



Office of the Treasurer of The Regents

University of California

# I-1 UCRP and GEP Quarterly Investment Risk Report

Committee on Investments/  
Investment Advisory Group  
Fourth Quarter 2008

February 24, 2009

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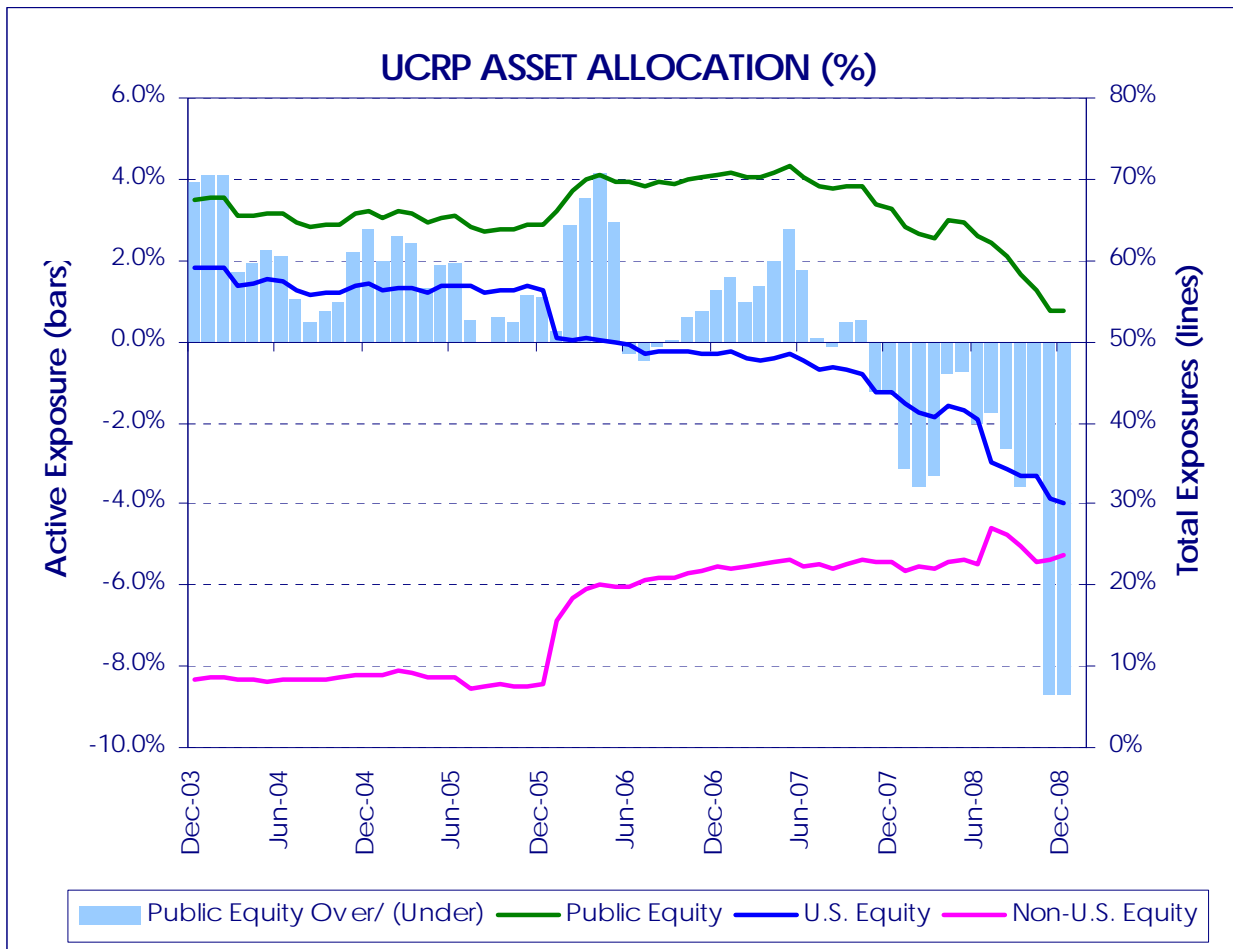
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# Risk Metrics for UCRP



# Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity underweight increased during Q4 2008 as a result of the October 08 correction

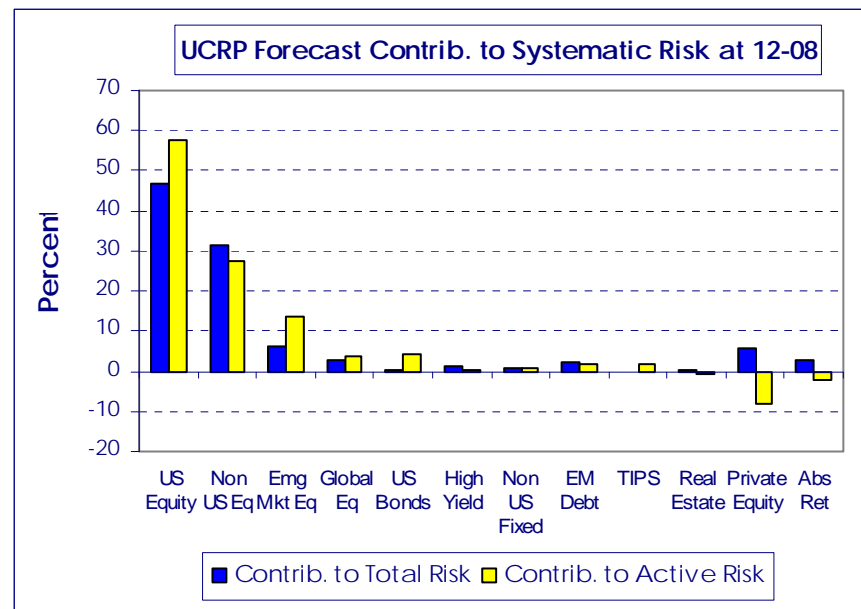
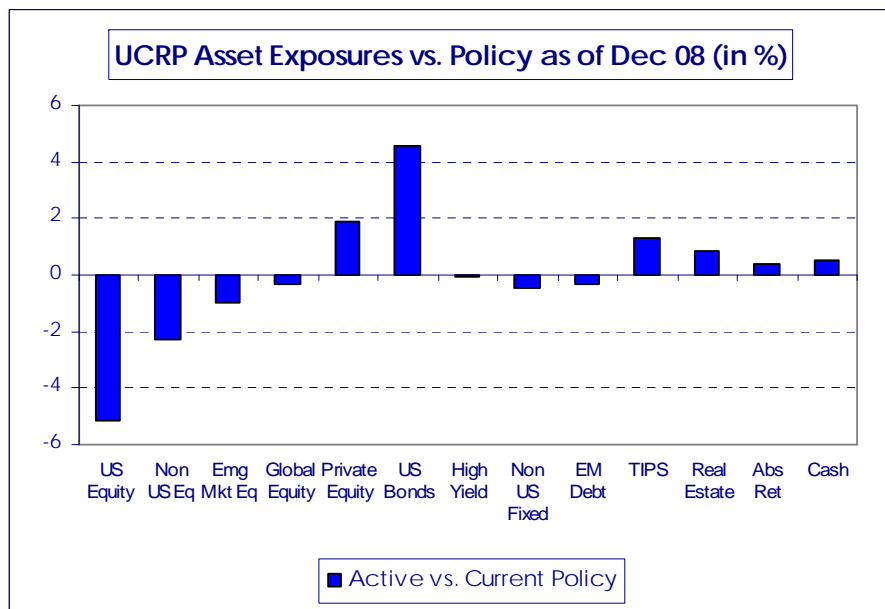


# Asset Allocation and Risk

Note: Exposures and Risk charts below are shown using October 1, 2008, target asset weights. Systematic risk is estimated using long term forecasts, not recent realized volatility.

