Office of the Treasurer of The Regents

University of California

UCRP and GEP
Quarterly Investment Risk Report

Quarter ending March 2013

Committee on Investments/
Investment Advisory Group

May 2013

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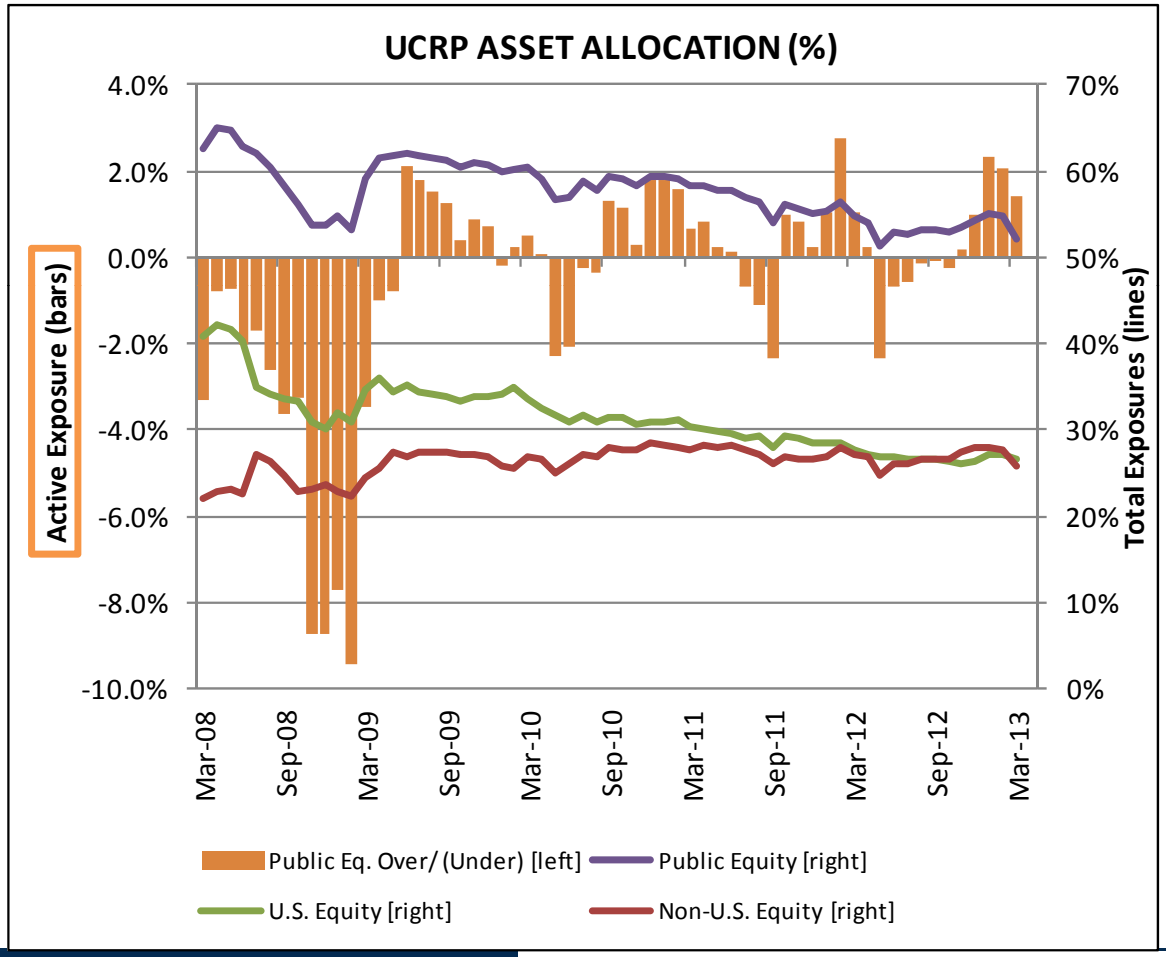
Risk Metrics for UCRP

Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- At quarter-end the portfolio's equity exposure was modestly above policy weight

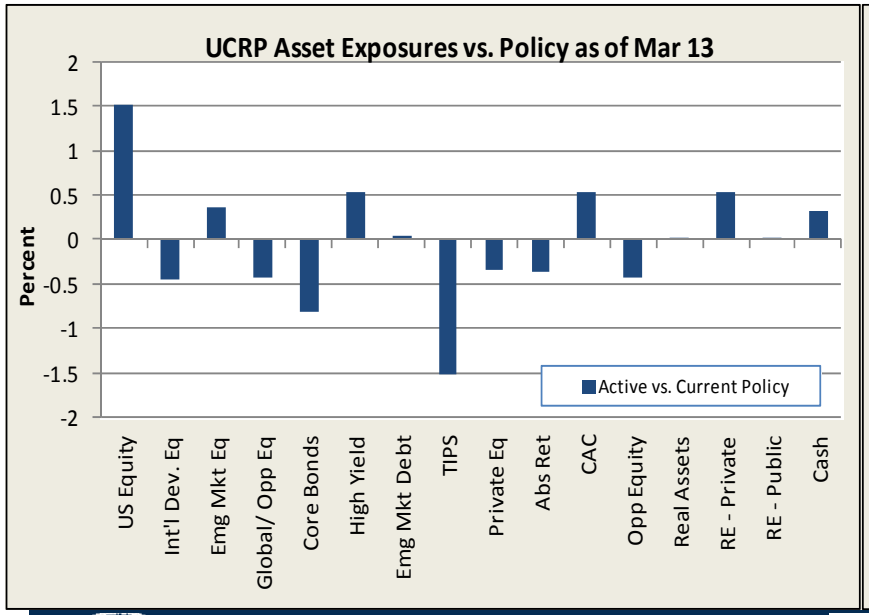


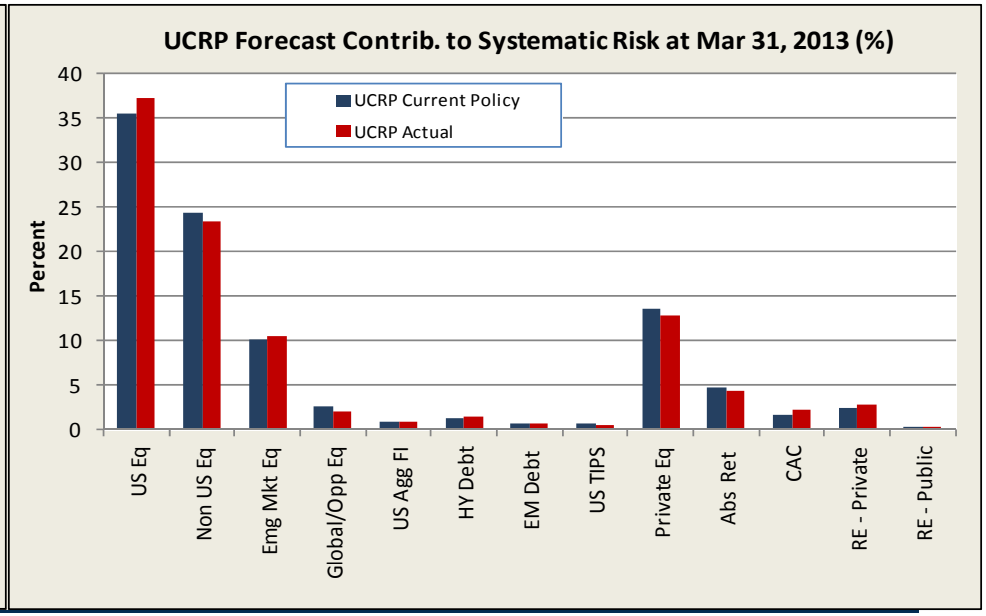
Asset Allocation and Risk

Note: Exposures and Risk charts below are shown using April 1, 2013 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 in Core Bonds and TIPS by 0.8% and 1.5% respectively. The fund is slightly overweight to US Equity, Emerging Markets Equity, High Yield, Cross Asset Class, Real Estate, and Cash.

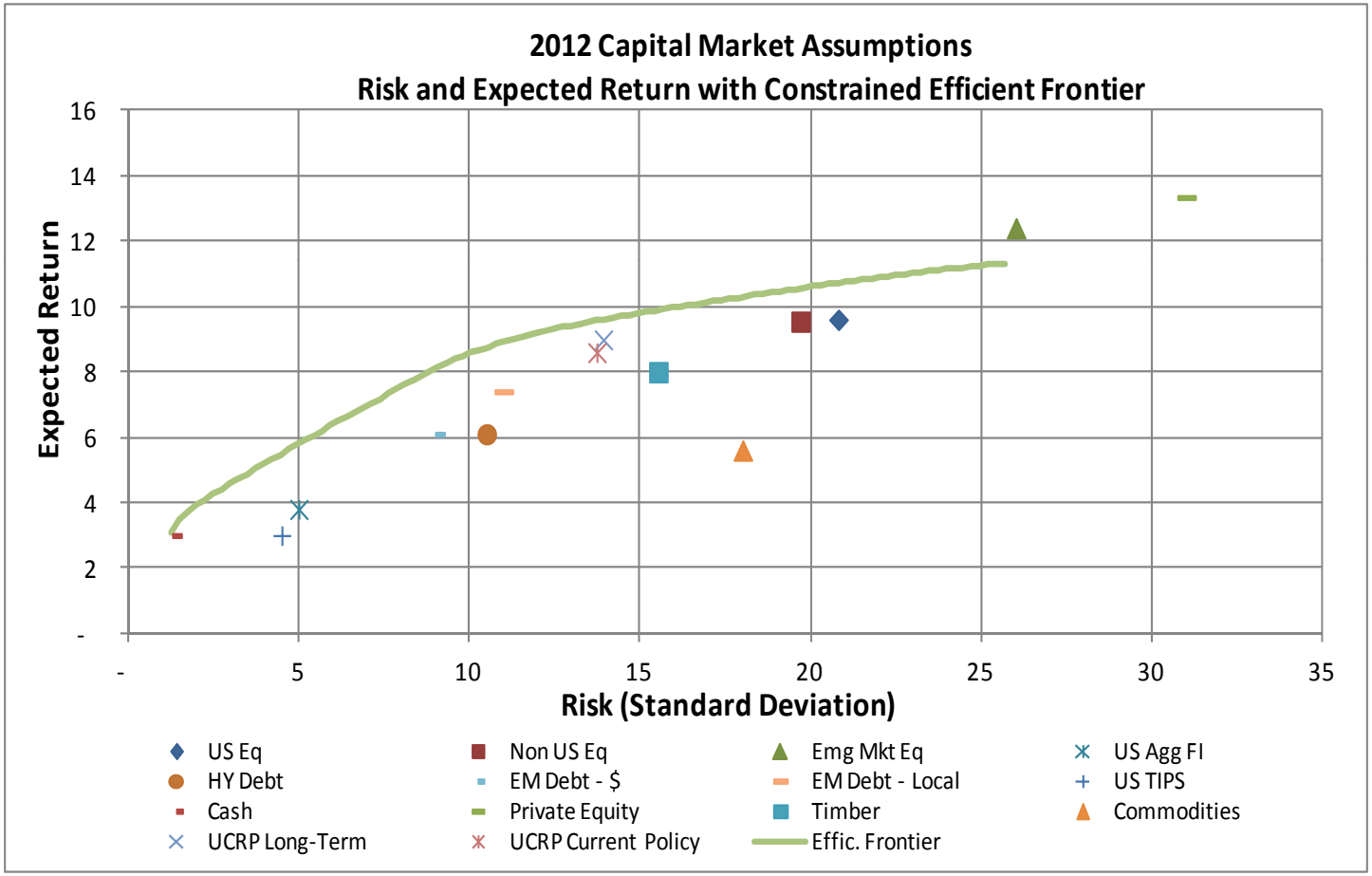
(Lower Right) The fund's forecast total systematic risk (blue bars) is 13.9% annualized standard deviation. It is heavily weighted to Public Equity (73% of total). Alternatives contributed 24%. Forecast active systematic risk is 32bp. The policy benchmark risk decomposition (red bars) is roughly identical 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; long-term forecast return of the *current* policy allocation of 7.7%* is close to the actuarially required return of 7.5%.

