

# FUNDAMENTAL REVIEW OF THE TRADING BOOK



## EVOLUTION OF INTERNAL MODELS

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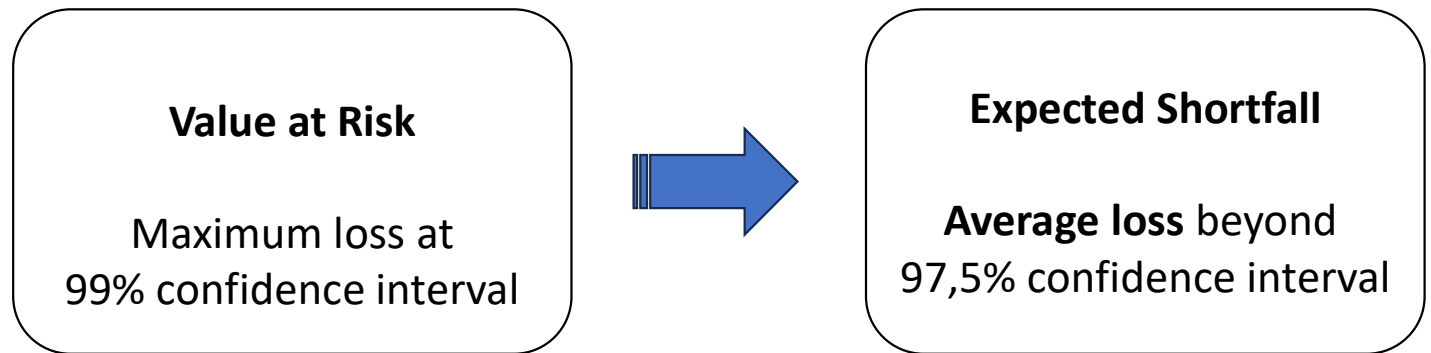
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Evolution of Internal Models

# RATIONALE OF THE FRTB REFORM

- ➡ Weak capture of credit and market risk
- ➡ Poor modelling of structured credit products
- ➡ Incentives for excessive risk-taking
- ➡ Backtesting exceptions (model underestimation of losses)

# KEY REGULATORY CHANGES

## FROM VALUE AT RISK TO EXPECTED SHORTFALL



Captures the **entire tail of the loss distribution**, not just a threshold

# KEY REGULATORY CHANGES

## MULTIPLE LIQUIDITY HORIZONS

### RATIONALE



Risks unwind at different speeds



Liquidity explicitly reflected in capital



No longer a single 10-day assumption

# KEY REGULATORY CHANGES

## MULTIPLE LIQUIDITY HORIZONS

### Example of liquidity horizons

- Large-cap equities: 10 days
- Liquid interest rates and FX: 10 days
- Small-cap equities: 20 days
- FX volatility: 40 days
- Interest rate volatility & energy prices: 60 days
- Other commodities & credit spreads: 120 days

# KEY REGULATORY CHANGES

## STRONGER VALIDATION FRAMEWORK



Enhanced profits and losses attribution



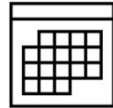
Clear risk factor identification



Internal validation and hypothetical portfolios

# EXPECTED SHORTFALL CALCULATION FRAMEWORK

## FRAMEWORK



Daily calculation



97.5% confidence level



Tail-loss focused measure

# EXPECTED SHORTFALL CALCULATION PROCESS



## STEP 1 - IDENTIFICATION OF RISK FACTOR

- Interest rates
- FX rates
- Equity prices
- Credit spreads
- Commodity prices
- Volatility risk factors

# EXPECTED SHORTFALL CALCULATION PROCESS



## STEP 2 – MODELLING AND VALUATION

- Approximation of pricing models
- Use of numerical methods
- Sensitivity-based or full revaluation approaches



## STEP 3 – PROFIT AND LOSS DISTRIBUTION

- Generation of risk factor shocks
- Construction of the portfolio P&L distribution
- Separation by liquidity horizon buckets

# EXPECTED SHORTFALL CALCULATION PROCESS



## STEP 4 – EXPECTED SHORTFALL COMPUTATION

- Order P&L outcomes from best to worst
- Identify the 97.5% quantile
- Compute the average loss beyond this threshold

$$ES = \sqrt{\sum_{j \in LH} \left( ES_j \times \sqrt{\frac{LH_j}{10}} \right)^2}$$

- *ES<sub>j</sub> = Expected shortfall for liquidity horizon bucket j*
- *LH<sub>j</sub> = Liquidity horizon (10, 20 ... 120 days)*

# DETERMINATION OF CAPITAL REQUIREMENTS

**CAPITAL REQUIREMENTS = MAXIMUM OF**



Previous day's  
Expected Shortfall

**AND**

Previous day's  
stressed Expected  
Shortfall



Average over the last  
60 business days of  
daily ES multiplied by  
a scaling factor

**AND**

Average over the last  
60 business days of  
daily stressed ES

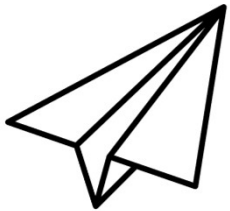
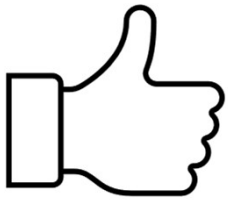


Default risk capital  
requirement  
calculated using an  
internal model

**AND**

Average of these  
default risk capital  
requirements over the  
last 12 weeks.

# Happy to connect and discuss !!!!!



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