

BellAssociates

Case Study: Fixed Income Portfolio Construction under M-V and M-CVaR Optimization

June 15, 2010

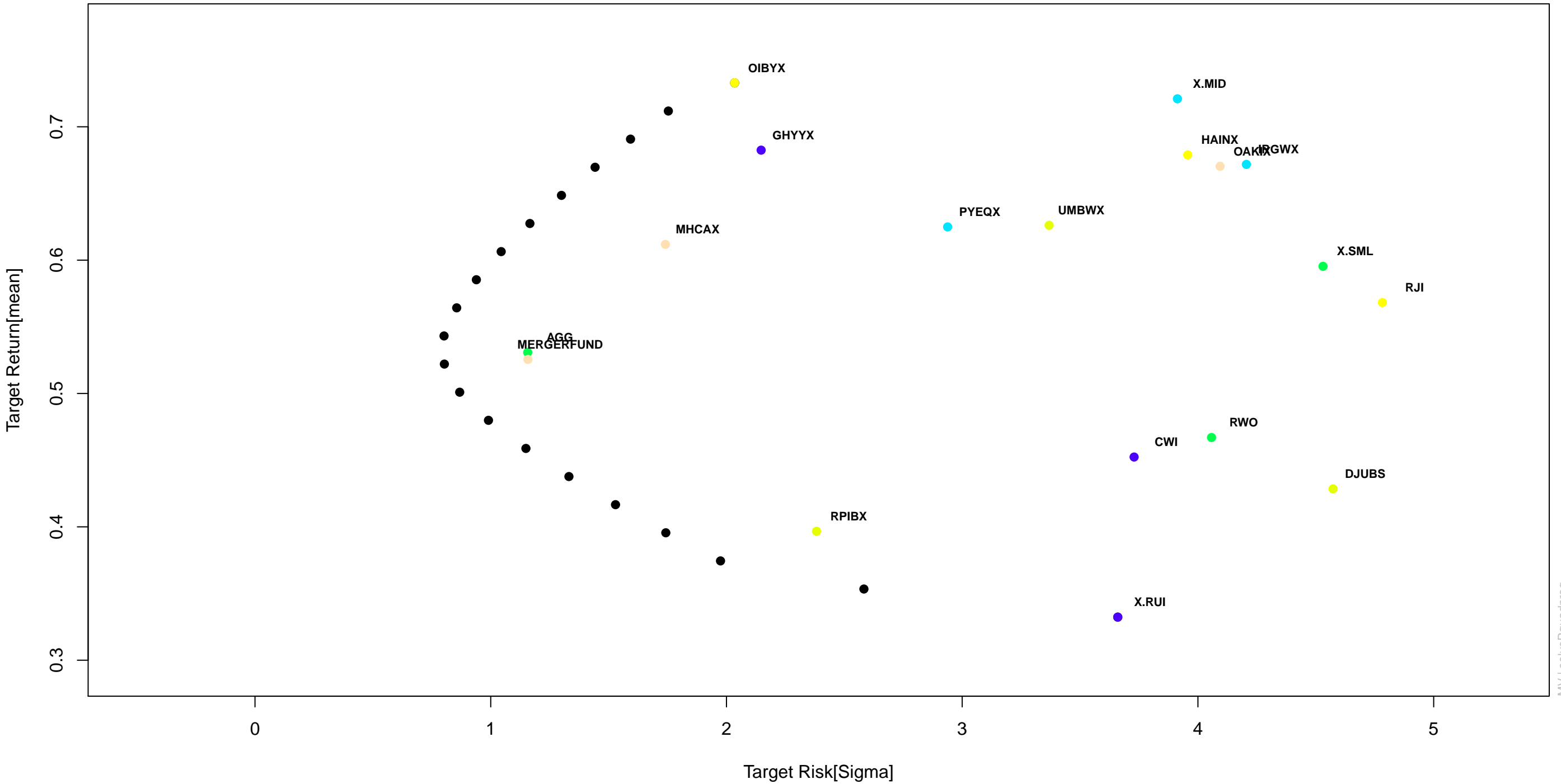
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Sample Portfolio