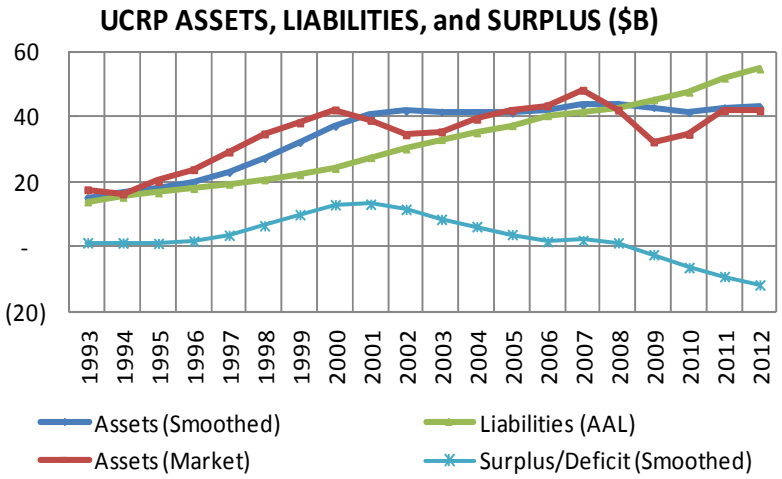


*Asset Class returns and efficient frontiers are shown in the chart as arithmetic (i.e., average) expected returns.

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

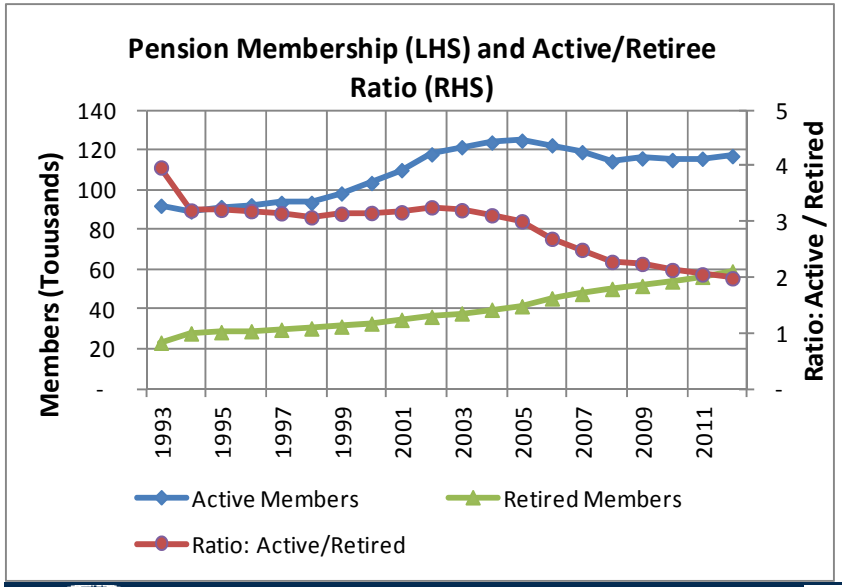
Forecast volatility of the current policy is 13.7%.

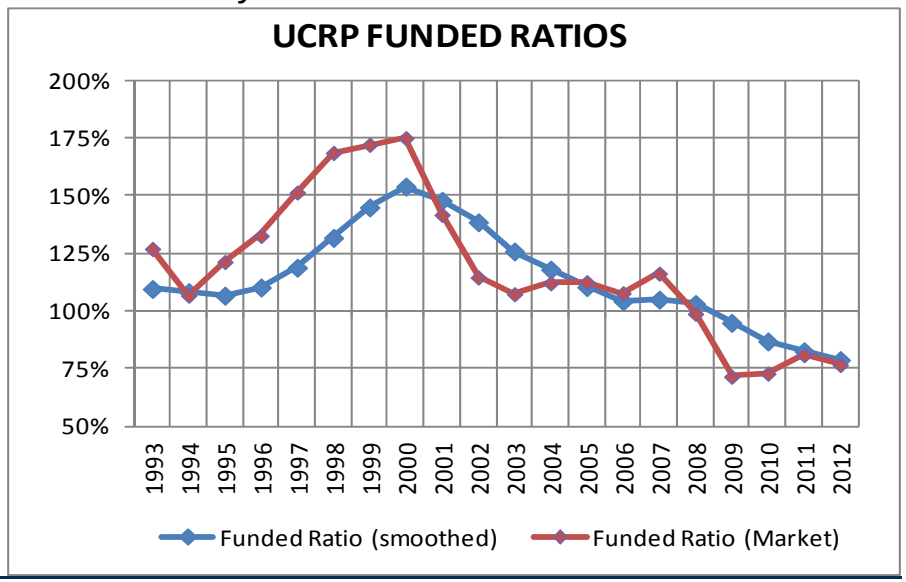
Historical Funded Status



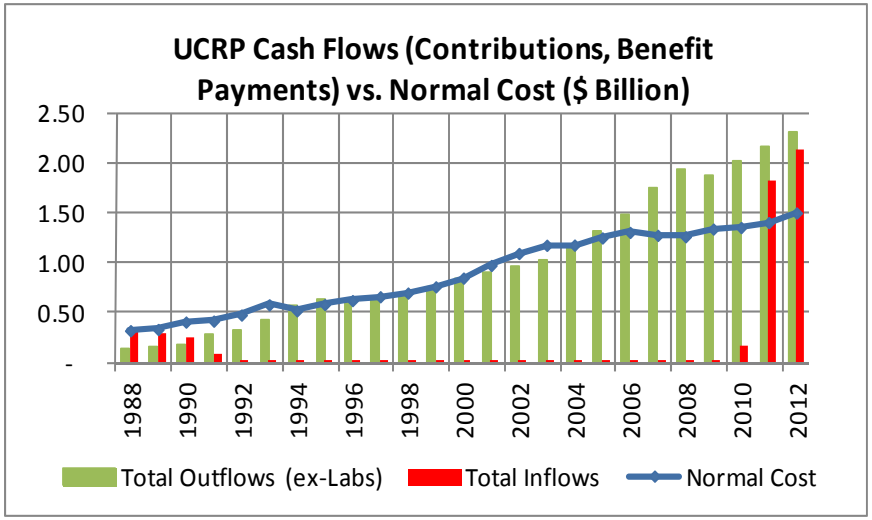
The Pension Fund's liabilities have been growing steadily (**upper left**) with University employment, while the assets have grown (and fallen) with the equity markets. The ratio of actives to retirees has fallen from 3x to 2x (**lower left**).

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 fallen below 100% with the bear market of 2007-09, and has not yet recovered.



