

FRTB: Standardised Approach









FRTB definition

- The Fundamental Review of the Trading Book (FRTB) is a new Basel committee framework for the next generation market risk.
- FRTB is inspired by the undercapitalisation of trading book exposures witnessed during the financial crisis.
- It aims to address shortcoming of the current Basel 2.5 market risk capital framework.



FRTB vs Basel 2.5

Standardised Approach

FRTB

Sensitivity based risk charge + Default risk charge + Residual risk add-on

Basel 2.5

Standardised capital charge

Internal Model Approach

FRTB

Expected shortfall + Default risk charge + Non-modellable risk factors

Basel 2.5

VaR + Stress VaR + Incremental Risk Charge (IRC)



FRTB Main Features

- Clear definition of the boundary between the trading book and the banking book
- An overhaul of the internal model approach (IMA) to focus on tail risk
- An overhaul of the standardized approach (sa) to make it more risk sensitive and explicitly capture default risk and other residual risks
- Inclusion of liquidity horizons explicitly for different asset classes.



FRTB approaches

Standardized approach (SA): a regulator-set approach

- Sensitivity-based risk charge (SBRC)
- Default risk charge (DRC-SA)
- Residual add-on (RAD)

Internal model approach (IMA): a bank's own approach

- Expected shortfall (ES)
- Default risk charge (DRC-IMA)
- Non-modellable risk factors (NMRF)

This presentation focuses on standardized approach



FRTB Standardized Approach

- 3 risk measures: Delta, Vega and Curvature
- 7 risk classes
 - General interest rate risk (GII)
 - Credit spread risk
 - Credit spread risk: non-correlated securitisation
 - Credit spread risk: correlated securitisation
 - Equity risk
 - Commodity risk
 - Foreign exchange risk
- Sensitivity based risk charge should be calculated separately for each risk class and each risk measure.



FRTB Standardized Approach (cont'd)

- Reporting hierarchy: portfolio, desk, bank
- Total risk charge

Total = sensitivity-based risk charge + default risk charge + residual add-on

For example

An equity desk has equity risk and interest rate risk only, the total risk charge is given by

Total = equity Delta risk charge + equity Vega risk charge

+ equity Curvature risk charge + general interest rate Delta risk charge

+ default risk charge + residual add-on

FRTB SA

FRTB SA: Sensitivity Based Risk Charge

Required sensitivities

Delta: the first order derivative with respect to underlying price Vega: the first order derivative with respect to implied volatility Curvature: equivalent to the sum of all high-order derivatives with respect to underlying price

Sensitivity notes

- Delta: all trading products have Deltas.
- Vega and Curvature: only non-linear products (e.g., options) have Vega and Curvature.

FRTB SA

FRTB SA: Sensitivity Based Risk Charge (cont'd)

Sensitivity calculation

- Clearly define all Delta and Curvature calculation but not Vega.
- Interest rate deltas are computed based on yield rates (or zero coupon rates) rather than liquid instrument quotes (e.g., swap rates, futures).
- Curvature is a new measurement that is equal to shocked value change minus Delta.

Bucket and risk factor

- Sensitivities should be divided into buckets and risk factors within each risk measure and each risk class.
- Risk weight: a risk weight is defined for each risk factor.
- Risk correlation: correlations are specified between risk factors and between buckets.



FRTB SA: Sensitivity Based Risk Charge (cont'd)

Calculation

- Sum all sensitivities belonging to the same risk factor and then multiply by the risk weight → risk charge W_iS_i per risk factor
- Within one bucket, two risk factor charges can be added as

$$K_{b} = \sqrt{(W_{i}S_{i})^{2} + (W_{j}S_{j})^{2} + \rho_{ij}W_{i}S_{i})(W_{i}S_{i})}$$



Within each class and each measure, two bucket charges can be added as a correlated sum

For example, an equity Delta risk charge has two buckets only, the Delta risk charge is given by

$$DeltaRiskCharge = \sqrt{K_b^2 + K_c^2 + \gamma_{bc}K_b^2K_c^2}$$



FRTB SA: Default Risk Charge

Scope

- Debt instruments
- Equity products
- Securitisation products

Calculation procedure

- Determine jump-to-default (JTD) loss amount
- Offset the JTD amounts of long and short exposures with respect to the same obligor



- Discount the net short exposures by a hedge benefit ratio
- Apply default risk weights to exposures to arrive at the DRC



FRTB SA: Residual Add-on

The following trade types bearing residual risk

- Traded in incomplete markets
- Gap risk: such as path dependent options (barrier, Asian, digital, Bermudan, etc.)



- Correlation risk: such as multiple underlying options (basket, best, spread, basis, quote, etc.)
- Behavioural risk: such as mortgage

Calculation

RAD = notional * factor (1% or 0.1%)



Thanks!



You can find more online presentations at https://finpricing.com/lib/EqSwap.html

