



International Actuarial Association
Association Actuarielle Internationale



Opportunities for Actuaries in Banking

Measurement and modelling of interest rate
risk in the banking book (IRRBB)

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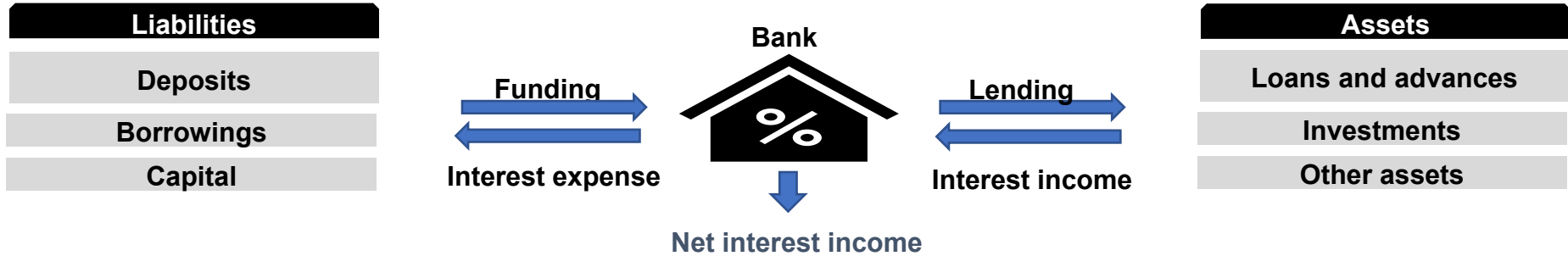
- A brief on the banking business model
 - ✓ Overview of key risks faced by banks today
 - ✓ Introduction to IRRBB: Definition, components and impact on banks
- Revised Basel standards for IRRBB measurement (SRP 31, Basel regulations)
 - ✓ Risk governance and oversight
 - ✓ IRRBB measurement, modelling and stress testing
 - ✓ Data integrity, model risk management and capital adequacy assessment
 - ✓ Reporting, disclosures and supervisory review process
- Illustrative case study for IRRBB modelling and economic value of equity (EVE) calculation
- Challenges and opportunities in IRRBB measurement
- Q/A

