



# FRTB: Standardised Approach

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## Summary

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## 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

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

- ◆ 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

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

## 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
  - ◆  $RAD = \text{notional} * \text{factor (1\% or 0.1\%)}$



# Thanks!



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