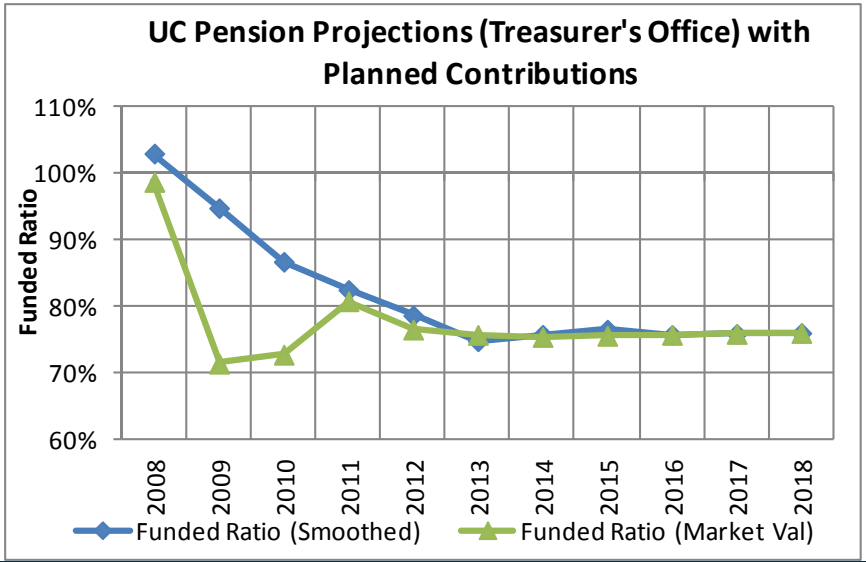


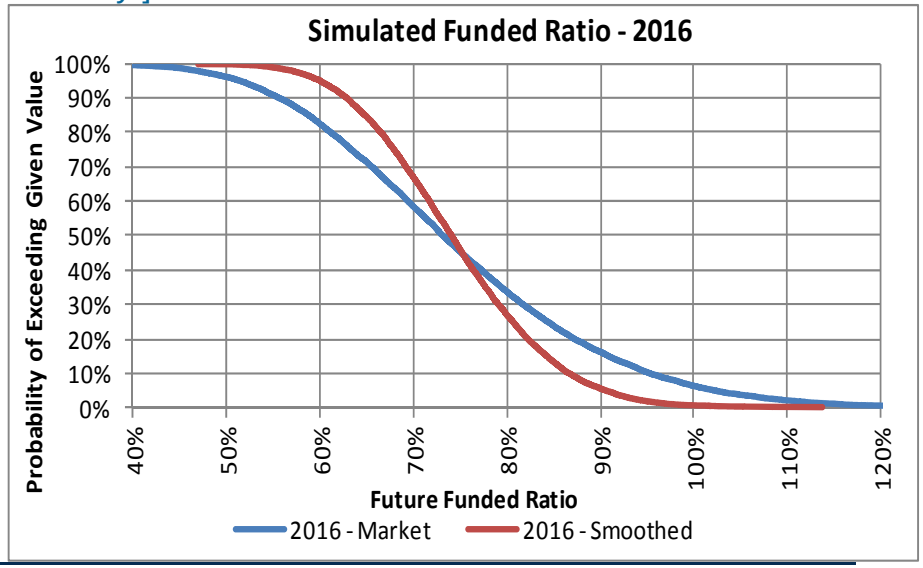
Forecast Funded Status



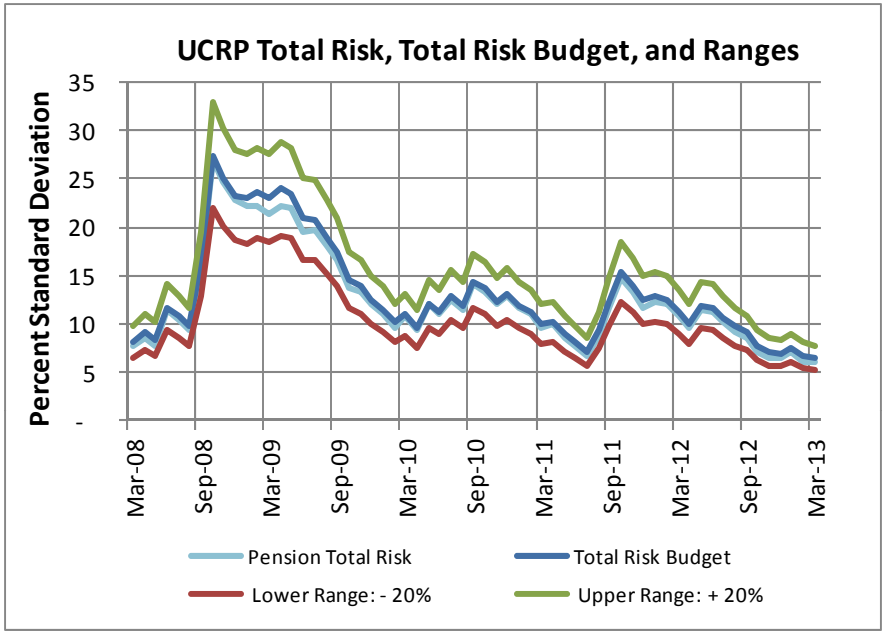
Contributions were reinstated in 2010 after a pension "holiday" that began in 1990. Annual benefit payments have grown in line with and recently exceeded Normal Cost over the last decade (**upper left**).

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 estimates only, developed by the Treasurer's Office, not Segal Co, the Regents actuary.]



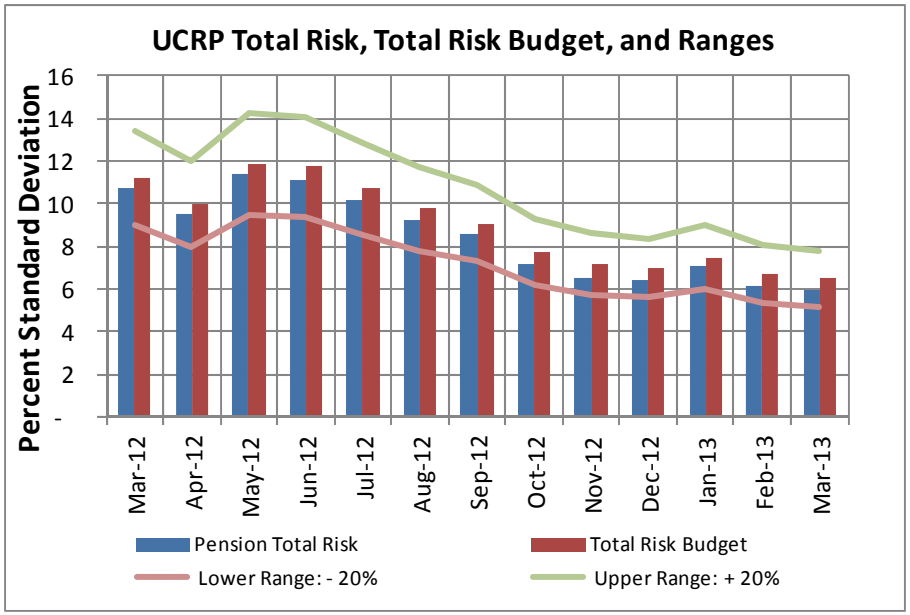


Risk Measures: Total



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.

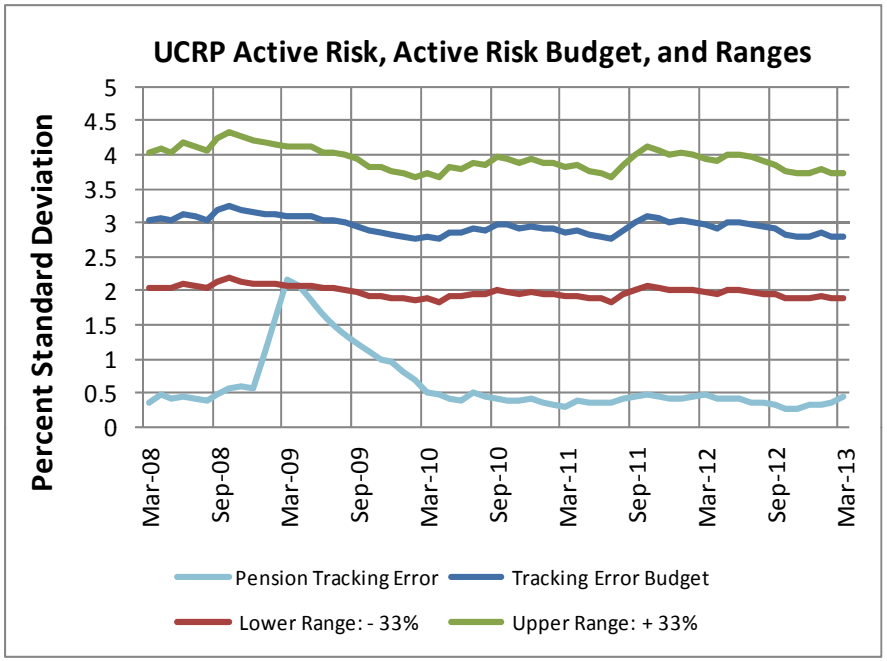


Total Risk is measured by standard deviation of monthly **total** returns; each point or bar shows a 12 month measurement period.

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.

At the end of the quarter total risk was 5.99% for UCRP and 5.74% for the benchmark.

Risk Measures: Active



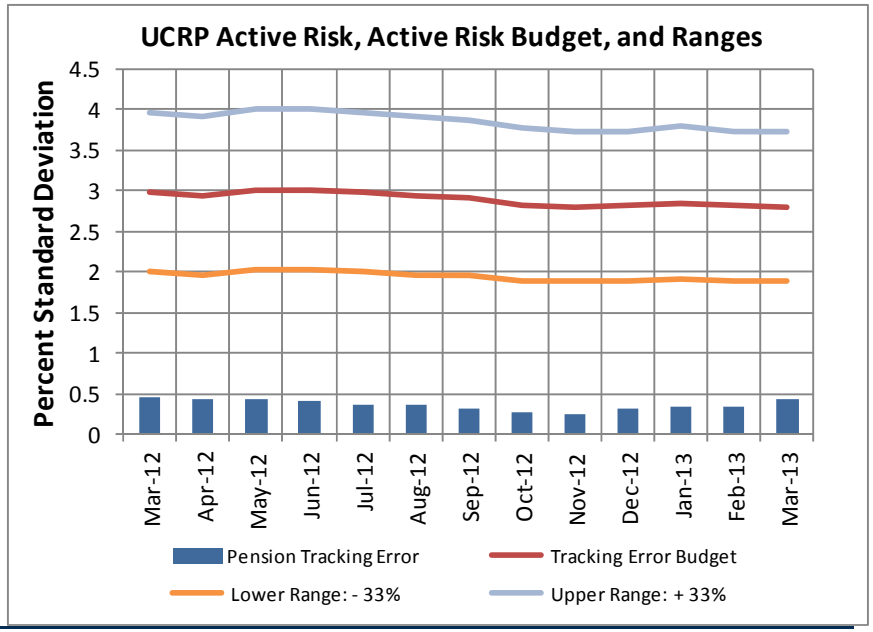
Active risk is measured by standard deviation of monthly **active** returns; each point or bar shows a 12 month measurement period.

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.

