21%	-19.62%	-1.14%	-22.91%
Non_US_Eq_Dev	8.08%	-8.42%	5.77%	-15.48%	1.77%	-22.17%	-1.46%	-26.81%
EM_Equity	13.70%	-8.22%	10.25%	-20.23%	2.04%	-32.62%	-3.96%	-38.99%
US_FI_Agg	1.28%	-3.83%	1.77%	-4.60%	2.06%	-4.33%	2.49%	-3.97%
Non_US_FI_Agg	0.60%	-7.48%	0.85%	-9.27%	1.10%	-8.10%	1.31%	-8.02%
EM_FI_Agg	2.12%	-13.92%	3.60%	-10.94%	4.46%	-8.96%	5.24%	-7.67%
US_High_Yield	5.72%	2.00%	5.18%	-3.13%	4.12%	-7.77%	3.00%	-8.33%
US_TIPS	0.08%	-5.13%	-0.32%	-7.17%	-0.68%	-8.27%	-0.97%	-8.77%
US_Cash_Equiv	1.95%	0.60%	1.27%	0.16%	1.06%	0.18%	0.34%	0.03%
Real_Estate	9.28%	-4.28%	5.96%	-11.07%	1.91%	-17.12%	-2.98%	-22.32%
Private_Equity	11.15%	-6.90%	6.61%	-19.29%	-0.36%	-29.28%	-8.41%	-37.01%
Hedge_Funds	10.67%	4.87%	7.10%	0.28%	3.18%	-2.50%	0.49%	-5.17%
Opp_Equity	13.20%	-0.65%	10.23%	-8.29%	4.98%	-17.18%	1.25%	-20.68%
Nat_Resources	9.77%	-4.77%	5.42%	-13.77%	2.80%	-23.55%	-4.94%	-30.19%