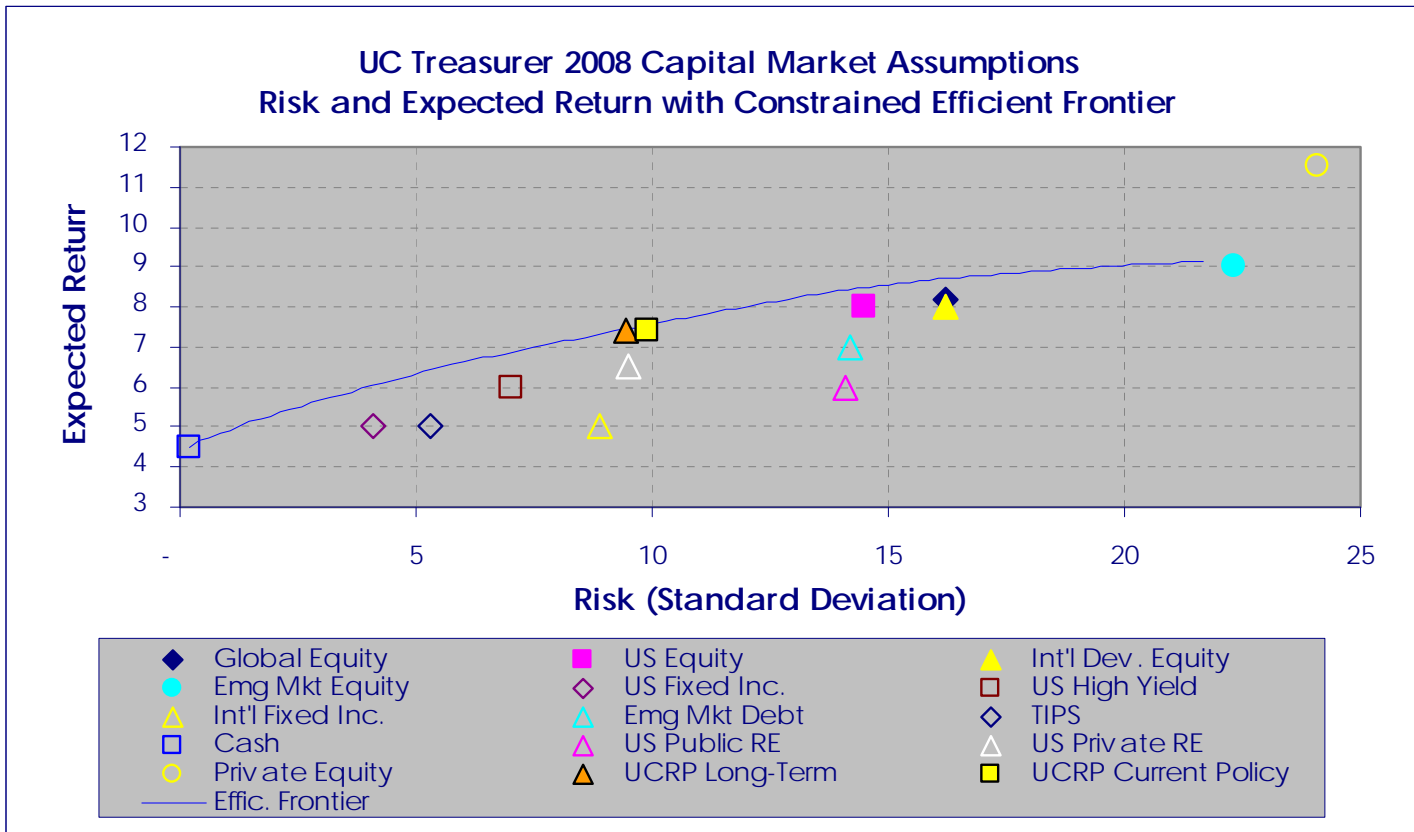
(Lower Left) Asset weights are measured relative to Current Policy. The fund has an underweight in all Equity classes, and an overweight in US Bonds, TIPS and Private Equity.

(Lower Right) The fund's forecast total systematic risk (blue bars) is 9.9% annualized standard deviation. It is heavily weighted to US and Non-US developed equity (almost 80% of total). Forecast active systematic risk is 109 bp. The Equity underweight accounted for almost 100% of this amount (yellow bars).



# Expected Risk and Return

Forecast risk and return (using Treasurer's 2008 capital markets assumptions) lies on the constrained efficient frontier; however, forecast return of 6.9%\* is less than actuarially required return of 7.5%.



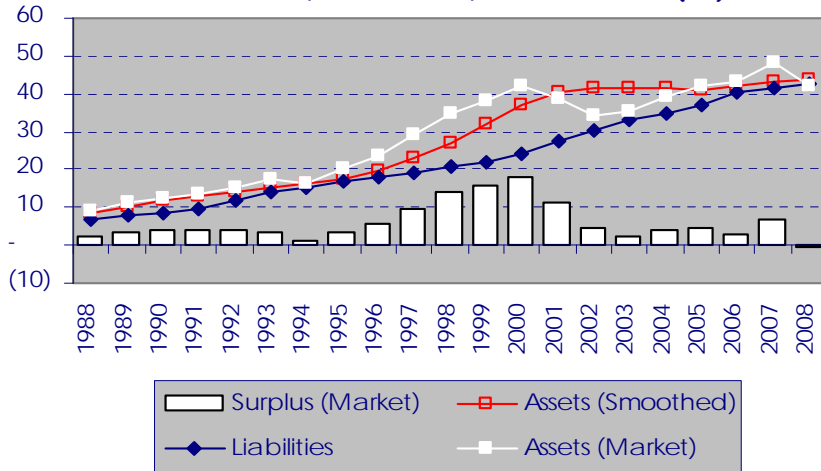
\*Asset Class returns and efficient frontiers are shown in the chart as arithmetic (i.e., average) expected returns.

The projected compound annual return over multi-year horizon is 6.9% for the **Current Policy** weights.

Forecast risk is 9.9%.

# Historical Funded Status

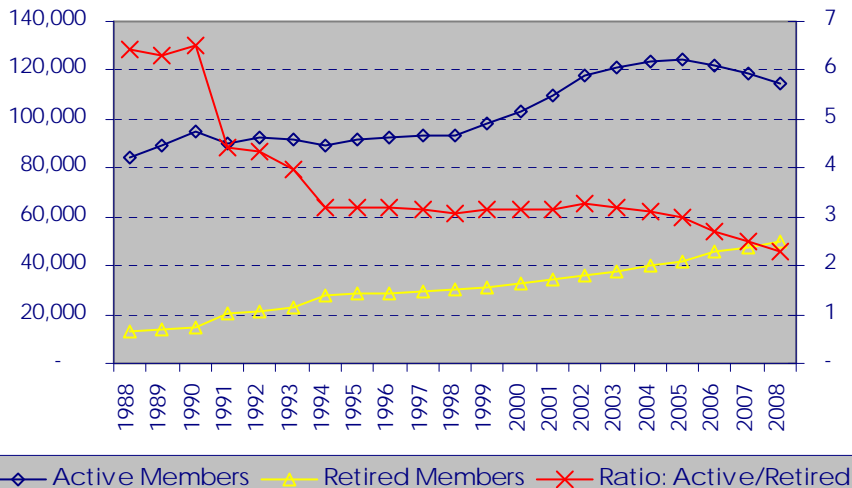
UCRP ASSETS, LIABILITIES, and SURPLUS (\$B)



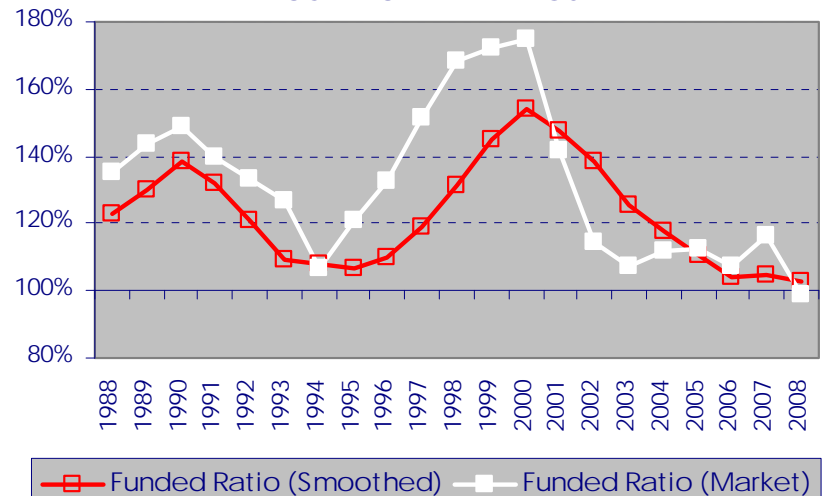
The Pension Fund's liabilities have been growing steadily (**upper left**) with University employment, while the assets have grown with the bull markets of 1982-2000 and 2003-2007. The ratio of actives to retirees has recently fallen from 3x to 2x (**lower left**).

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 while currently just at 100%, is expected to decline over the next decade (see next slide).

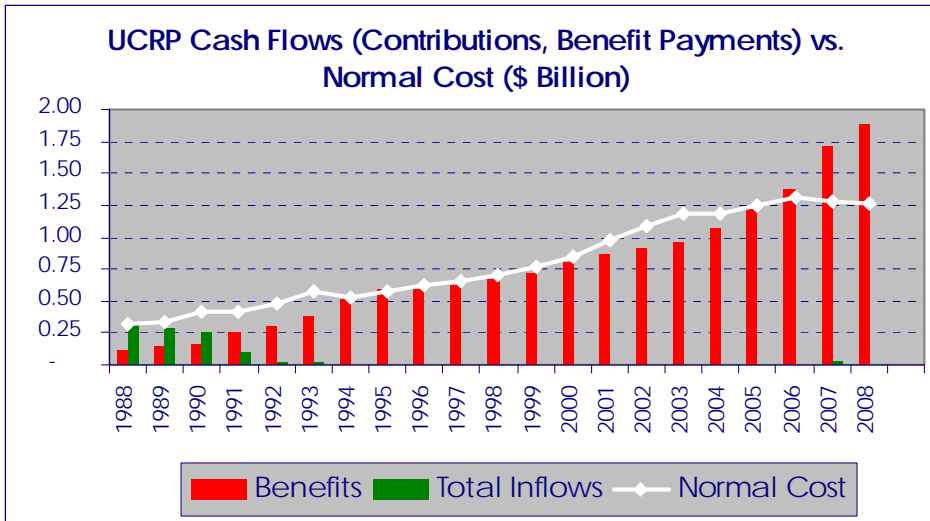
Pension Membership (LHS) and Active/Retiree Ratio (RHS)