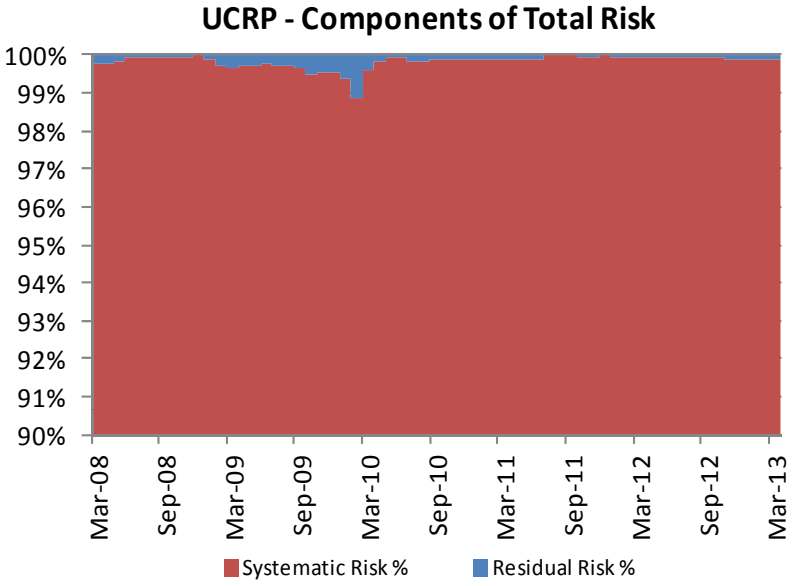
Active risk at the end of the quarter was 0.44%.

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.

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



Risk Attribution



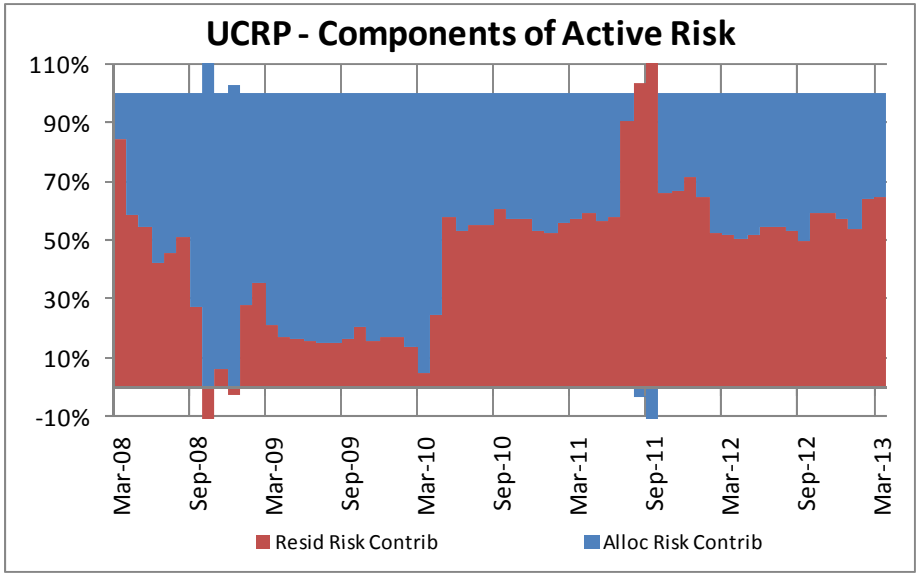
Note: Scale represents 0-100% but for greater clarity between systematic and residual risk horizontal and vertical axes cross at 90%.

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

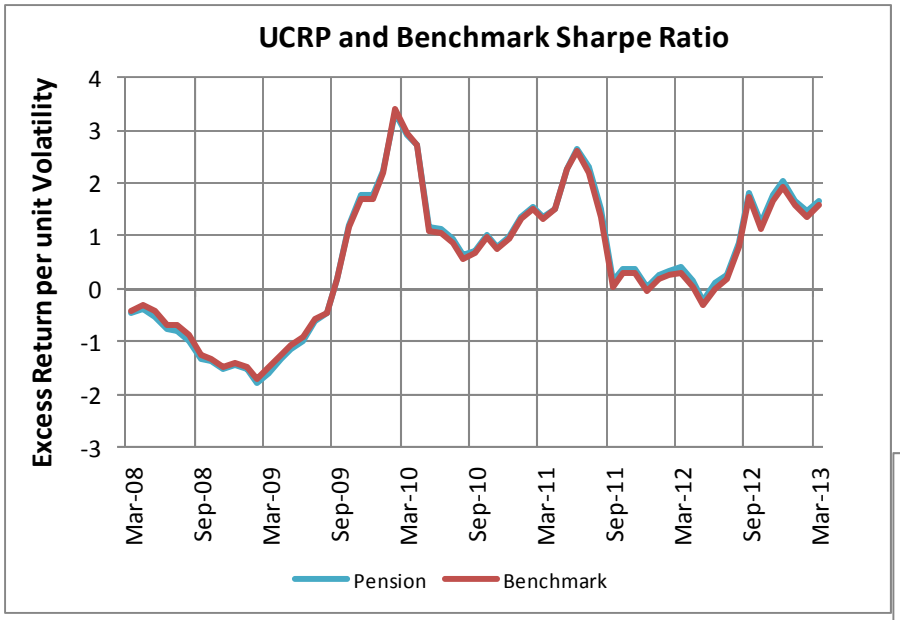
Systematic Risk is associated with policy benchmark exposures; **residual risk** is associated with non benchmark decisions (security selection or asset allocation tilts).

(Upper Left) Virtually all (99.9%) of **Total Risk** is attributed to systematic (market) factors (red bars).

(Lower Right) Normally, the majority of **Active Risk** is attributed to security/manager 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 11 quarters security selection risk is resuming its normal contribution.



Risk Adjusted Return: Total

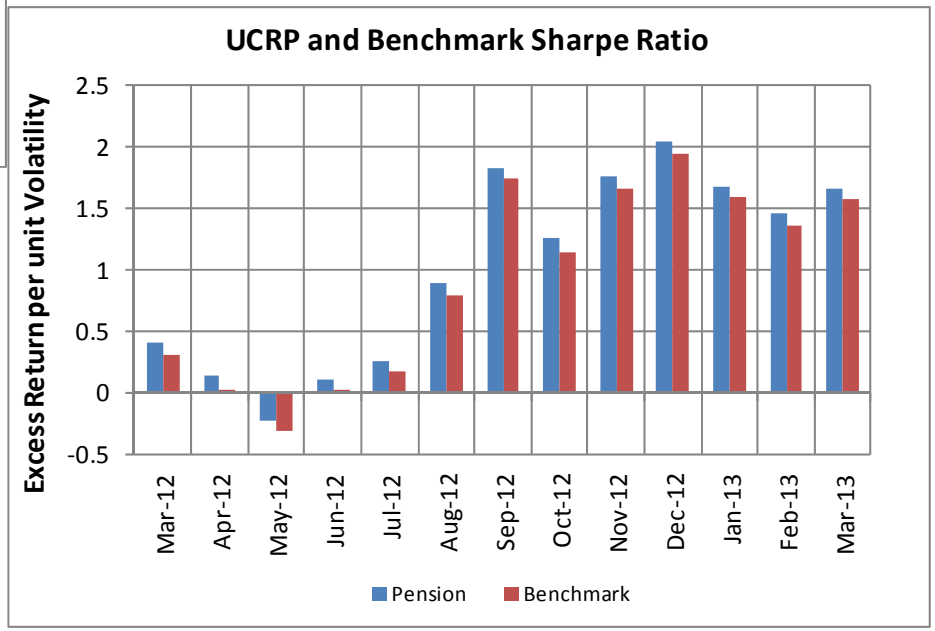


Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark for the past 5 years. The 12 month return on risky assets has been generally positive since 2009 but with considerable volatility.

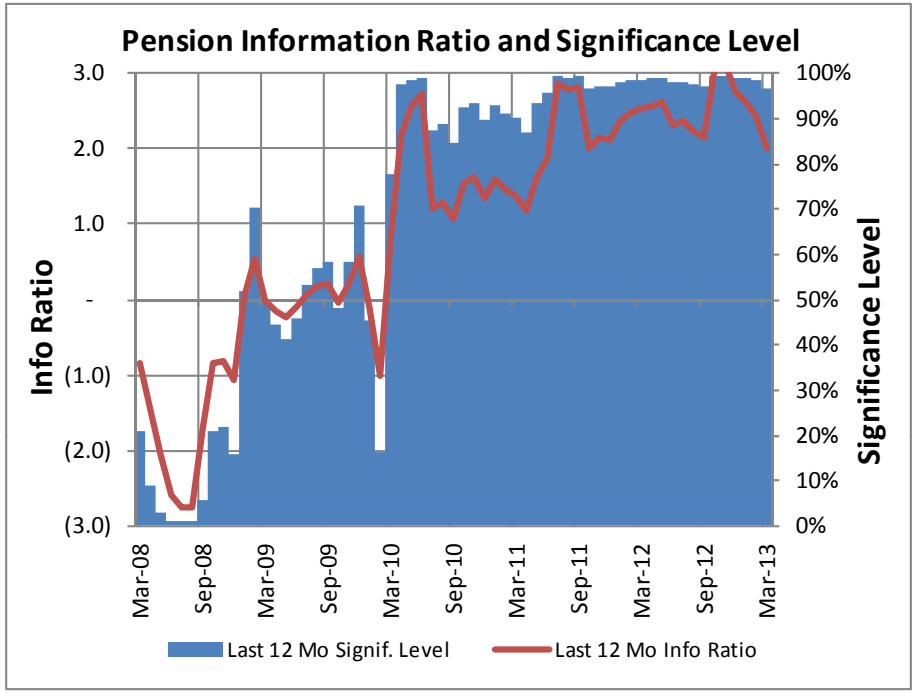
Sharpe ratio is "excess" return (total return less risk-free rate) divided by total risk; each point or bar shows a 12 month measurement period.

