UCRP and GEP Quarterly Investment Risk Report

Quarter ending September 2012

Committee on Investments/
Investment Advisory Group

November 2012
Contents

- **Asset allocation history**  5  17
  - What are the fund’s asset exposures?
- **Asset allocation current position and risk contributions**  6  18
  - How do they compare to policy targets?
- **Capital markets expectations for return**  7  19
  - What is the probability the fund will achieve its required return?
  - Is the amount of risk required acceptable?
- **Historical Funded Status**  8  NA
- **Forecast Funded Status**  9  NA
  - What is the probability the fund will be able to meet future obligations (with and without additional contributions)?
- **Historical standard deviation of total returns vs. benchmark**  10  20
- **Historical standard deviation of active return**  11  21
  - What is fund’s realized volatility?
  - How does it compare with the policy benchmark and risk budgets?
**Contents continued**

- **Systematic vs. residual risk contribution**
  - UCRP 12  
  - GEP 22
- **Asset allocation vs. selection risk contribution**
  - What are the sources of volatility?  
  - UCRP 12  
  - GEP 22
  - What factors drive performance?  
  - Is the fund adequately diversified?
- **Sharpe ratio (total risk)**
  - UCRP 13  
  - GEP 23
- **Information ratio (active risk)**
  - Are risk exposures being rewarded?  
  - UCRP 14  
  - GEP 24
  - Historical risk adjusted returns
- **Performance Attribution**
  - What are the sources of active return?  
  - UCRP 15  
  - GEP 25
  - Asset allocation versus security selection
  - Which asset classes contributed or detracted from return?
Risk Metrics for UCRP
Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- The portfolio ended the quarter with equity exposure equal to policy weight
Asset Allocation and Risk

**Note:** Exposures and Risk charts below are shown using August 1, 2012 target asset weights. Systematic risk is estimated using long term forecasts [from Mercer Investment Consulting, July 2012], not recent realized volatility.

**(Lower Left)** Asset weights are measured relative to **Current** Policy. The fund has a 1.25% underweight in TIPS, and small overweight in Real Assets, Real Estate, and Cash. Underweight in Core bonds is funding an overweight in High Yield.

**(Lower Right)**
- The fund’s forecast total systematic risk (blue bars) is 13.9% annualized standard deviation. It is heavily weighted to Public equity (70% of total). Alternatives contribute 24%.
- Forecast active systematic risk is roughly unchanged at 12 bp. The policy benchmark risk decomposition (red bars) is roughly identical to the actual fund as of quarter end.

---

**UCRP Asset Exposures vs. Policy as of Sep 12**

**UCRP Forecast Contrib. to Systematic Risk at Sep 30, 2012 (%)**
Forecast risk and return (using Mercer's July 2012 capital markets assumptions) lies near the constrained efficient frontier; long-term forecast return of the current policy allocation of 7.7%* is close to the actuarially required return of 7.5%.

*Asset Class returns and efficient frontiers are shown in the chart as arithmetic (i.e., average) expected returns.

The projected compound annual return over multi-year horizon is 7.7% for the Current Policy weights.

Forecast volatility of the current policy is 13.8%.
Historical Funded Status

The Pension Fund’s liabilities have been growing steadily (upper left) with University employment, while the assets have grown (and fallen) with the equity markets. The ratio of actives to retirees has recently fallen from 3x to 2x (lower left).

The Funded Ratio (= the ratio of assets to liabilities), is an overall metric of the financial health of a pension plan. This ratio has fluctuated considerably over the past (lower right), and has recently fallen below 100% with the bear market of 2007-09, and not yet recovered.
Forecast Funded Status

• Contributions were reinstated in 2010 after a pension “holiday” that began in 1990. Annual benefit payments have grown in line with and recently exceeded Normal Cost over the last decade (upper left).

• The bottom charts show projected funded ratio with planned contributions. On the left is a static forecast assuming a constant 7.5% investment return beginning FY 2013. On the right is a simulation of a variable rate of return. It indicates that the probability of reaching full funding (ratio = 1.0) by 2016 is below 20% [These projections and simulations are approximations only, developed by Treasurer’s Office, not Segal Co.]
Risk Measures: Total

Total risk trend is quite similar to the benchmark; recently Plan volatility has been slightly less than the Budget, but well within allowed ranges. Total volatility has resumed a historically normal range, higher than the mid 2000’s but lower than the 2008-09 crash.

Total Risk budget equals Benchmark risk plus the Active risk budget. The ranges are +/- 20% around the budget.

Risk is measured by standard deviation of monthly total returns; each point or bar shows a 12 month measurement period.

A standard deviation of 12% means that roughly 2/3 of the time, the realized return will be within ± 12% points from the average return.
The spike in Active Risk in Q1 09 resulted from the underweight in equity as the market fell and then rallied, plus higher equity volatility. Active risk has currently resumed its low level of the mid 2000’s (about 0.5% annualized standard deviation). Although well diversified, active risk is still well below long term expectations for active return.

Risk is measured by standard deviation of monthly active returns; each point or bar shows a 12 month measurement period. A standard deviation of 3% means that roughly 2/3 of the time, the realized active return will be within ± 3% points from the average active return.
Risk Attribution

(Upper Left) Virtually all of Total Risk is attributed to systematic (market) factors (red bars).

(Lower Right) Normally, the majority of Active Risk is attributed to security selection. When asset allocation transitions are implemented, allocation risk increases. During the market turmoil, the equity over/underweight dominated all other decisions, but for the past 9 quarters residual risk is resuming its normal contribution.

Risk is measured here by variance (standard deviation squared) of monthly returns; each bar shows a 12 month measurement period.

