



Office of the Treasurer of The Regents

University of California

# UCRP and GEP Quarterly Investment Risk Report

Committee on Investments/  
Investment Advisory Group  
1st Quarter 2009

May 6, 2009

# Contents

	<u>UCRP</u>	<u>GEP</u>
• <b>Asset allocation history</b>	5	16
– What are the fund’s asset exposures?		
• <b>Asset allocation current position and risk contributions</b>	6	17
– How do they compare to policy targets?		
• <b>Capital markets expectations for return</b>	7	18
– What is the probability the fund will achieve its required return?		
– Is the amount of risk required acceptable?		
• <b>Historical Funded Status</b>	8	NA
• <b>Forecast Funded Status</b>	9	NA
– What is the probability the fund will be able to meet future obligations (with and without additional contributions)?		
• <b>Historical standard deviation of returns vs. benchmark</b>	10	19
• <b>Historical standard deviation of active return</b>	11	20
– What is fund’s realized volatility?		
– How does it compare with the policy benchmark and risk budgets?		



# Contents *continued*

---

	<u>UCRP</u>	<u>GEP</u>
• Systematic vs. residual risk contribution	12	21
• Asset allocation vs. selection risk contribution	12	21
– What are the sources of volatility?		
– What factors drive performance?		
Is the fund adequately diversified?		
• Sharpe ratio (total risk)	13	22
• Information ratio (active risk)	14	23
– Are risk exposures being rewarded?		
– Historical risk adjusted returns		



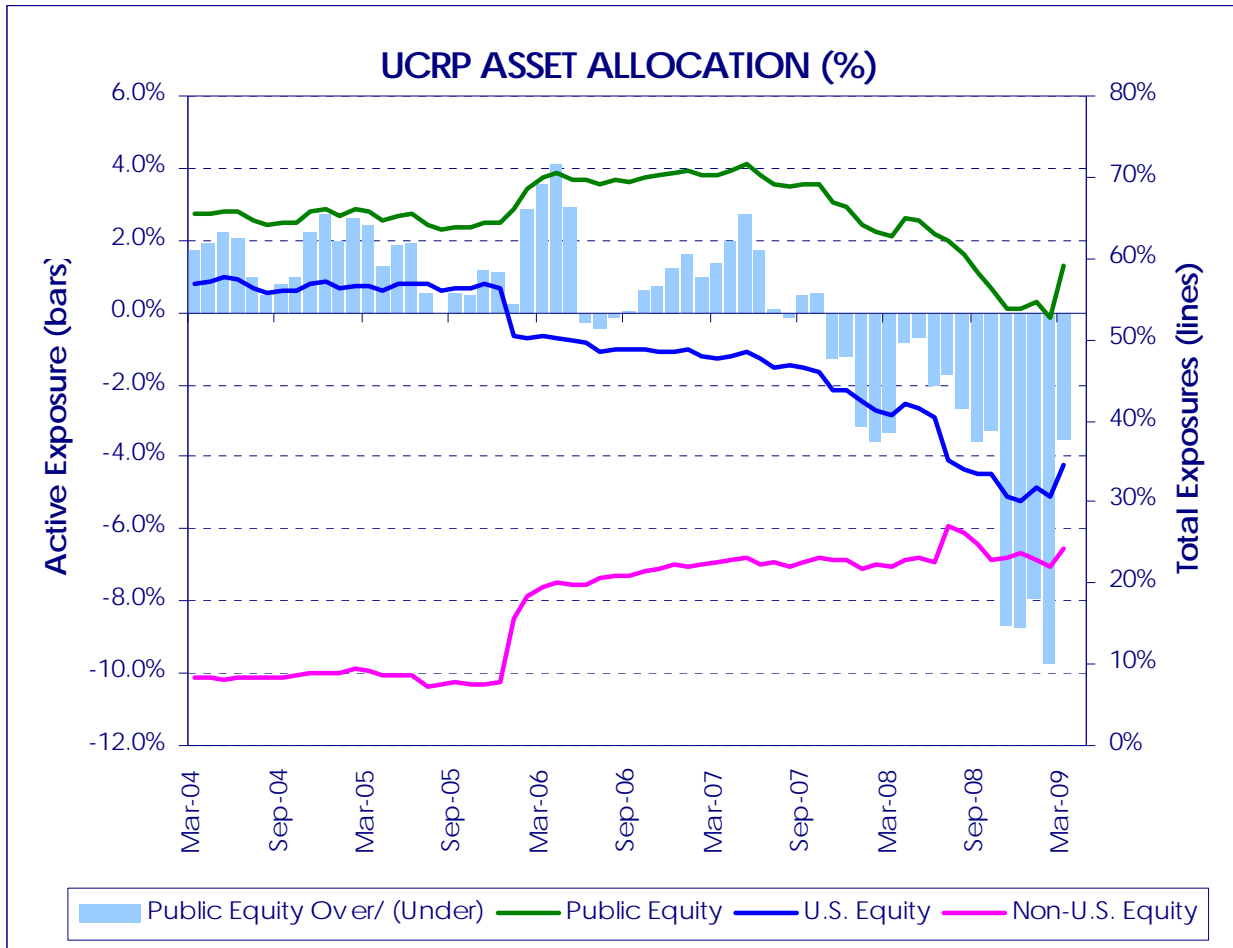
---

# Risk Metrics for UCRP



# Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity **underweight** decreased during Q1 2009 as a result of the March rally

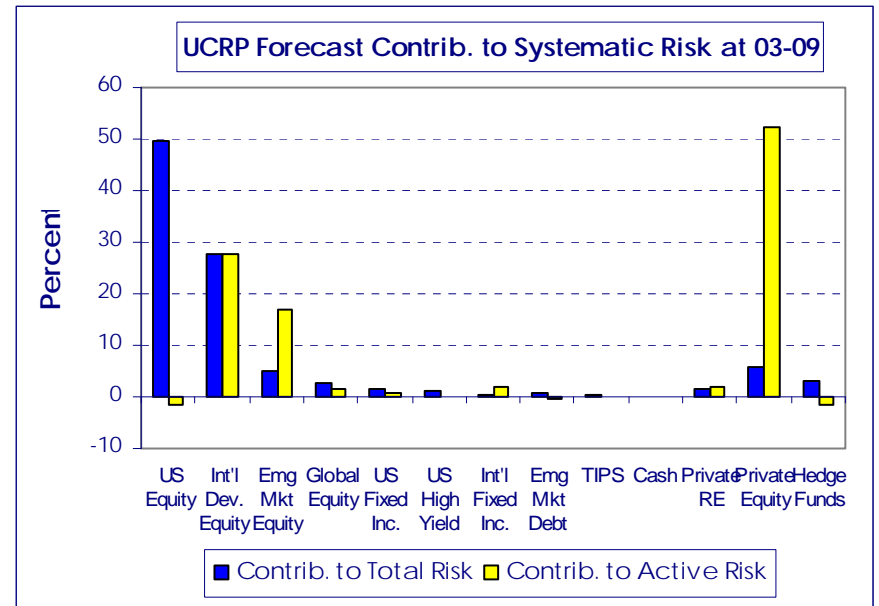
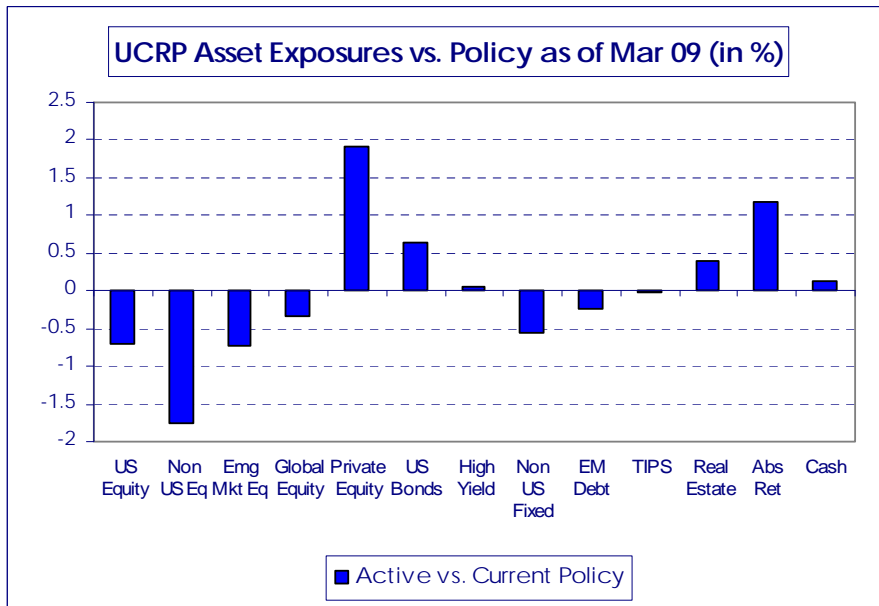


# Asset Allocation and Risk

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.

