

Reuters Trade and Risk Management Solutions

Reuters Kondor Global Risk – PFE Monte Carlo Risk Engine

Counterparty exposure is generally defined as the amount lost in the event of counterparty defaulting. Driven by the regulators, the way in which this credit risk is measured has evolved over the years:

- Percentage of notional
- Current replacement cost + add-on based on remaining time to maturity
- Current replacement cost + volatility-based add-on with the incorporation of credit risk mitigation techniques

However, these measures are too static for more complex instruments – such as derivatives and exotics – as they are particularly sensitive to market movements.

The need for PFE models

Assessing the credit risk for market-sensitive instruments requires sophisticated tools. Effectively calculating the potential future exposure (PFE) requires more than just traditional analytic methods since it needs to capture correlation between market variables and include portfolio effects such as netting and collateral across time.

The only widely accepted methodology for calculating potential future exposures accurately is through Monte Carlo simulation. This involves simulating future paths of market variables, aging the portfolio through time with simulated payments and deal events, and computing exposure values at each simulation point – whilst taking into account credit risk mitigation techniques. Monte Carlo methodology is especially important for portfolios which include options and other nonlinear instruments. This is because these instruments may cause extreme future exposures even when they represent only a small part of the overall portfolio.

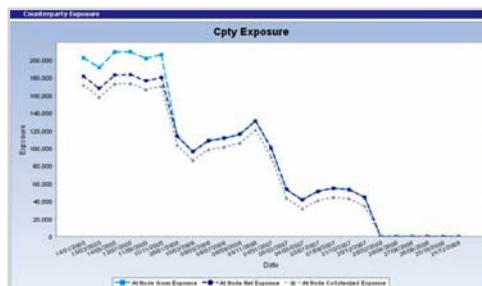


Figure 1 – PFE profile

Whilst the Monte Carlo method is more demanding than more traditional approximations, it enables portfolio managers to measure exposures with much greater accuracy. By measuring the true effect of deal aging, netting and collateral agreements, the Monte Carlo-based PFE calculation helps to achieve more effective risk allocation.

The Reuters Solution

Reuters Kondor Global Risk consolidates credit limit information and manages the data in real-time across all instrument types. It enables credit and risk managers to control and monitor credit exposures, so that limits can be used efficiently across the enterprise.

Now, Reuters Kondor Global Risk can also be used to effectively calculate PFE exposures. The new PFE Risk Engine in Reuters Kondor Global Risk version 3.0 uses Monte Carlo simulation to provide credit and risk managers with improved credit exposure analysis. Using Monte Carlo simulation for PFE is recommended as:

- 1) PFE is measured as a quantile of portfolio prices distribution, for a given confidence level (e.g. 95%)
- 2) It captures correlation effects between market variables whilst at the same time taking into account credit mitigation effects

Reuters Kondor Global Risk delivers improved risk analysis through:

- More accurate calculation of potential future exposures on a portfolio and deal basis
- More precise exposure values which can be compared against regulatory exposures (e.g. mark-to-market plus add-on)
- The capturing of changes of exposure over time
- Avoiding the need to batch import market values from a front-office system
- Analysis of sources of exposure with drilldown features to evaluate the effect of deal aging, collateral, and netting
- Pre-trade analysis on how potential new trades affect portfolio PFE

With Reuters Kondor Global Risk PFE figures can also be imported from proprietary risk engines.

Simulation approach

- Scenario generation model based on a cross-asset implementation using the Heath Jarrow Morton framework
- User-defined scenario model calibration to historical and/or market data, including a flexible hierarchical model of factor correlations
- Correlations are specified directly or calculated from historical time series

- User-defined future time nodes where deals are re-evaluated
- Each deal priced and aged separately along market rate scenario paths
- Deal aging module updates deal data as it evolves (this is especially important for path-dependent options)
- Engine simulates rate fixings, cash flow amounts for floating rates, and option exercise decisions
- Aggregation module combines 'per leg' results with netting and collateral and computes PFE statistics

PFE applications

The PFEs simulated with the Monte Carlo Risk Engine can be used to compute:

- The amount of credit limit as the exposure of a portfolio (where a credit limit has been set to monitor its riskiness)
- Contribution of a credit leg being the exposure of a single transaction
- Exposure for a given counterparty as a function of time (PFE profile) in a counterparty exposure report

Counterparty exposure report

For each counterparty, Reuters Kondor Global Risk computes Monte Carlo PFEs and provides:

- Exposure for a given counterparty vs. time for a given quantile (PFE profile as shown in fig 1)

- Yield curve as 2D curve vs. rate maturity, for a given Monte Carlo path and simulation step (fig 2)
- Deal price as 3D surface vs. simulation step and quantile (fig 3)
- Specific point on yield curve as 3D surface vs. simulation step and quantile (fig 4)

Reuters: with you at every step of the trade

The Reuters Kondor suite of trade and risk management solutions addresses the core risk issues and is designed to meet the requirements of traders, heads of desk, risk and operations managers. It covers two areas:

Desk-level technology, providing real-time pricing, position keeping, trade processing and reporting features – from the front into the back office, including messaging and the generation of accounting entries.

Enterprise-wide risk management, supporting the analysis of credit and market risk exposures at the group or firm-wide level.

Reuters modular system is flexible and integrated, offering increased efficiency, control and automation. All of Reuters trade and risk management products can be used independently or fully integrated with each other or third party systems – to provide tailored functionality at every step of the trade.

For more information visit www.reuters.com/risk

Figure 2 - Market Data 2D Surface

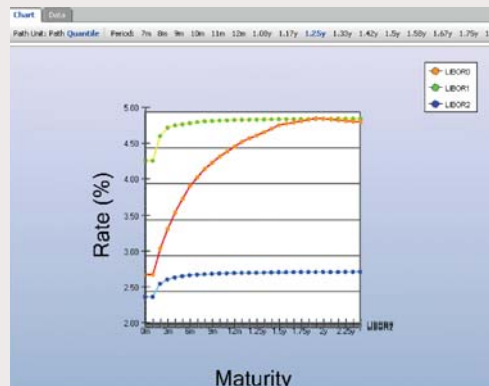


Figure 3 - Detail of prices per time nodes and Monte Carlo paths

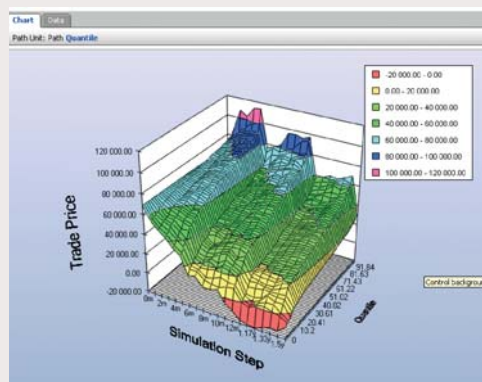
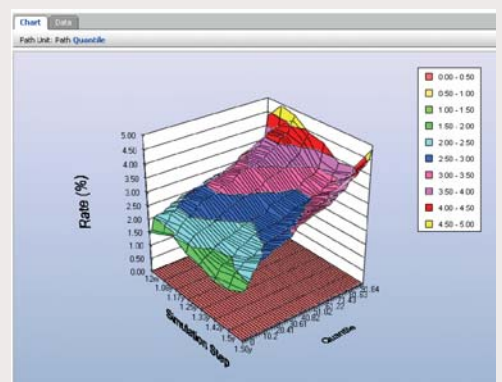


Figure 4 - Market Data 3D Surface (evolution of a point in a yield curve)



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