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risk.foundry

Beyond Partial Derivatives:

Traditionally, risk analysis has depended on the measurement of sensitivity. Most commonly, this is the partial derivative of security value to relevant model parameters and inputs.

Introducing risk.foundry – powerful tools for better understanding of risk. By going beyond the limitations of models and designing meaningful scenarios, risk.foundry constructs risk measures to reflect realistic co-movement of model inputs both with each other and with non-inputs. (for example, sensitivity of a CDS portfolio to oil price.)

Risk.foundry's agility in risk analysis allows for scenarios and risk factors that are neither static nor rigid. Users can set up or recalibrate scenarios at will, without having to wait on programmers to modify existing, inflexible systems.

There are no long waits for software releases, allowing you the freedom to explore, understand and innovate more expeditiously.

risk.foundry also helps to decompose and understand the structure of portfolio risk - going beyond classical slice-and-dice, converting large sets of risk numbers using principal component rotations and allowing for other transformations to gain insight into the structure of positions relative to any reference portfolio.

An easy to use API allows bespoke models to be embedded into risk.foundry, creating an extensible platform for risk analysis, strategy evaluation, (back-testing), opportunity identification and portfolio optimization. Easy integration into existing risk management infrastructure enables risk. foundry to be used both in the pre-computation phase, (scenario and risk factor design), and in post-computation analysis, (risk decomposition and analysis).

With an embedded multi-dimensional database, greater flexibility and expressive power by virtue of its ability to synthesize time-series from aggregations of other data (market, risk and fundamentals such as balance sheets) is realized. An example of this is the sensitivity of corporate profitability to the cost of inputs and macroeconomic factors.

Constructing Risk Measures:

Specify a perturbation to
market inputs
data universe choice –
arbitrary superset of model
inputs
sample set – current data,
historic episode or all history
compute principal
components of covariance
periodicity, scaling &
normalization choices
scale selected principal
components to unit move in benchmark portfolios

label and save perturbation as factor sets
apply deformation to current market data
compute portfolio or asset value
risk measure = scaled difference of values

Benefits: Hedging Efficiency:

Hedge with 'prime mover' benchmarks
reduced transaction costs
formalized 'correlation hedging'
quantitative foundation to common intuition
advantageous for portfolios exposed to large
numbers of underlying assets
equity & equity derivatives portfolios
credit portfolios
consumer credit portfolios

caveat: choice of reference benchmarks requires care

Benefits: Non-Parametric Measures:

expected change in portfolio value for a 1% change in brent crude, though portfolio contains no commodity linked assets
use credit / equity + commodity prices as data set
compute covariance matrix using this superset
scale shifts to 1% move in crude oil contract

portfolio performance measures
correlate historical portfolio PnL to benchmarks
measure alpha
hedging residual risks
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Episodic Scenarios:

Choice of time window
sample any historical time window
covariance captures episodic market behavior
design scenarios analyzing crashes, inflationary episodes etc

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