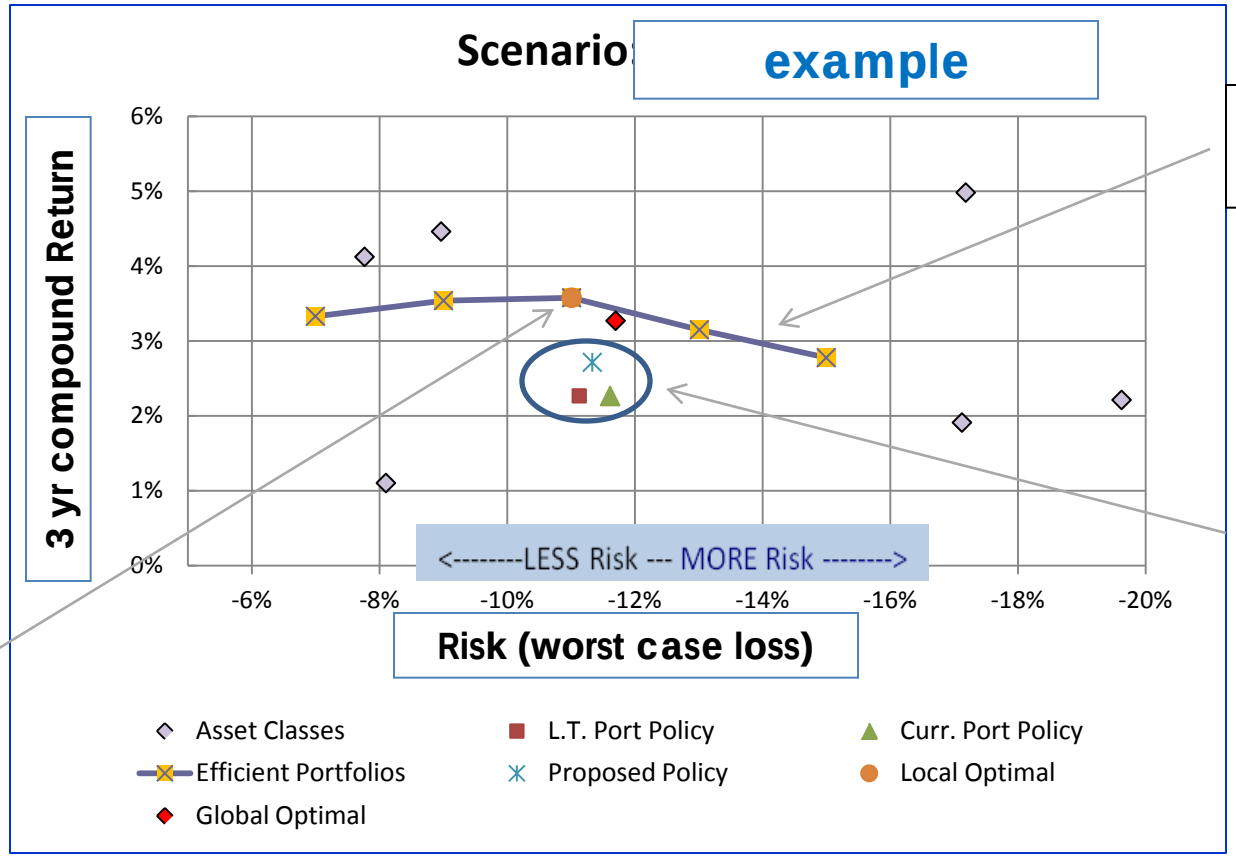
Portfolio Selection - Summary

- For each scenario, a "local optimal" portfolio was selected
  - Best return available given constraints
- The optimal portfolios from all four scenarios were combined into a single "global optimal" portfolio
  - No portfolio will have the best performance in all economic scenarios
  - Goal is to Minimize *average* worst case loss, and
  - Maximize *average* risk adjusted return
- CIO proposed portfolio moving in the direction of change of the global optimal portfolio
  - Proposed policy has improved expected return and worst case loss than current policy

Portfolio Selection Within Scenario

For each scenario:

1. **The likely level and range of asset class returns was estimated**
2. **Optimal (best return for a given level of risk) portfolios were computed**
3. **The risk and return of the current and proposed policy mixes were estimated**



