

Cutwater's Risk Analysis Manager ('RAM') is a proprietary asset allocation and portfolio construction tool that seeks to minimize risk and volatility while meeting a client's investment objectives.

RAM was originally developed to assess the risk and capital charges for Cutwater's LDI strategies, which invest in a broad spectrum of fixed income securities including credit, government, RMBS, ABS, and CDO sectors. RAM was later adapted to analyze pension plan funding scenarios and expanded to handle equities and alternative assets. RAM's forward-looking and counter-cyclical capital risk framework can be utilized to construct an optimized portfolio with customized risk return profiles. This provides a multi-faceted risk budgeting, asset allocation and scenario management platform, enabling Cutwater clients to model a wide range of investment objectives, funding specifications and constraints while considering forecasts over an extended time horizon.

For additional details, contact:
Alexander Ng, FRM
 (914) 765-3491
 Alexander.Ng@Cutwater.com

Cutwater Asset Management
 113 King Street
 Armonk, NY 10504

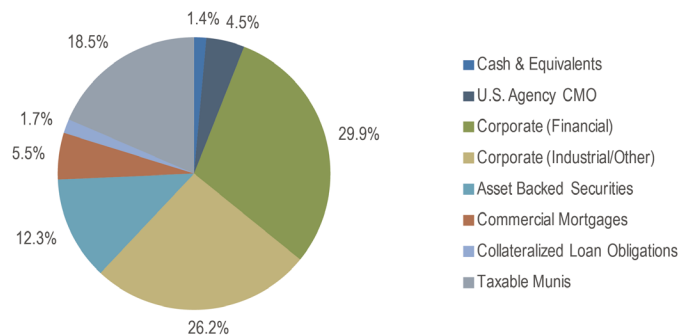
Introduction to the Risk Analysis Manager

"RAM," Cutwater's Proprietary Asset Allocation and Portfolio Construction Tool

RAM is used to

- Define portfolio objectives
- Construct a portfolio taking into consideration the client's liability profile, target risk buckets, and market conditions
- Define constraints and maximums / minimums for risk tolerances such as liquidity, ratings, and credit
- Run portfolio through a series of Monte Carlo simulations (typically 10,000 runs)
- Report the distribution of portfolio risk statistics and cash flows across time and paths

Sector Allocation



Each simulation incorporates:

- Credit spread dynamics calibrated at the sector level
- Credit default events
- Interest rate modeling with mean reversion
- Jump diffusion dynamics
- Ratings migration
- Mark-to-market risk

The unifying philosophy of RAM is to calculate long-run model dynamics while incorporating current market conditions, jump diffusion, and mean reversion. Jump diffusion allows for better estimation of tail risks by simulating credit crises. The no arbitrage, multi-factor

interest rate model adds realism to risk forecasts by incorporating historical market rates which span multiple business cycles. The mean reversion component of the interest rate model ensures portfolio dynamics are not procyclical. Both tail risks and procyclicality have been significant challenges of risk models during the financial crisis.

Additional risk factors captured in RAM include foreign exchange risk, credit volatility, correlations, and, most recently, the capability to model the tail risk of equity and alternative assets. One example of RAM’s modeling approach is illustrated in the area of credit spread dynamics:

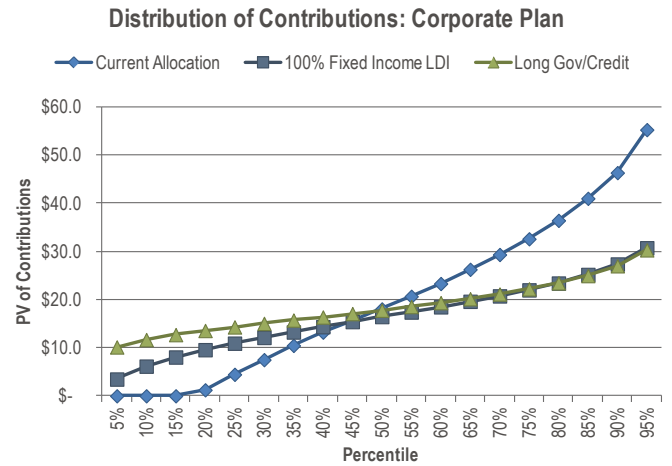
$$\Delta S = \alpha(\theta - S_t)dt + \sigma_B dW + J(\mu, \sigma_f^2)dQ$$

The above equation describes credit spread dynamics for a single credit sector using α as the speed of mean reversion and θ as the long run average credit spread. Credit shocks are modeled by an independent Poisson process Q with conditional lognormal jump sizes $J(\mu, \sigma_f^2)$, which incorporates tail risk, whereas normal credit moves follow a Brownian process with mean reversion.

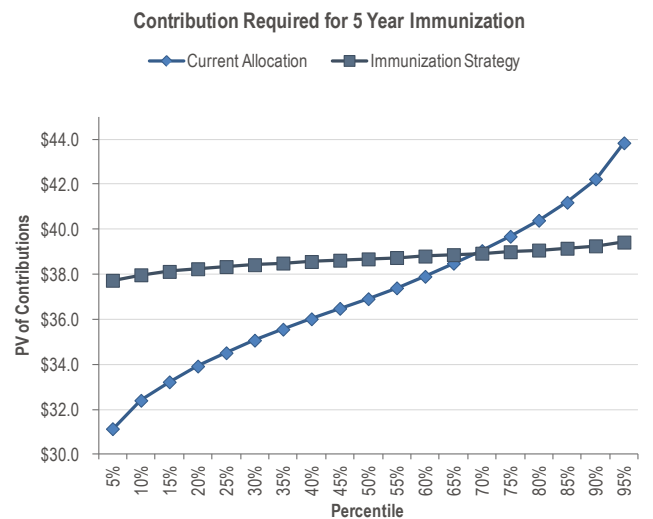
In order to meet the dynamic needs of its clients and adapt to changing market conditions, Cutwater is continually evolving RAM and actively pursues areas of research which could further improve RAM’s capabilities. Current research avenues include the ability to project and understand the tracking error between a benchmark and an actively managed portfolio through time, as well as expanding sector coverage.

The results of the model frame the risk of a given investment strategy by producing a distribution of the portfolio’s risk.

Sample output for a defined benefit pension client:



Source: Cutwater Asset Management



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Even as Cutwater continues to develop innovative risk and portfolio optimization models, there is no substitute for fundamental credit research. The investment team uses its quantitative capabilities as an input to the ultimate investment decision and maintains its core philosophy of delivering consistent and superior risk adjusted returns. We view this balanced approach to investing as a key differentiating factor that uniquely positions Cutwater on the forefront of fixed income investing.

Performance comparisons will be affected by changes in interest rates. Investment returns fluctuate due to changes in market conditions. Investment involves risk, including the possible loss of principal. No assurance can be given that the performance objectives of a given strategy will be achieved. **Past performance is not a guarantee of future results.**