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

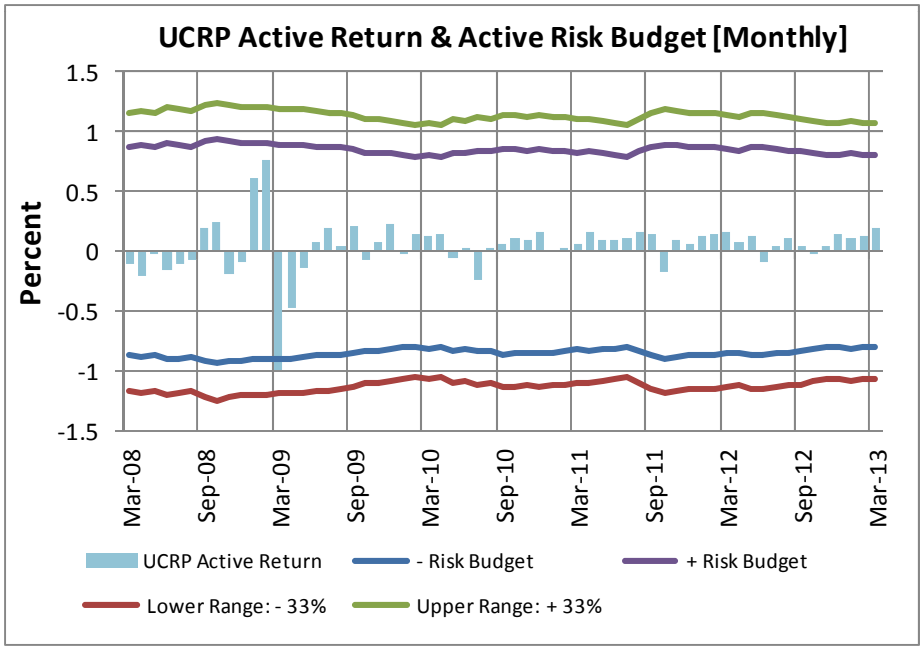
At the end of the quarter the UCRP Sharpe Ratio was 1.7 vs. 1.6 for the benchmark.



Risk Adjusted Return: Active



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 12 quarters; from the graph below, active returns for the past 15 quarters have been small but positive.

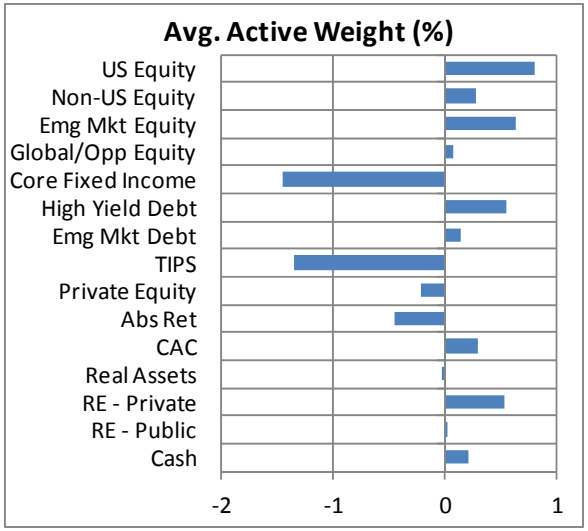


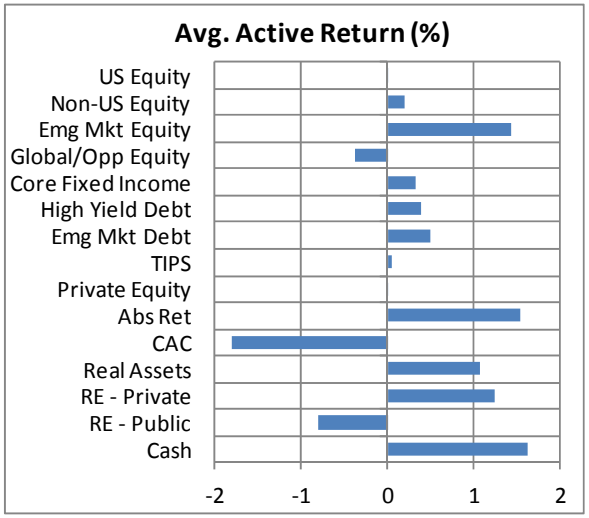
Information ratio is active return (total return less benchmark) divided by active risk; each point shows a 12 month measurement period.

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”).

The UCRP Information Ratio was 2.0 at quarter-end.

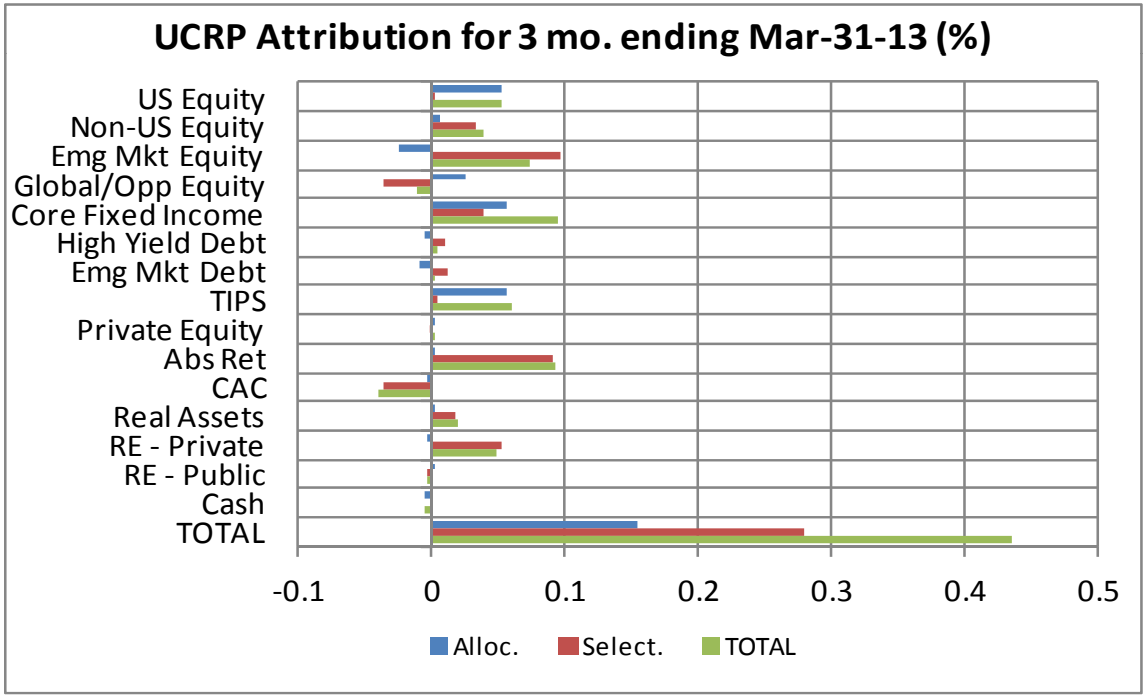
Performance Attribution





Active Return for the Quarter was +0.44% (Fund return of +4.59% vs. policy benchmark of +4.15%).

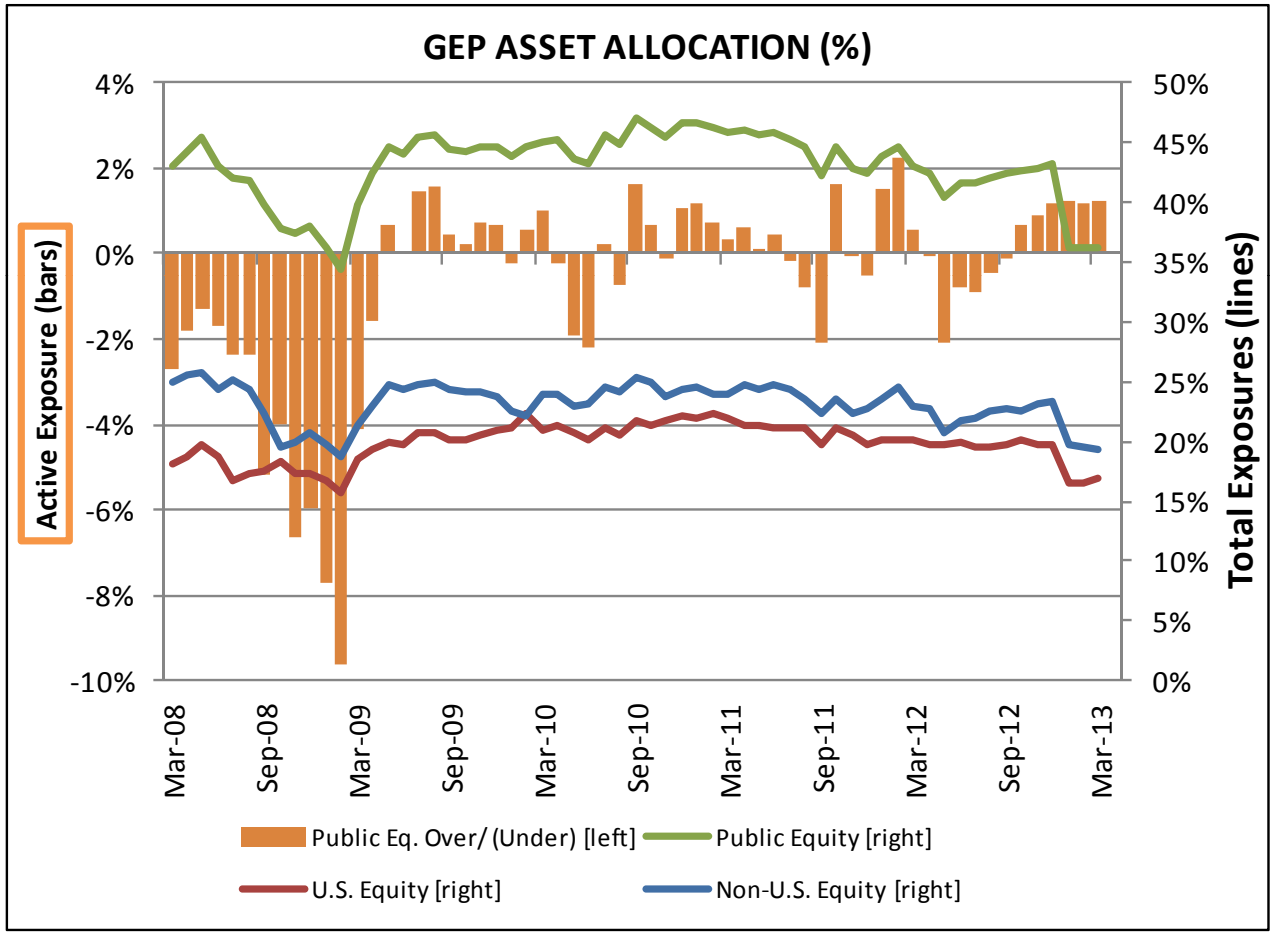
[BELOW] Asset allocation decisions in US Equity, Core Fixed Income and TIPS **(blue bars)** contributed to active return(15bp). Security selection decisions **(red bars)** added 29bp (primarily Non-US and EM Equity, Core Fixed Income, Absolute Return Strategies, Real Assets and Real Estate).