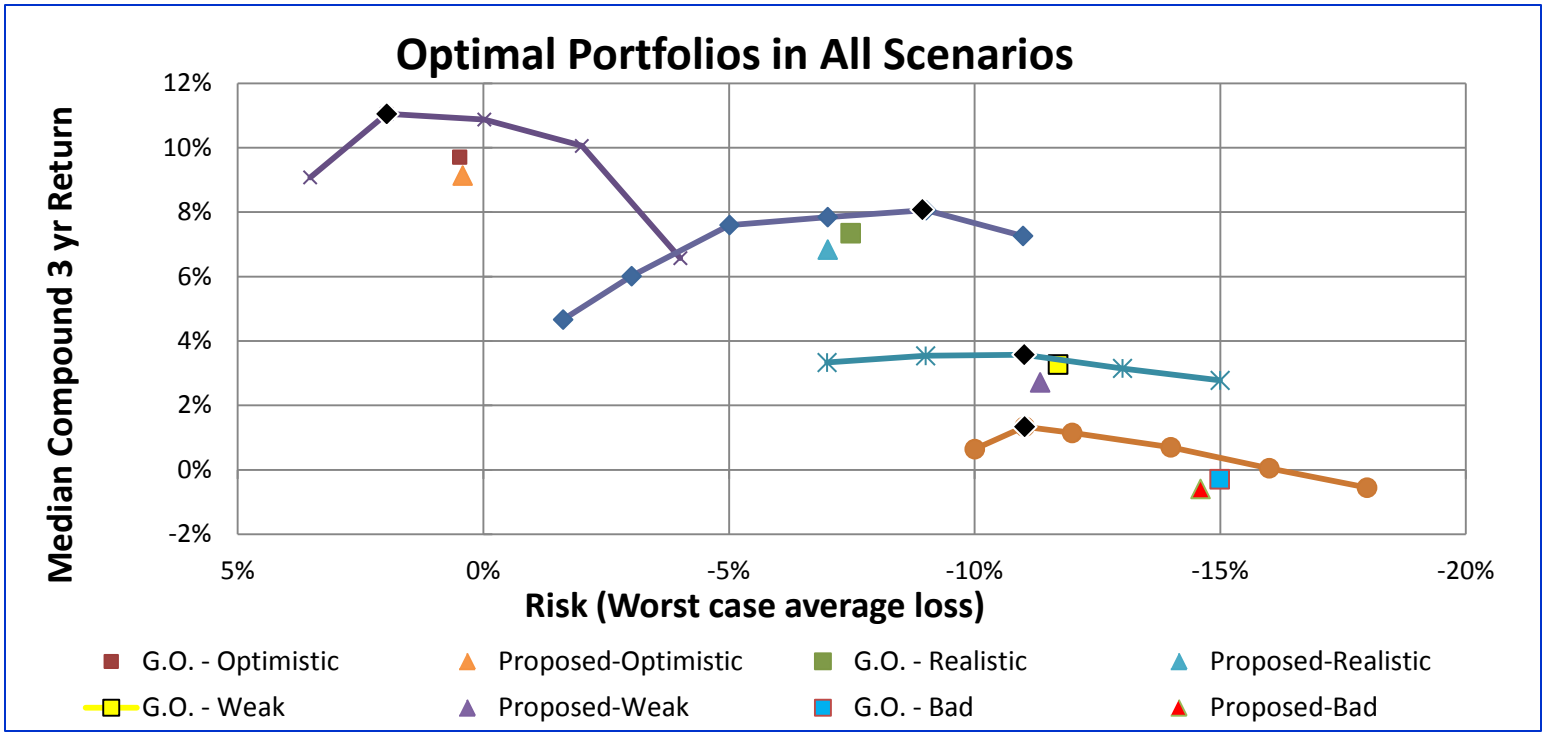
Efficient Portfolios

Current and proposed Policy mix

Highest return ("optimal")

Portfolio Selection Across Scenarios

- "Efficient Frontiers" of all scenarios shown below
- Any portfolio will have different performance in each scenario
- Local Optimal portfolios (black diamonds) lie on Frontier
- Global Optimal (squares) is a compromise (neither best nor worst)
- Proposed policy (triangles) close to Global Optimal