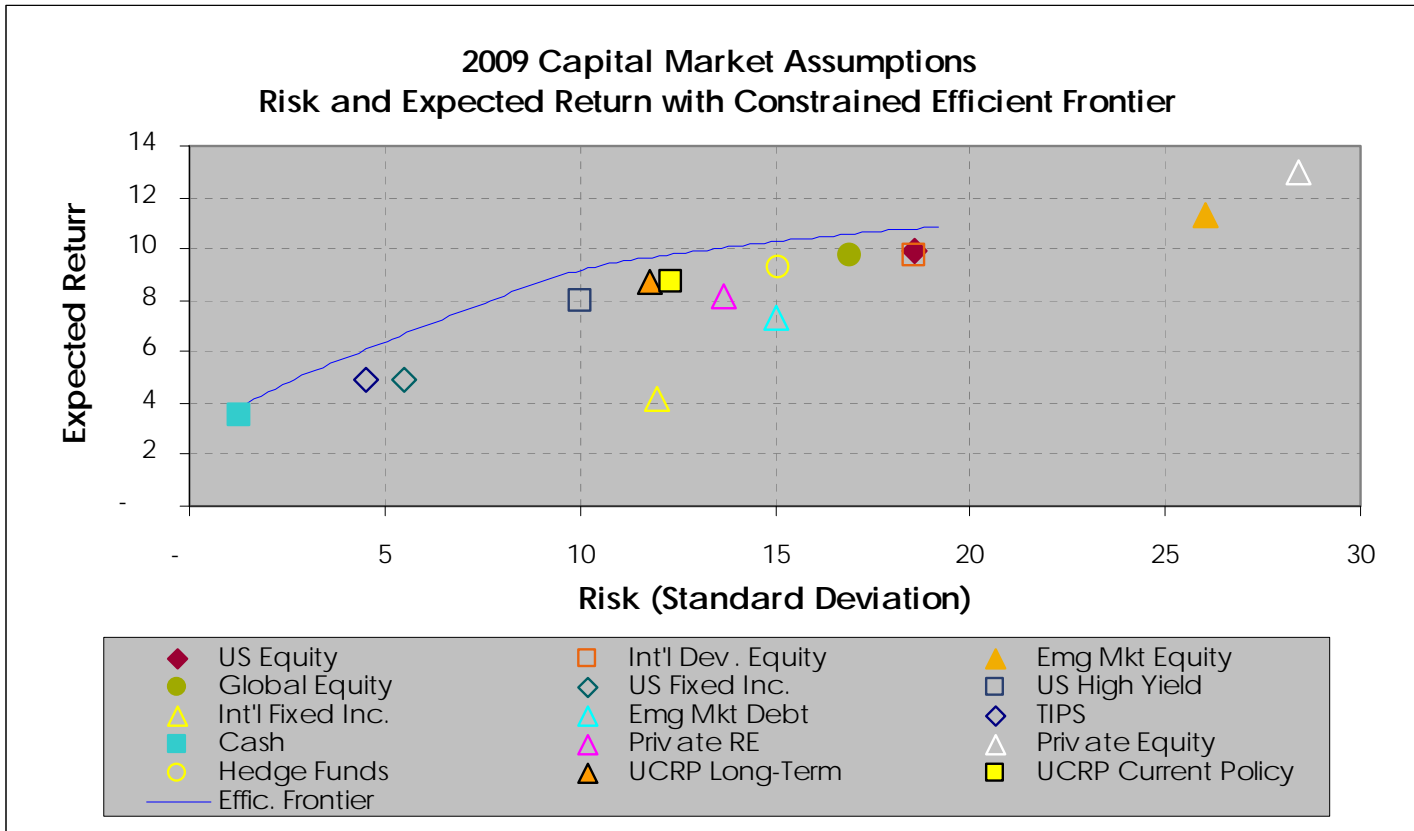
(Lower Left) Asset weights are measured relative to **Current** Policy. The fund has an underweight in all Equity classes, and an overweight in US Bonds and Alternatives.

(Lower Right) The fund's forecast total systematic risk (blue bars) is 12.35% annualized standard deviation. It is heavily weighted to US and Non-US developed equity (almost 80% of total). Forecast active systematic risk is 63 bp. The Private Equity overweight accounted for over 50% 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 8.0%\* 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.

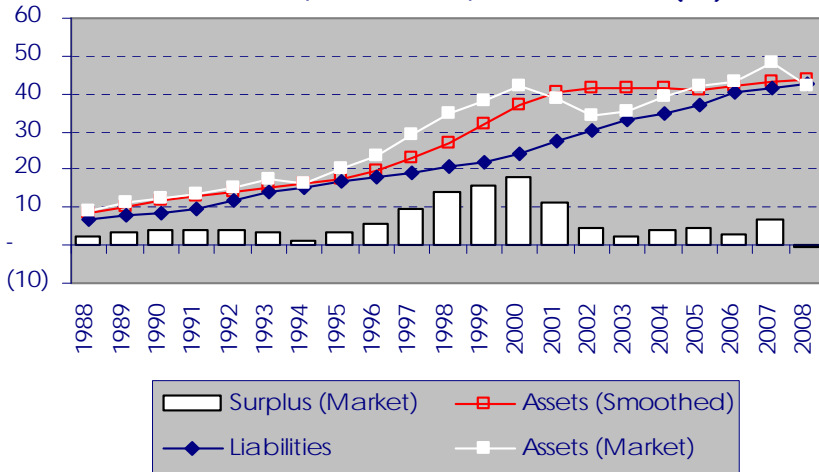
The projected compound annual return over multi-year horizon is 8.0% for the **Current Policy** weights.

Forecast volatility is 12.4%.



# Historical Funded Status

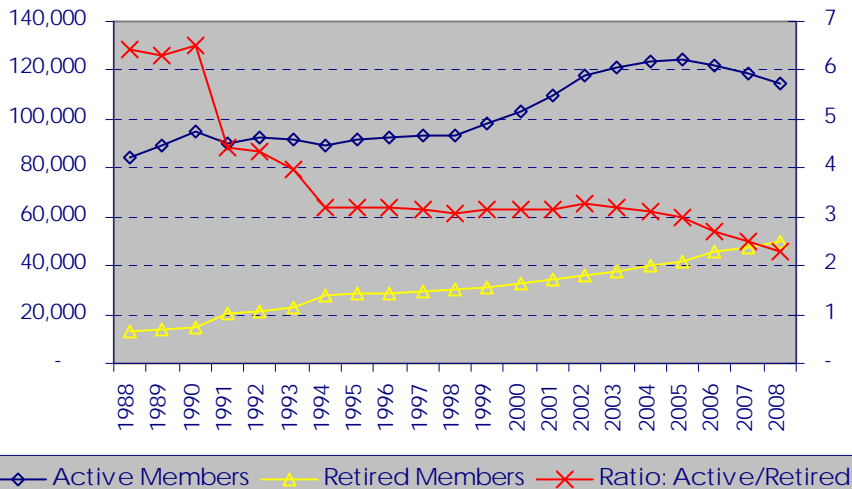
UCRP ASSETS, LIABILITIES, and SURPLUS (\$B)



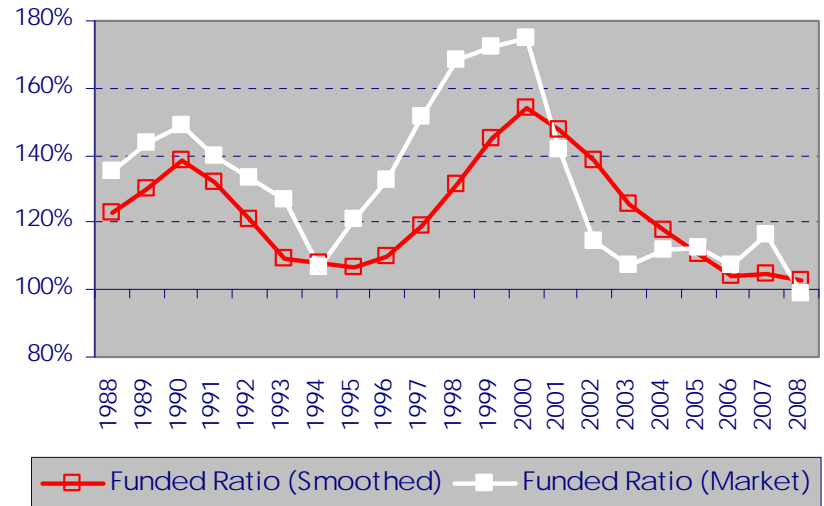
The Pension Fund's liabilities have been growing steadily (**upper left**) with University employment, while the assets have grown with the bull markets of 1982-2000 and 2003-2007. The ratio of actives to retirees has recently fallen from 3x to 2x (**lower left**).

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).