Risk Metrics for GEP

Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- At quarter-end the portfolio's equity exposure was modestly above policy weight

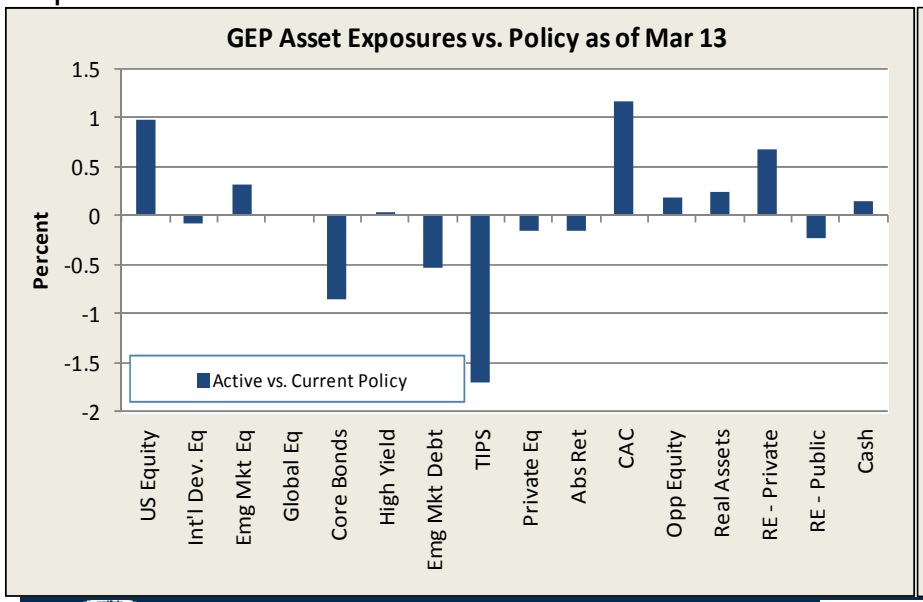


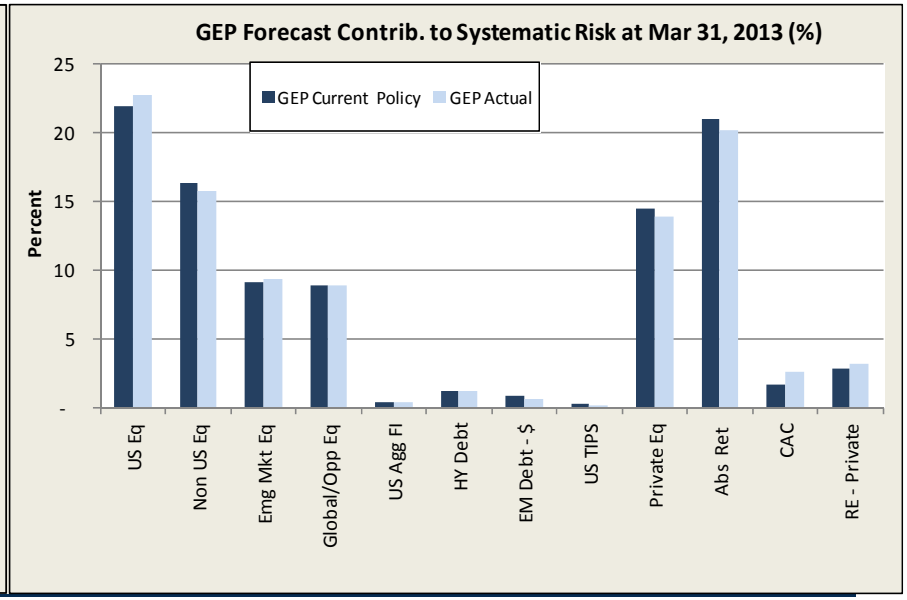
Asset Allocation and Risk

Note: Exposures and Risk charts below are shown using January 1, 2013 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 in Core Fixed Income, EM Debt, and TIPS by 0.9%, 0.5%, and 1.7% respectively. The fund is overweight in US and EM Equity, Cross Asset Class, and Real Estate.

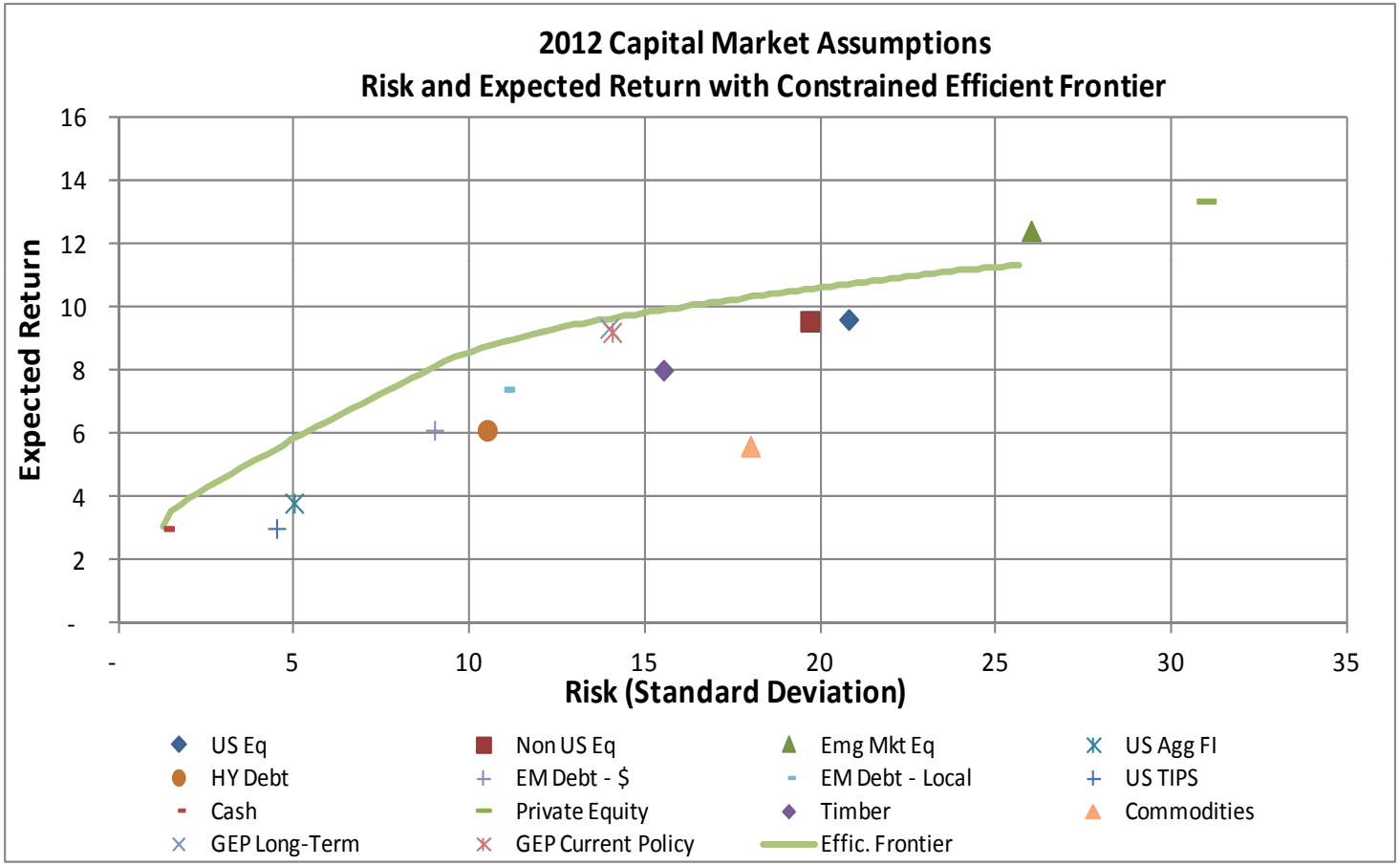
(Lower Right) The fund's forecast **total systematic risk** (dark blue bars) is 14.42% annualized standard deviation. It is still heavily weighted to Public Equity (57% of the total). Forecast **active systematic risk** is 42bp. The policy benchmark risk decomposition (light blue bars) is similar to 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%).

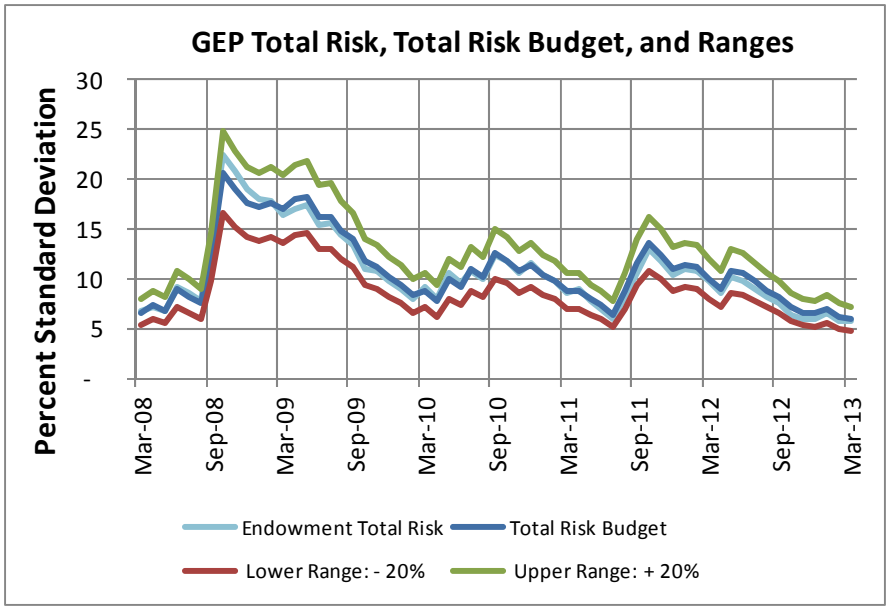


* Asset Class returns and Efficient frontiers are shown in the chart as arithmetic (average) expected returns.