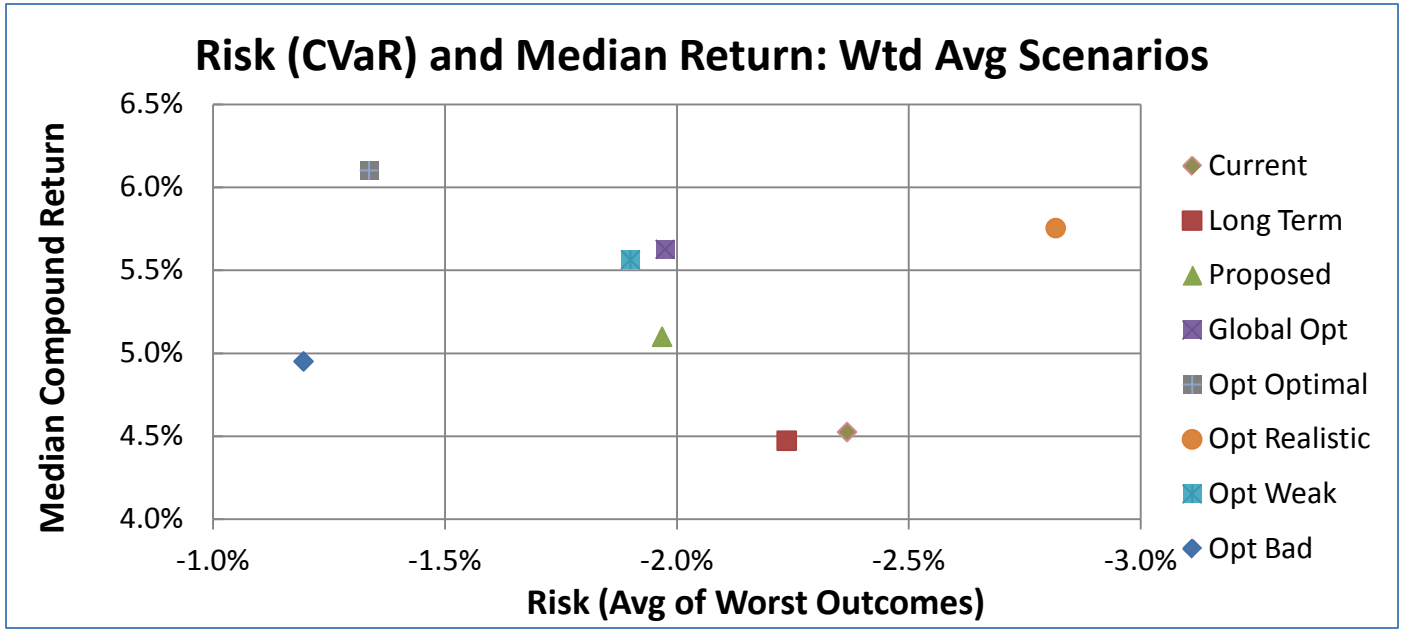


Portfolio Return and Risk – All Scenarios

	UCRP Current Policy	UCRP Long Term Policy	Proposed Long Term Policy	Global Opt	Local Opt in Optimistic	Local Opt in Realistic	Local Opt in Weak	Local Opt in Bad
Median Return								
OPTIMISTIC	8.3%	8.3%	9.1%	9.7%	11.0%	10.9%	8.9%	7.3%
REALISTIC	6.2%	6.2%	6.8%	7.3%	8.0%	8.1%	7.0%	5.9%
WEAK	2.3%	2.3%	2.7%	3.3%	3.5%	2.9%	3.6%	3.4%
BAD	-0.6%	-0.7%	-0.6%	-0.3%	-0.7%	-1.6%	0.4%	1.3%
WTD AVERAGE	4.5%	4.5%	5.1%	5.6%	6.1%	5.8%	5.6%	5.0%
Risk (Avg of Worst Losses)								
OPTIMISTIC	-0.2%	0.0%	0.4%	0.5%	2.0%	0.1%	0.0%	-0.4%
REALISTIC	-7.1%	-6.9%	-7.0%	-7.5%	-6.3%	-8.9%	-7.5%	-5.6%
WEAK	-11.6%	-11.1%	-11.3%	-11.7%	-10.7%	-14.2%	-11.0%	-9.1%
BAD	-14.7%	-14.3%	-14.6%	-15.0%	-14.4%	-18.3%	-13.8%	-11.0%
WTD AVERAGE	-2.4%	-2.2%	-2.0%	-2.0%	-1.3%	-2.8%	-1.9%	-1.2%
Risk (Volatility of Returns)								
OPTIMISTIC	13.2%	12.7%	13.1%	13.9%	13.3%	15.8%	13.5%	12.1%
REALISTIC	18.8%	18.4%	19.5%	21.0%	20.4%	23.7%	20.5%	16.4%
WEAK	20.7%	20.0%	20.9%	22.0%	20.7%	25.0%	21.3%	18.5%
BAD	20.4%	19.8%	20.6%	21.7%	20.5%	24.7%	21.1%	18.2%
WTD AVERAGE	10.4%	10.1%	10.6%	11.3%	10.9%	12.8%	11.0%	9.2%