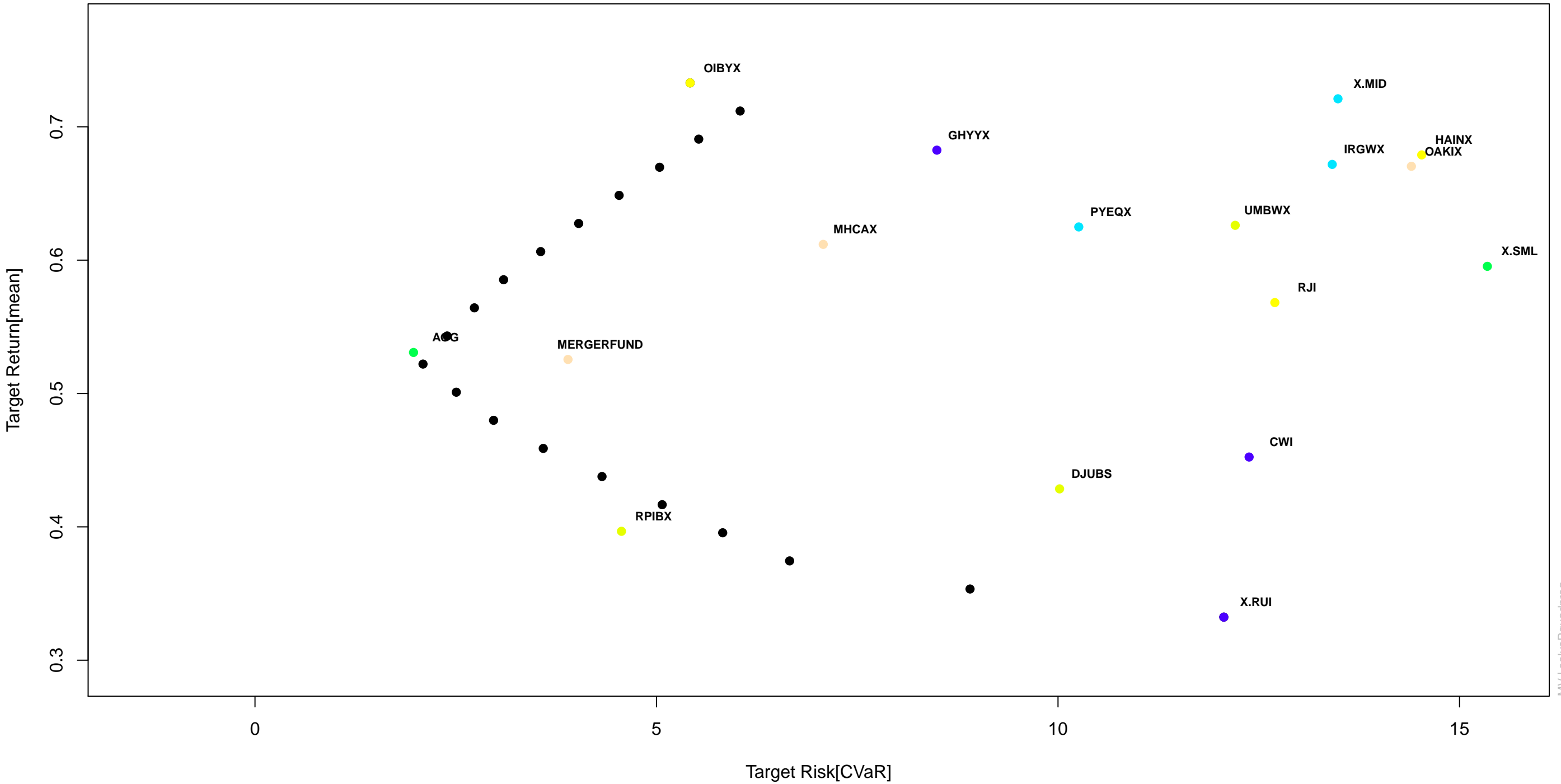
Consider the following Fixed Income/Alternatives Portfolio:

- AGG, Barclays Aggregate
- OIBYX, Oppenheimer International Bond
- MHCAX, MainStay High Yield Corporate
- GHYYX, Pioneer Global High Yield
- RJI, Rogers International Commodity Index
- Merger Arbitrage Index (CS/Tremont)

