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UCRP and GEP
Quarterly Investment Risk Report

Committee on Investments/
Investment Advisory Group
Quarter ending December 2009

February 23, 2010
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Risk Metrics for UCRP
Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity slight *overweight* continued throughout Q4 2009

UCRP Asset Allocation (%)

![UCRP Asset Allocation Chart]

- **Active Exposure (bars)**
- **Total Exposures (lines)**

Legend:
- Public Equity Over/ (Under)
- Public Equity
- U.S. Equity
- Non-U.S. Equity
**Asset Allocation and Risk**

**Note:** Exposures and Risk charts below are shown using June 1, 2009, target asset weights. Systematic risk is estimated using long term forecasts [from Mercer Investment Consulting, March 2009], not recent realized volatility.

(Lower Left) Asset weights are measured relative to **Current Policy.** The fund has an overweight in Public Equity, Absolute Return, and cash, and an underweight in TIPS and Real Estate.

(Lower Right)
- The fund’s forecast total systematic risk (blue bars) is unchanged at 12.50% annualized standard deviation. It is heavily weighted to US and Non-US developed equity (74% of total).
- Forecast active systematic risk is unchanged at 30 bp. The Real Estate / Private Equity underweight and Absolute Return overweight accounted for over 80% of this amount (yellow bars).
Expected Risk and Return

Forecast risk and return (using Mercer’s April 2009 capital markets assumptions) lies near the constrained efficient frontier; long-term forecast return of 8.1%* 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 8.1% for the Current Policy weights.

Forecast volatility is 12.4%.
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.
Forecast Funded Status

- Contributions were suspended in 1990, but annual benefit payments have grown in line with and recently exceeded, Normal Cost over the last decade (upper left).
- The bottom two charts show projected funded ratio without and with contributions, assuming a -19% return for FY 2009 and a constant 7.5% investment return beginning FY 2010. (For this example, contributions were set to be equal to forecast Normal Cost, beginning FY 2011.)

- LEFT: Assumes no contributions, 7.5% annual investment return after FY 2009
- RIGHT: Assumes Normal Cost contributed annually beginning FY 2011; 7.5% return after FY 2009
- These projections are approximations only, developed by Treasurer’s Office, not Segal Co.
Risk Measures: Total

Total risk trend quite similar to benchmark; recently Plan volatility has been slightly less than the Budget, but well within ranges. Total volatility has been moving higher since July 2007, and spiked up in October 2008 and remains high, but is trending downward.

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. All risk calculations done using exponentially declining weights. (This and following charts show risk budgets as if they had been in place during entire historical period.)
Until 2009, active risk for the total fund has held steady at 0.50% annualized standard deviation. The spike up in Q1 09 resulted from the underweight in equity as the market fell and then rallied. Active risk remains higher than 2008 levels due to higher market volatility, but is still well below long term expectations for active return, and is well diversified.

The Active risk budget is 3% annualized Tracking Error (adjusted for market volatility), with ranges of +/- 1 pct. point around Budget

Risk is measured by standard deviation of monthly active returns; each point or bar shows a 12 month measurement period. All risk calculations done using exponentially declining weights.
Risk Attribution

(Upper Left) Almost all of Total Risk is attributed to systematic (market) factors.

(Lower Right) Normally, the majority of Active Risk is attributed to security selection. When active management is reduced, or when asset allocation transitions are implemented, allocation risk increases. In the last 12 months, the equity over/underweight dominated all other decisions.

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 - Components of Total Risk

UCRP - Components of Active Risk

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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 finally turned positive as the March rally continues.

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. All risk calculations done using exponentially declining weights.
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 in the last two quarters finally turned positive as market volatility decreased (see graph below).

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. All risk calculations done using exponentially declining weights.
Active Return for the Quarter was +0.24% (Fund return of 3.69% vs policy benchmark of 3.45%).

**[BELOW]** Asset allocation decisions (blue bars) added 0.14% (primarily the underweight in Real Estate) and Security selection (red bars) decisions added 0.10% (primarily non-US Equity, offset by Real Estate)

**UCRP Attribution for 3 mo. ending Dec-31-09**
Risk Metrics for GEP
Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity was slightly **overweight** at the end of Q4 2009
Asset Allocation and Risk

**Note:** Exposures and Risk charts below are shown using October 1, 2008 target asset weights. Systematic risk is estimated using long term forecasts [from Mercer Investment Consulting, March 2009], not recent realized volatility.

**(Lower Left)** Asset weights are measured relative to Current Policy. The fund is overweight in US Equity, Core Bonds, Abs. Return, and Cash, and underweight in Real Estate and Private Equity.

**(Lower Right)** The fund’s forecast total systematic risk (blue bars) is unchanged at 12.1% annualized standard deviation. It is evenly balanced among US equity, Non US developed equity, and Absolute Return (over 75% of total). Forecast active systematic risk is unchanged at 36 bp. The P.E. and R.E. underweight accounted for over 60% of this amount, while the overweight in Abs. Ret. accounted for almost 30% (yellow bars).
Expected Risk and Return

Forecast risk and return (using Mercer’s April 2009 capital markets assumptions) lies near the constrained efficient frontier; forecast return of 8.3%* 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 8.3% for the Current Policy weights.

Forecast volatility is 12.0%.
Risk Measures: Total

Total risk trend has been quite similar to benchmark; GEP volatility is quite close to its Budget. Until the past two quarters, total volatility has remained stable, primarily because of the larger non-market risk component in the GEP; however, volatility spiked up in October 2008 and remains high, although trending lower.

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. All risk calculations done using exponentially declining weights. (Charts show risk budgets as if they had been in place during entire historical period.)
Active risk for the total fund has grown slowly over this period from 0.50% to 1.50% annualized standard deviation, up until the 2008 crash.

Active risk remains higher than 2008 levels due to higher market volatility, but is still well below long term expectations for active return, and is well diversified.

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

Risk is measured by standard deviation of monthly active returns; each point or bar shows a 12 month measurement period. All risk calculations done using exponentially declining weights.
Almost all of **Total Risk** is attributed to systematic (market) factors.

Normally, the majority of **Active Risk** is attributed to security selection. When asset allocation transitions are implemented, allocation risk tends to dominate. Now that the mismatch between Abs. Ret. Strategies and its former benchmark has been eliminated, asset allocation risk has been dominant. In the last 3 months, the equity over/underweight dominated all other decisions.
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 finally turned positive as the March rally continues.

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. All risk calculations done using exponentially declining weights.
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 active return has recently turned positive (see graph below), while active risk is decreasing (see page 20). In the last two quarters, both allocation and selection decisions have been positive.
Active Return for the Quarter was +0.29% (Fund return of 3.41% vs policy benchmark of 3.13%).

**[BELOW]** Asset allocation decisions (red bars) added 0.09% (primarily the underweight in Real Estate) and Security selection decisions (orange bars) added 0.20% (primarily non-US Equity and Absolute return).