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

Forecast volatility of the current policy is 14.1%.

Risk Measures: Total



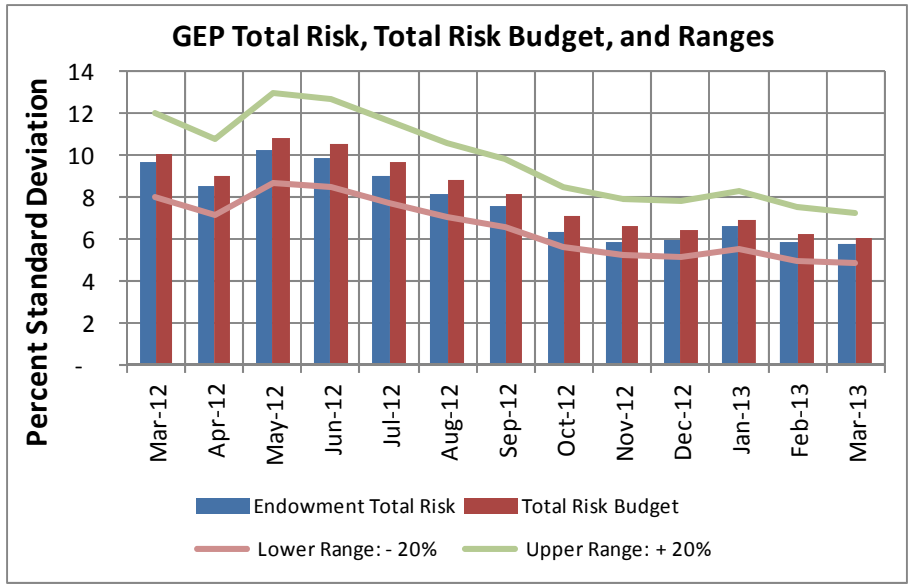
Total risk is measured by standard deviation of monthly **total** returns; each point or bar shows a 12 month measurement period.

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.

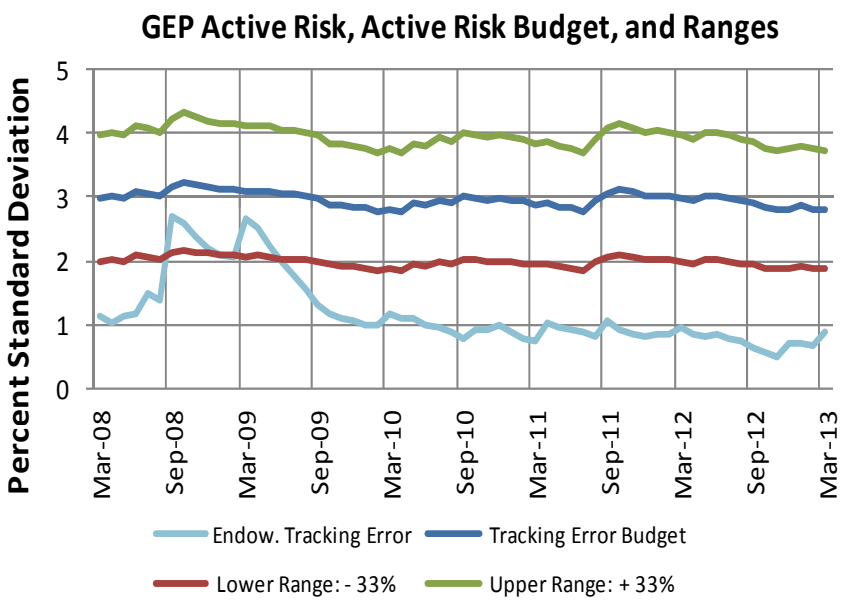
At the end of the quarter total risk was 5.73% for GEP and 5.99% for the benchmark.

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 Measures: Active



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

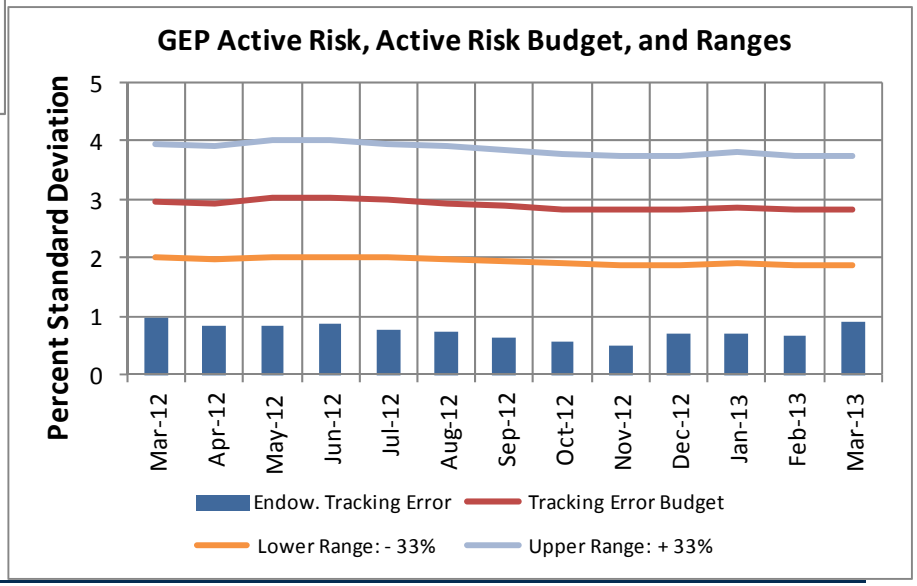
A standard deviation of 3% means that roughly 2/3 of the time, the realized active return will be within ± 3% points from the average active return.

Active risk at the end of the quarter was 0.90%.

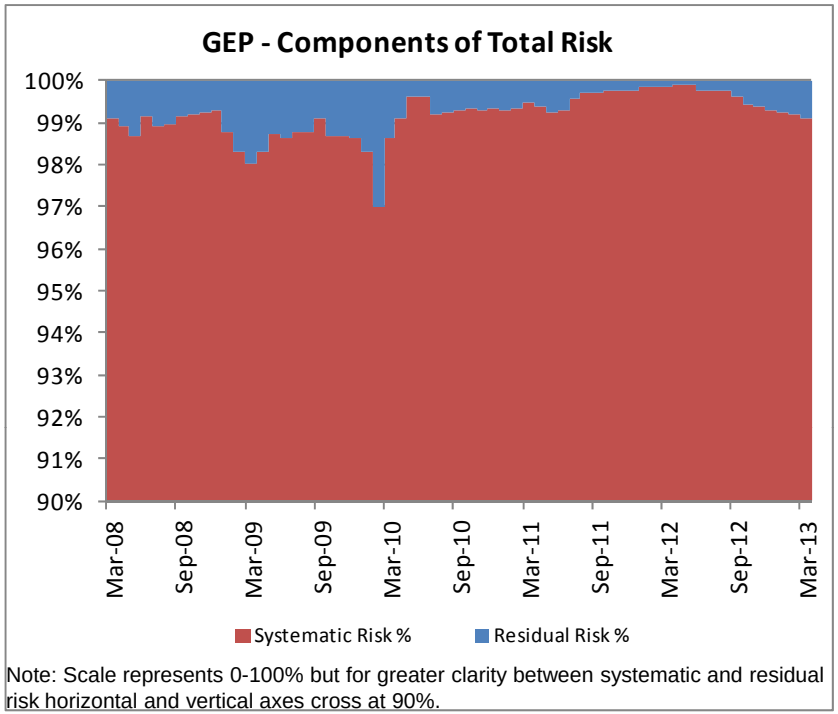
The spike in Active Risk in 2008-09 resulted from the underweight in equity as the market fell and then rallied, plus higher equity volatility.

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

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



Risk Attribution



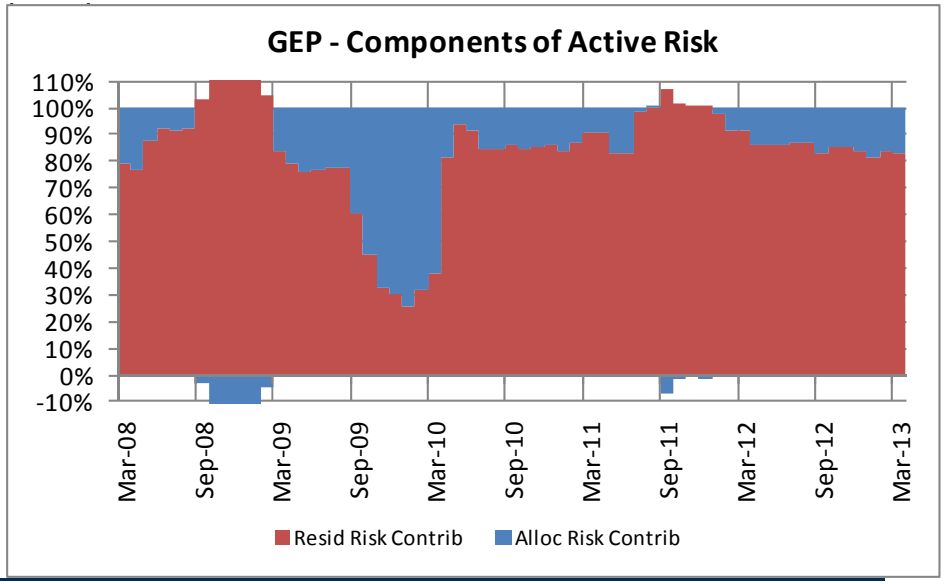
Note: Scale represents 0-100% but for greater clarity between systematic and residual risk horizontal and vertical axes cross at 90%.