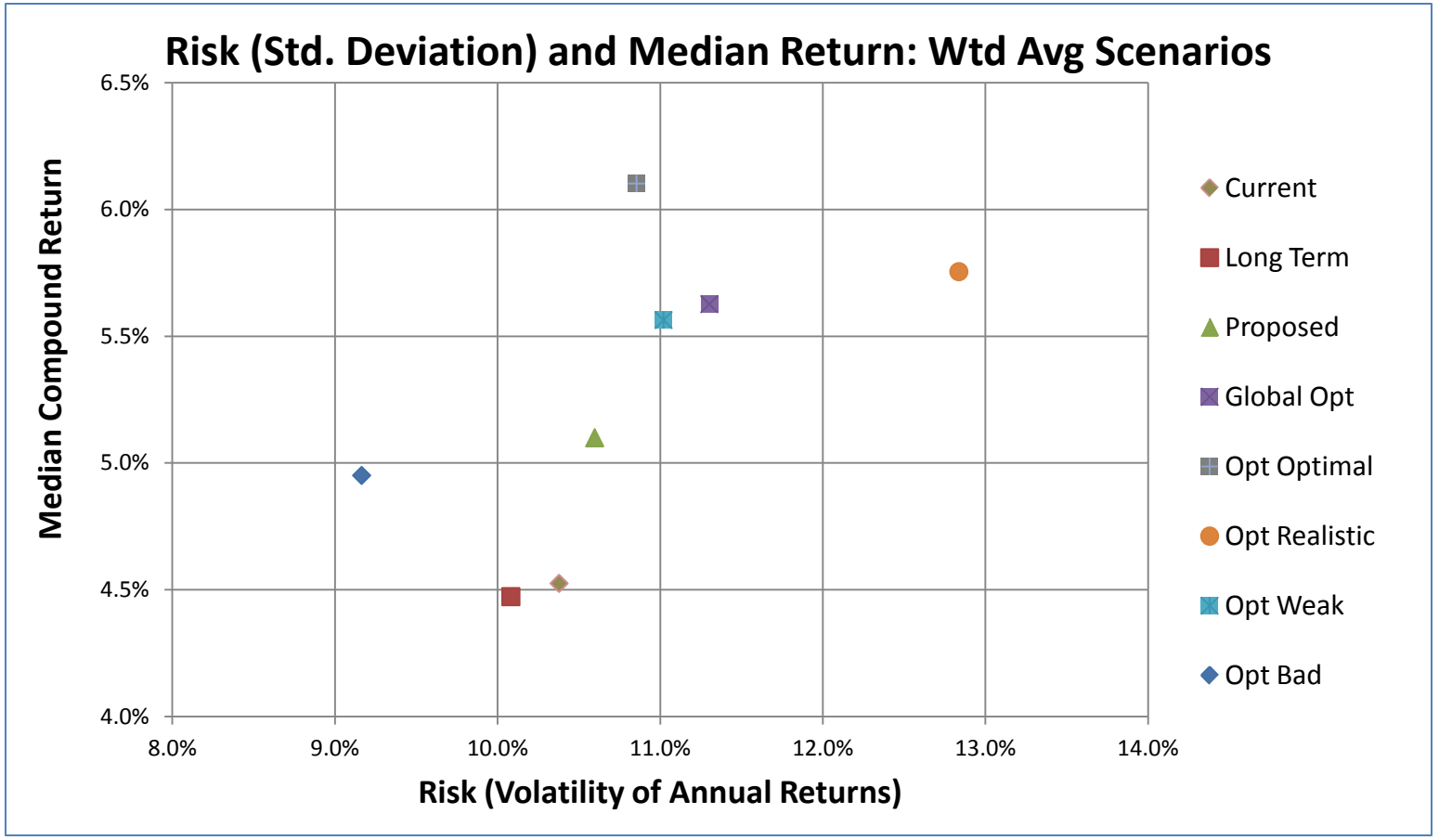
Weighted Average of Scenario Returns

- **Subjective probability weights for the four scenarios are:**
  - **15% (Optimistic) / 30% (Realistic) / 40% (Weak) / 15% (Bad)**
- **Weighting the simulated returns of the portfolios shows:**
  - **Proposed policy superior to current / long-term**
  - **Global Optimal midway between Aggressive and Defensive mixes**