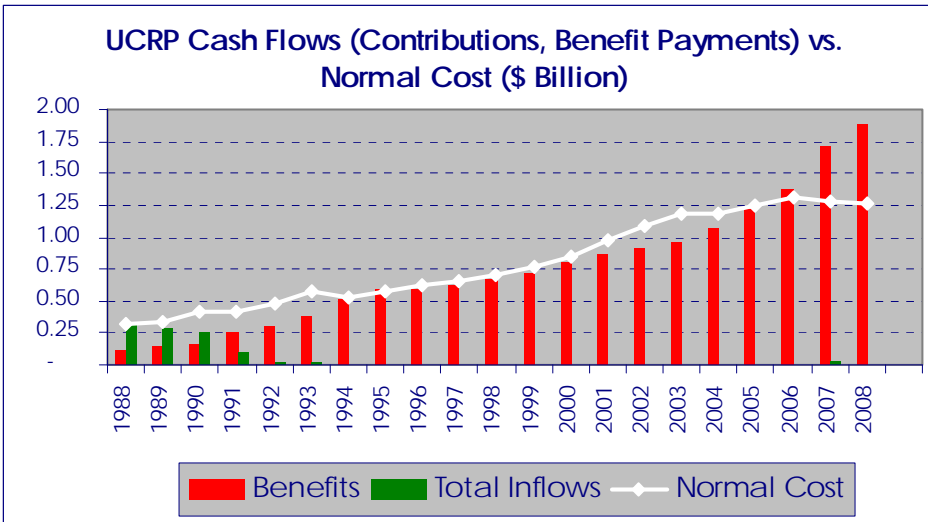
Pension Membership (LHS) and Active/Retiree Ratio (RHS)



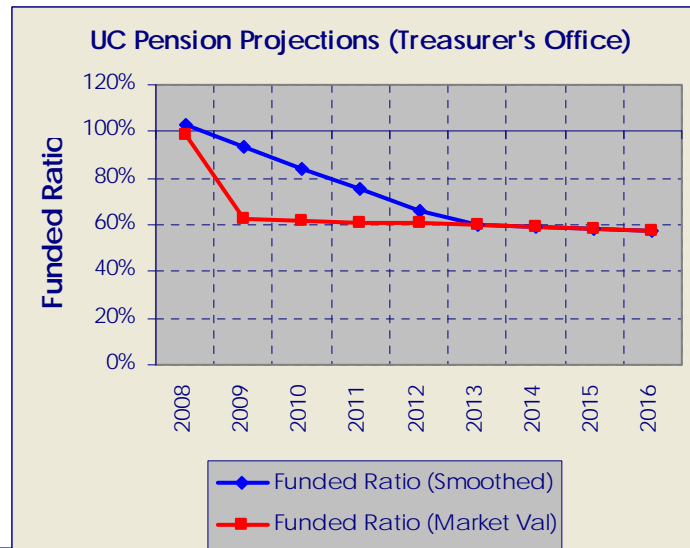
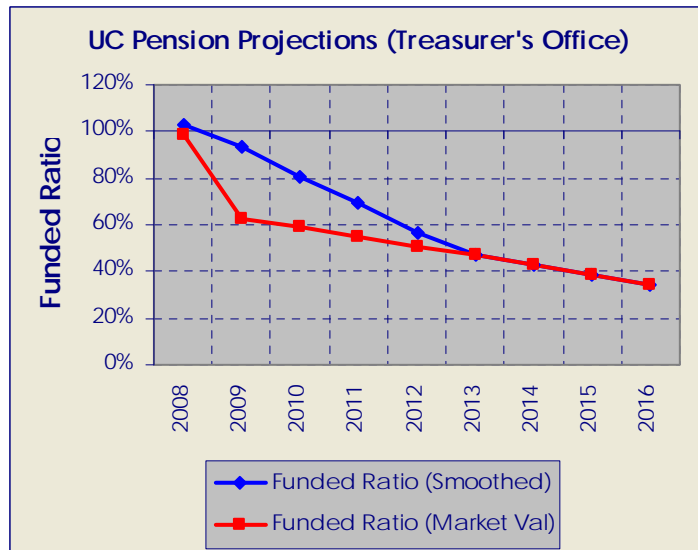
UCRP FUNDED RATIOS



# Forecast Funded Status

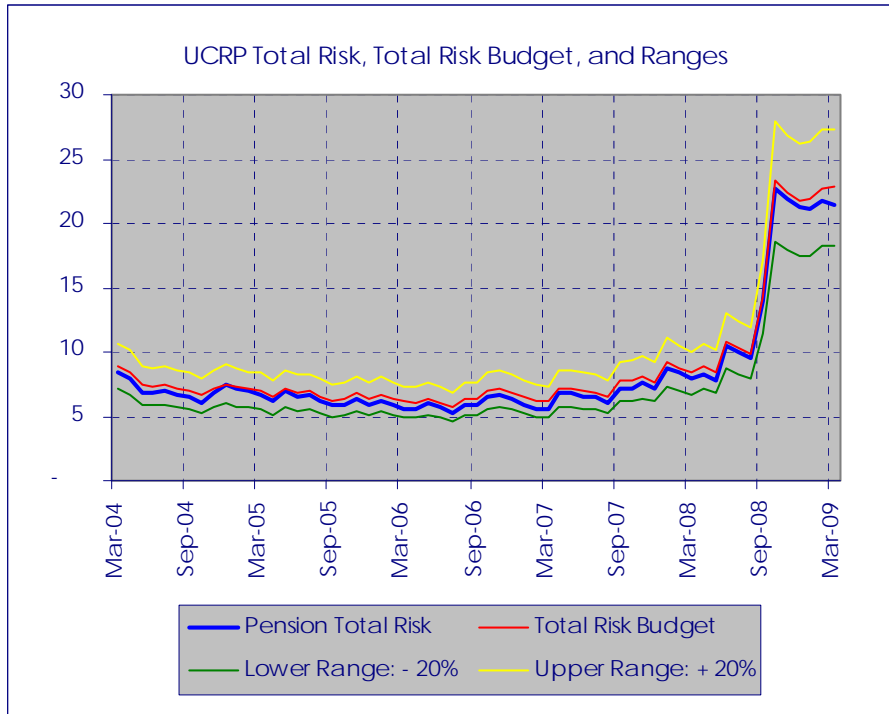


- Contributions were suspended in 1990, but annual benefit payments have grown in line with and recently exceeded, Normal Cost over the last decade (**upper left**).
- The **bottom** two charts show projected funded ratio **without and with contributions**, assuming a **-28% return for FY 2009** and a **constant 7.5% investment return beginning FY 2010**. (For this example, **contributions were set to be equal to forecast Normal Cost, beginning FY 2010**.)



- LEFT: Assumes no contributions, 7.5% annual investment return after FY 2009
- RIGHT: Assumes Normal Cost contributed annually beginning FY 2010; 7.5% return after FY 2009
- These projections are approximations only, developed by Treasurer's Office, not Segal Co.

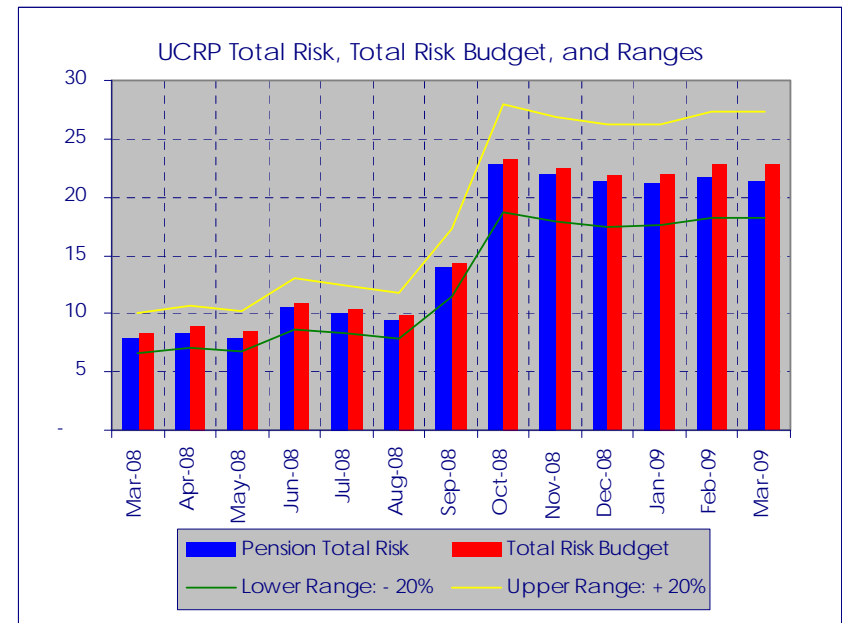
# Risk Measures: Total



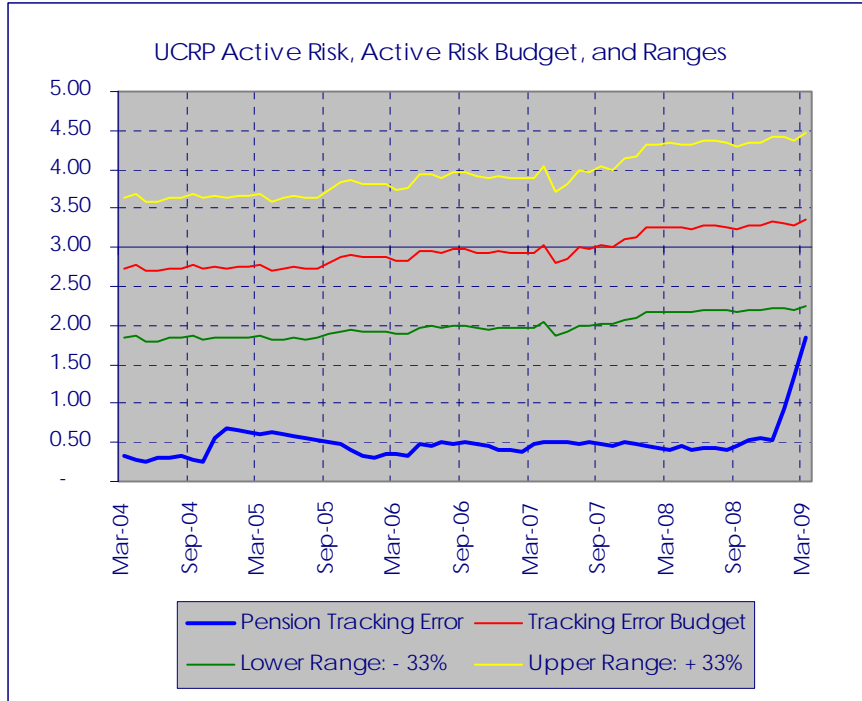
Risk is measured by standard deviation of monthly **total** returns; each point or bar shows a 12 month measurement period. All risk calculations done using exponentially declining weights. (This and following charts show risk budgets as if they had been in place during entire historical period.)