UCRP FUNDED RATIOS



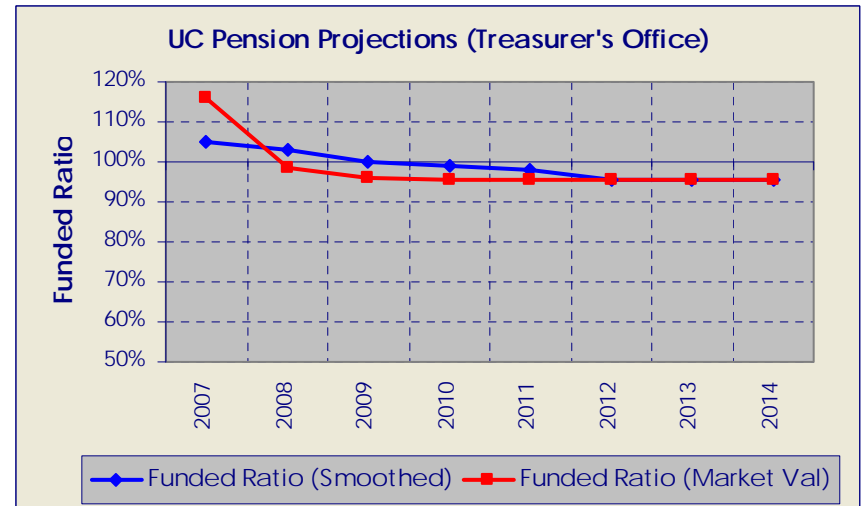
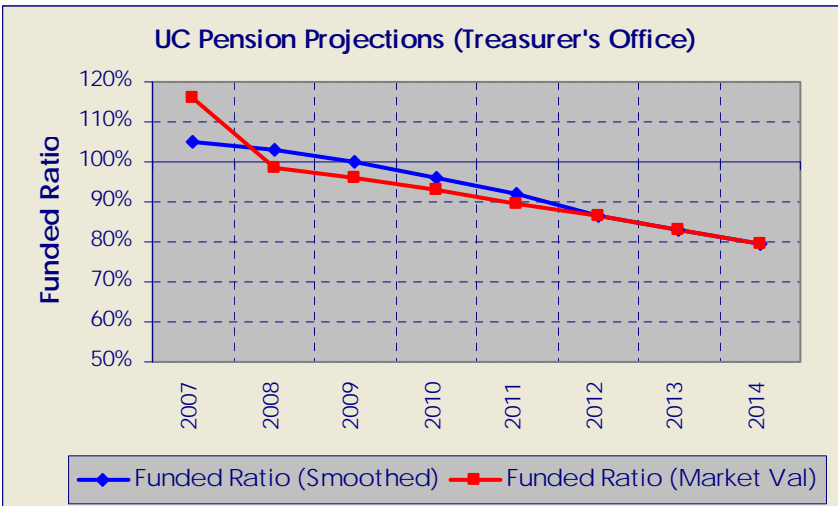
# Forecast Funded Status



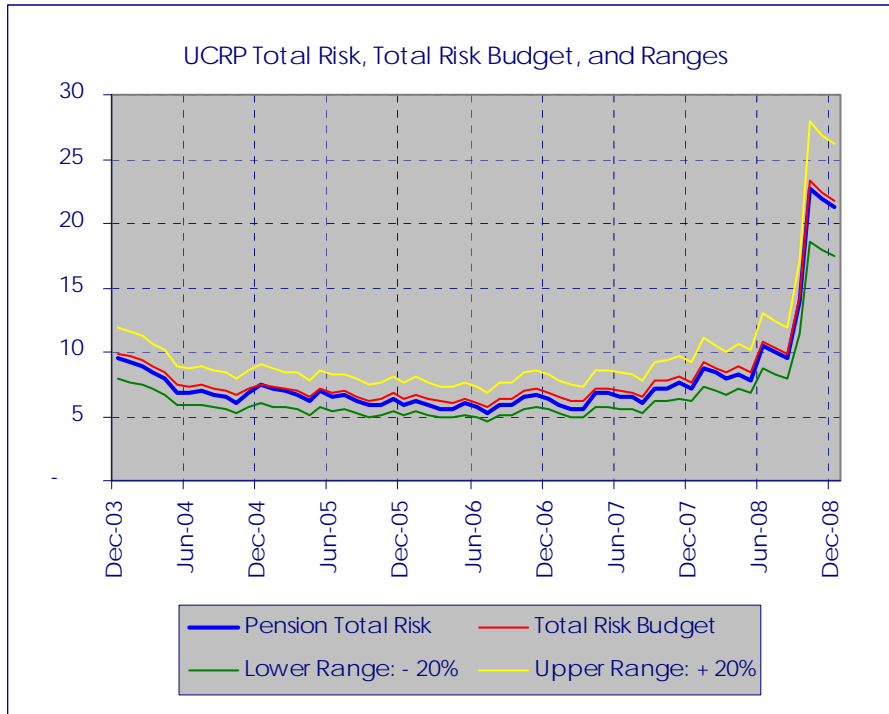
- Contributions were suspended in 1990, but annual benefit payments have grown in line with and recently exceeded, Normal Cost over the last decade (**upper left**).
- The **bottom** two charts show projected funded ratio without and with contributions, **assuming a constant 7.5% investment return**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

LEFT: Assumes no contributions, 7.5% annual investment return

RIGHT: Assumes Normal Cost contributed annually beginning FY 2010; 7.5% return



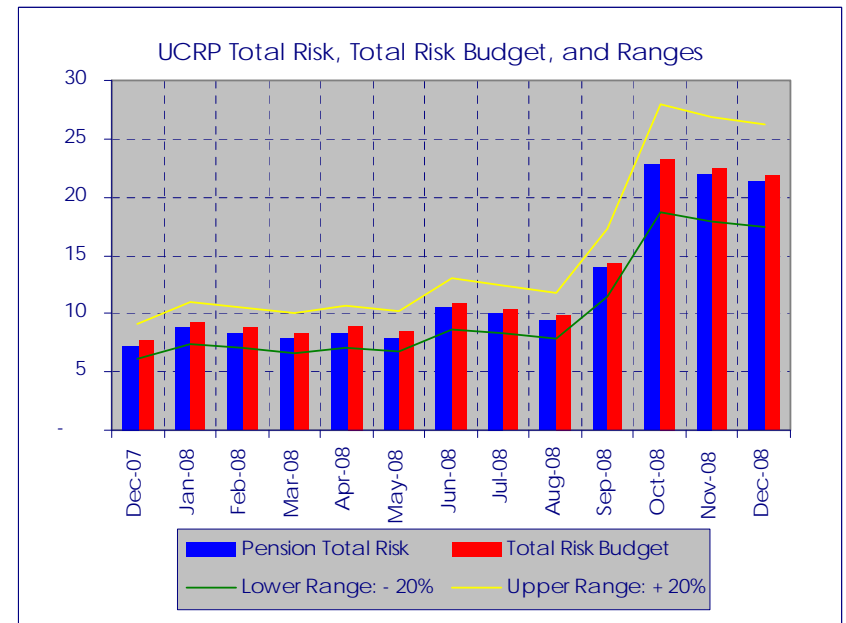
# Risk Measures: Total



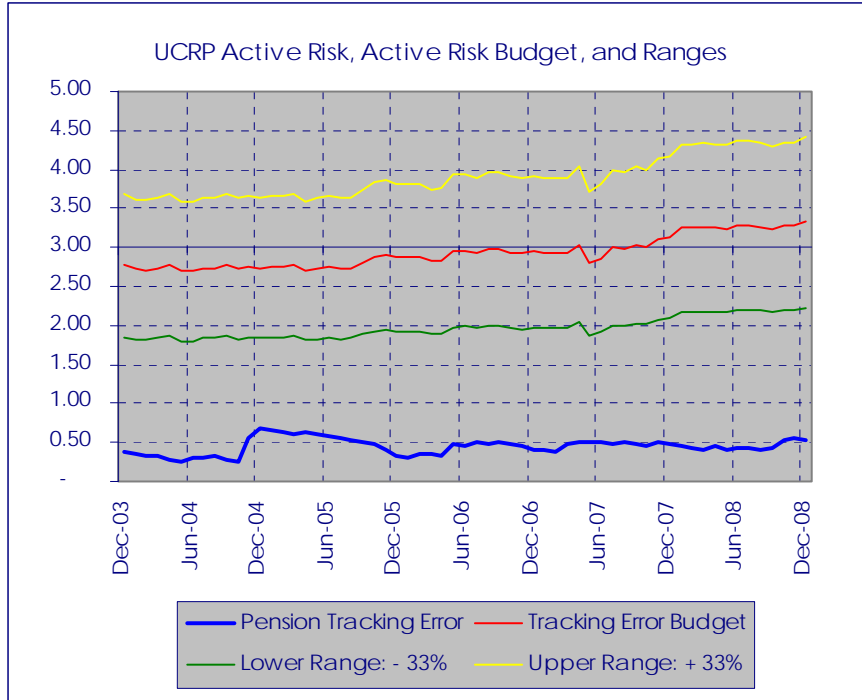
Total risk trend quite similar to benchmark; recently Plan volatility has been slightly less than the Budget, but well within ranges. Total volatility has been moving higher since July 2007, and spiked up in October 2008.