Systematic Risk is associated with benchmark exposures; residual risk is associated with non benchmark decisions (security selection).

UCRP and GEP Quarterly Investment Risk Report
Sept Quarter 2012 | Nov. 2012 | 12
Risk Adjusted Return: Total

Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark for the past 5 years. The 12 month return on risky assets has been generally positive since 2009 but with considerable volatility.

Sharpe ratio is “excess” return (total return less risk-free rate) divided by total risk; each point or bar shows a 12 month measurement period.

Over long periods, most asset classes show an average Sharpe ratio of 0.25.
Information ratio (risk adjusted active return) is the result of both asset weighting decisions and active performance. It is higher when the returns are positive and more consistent (less volatile). The Info. ratio has been positive for the past 10 quarters; from the graph below, active returns for the past 13 quarters have been small but positive.

Information ratio is active return (total return less benchmark) divided by active risk; each point shows a 12 month measurement period.

The Significance level is the probability that results are due to skill, with 50% being a neutral measure. (e.g., “0% sure,” “100% sure,” “50/50”).
Active Return for the Quarter was +0.19% (Fund return of +4.85% vs. policy benchmark of +4.66%).

[BELOW] Asset allocation decisions (blue bars) did not add to active return. Security selection decisions (red bars) added 19bp (primarily Core Fixed Income and Absolute Return Strategies)
Risk Metrics for GEP
Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- The portfolio ended the quarter with equity exposure equal to policy weight
Asset Allocation and Risk

**Note:** Exposures and Risk charts below are shown using August 1, 2012 target asset weights. Systematic risk is estimated using long term forecasts [from Mercer Investment Consulting, July 2012], not recent realized volatility.

**(Lower Left)** Asset weights are measured relative to Current Policy. The fund is underweight 1.5% in TIPS and overweight in Real Estate and Cash.

**(Lower Right)** The fund’s forecast total systematic risk (dark blue bars) is 14.2% annualized standard deviation. It is evenly balanced among US equity, Non US developed equity, Private Equity, and Absolute Return (82% of total).

Forecast active systematic risk is very low at 19 bp. The policy benchmark risk decomposition (light blue bars) is roughly identical to the actual fund as of quarter end.
Expected Risk and Return

Forecast risk and return (using Mercer’s July 2012 capital markets assumptions) lies near the constrained efficient frontier; forecast return of the current policy mix of 8.2%* is close to the nominal return needed to maintain a constant real payout per student (estimated at 8.5%).

* Asset Class returns and Efficient frontiers are shown in the chart as arithmetic (average) expected returns.

The projected compound annual return over multi year horizon is 8.2% for the Current Policy weights.

Forecast volatility of the current policy is 14.2%.
Total risk trend has been quite similar to the benchmark; GEP volatility is quite close to its Budget. Total volatility has resumed a historically normal range, higher than the mid 2000’s but lower than the 2008-09 crash.

Total Risk budget equals Benchmark risk plus the Active risk budget. The ranges are +/- 20% around the budget.

Risk is measured by standard deviation of monthly total returns; each point or bar shows a 12 month measurement period.

A standard deviation of 10% means that roughly 2/3 of the time, the realized return will be within ±10% points from the average return.
The spike in Active Risk in 2008-09 resulted from the underweight in equity as the market fell and then rallied, plus higher equity volatility.

Active risk has resumed its low level of the mid 2000’s (about 1.0%) Although well diversified, active risk is still well below long term expectations for active return.

Risk is measured by standard deviation of monthly active returns; each point or bar shows a 12 month measurement period.

A standard deviation of 3% means that roughly 2/3 of the time, the realized active return will be within ±3% points from the average active return.

The Active risk budget is 3.0% annualized Tracking Error (adj. for market volatility), with ranges of +/- 1 pct. point around Budget.
Risk Attribution

(Upper Left) Virtually all of **Total Risk** is attributed to systematic (market) factors (red bars).

(Lower Right) Normally, the majority of **Active Risk** is attributed to security selection. When asset allocation transitions are implemented, allocation risk tends to dominate. In late 2009, the equity overweight dominated all other active decisions. For the past 9 quarters, residual risk has resumed its normal contribution level.

Risk is measured here by variance (standard deviation squared) of monthly returns; each bar shows a 12 month measurement period.

**Systematic risk** is associated with benchmark exposures; **residual risk** is associated with non benchmark decisions (security selection)

---

Office of the Treasurer of The Regents
University of California
Sharpe ratio is “excess” return (total return less risk-free rate) divided by total risk; each point or bar shows a 12 month measurement period.

Over long periods, most asset classes show an average Sharpe ratio of 0.25.

Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark for the past 5 years; in the past year it has been slightly higher. The 12 month return on risky assets had been generally positive since 2009 but with considerable volatility.
Information ratio (risk adjusted active return) is the result of both asset weighting decisions and active equity and bond performance. It is higher when the returns are more consistent (less volatile). The information ratio has been positive for the past 10 quarters; active return has been small but on average, positive in the past 13 quarters.

Information ratio is active return (total return less benchmark) divided by active risk; each point shows a 12 month measurement period.

The Significance level is the probability that results are due to skill, with 50% being a neutral measure (e.g., “0% sure,” “100% sure,” “50/50”).
Active Return for the Quarter was +0.28% (Fund return of +4.40% vs. policy benchmark of +4.12%).

**[BELOW]** Asset allocation decisions (blue bars) subtracted 7 bp (primarily Private Equity overweight). Security selection decisions (red bars) added 35 bp (primarily Absolute Returns and Core Bonds).