Efficient Frontier MCD MV Portfolio



Efficient Frontier Mean-CVaR Portfolio



Allocations Compared

Robust Mean-Variance Efficient Allocation

AGG	OIBYX	MHCAX	GHYYX	RJI	MERGER
40%	11%	7%	3%	4%	36%

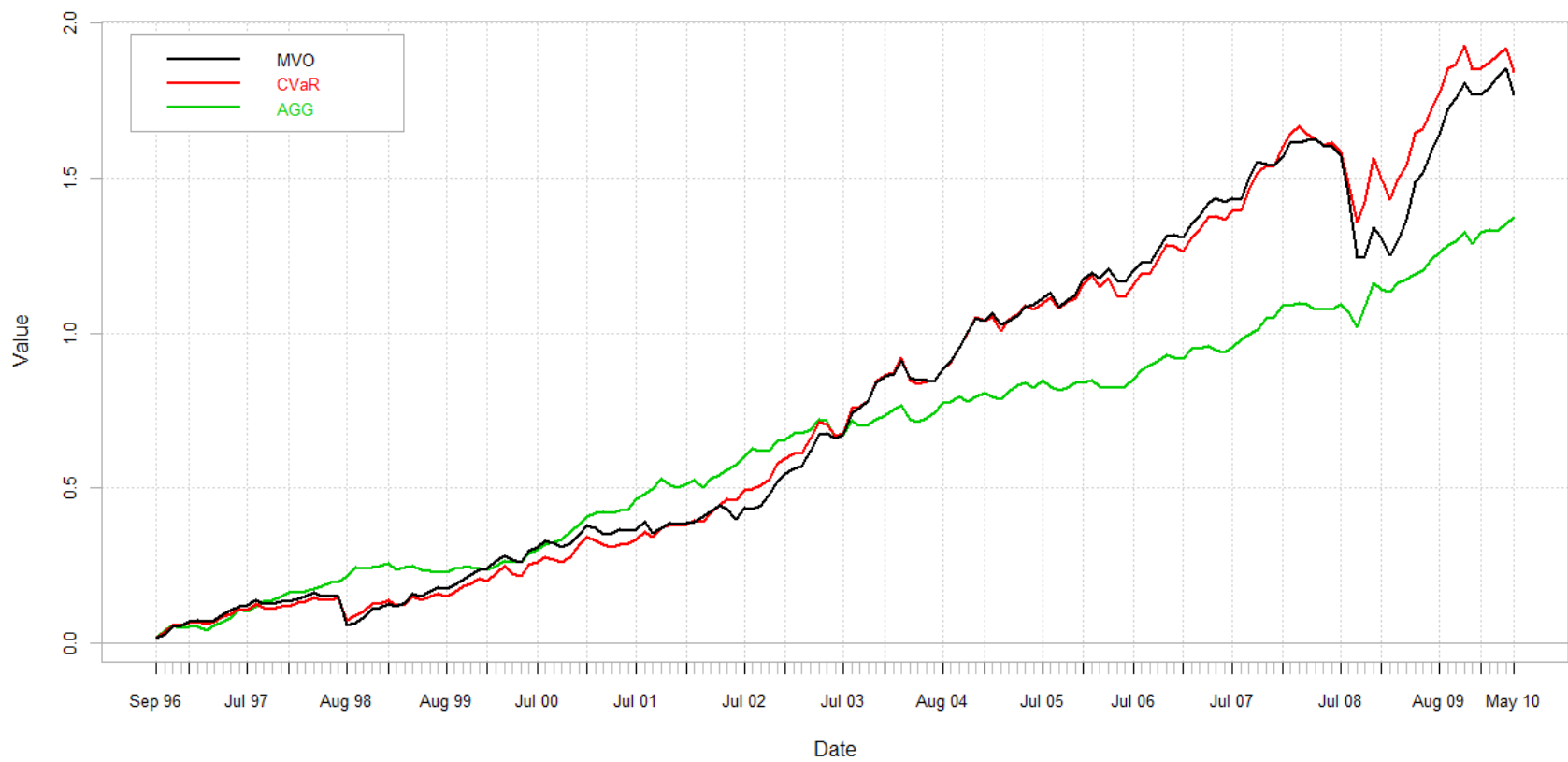
Mean-CVaR Efficient Allocation

AGG	OIBYX	MHCAX	GHYYX	RJI	MERGER
58%	17%	0%	0%	0%	25%