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.)

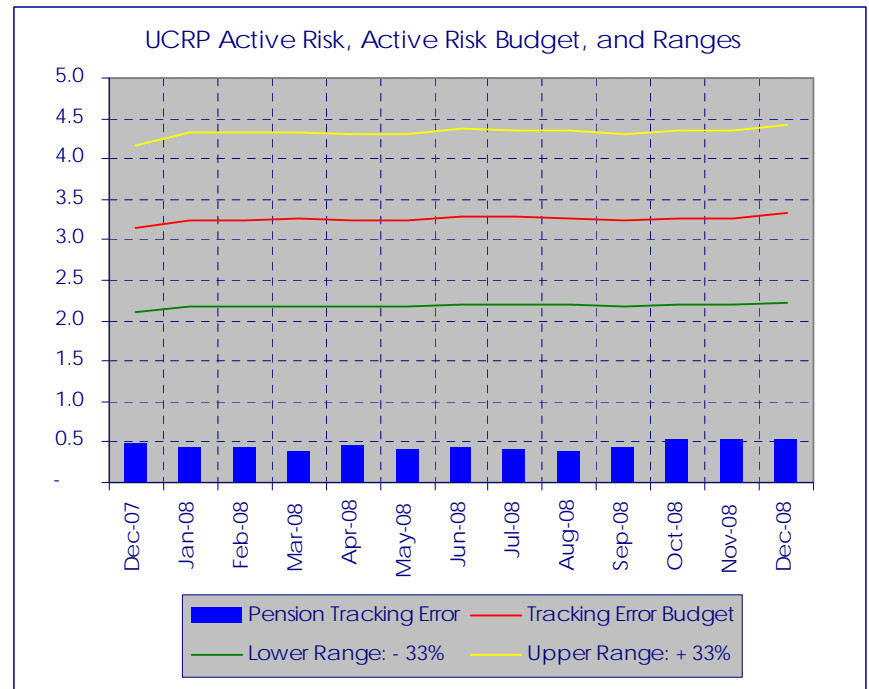


# Risk Measures: Active



Active risk for the total fund has held steady over this period at 0.50% annualized standard deviation.

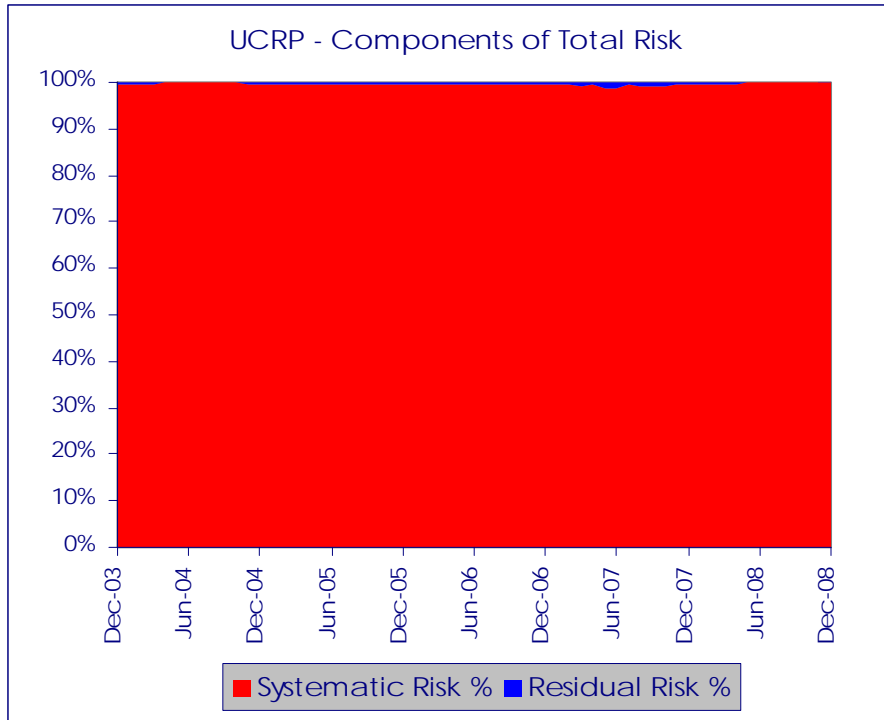
Active risk is currently stable and well below long term expectations for active return. Despite recent market volatility, active risk is well diversified.



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

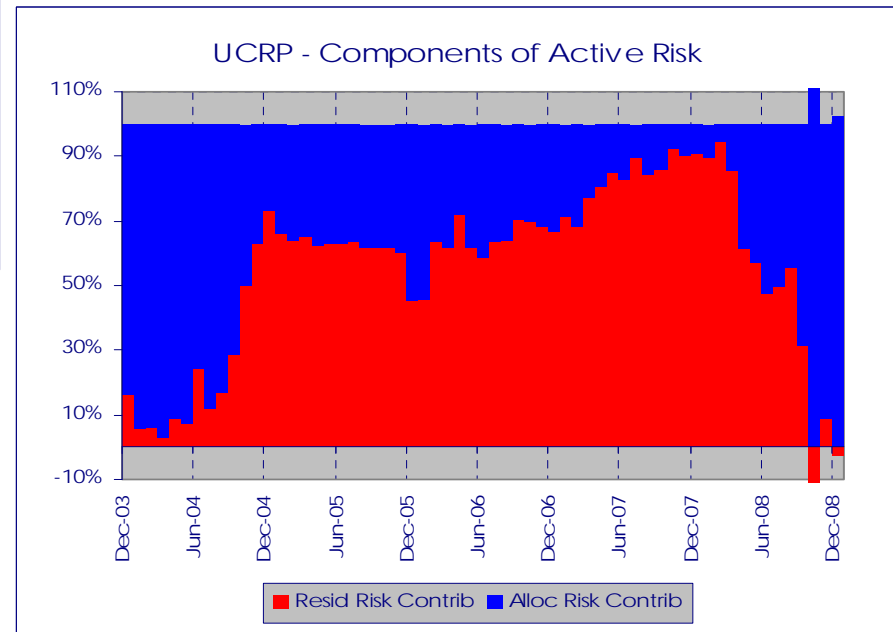


**(Upper Left)** Almost all of **Total Risk** is attributed to systematic (market) factors.

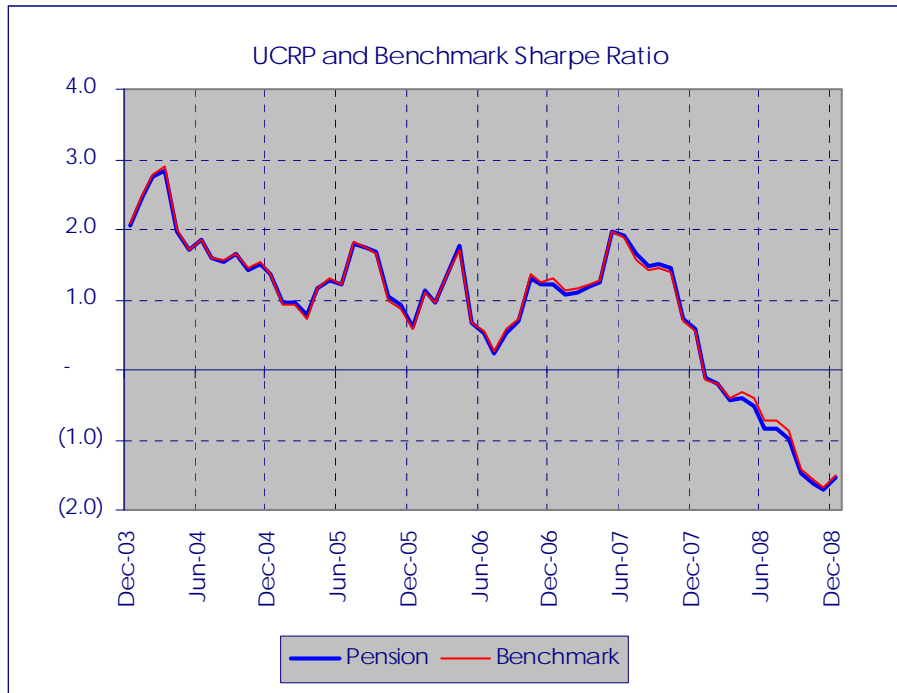
**(Lower Right)** Normally, the majority of **Active Risk** is attributed to security selection. When active management is reduced, or when asset allocation transitions are implemented, allocation risk increases. In the last quarter, the equity underweight dominated all other decisions.

