

Market Risk Modeling

There are multiple assumptions that are made when modelling risk factors. These choices need to be selected and reviewed to allow for an accurate representation of returns from the simulation engine. The Risk Measurement Performance Review Stream will be responsible for maintaining and signing off on the representation of risk factors and results of the risk simulation.

For example, bond spread factors could be simulated as a bond yield or zero yield. Bond yields could also be simulated as a spread to another curve or an all-in rate. The results of the calibration and simulation engine are highly dependent on these assumptions.

A review of modelling assumptions has been incorporated. For example, the simulation of base metal commodity futures was changed from an all-in representation to a spread against commodity forwards. The revised modelling assumption helped to improve the accuracy of the basis between futures and forwards, which previously exhibited nearly unbelievable scenarios that were far outside the realm of a 99% confidence level.

We have reviewed the basic premises in the risk factor definitions including the use of constant maturity risk factors in commodities and zero interest rate yields for simulation.

A distribution analysis of historical returns against simulated returns will be performed in cases where material adverse effects are observed. This includes the evaluation of important spreads (such as libor-OIS) as well as outright prices (such as libor futures and swap instruments) using statistical tests for model validation (such as the Kolmogorov-Smirnov test). The simulated scenarios should be able to effectively reproduce the original correlation and volatility matrices used as inputs while considering VaR as a forward looking measure.

Items identified through the assessment in the prior section will require proxy trades to represent the enhanced risk exposure in the official VaR system. As discussed, for market data differences, market data will be passed to the source system and new risk sensitivities will be computed. The observed change in the risk sensitivities between the new and old sensitivities will then be recorded and used to construct a new proxy trade.

There is formal proxy trade governance and procedures that will be followed to implement the proxy. Once the proxy is implemented, it will be updated monthly assuming the associated IPV balance remains material.

For adjustments driven by source system constraints, the solution will depend on the nature of the limitation. Generally speaking, the solution will be to book a proxy trade in the source system to reflect the omitted effect. This would be booked and maintained by the LOB with verification by Risk Oversight. A good example of this is the proxy trades booked to represent the effect of OIS discounting for CSA-based interest rate swaps. As part of the proxy trade governance requirements, a memo detailing the nature of the proxy and roles and responsibilities will be created.

Value at Risk (VaR) is computed using risk sensitivities from the official risk systems. Given that the IPV and VA are applied outside the system, consideration must be paid to what impact these adjustments may have, if any, to these risk sensitivities. For example, a large IPV may signal a material difference between the market data in the source system and the independent market data. The source system data is used to compute the risk sensitivities for VaR.

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Differences in market data can change the risk sensitivities, particularly for the non-linear books. For exotic derivative desks and options desks, calculating new risk sensitivities using market data is an important consideration given the inherent non-linearity existing in these portfolios. For more linear books, the effect of market data differences on risk sensitivities will not be as pronounced.

Risk Oversight will compute new risk sensitivities for material IPV balances.

In certain cases, fair valuation of financial instruments may require capabilities that are not present in the source system valuation models or valuation environment. In these cases, we will use existing vetted models outside the source systems to compute fair value. For material IPV adjustments, the factor(s) will be assessed with respect to the implications on risk sensitivities.

Reference:

<https://finpricing.com/lib/IrOIS.html>