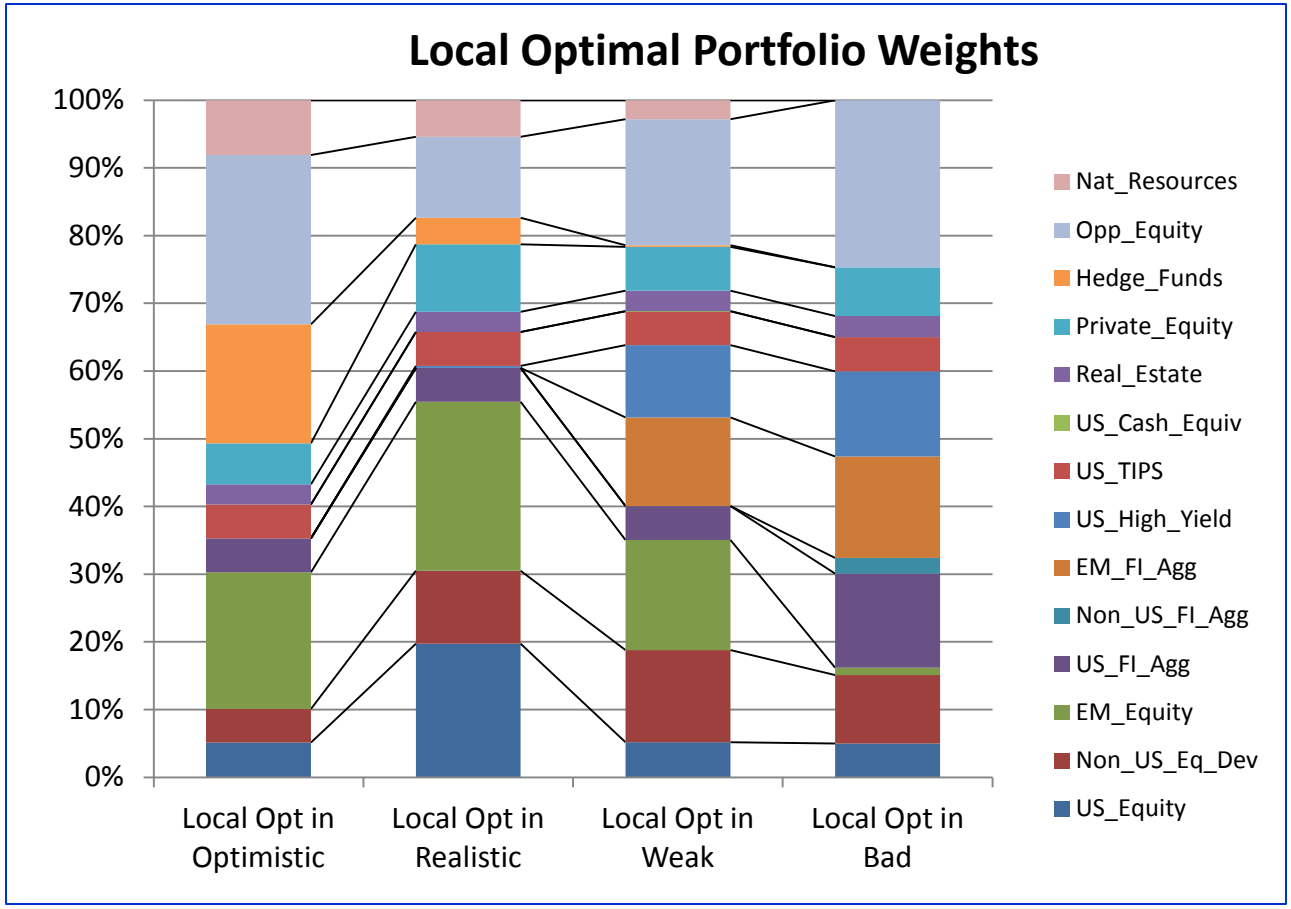
Weighted Average of Scenario Returns

- **Portfolio Risk shown as volatility of annual returns**



Local Optimal Portfolios

- **Local optimal portfolios are very different, as each reflects what will perform best in that environment**