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)

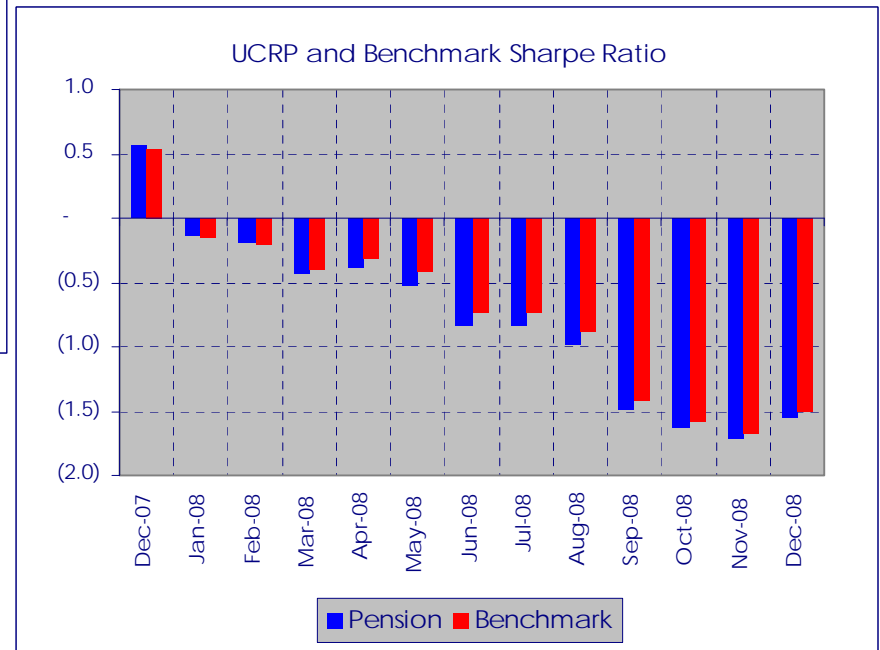


# Risk Adjusted Return: Total

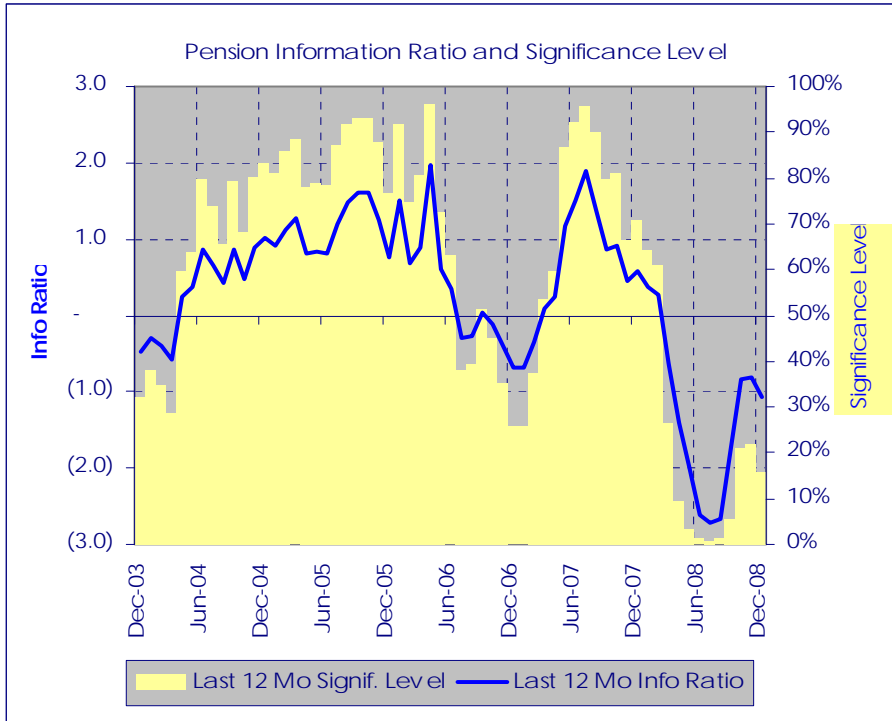


Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark since March 2003. The return on risky assets has reached lows not seen since FY 2002.

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.

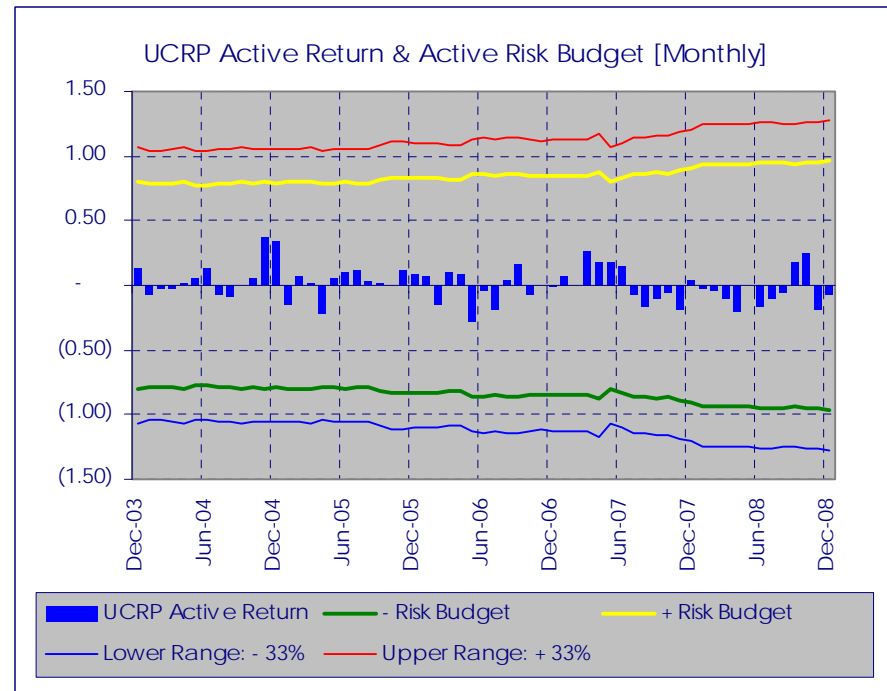


# Risk Adjusted Return: Active



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 recently turned negative as active returns have been slightly negative while active risk has remained low (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.



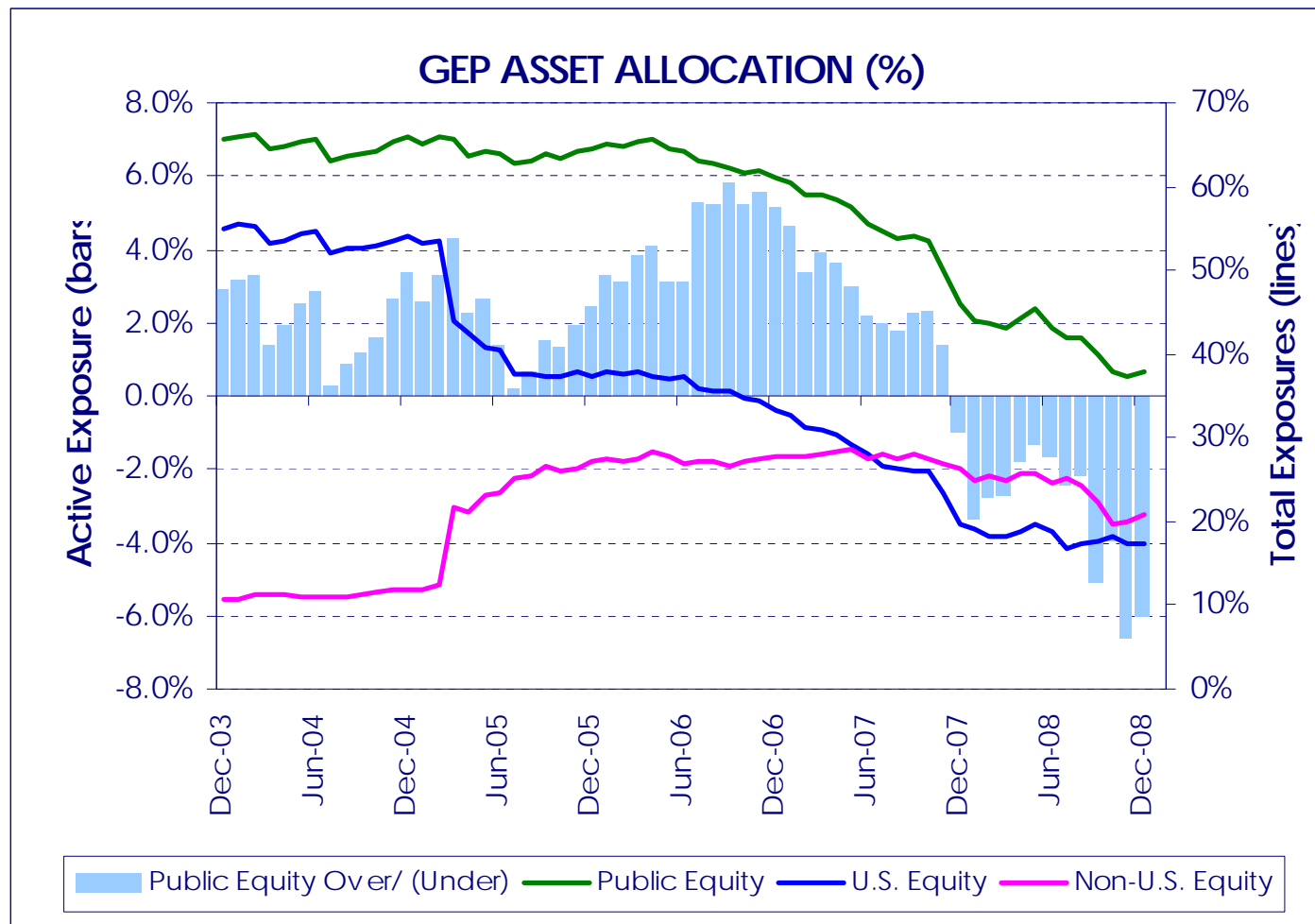
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# Risk Metrics for GEP



# Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity underweight increased during Q4 2008 as a result of the October 08 correction.