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.

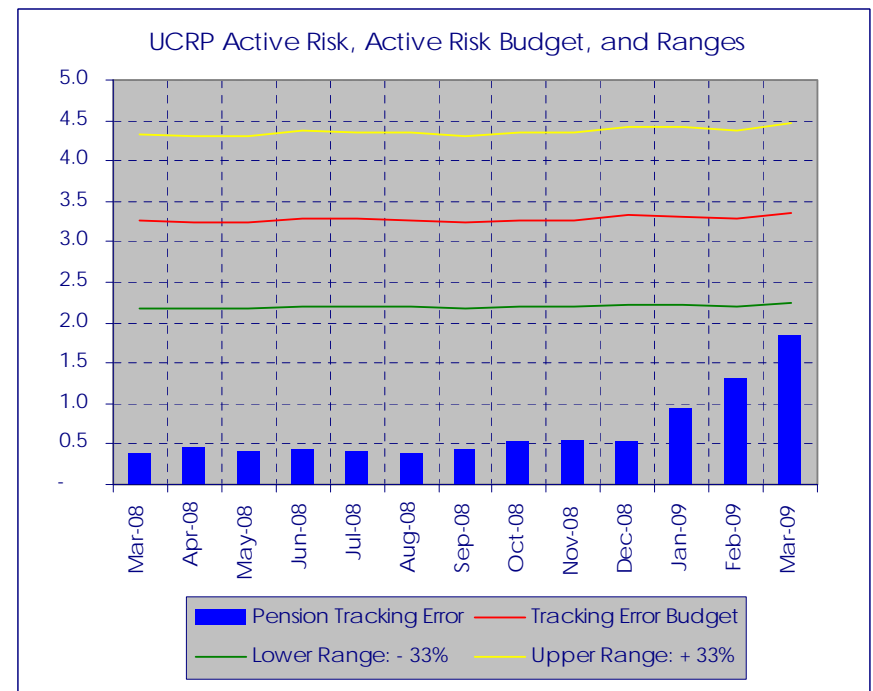


# Risk Measures: Active



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 is still well below long term expectations for active return, but is well diversified.

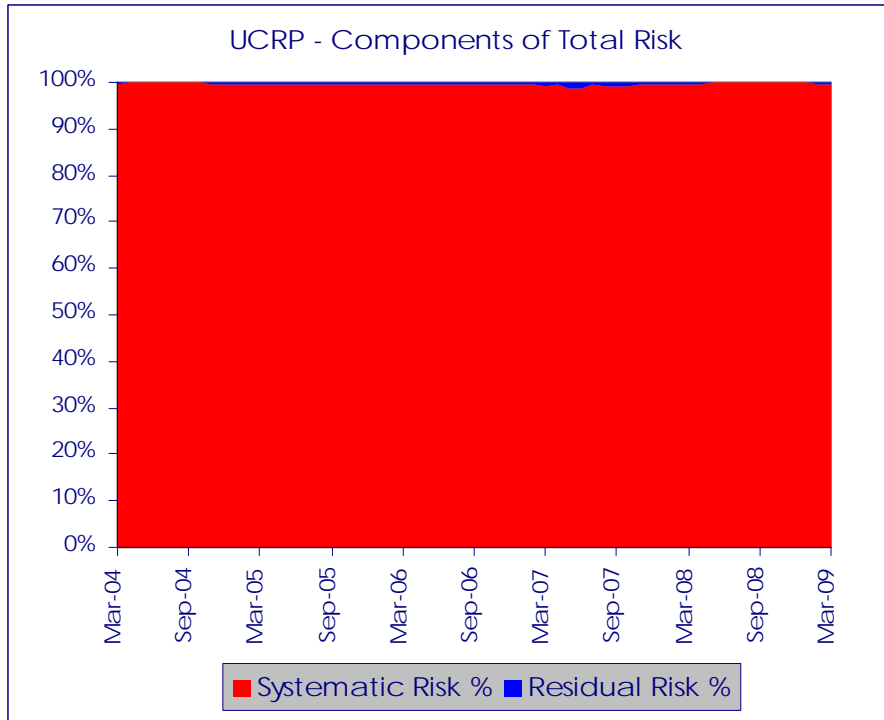


The Active risk budget is 3% annualized Tracking Error (adjusted for market volatility), with ranges of +/- 1 pct. point around Budget

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

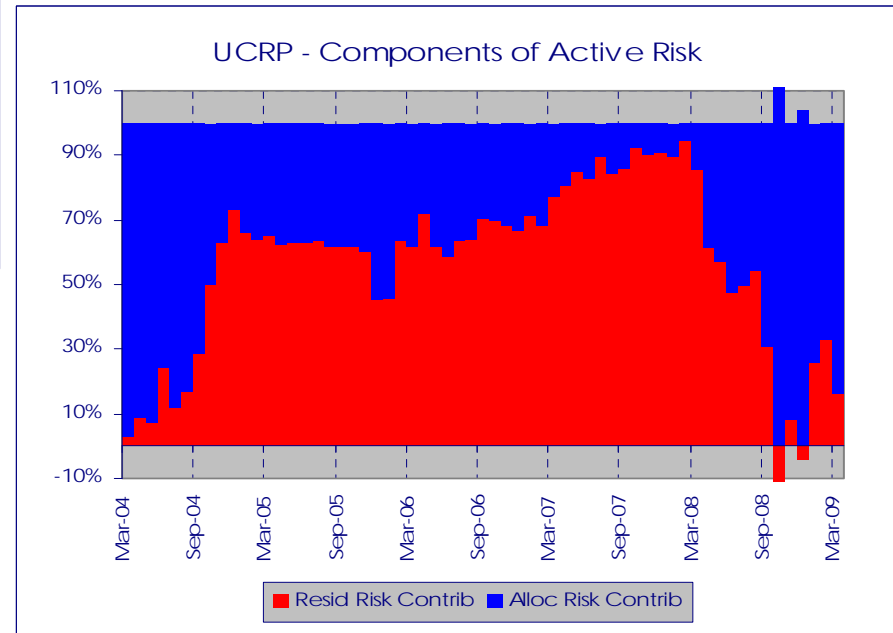


**(Upper Left)** Almost all of **Total Risk** is attributed to systematic (market) factors.

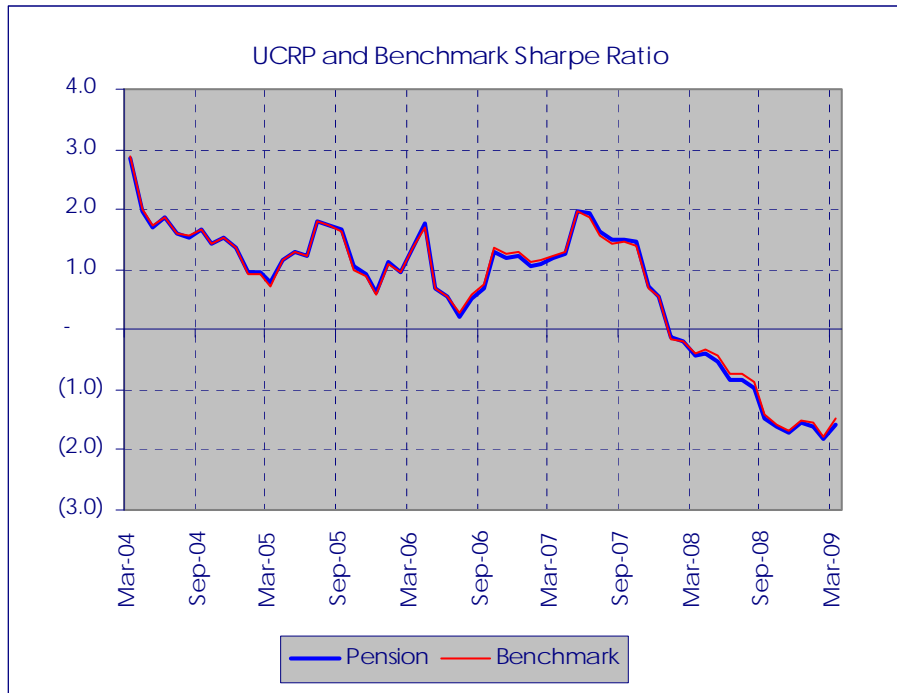
**(Lower Right)** Normally, the majority of **Active Risk** is attributed to security selection. When active management is reduced, or when asset allocation transitions are implemented, allocation risk increases. In the last six months, the equity underweight dominated all other decisions.

