

# Intraday Exposure

Most product types, with the exception of equity derivatives, will be calculated using the MTM+FPE approach for intraday replacement risk. For deals existing as of the prior end-of-day cycle, the MTM value will be retrieved from centralized sources of this data, which in most cases is Sentry, but may be the product systems themselves if the data is not available in the prior.

For new and amended deals completed intraday, the MTM values or premiums reflecting these values, will either be retrieved directly from the product systems (assuming that appropriate pricing parameters and market data were specified at the time of input) or entered manually by the trader.

The referenced FPE, calculated with risk factor based on a transaction's product type and underlying attributes, is then added to this MTM value to come up with the replacement risk for the deal. The overall replacement risk calculation is restricted to  $\text{MAX} [(0, \text{MTM})] + \text{FPE}$ , such that in no instances will a negative MTM be considered in the calculation.

The formula based approach is mostly reserved for OTC equity derivatives, like Equity Forward and Equity Option, in which a diffusion model is used to determine replacement risk on a particular position. For long calls, long equity forwards and long mutual fund forwards, the 95th percentile level (1.65 sigma) of the equity price is estimated under a diffusion process with drift equal to the expected return under the CAPM formula and volatility set to the greatest of the 1, 3 and 5-year standard deviations.

The percentage replacement risk factor is determined using the ratio of the upward diffused price over the strike price. For long puts, short equity forwards and short mutual fund forwards, the current price of the equity is diffused downwards with drift equal to 0 (i.e., no directional bias) and volatility set to the greatest of the 1, 3, and 5-year standard deviations.

The percentage replacement risk factor is determined using the ratio of the downward diffused price over the strike price. Where product types that are fed into the system are unknown, or where specific transactions are denoted as non-standard, then the most conservative application would be to estimate replacement risk at 100% of the notional.

Note that the risk analyst / manager who are included in the non-standard workflow will be informed of these positions, and they will then perform appropriate tasks to introduce new risk factors for the product type, assign existing product codes as proxies, or model these outside the system as is done through the non-standard transaction workflow.

Add-on factor tables (profile basis) are uploaded to the production system to monitor the replacement risk. The system could easily pick up the tables for exposure calculation. A complete term profile of add-on factors for FX Forward trades and FX Option trades (including buy/sell domestic currency and sell/buy foreign currency, with gross exposure and collateralized exposure) are stored in production system.

Also the system stores the add-on factors of Repo, Reverse Repo, Security Bought & Sold, and Security Borrow and Lending with all currencies, issuer types, credit rating, underlying type and underlying terms.

If add-on factor profiles (in terms of tenor) are missing in the table, it would be approximated by interpolation. Once the add-on factor profile has been obtained for a product, the system proceeds to calculate the exposure profile. The procedure would calculate the stand-alone exposure based on either gross add-on factor collateralized add-on profile. The add-on exposure plus the deal's MtM (only if it is positive, otherwise it is assumed as 0) is considered as exposure.

Then, the proper exposure is added to the counterparty's profile. After this quick and simple aggregation, the peak of the post-deal exposure is compared with the counterparty's credit limit. A violation warning would be triggered if the limit is breached.

A counterparty's exposure limit could be time-dependent and set up in other currencies rather than USD. Also, a counterparty's exposure profile is time-dependent. In this way, the exposure calculated at each time bucket should be compared with the limit set up at the corresponding time interval. If the exposure is higher than the limit, there should be a limit breach warning triggered. Also, the limit should be compared with the exposure calculated at the related time bucket. If the limit is lower than the exposure, the system should trigger a warning/violation.

Reference:

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