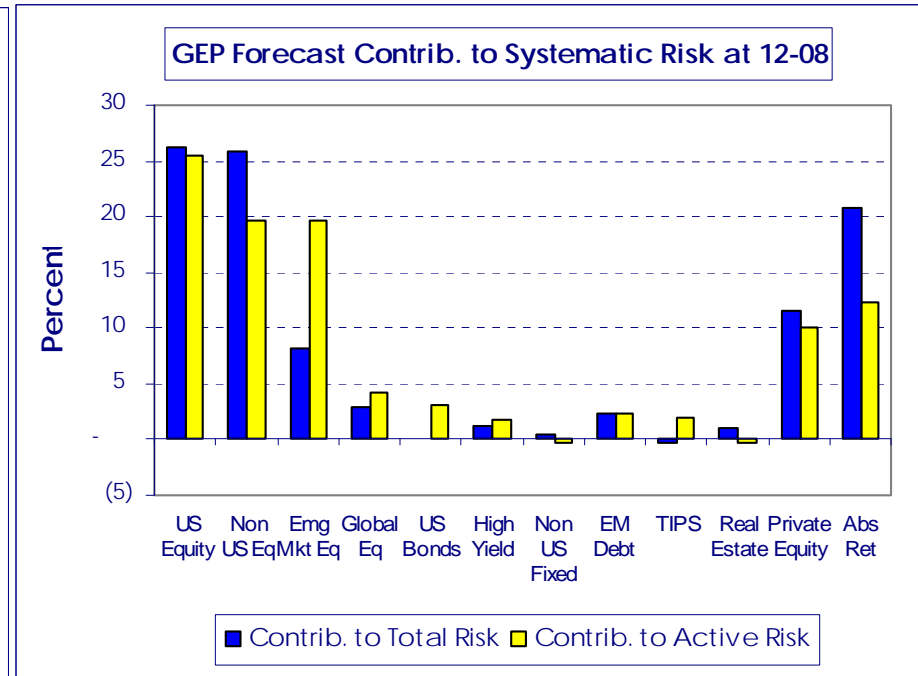
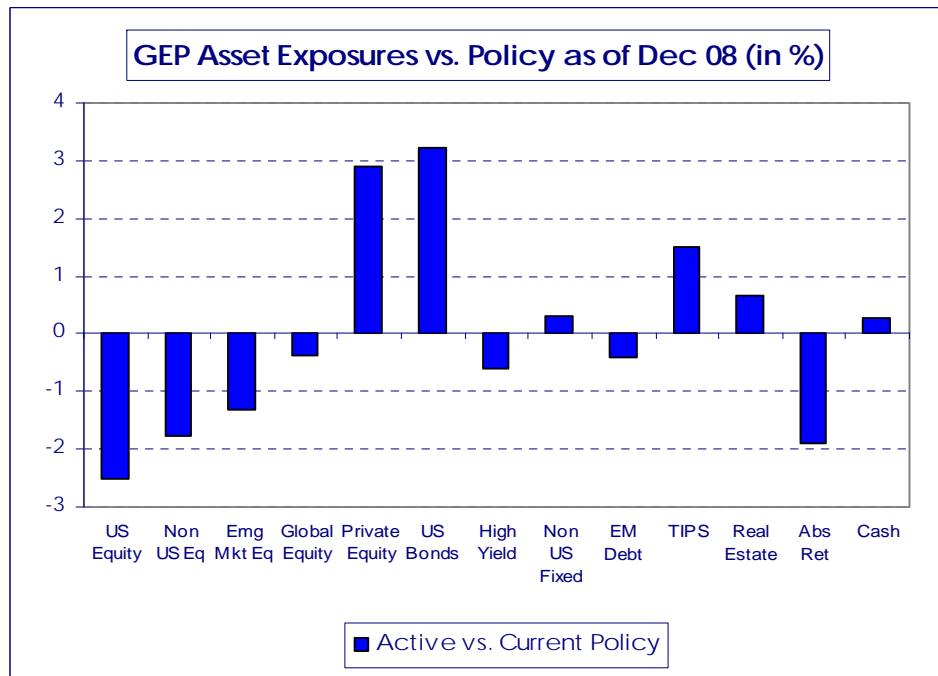


# Asset Allocation and Risk

Note: Exposures and Risk charts below are shown using October 1, 2008 target asset weights. Systematic risk is estimated using long term forecasts, not recent realized volatility.

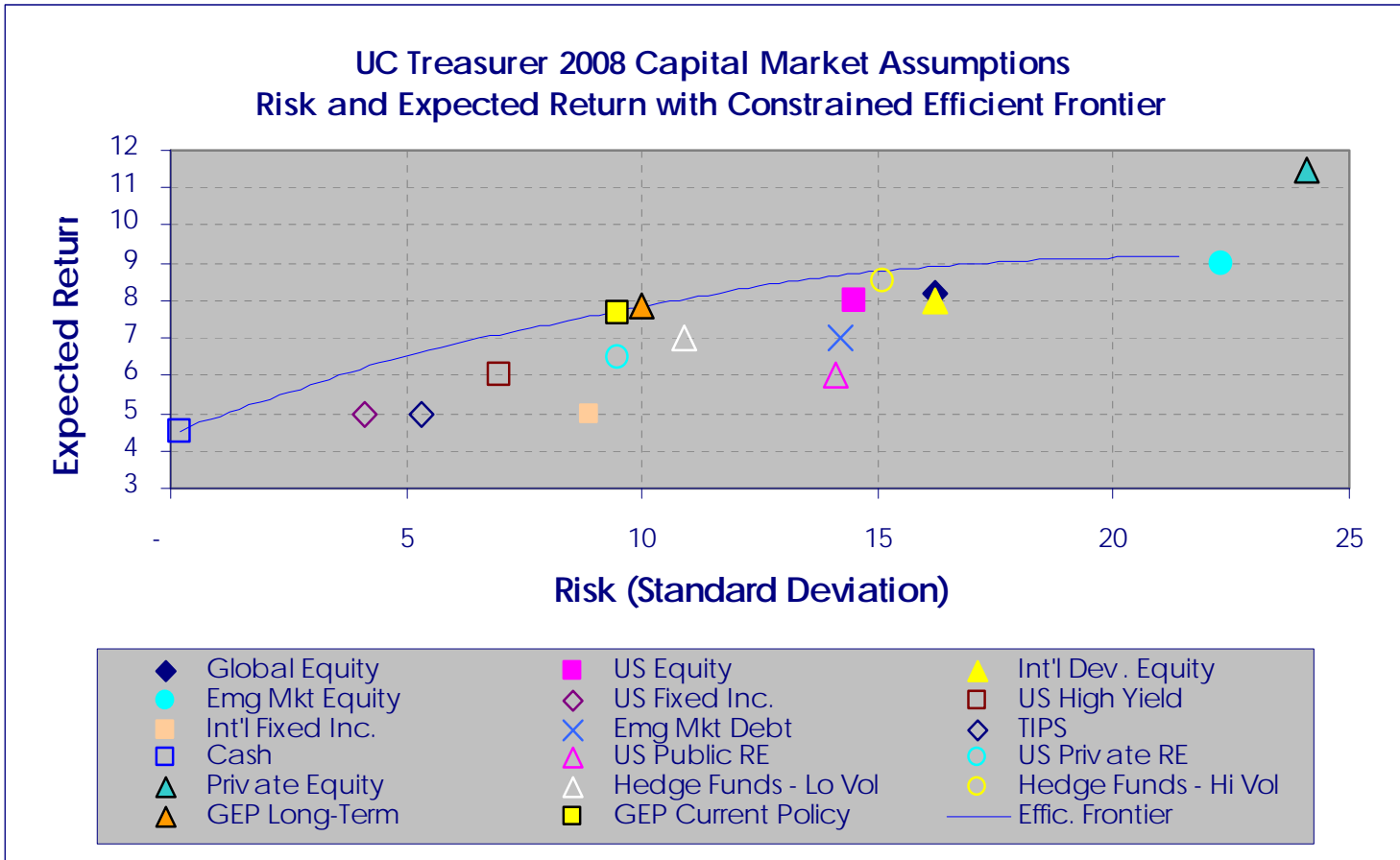
**(Lower Left)** Asset weights are measured relative to Current Policy. The fund is underweight in all Equity classes and Absolute Return, and an overweight in US bonds, TIPS, and Private Equity.

**(Lower Right)** The fund's forecast **total systematic risk** (blue bars) is 9.5% annualized standard deviation. It is evenly balanced among US equity, Non US developed equity, and Absolute Return (over 70% of total). Forecast **active systematic risk** is 93 bp. The equity underweight accounted for over 65% of this amount (yellow bars).



# Expected Risk and Return

Forecast risk and return (using Treasurer's 2008 capital markets assumptions) lies on the constrained efficient frontier; however forecast return of 7.2%\* is less than 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.