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)

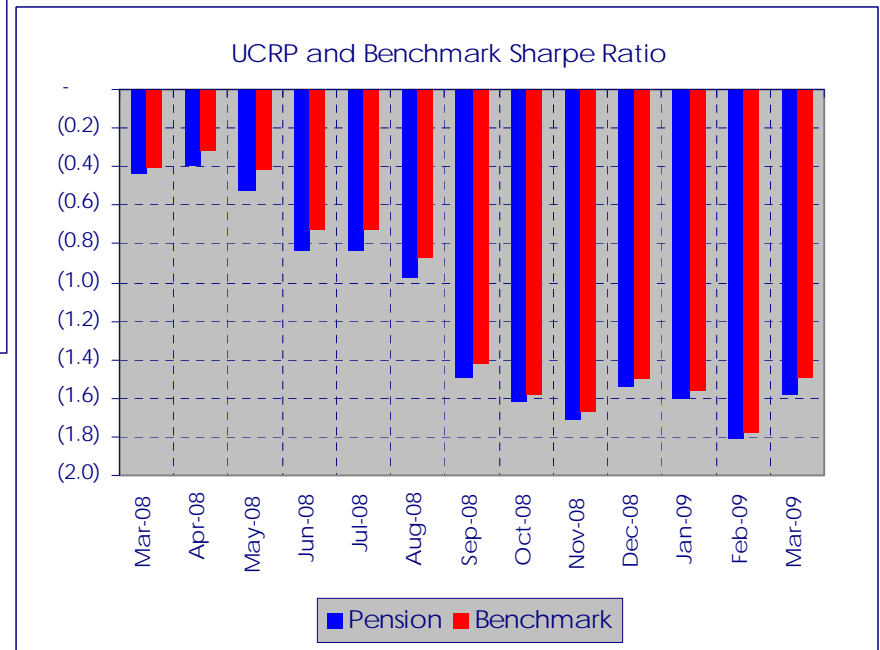


# Risk Adjusted Return: Total

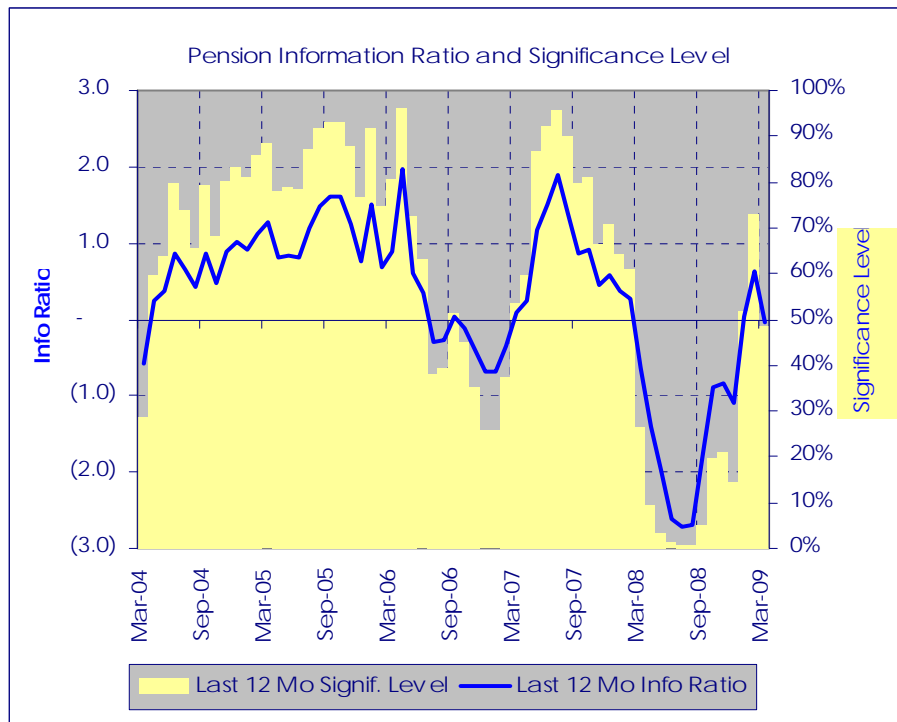


Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark since March 2003. The return on risky assets has reached lows not seen since FY 2002.

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.

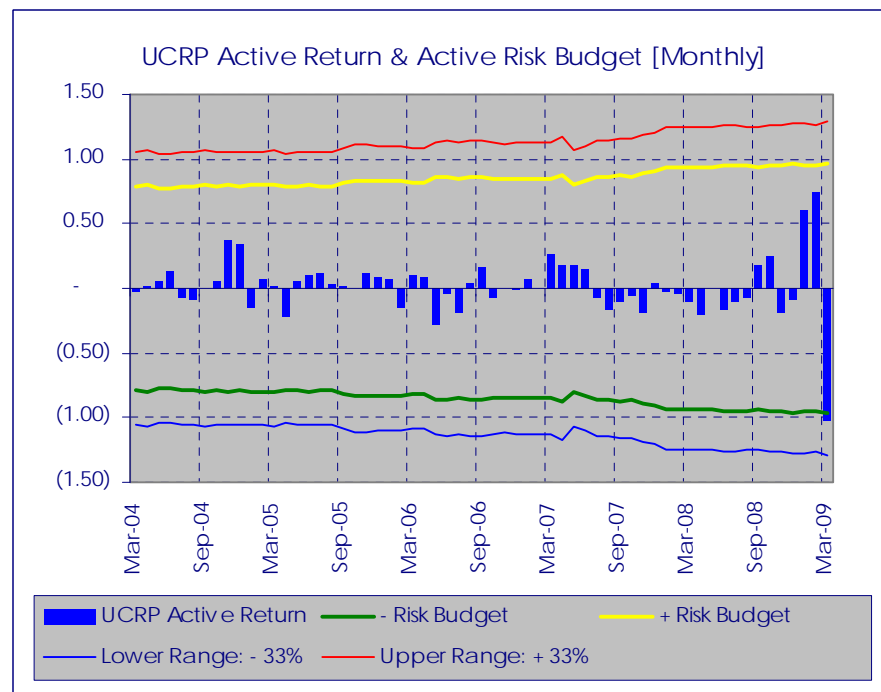


# Risk Adjusted Return: Active



Information ratio 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 performance. It is higher when the returns are positive and more consistent (less volatile). The Info ratio in the last quarter was dominated by the volatile equity return and equity underweight in both falling and rising markets (see graph below).