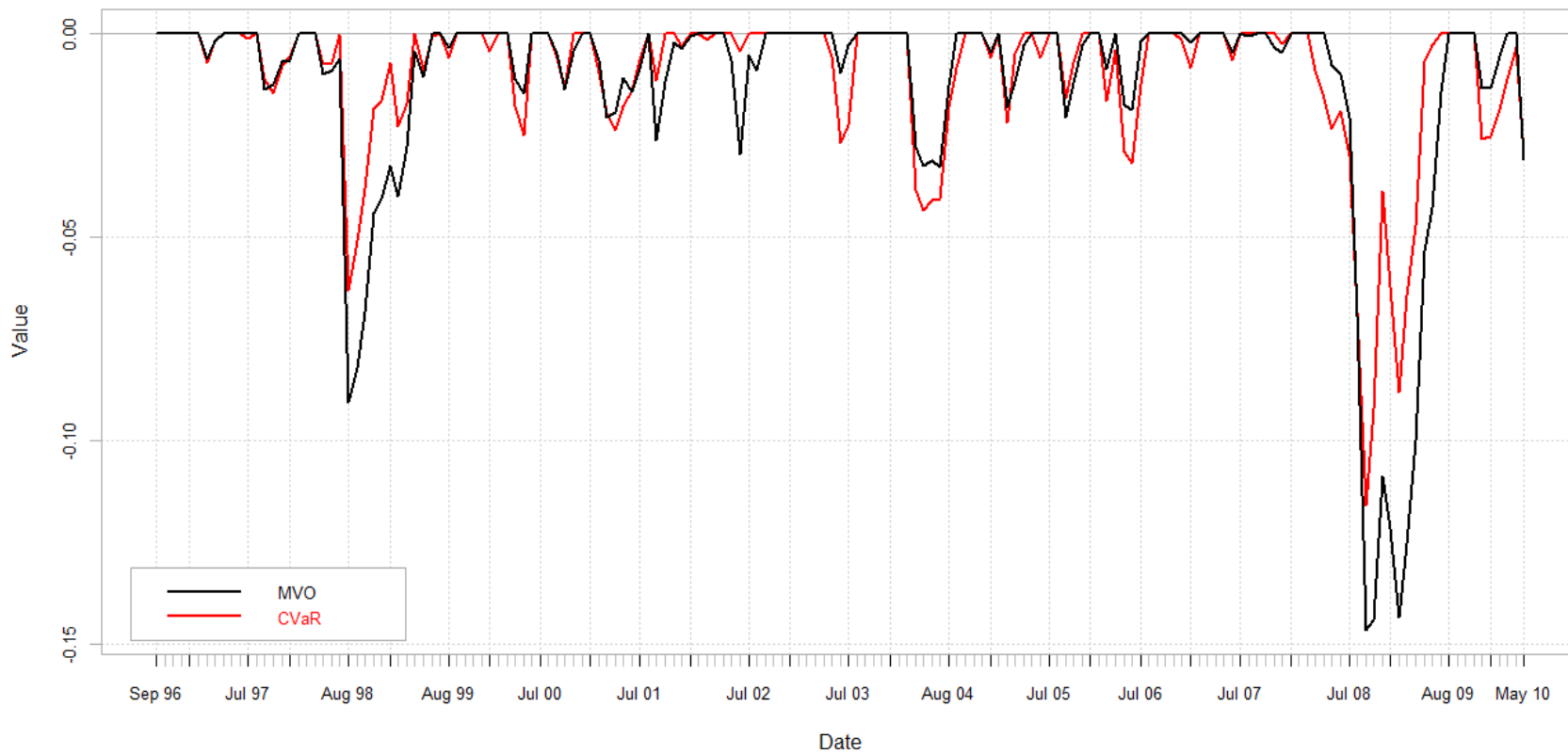
Back tested results, Sep 1996 – May 2010

			MV	CVaR
Annualized	Return		7.7%	7.9%
Annualized	Std Dev		6.1%	5.8%
Annualized	Sharpe	(Rf=0%)	1.27	1.36
Maximum	Drawdown		-14.7%	-11.6%
Historical	VaR	(0.95)	-2.0%	-2.4%
Historical	ES	(0.95)	-4.1%	-3.6%
Modified	VaR	(0.95)	-2.7%	-2.3%
Modified	ES	(0.95)	-6.4%	-4.1%