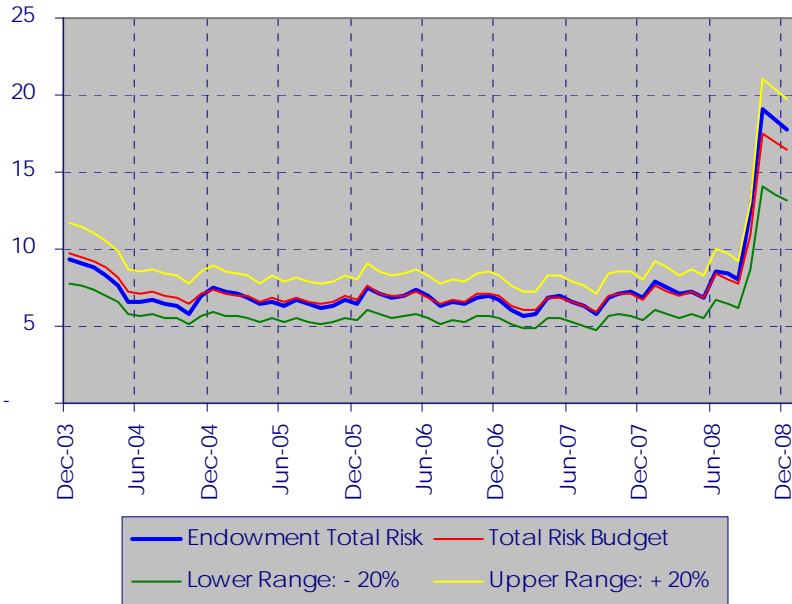
The projected compound annual return over multi year horizon is 7.2% for the Current Policy weights.

Forecast risk is 9.5%.



# Risk Measures: Total

GEP Total Risk, Total Risk Budget, and Ranges

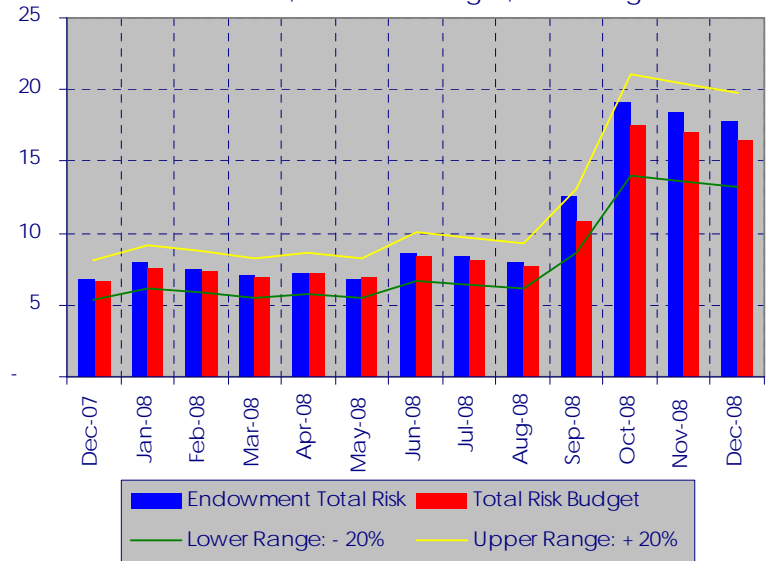


Total risk trend has been quite similar to benchmark; recently GEP volatility has risen marginally above the Budget, but well within acceptable ranges. Until the past two quarters, total volatility has remained stable, primarily because of the larger non-market risk component in the GEP; however, volatility spiked up in October 2008.

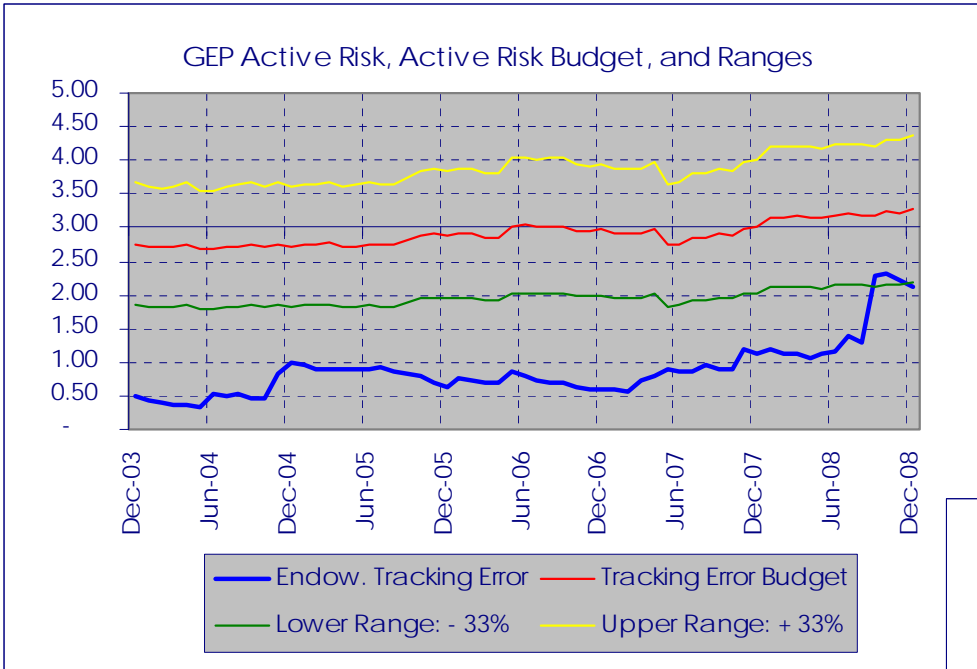
Total Risk budget equals Benchmark risk plus the Active risk budget. The ranges are +/- 20% around the budget.

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.)

GEP Total Risk, Total Risk Budget, and Ranges



# Risk Measures: Active

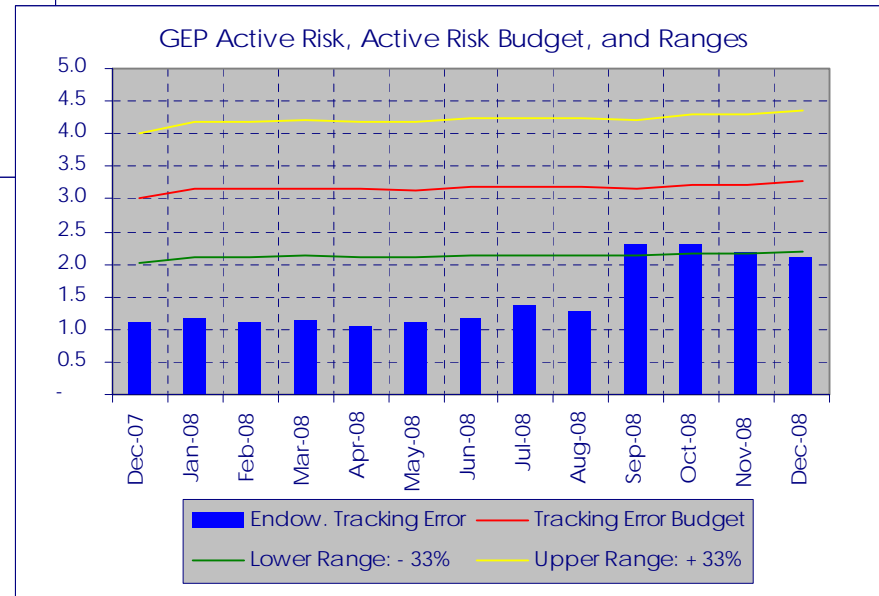


Active risk for the total fund has grown slowly over this period from 0.50% to 1.50% annualized standard deviation.

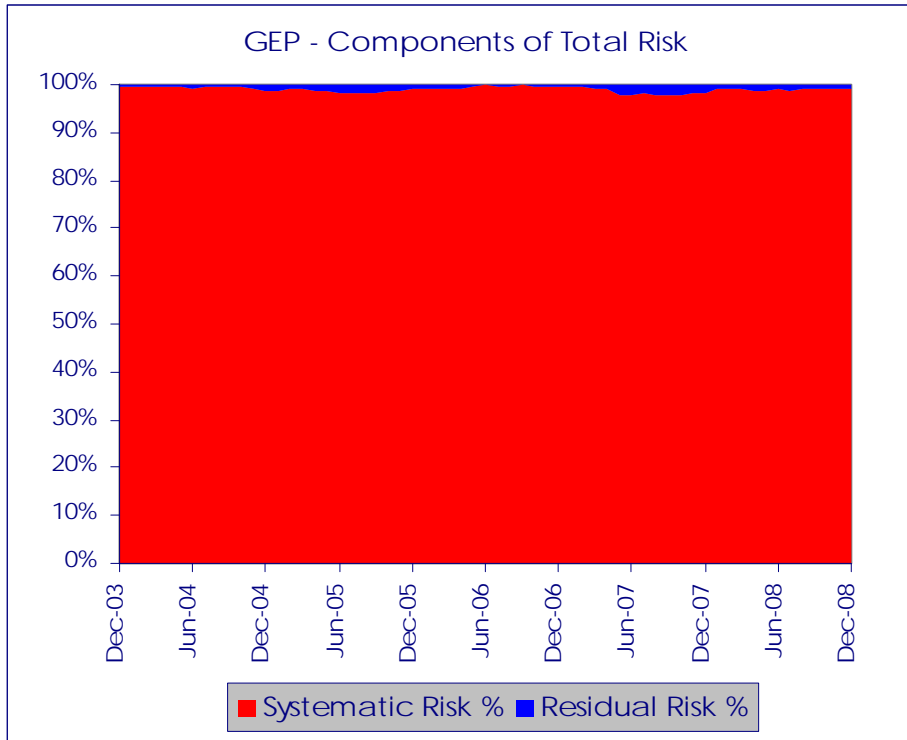
Active risk is currently below long term expectations for active return, but has recently exceeded over 2.0% with the sharp declines in Absolute Returns (relative to its cash-based benchmark).