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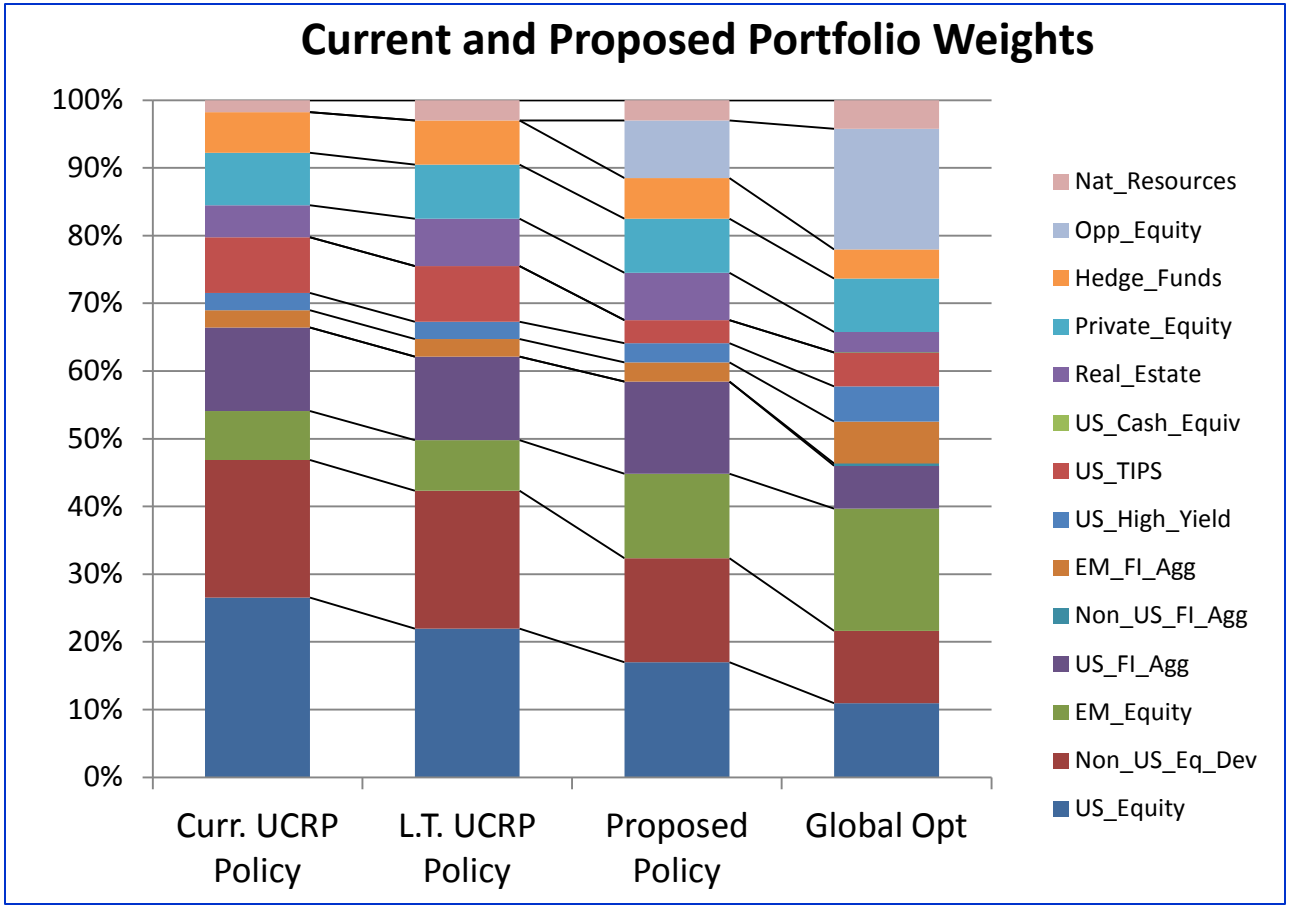
Local and Global Optimal Portfolios