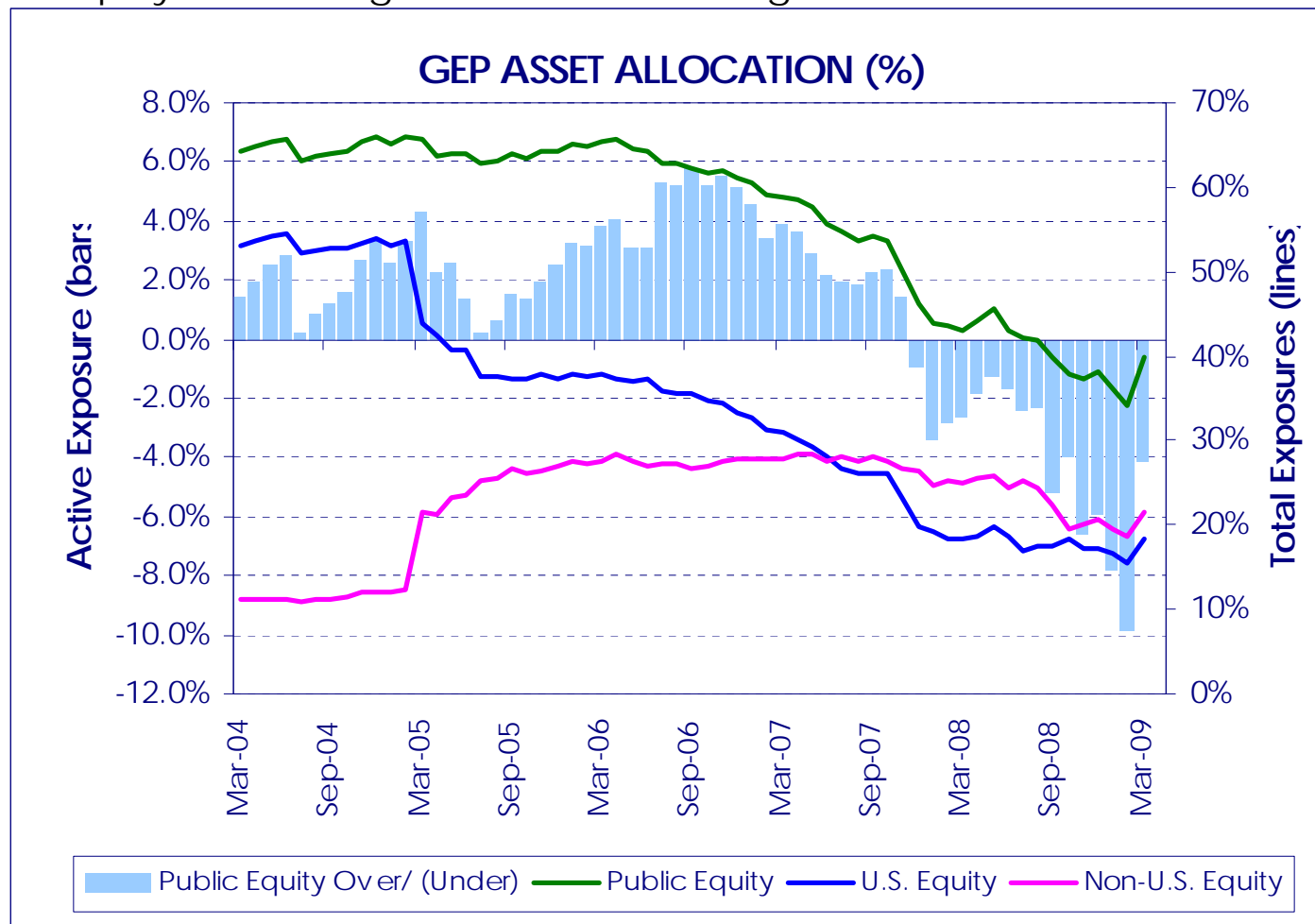
---

# Risk Metrics for GEP



# Asset Allocation

- Total Risk is largely related to the allocation between equity and bonds
- Total equity **underweight** **decreased** during Q1 2009 as a result of the March rally.

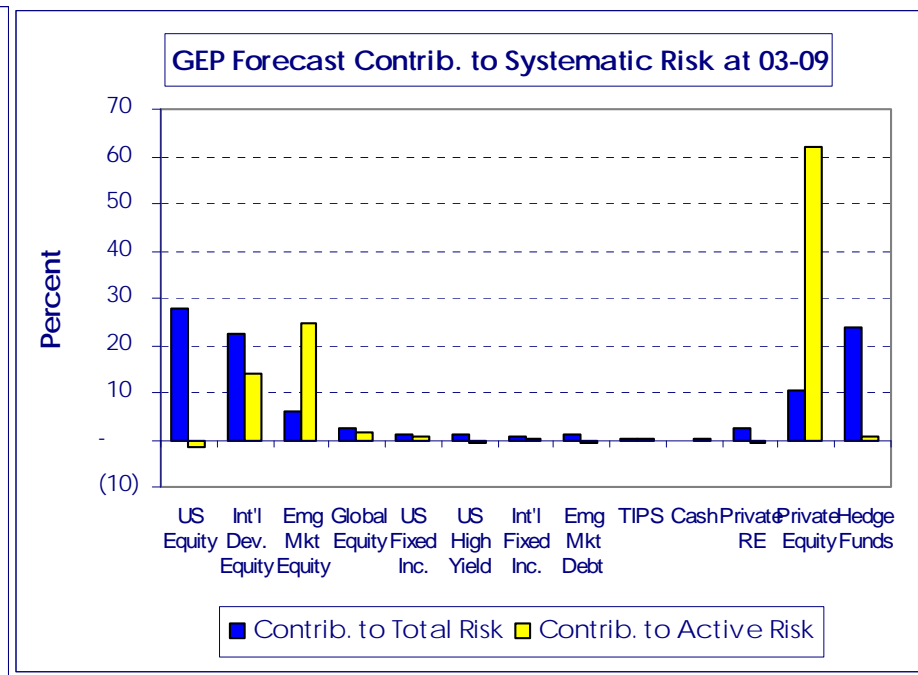
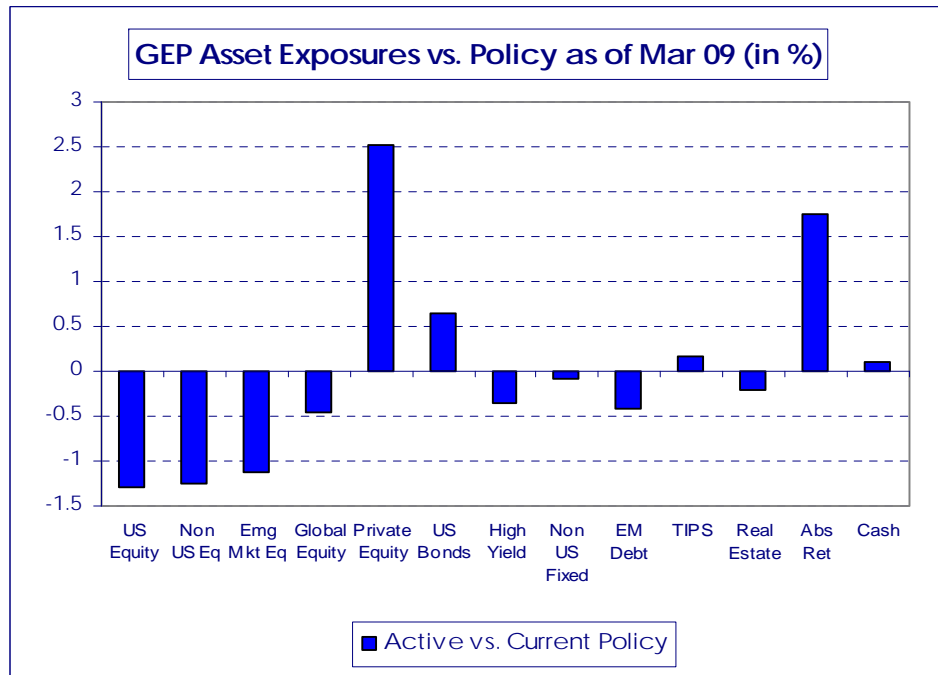


# Asset Allocation and Risk

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.

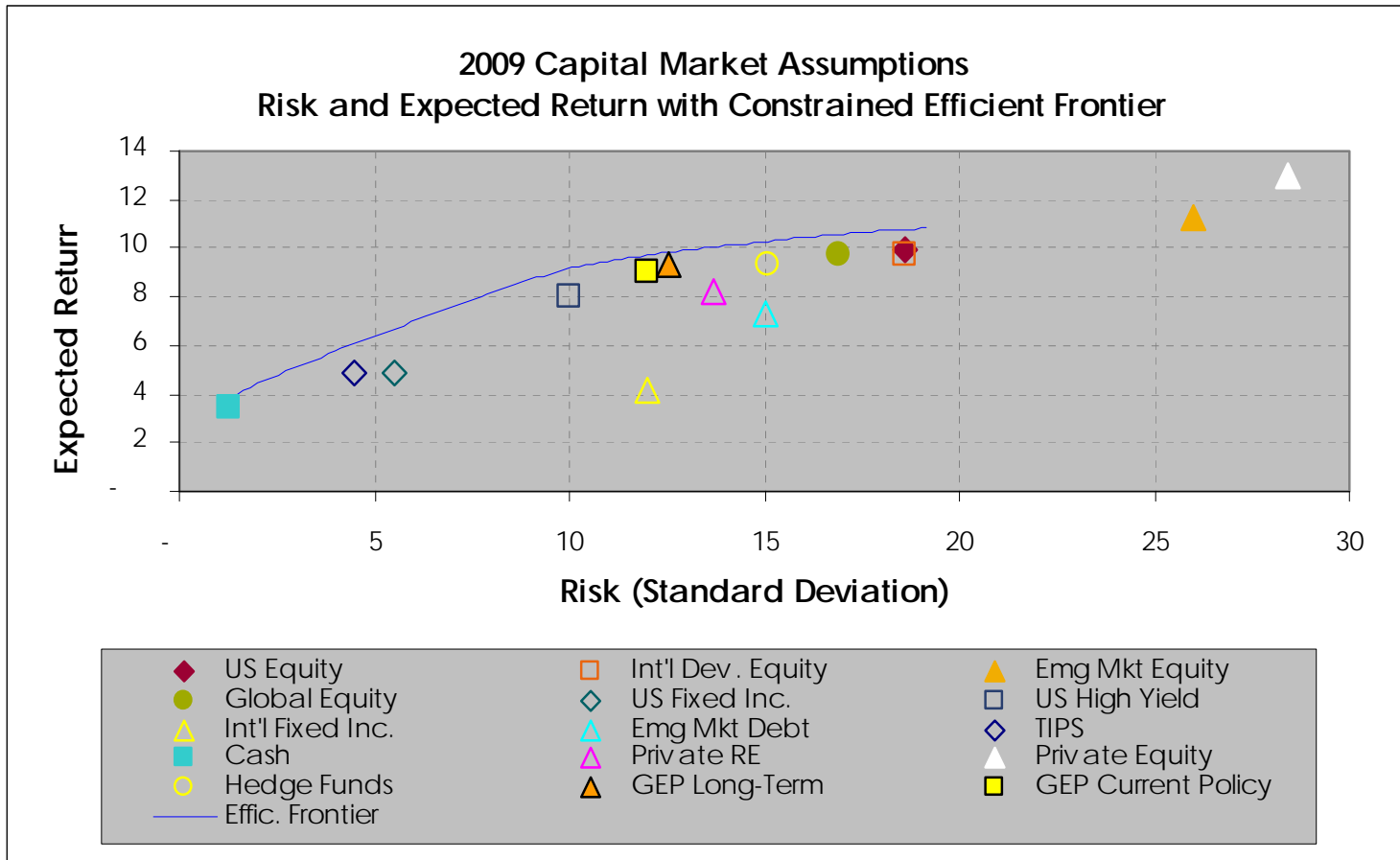
**(Lower Left)** Asset weights are measured relative to Current Policy. The fund is underweight in all Equity classes, and overweight in US bonds, Absolute Return, and Private Equity.