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.



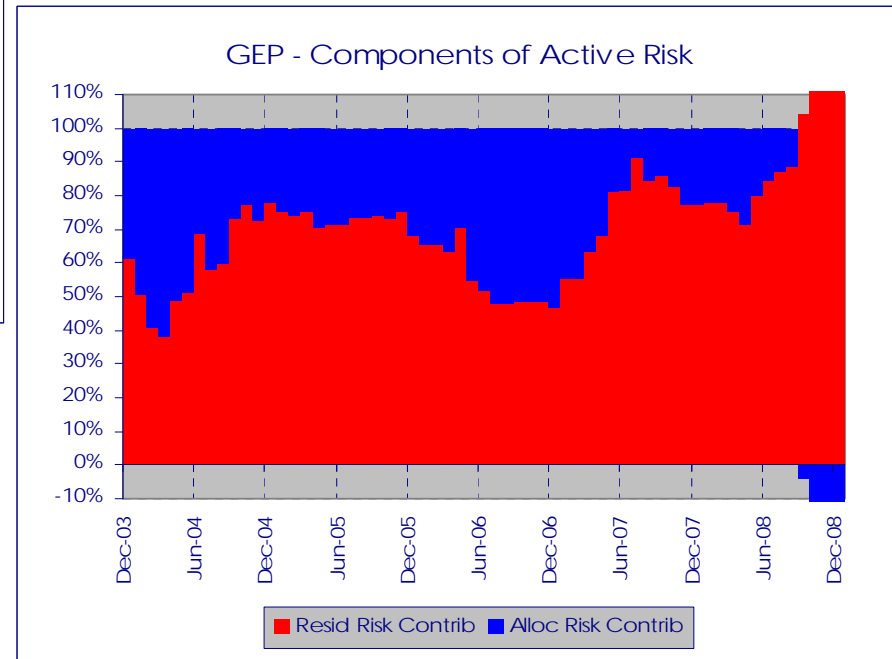
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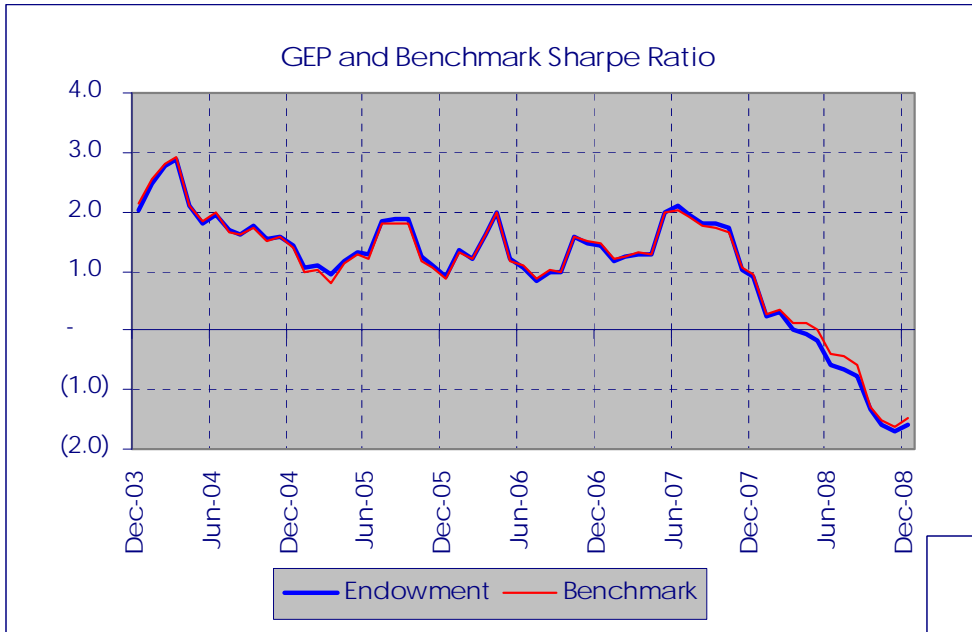
**(Upper Left)** Almost all of **Total Risk** is attributed to systematic (market) factors.

**(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 tends to dominate. Due to the mismatch between Abs. Ret. Strategies and its benchmark, residual risk is dominant.

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).

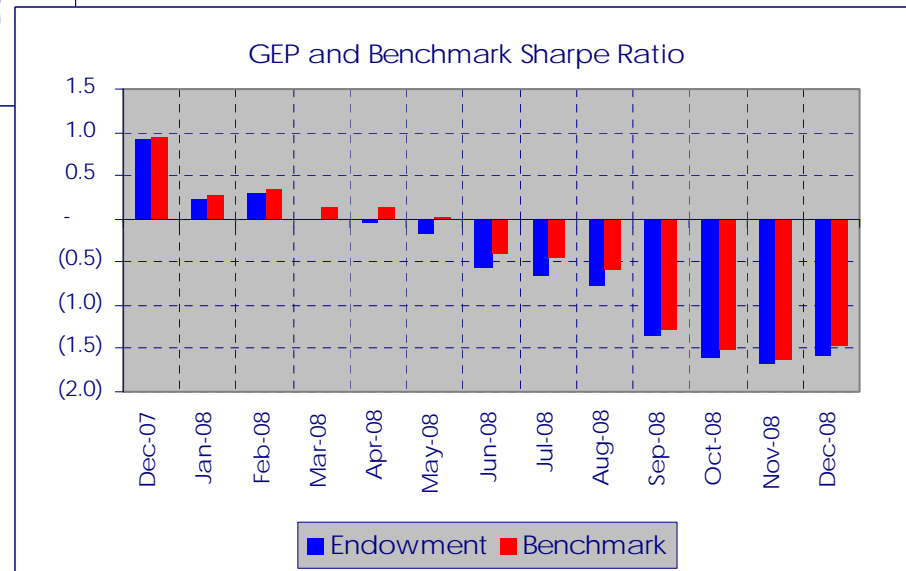


# Risk Adjusted Return: Total

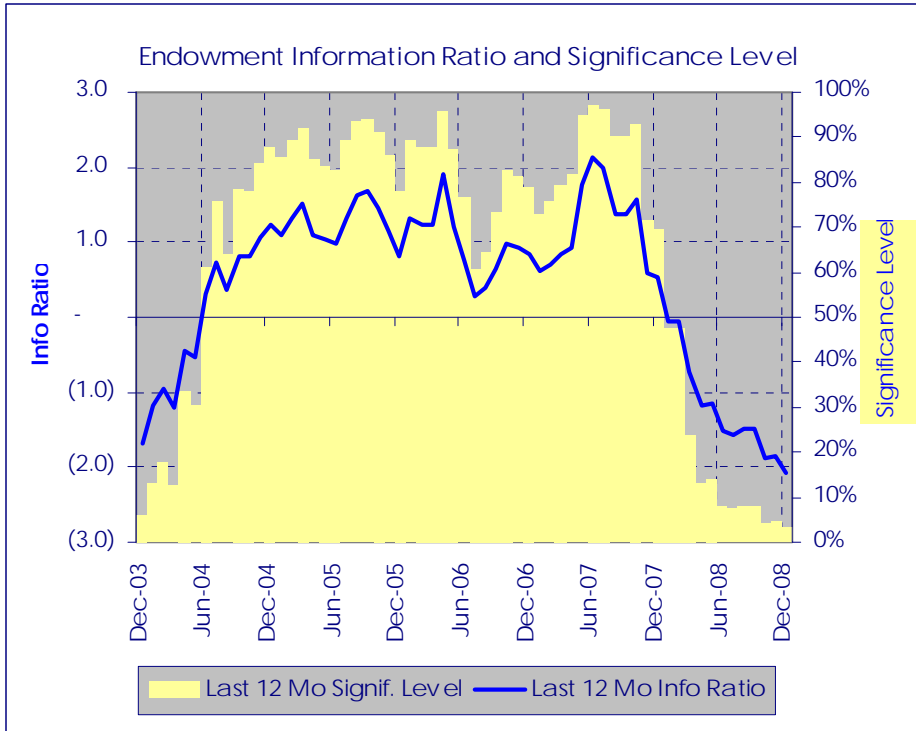


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Sharpe ratio is "excess" return (total return less risk-free rate) divided by total risk; each point or bar shows a 12 month measurement period. All risk calculations done using exponentially declining weights.



# 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. 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 Info ratio has recently turned negative as active return has been negative (see graph below), while active risk has increased, primarily due to the mismatch between Absolute Return Strategies and its benchmark.