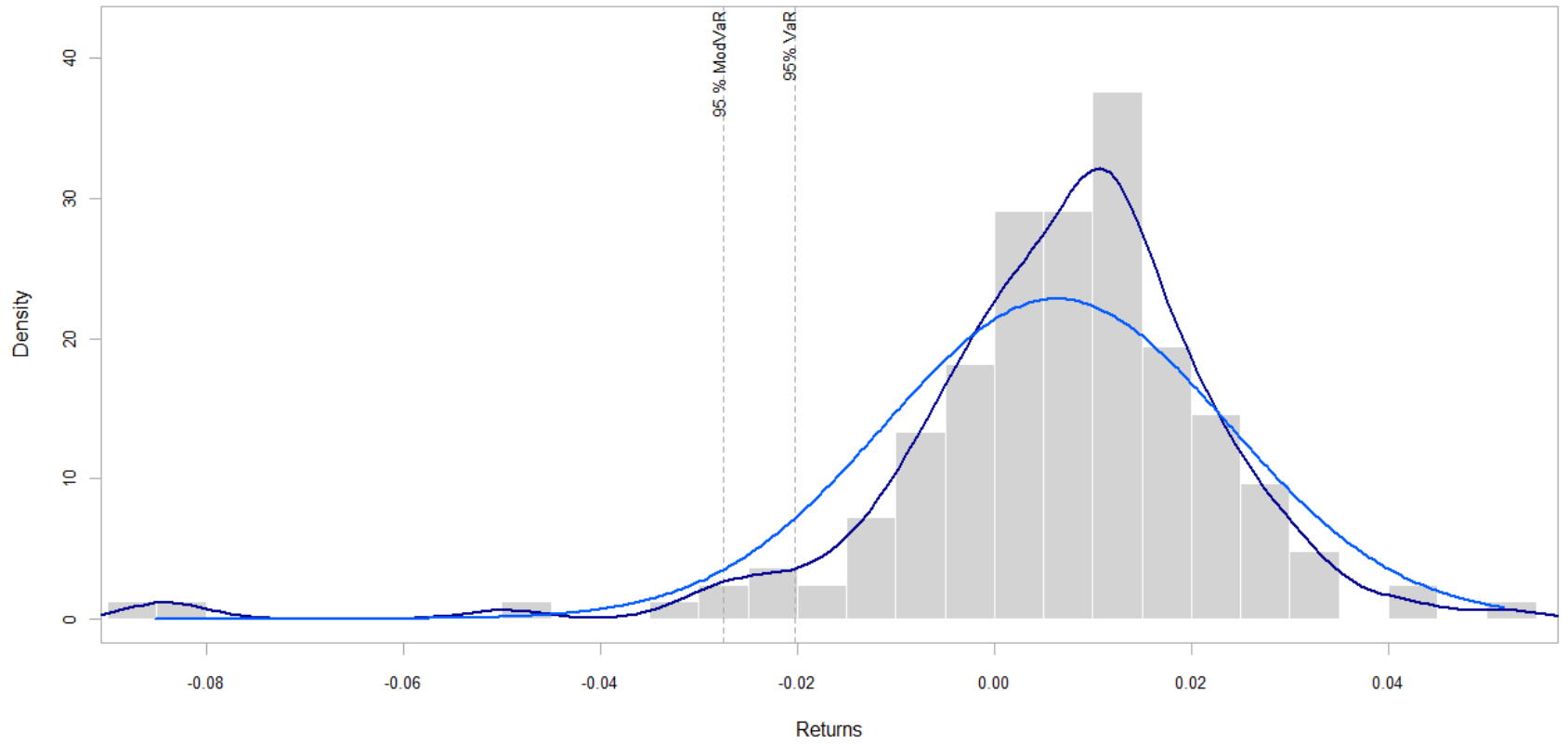
Cumulative Returns- Fixed Income



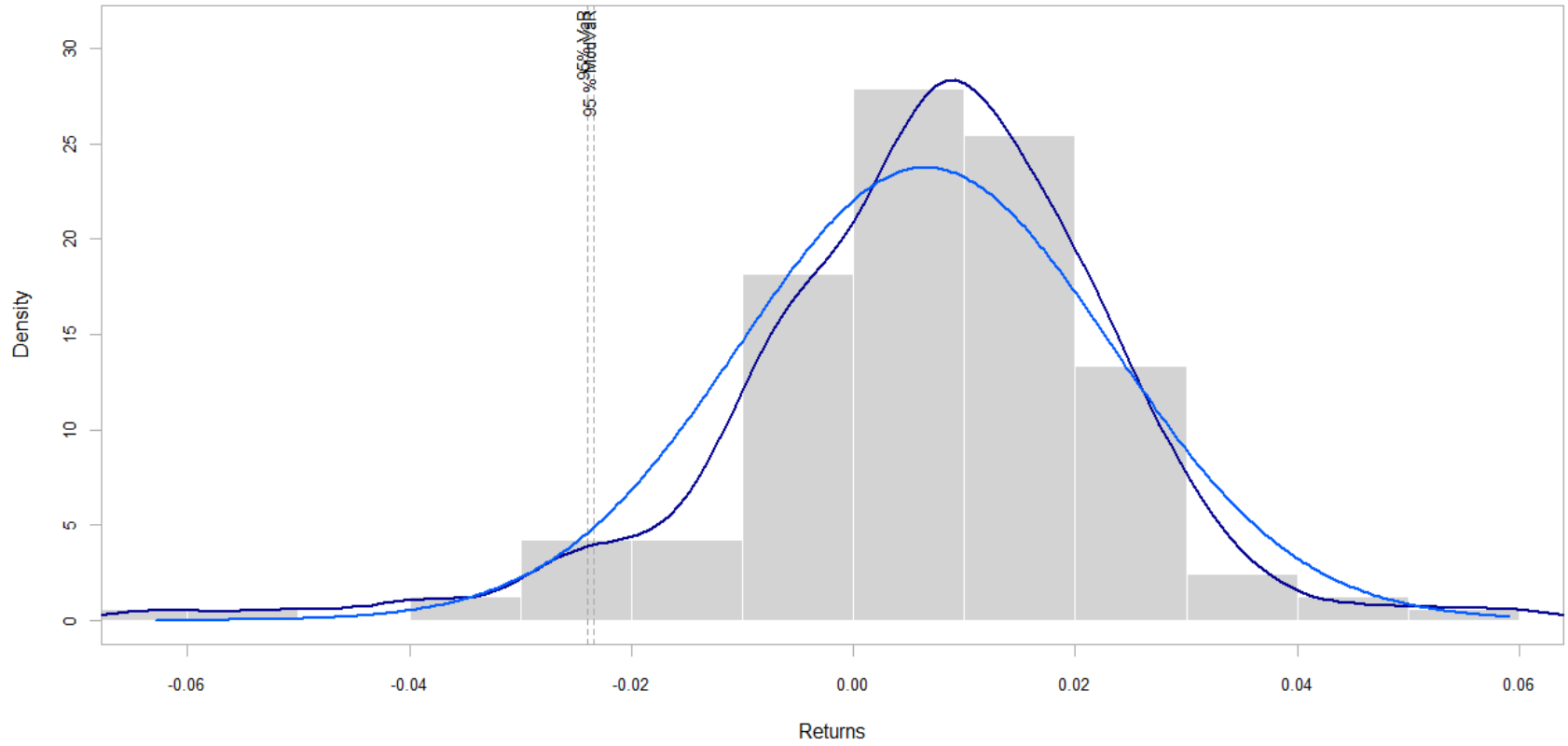
Maximum Drawdowns- Fixed Income



Risk Measures- MV



Risk Measures- CVaR



Summary

- Mean-CVaR optimization prefers assets with positive skewness, low kurtosis and low variance.
- In a 15 year sampling period (1995-2010), the following assets exhibited negative skewness: US large value, global high yield, US REITs and TIPS. Higher kurtosis was observed in global high yield, emerging market equity, US REITs and TIPS. These asset classes are likely to be underweighted in a Mean-CVaR model.
- Conversely, non-US developed market government debt, global real estate ex-US and non-US developed equity exhibited positive skewness and lower kurtosis. These assets are likely to be overweighted.