**(Lower Right)** The fund's forecast **total systematic risk** (blue bars) is 12.0% 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 72 bp. The Private equity overweight accounted for over 60% 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; 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.

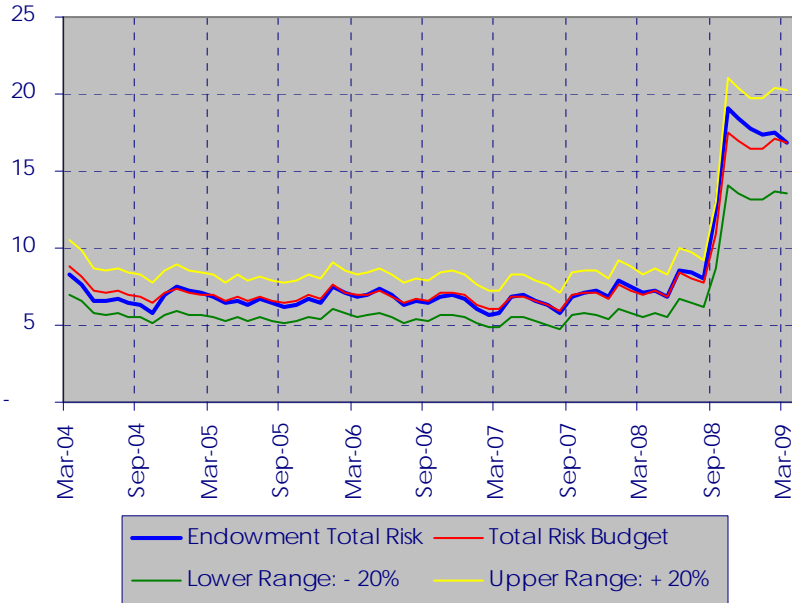
The projected compound annual return over multi year horizon is 8.3% for the **Current Policy** weights.

Forecast volatility is 12.0%.



# Risk Measures: Total

GEP Total Risk, Total Risk Budget, and Ranges

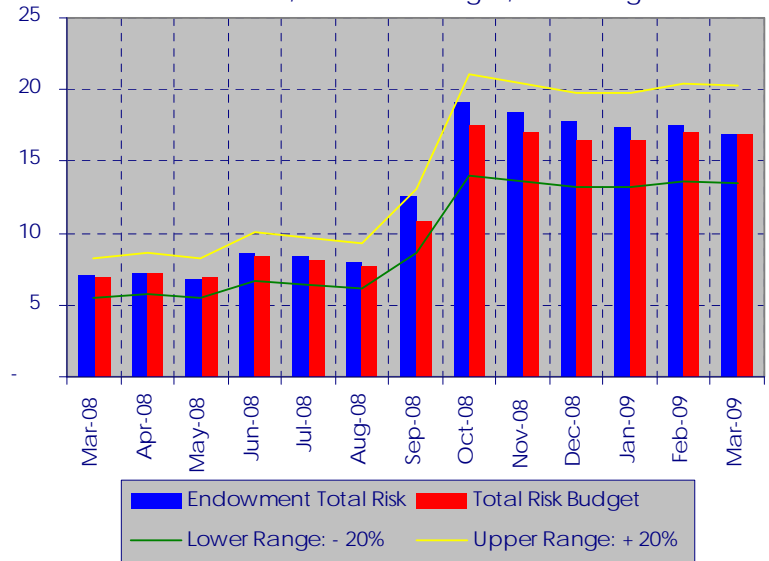


Total risk trend has been quite similar to benchmark; recently GEP volatility has risen marginally above the Budget, but well within acceptable ranges. Until the past two quarters, total volatility has remained stable, primarily because of the larger non-market risk component in the GEP; however, volatility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

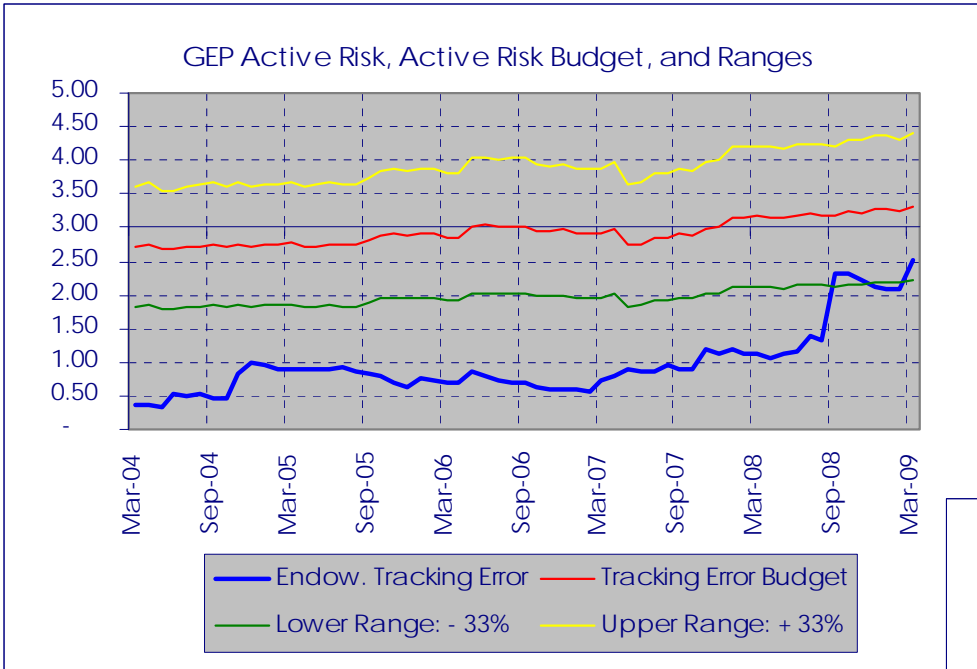
Total Risk budget equals Benchmark risk plus the Active risk budget. The ranges are +/- 20% around the budget.

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

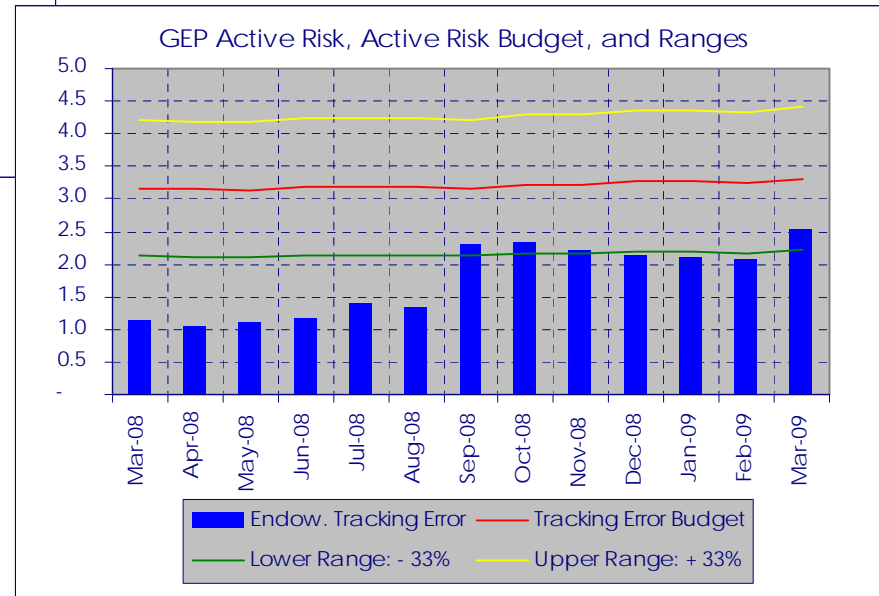


Active risk for the total fund has grown slowly over this period from 0.50% to 1.50% annualized standard deviation.

