



# FRTB: Standardised Approach

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## FRTB SA

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

FRTB provides a clear definition of the boundary between the trading book and the banking book. It consists of an overhaul of the internal model approach (IMA) to focus on tail risk and an overhaul of the standardized approach (SA) to make it more risk sensitive. Each approach also explicitly captures default risk and other residual risks. Liquidity risk is explicitly included for different asset classes via liquidity horizons.

## Summary

- ◆ FRTB Definition
- ◆ FRTB vs Basel 2.5
- ◆ FRTB Main Features
- ◆ FRTB Approaches
- ◆ FRTB Standardised Approach (SA)
- ◆ FRTB SA: Sensitivity Based Risk Charge
- ◆ FRTB SA: Default Risk Charge
- ◆ FRTB SA: Residual Risk Add-on

## 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: 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: 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  $W_i S_i$  per risk factor
- ◆ Within one bucket, two risk factor charges can be added as

$$K_b = \sqrt{(W_i S_i)^2 + (W_j S_j)^2 + \rho_{ij} W_i S_i (W_j S_j)}$$

- ◆ 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

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

## 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 details at  
<https://finpricing.com/knowledge.html>