	Global Opt	Local Opt in Optimistic	Local Opt in Realistic	Local Opt in Weak	Local Opt in Bad
US_Equity	10.96%	5.11%	19.73%	5.17%	5.01%
Non_US_Eq_Dev	10.66%	5.00%	10.77%	13.63%	10.10%
EM_Equity	18.05%	20.17%	24.99%	16.24%	1.08%
US_FI_Agg	6.33%	5.00%	5.00%	5.00%	13.89%
Non_US_FI_Agg	0.35%	0.00%	0.00%	0.00%	2.31%
EM_FI_Agg	6.18%	0.00%	0.00%	13.11%	14.99%
US_High_Yield	5.20%	0.00%	0.26%	10.69%	12.58%
US_TIPS	5.01%	5.00%	5.00%	5.00%	5.06%
US_Cash_Equiv	0.00%	0.00%	0.00%	0.00%	0.00%
Real_Estate	3.02%	3.00%	3.00%	3.00%	3.14%
Private_Equity	7.91%	6.02%	9.98%	6.47%	7.17%
Hedge_Funds	4.29%	17.61%	3.92%	0.27%	0.00%
Opp_Equity	17.82%	24.99%	11.96%	18.61%	24.68%
Nat_Resources	4.21%	8.09%	5.39%	2.79%	0.00%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
Public Equity	39.67%	30.28%	55.49%	35.04%	16.18%
Fixed Income	23.07%	10.00%	10.26%	33.81%	48.82%
Alternatives	37.26%	59.72%	34.26%	31.16%	34.99%
Subjective Weights		15%	40%	30%	15%

- **An optimal portfolio is one with the highest return for any level of "risk" in a given scenario**
- **"Global" optimal portfolio developed by weighted averaging across scenarios**

Global Optimal and Recommended Portfolios

- **Proposed policy is smooth evolution from existing Long Term policy to Global Optimal portfolio**



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Global Optimal and Recommended Portfolios

	Global Opt	Proposed	Explanation
US_Equity	10.96%	17.02%	Regional equity weights chosen to be closer to global capital market weights
Non_US_Eq_Dev	10.66%	15.32%	
EM_Equity	18.05%	12.48%	
US_FI_Agg	6.33%	13.61%	no change in fixed income targets
Non_US_FI_Agg	0.35%	0.00%	
EM_FI_Agg	6.18%	2.84%	
US_High_Yield	5.20%	2.84%	
US_TIPS	5.01%	3.40%	view on rapid rise of real yields
Real_Estate	3.02%	7.00%	no change in illiquid targets
Private_Equity	7.91%	8.00%	
Hedge_Funds	4.29%	6.00%	minimal change (-50bp)
Opp_Equity	17.82%	8.50%	moderate allocation to new strategy
Nat_Resources	4.21%	3.00%	no change in illiquid targets
TOTAL	100.0%	100.0%	
Public Equity	39.67%	44.81%	
Fixed Income	23.07%	22.69%	
Alternatives	37.26%	32.50%	

- **Note that "model" asset categories do not map one-to-one onto Regents categories; Cross Asset Class is modeled as a weighted average of the liquid Public Equity and Fixed Income categories; Natural Resources is a proxy for Real Assets**

Decision Process - Return

- **Each scenario has a "best" portfolio, but that portfolio is <u>not</u> necessarily the best in a different scenario**
- **The "global optimal" portfolio is <u>neither</u> the best in all <u>nor</u> the worst in all scenarios**
- **Proposed UCRP portfolio reflect constraints, and so it underperforms the Global optimal but outperforms the Current policy**

MEDIAN RETURN OF EACH PORTFOLIO IN EACH SCENARIO

	Portfolio chosen -->	"Optimistic" optimal	"Realistic" optimal	"Weak" optimal	"Bad" optimal	"Global" Optimal	UCRP LT Policy (2011)	Proposed UCRP Policy
Realized Scenario	OPTIMISTIC	11.05%	10.94%	8.85%	7.28%	**9.71%**	8.29%	**9.14%**
	REALISTIC	8.03%	8.08%	7.00%	5.95%	**7.35%**	6.15%	**6.84%**
	WEAK	3.48%	2.88%	3.58%	3.41%	**3.27%**	2.27%	**2.72%**
	BAD	-0.66%	-1.55%	0.40%	1.34%	**-0.29%**	-0.73%	**-0.59%**
	Wtd Avg	5.81%	5.51%	5.26%	4.70%	5.33%	4.28%	4.83%
	Worst	-0.66%	-1.55%	0.40%	1.34%	-0.29%	-0.73%	-0.59%
	Best	11.05%	10.94%	8.85%	7.28%	9.71%	8.29%	9.14%

Comparison of Investment Outcomes