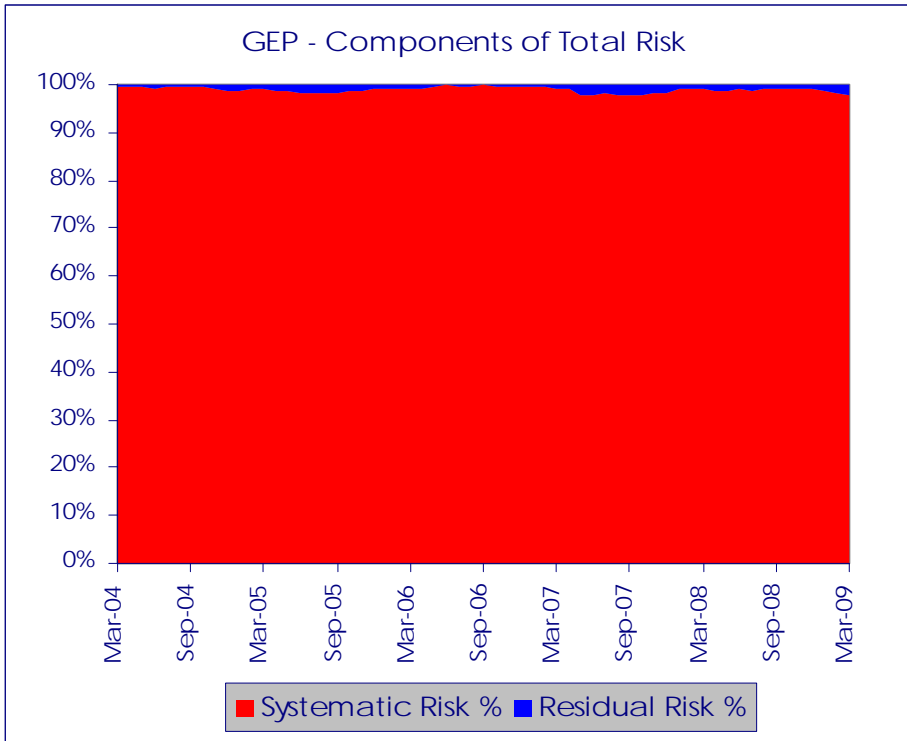
Active risk is currently below long term expectations for active return, but has recently exceeded over 2.0% with the sharp declines in Absolute Returns (relative to its cash-based benchmark).

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.

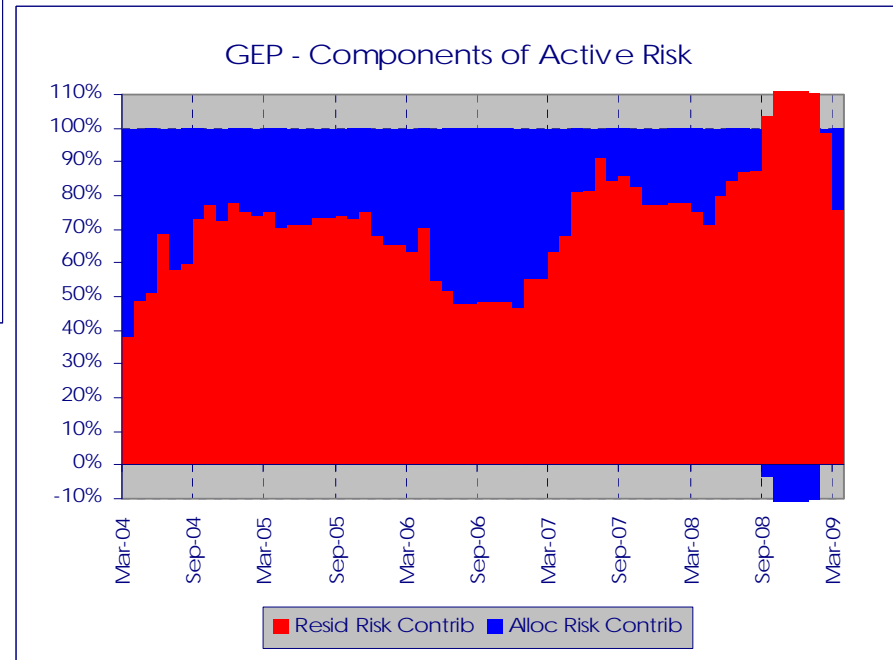


# Risk Attribution



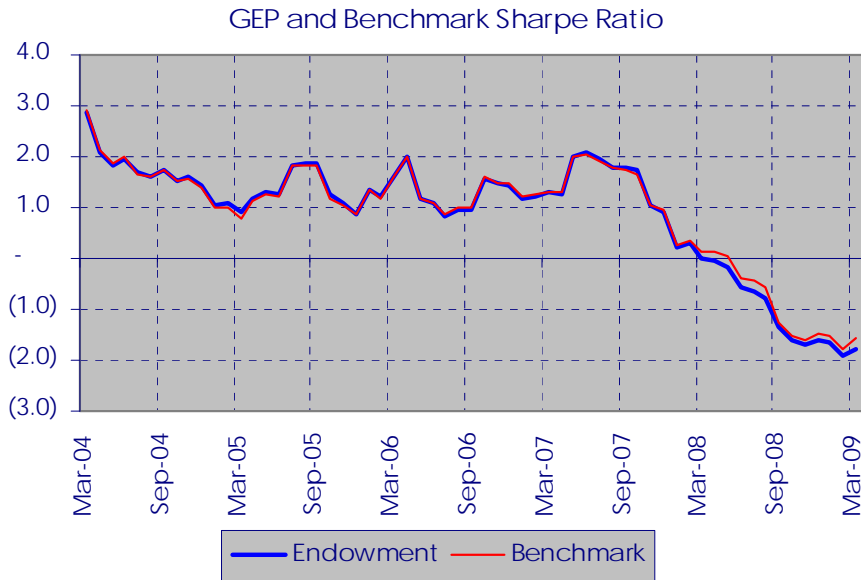
**(Upper Left)** Almost all of **Total Risk** is attributed to systematic (market) factors.

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



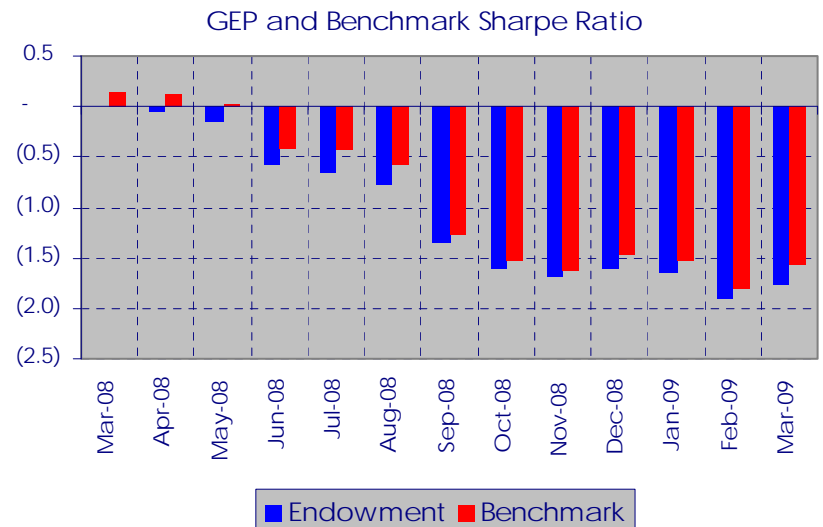
Risk is measured here by variance (standard deviation squared) of monthly returns; each bar shows a 12 month measurement period. Systematic risk is associated with benchmark exposures; residual risk is associated with non benchmark decisions (security selection).

# Risk Adjusted Return: Total

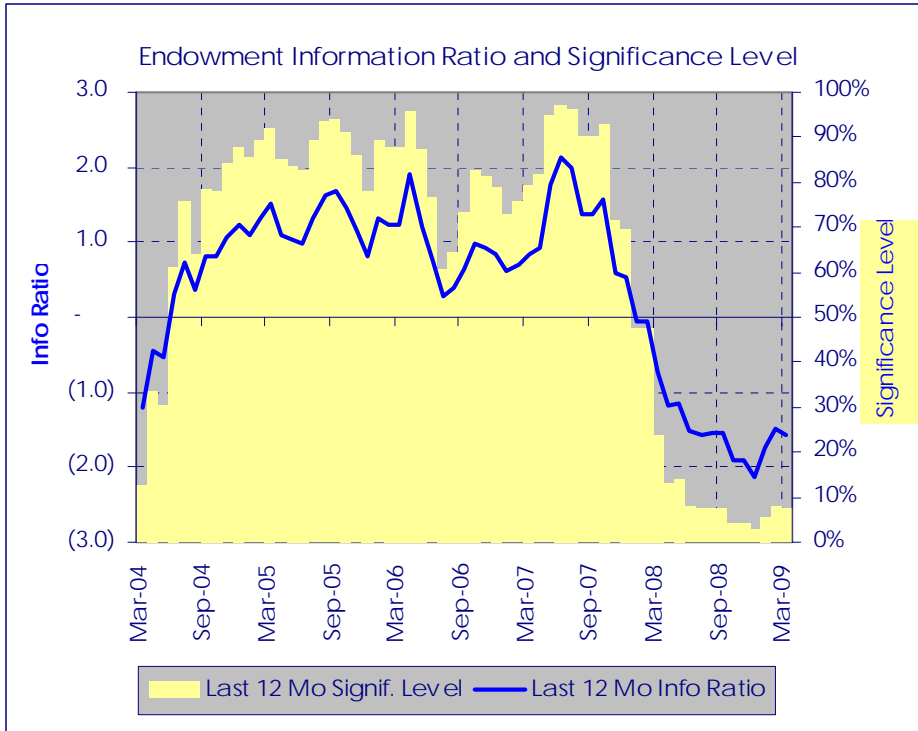


Sharpe Ratio (risk adjusted total return) trend has been quite similar to the benchmark since March 2003. The return on risky assets has reached lows not seen since FY 2002.

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 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. Both conditions are primarily due to the mismatch between Absolute Return Strategies and its benchmark.