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

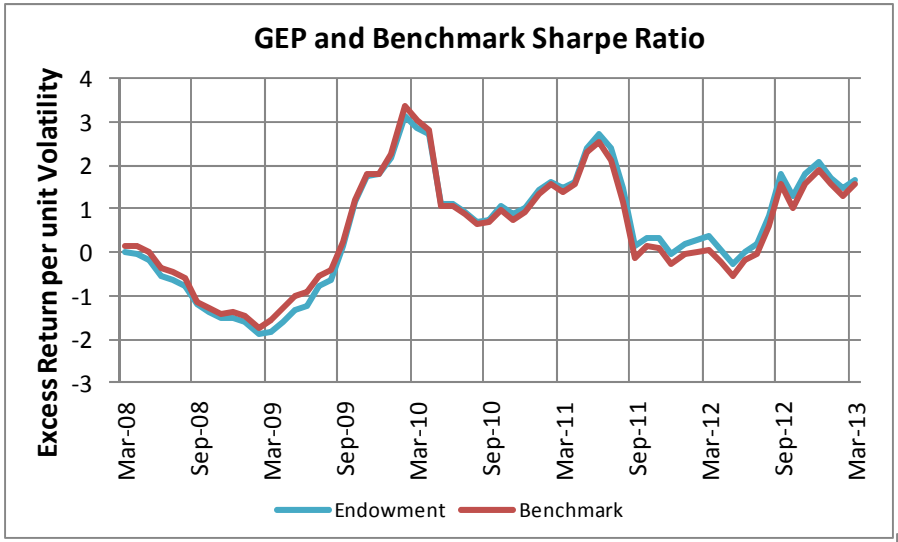
Systematic risk is associated with policy benchmark exposures; **residual risk** is associated with non benchmark decisions (security selection or asset allocation tilts).

(Upper Left) Virtually all (99.1%) of **Total Risk** is attributed to systematic (market) factors (red bars).

(Lower Right) Normally, the majority of **Active Risk** is attributed to security/manager 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 11 quarters, security selection risk has resumed its normal contribution



Risk Adjusted Return: Total

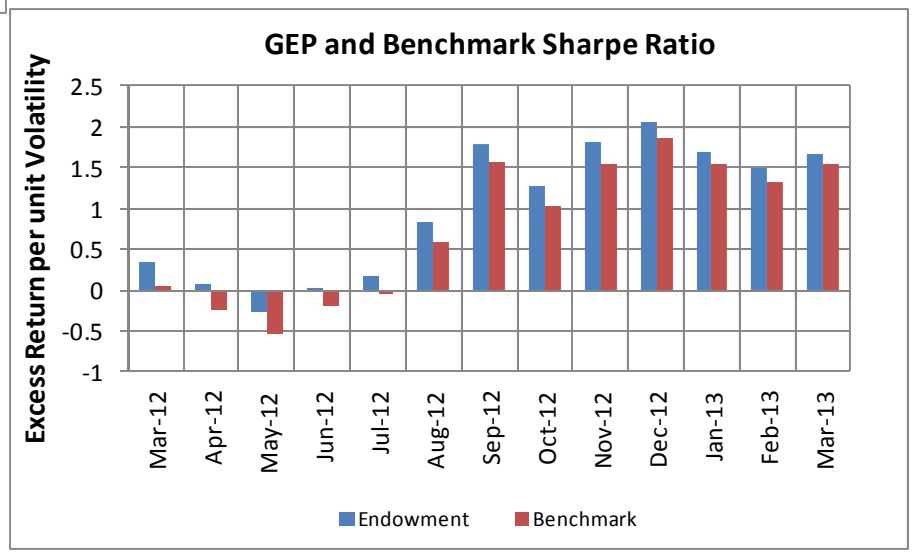


Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark for the past 5 years; in the past year it has been slightly higher. The 12 month return on risky assets had been generally positive since 2009 but with considerable volatility.

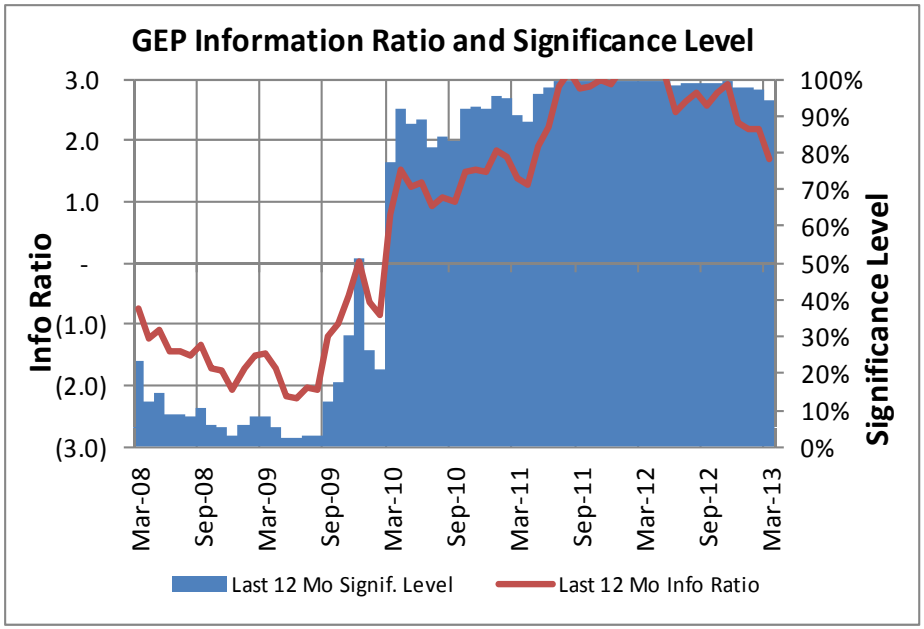
Sharpe ratio is "excess" return (total return less risk-free rate) divided by total risk; each point or bar shows a 12 month measurement period.

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

At the end of the quarter the GEP Sharpe Ratio was 1.7 vs. 1.6 for the benchmark.



Risk Adjusted Return: Active



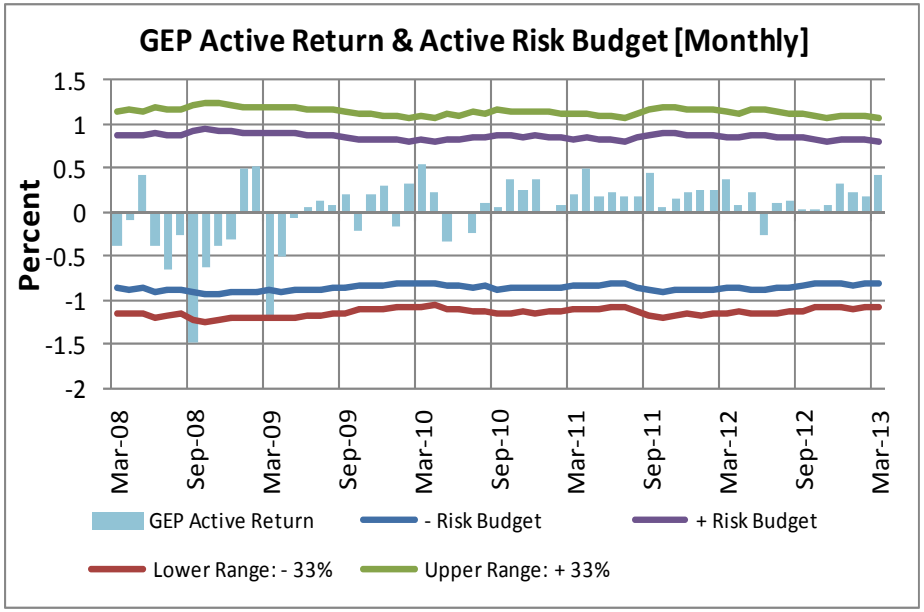
Information ratio is active return (total return less benchmark) divided by active risk; each point shows a 12 month measurement period.

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").

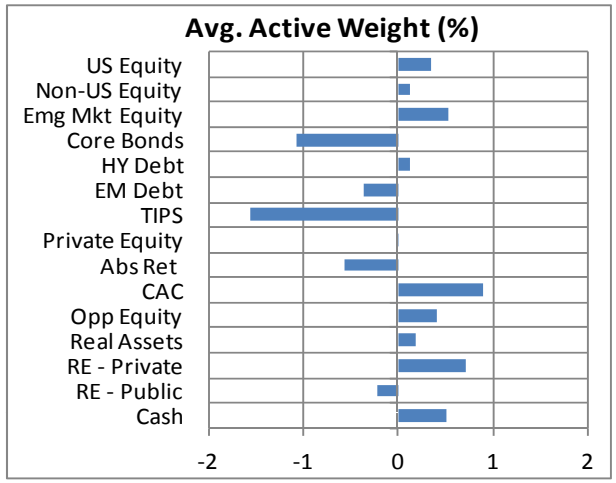
The GEP Information Ratio was 1.7 at quarter-end.

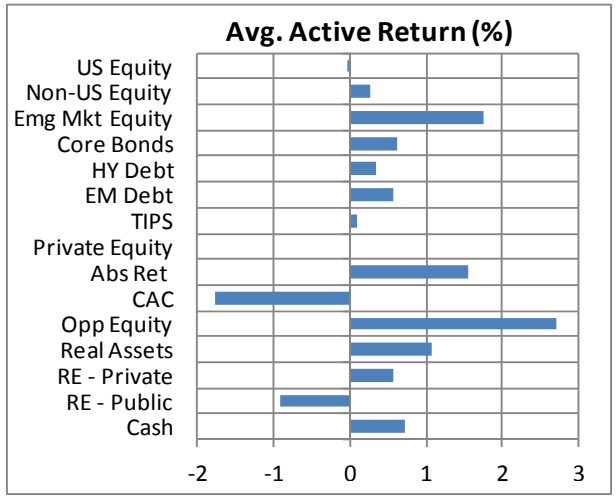
Information ratio (risk adjusted active return) is the result of both asset weighting decisions and active equity and bond performance.

It is higher when the returns are more consistent (less volatile). The information ratio has been positive for the past 12 quarters; active return has been small but on average, positive in the past 15 quarters.



Performance Attribution





Active Return for the Quarter was +0.82% (Fund return of +4.58% vs. policy benchmark of +3.76%).

[BELOW] Asset allocation decisions **(blue bars)** from Core Fixed Income and TIPS contributed 8bp. Security selection decisions **(red bars)** added 74bp (primarily Emerging Markets Equity, Absolute Return Strategies and Opportunistic Equity).