A brief on the banking business model and introduction to IRRBB

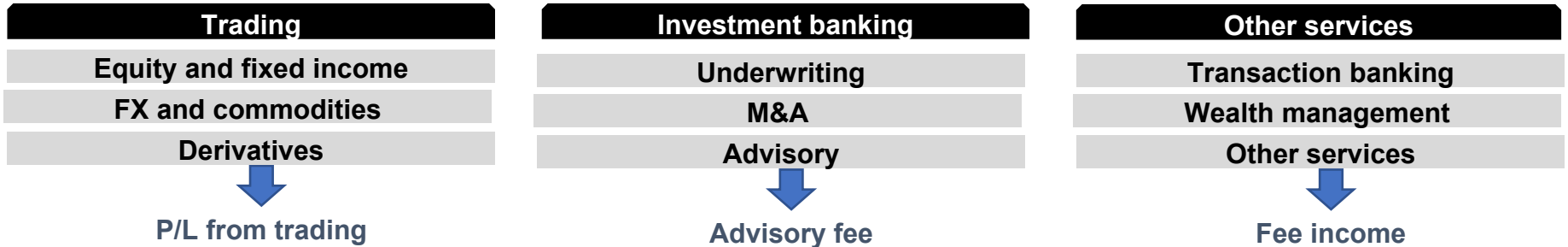


Overview of the Banking Business Model

Core Business Model

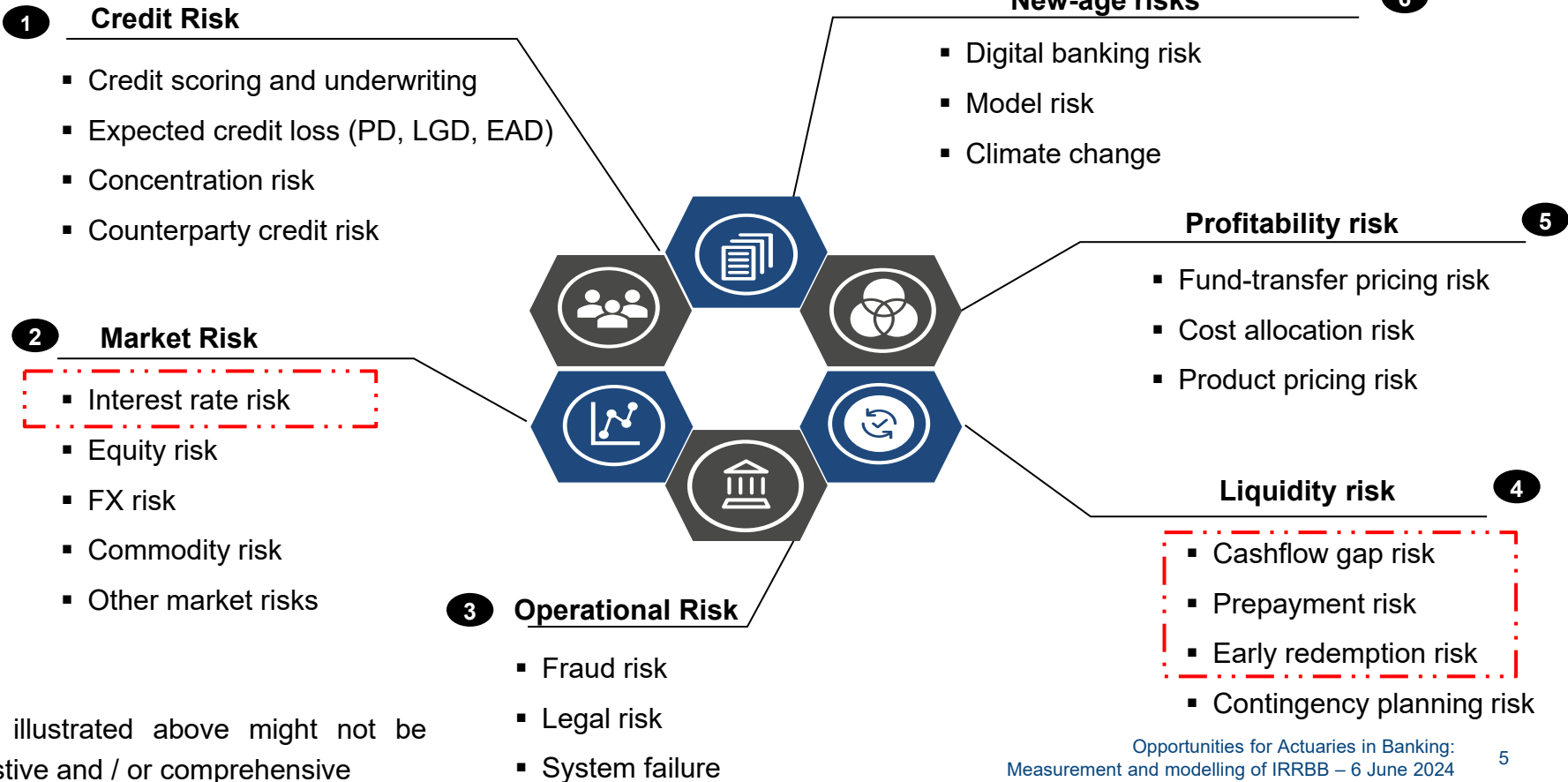


Other Business Models



Key Risks Faced by Banks Today

Risks covered in today's session



*Risks illustrated above might not be exhaustive and / or comprehensive



Introduction to IRRBB: Definition, Components and Impact on Banks

“Interest rate risk in the banking book (IRRBB) refers to the current or prospective risk to a bank’s capital and to its earnings, arising from the impact of adverse movements in interest rates on its banking book.”

– Basel Committee on Banking Supervision

Components of IRRBB

Gap Risk

- Difference in term structure and timing of rate resets between interest rate sensitive assets and liabilities
- E.g. rate of interest paid on liabilities increases before the rate received on assets

Basis Risk

- Correlation risk on financial instruments that have similar tenors but are priced using different interest rate indices
- E.g. an asset priced off LIBOR funded by a liability priced off US Treasuries

Option Risk

- Automatic option risk – explicitly embedded derivatives within loans such as a capped rate loans
- Behavioral option risk – prepayment on loans or early redemption on deposits due to change in interest rate

Impact of IRRBB on Banks

Impact on Economic Value

- Change in future cashflows for floating rate exposures
- Change in present value of future cash flows for all positions
- Impact on economic value of the bank’s assets, liabilities and off-balance sheet instruments

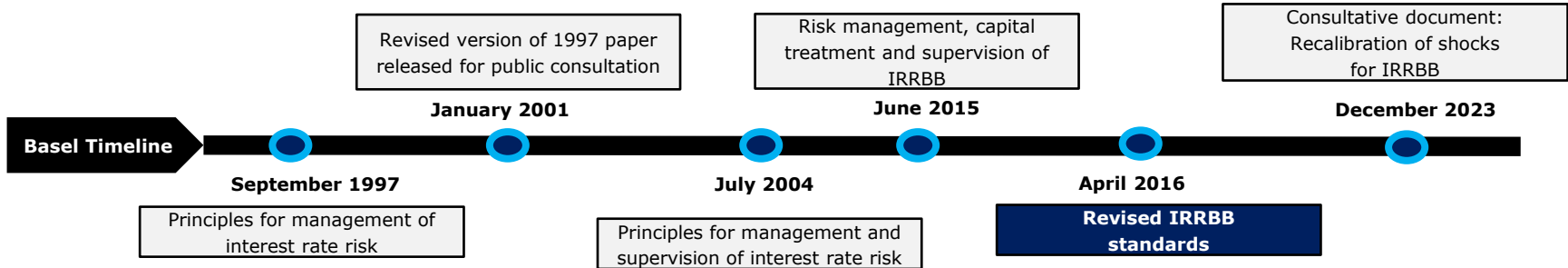
Impact on Earnings

- Change in interest income and expense
- Change in interest rate sensitive operating income and expense
- Impact on net interest income (NII) and overall income of bank

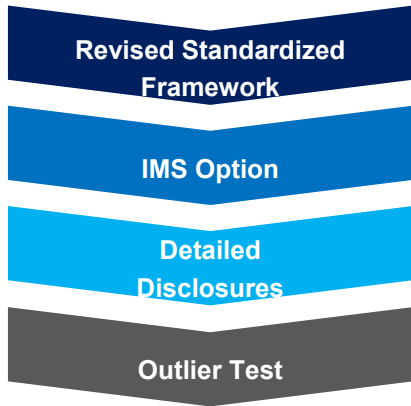
Revised Basel standards for IRRBB measurement (SRP 31)



Revised Basel Standards for IRRBB



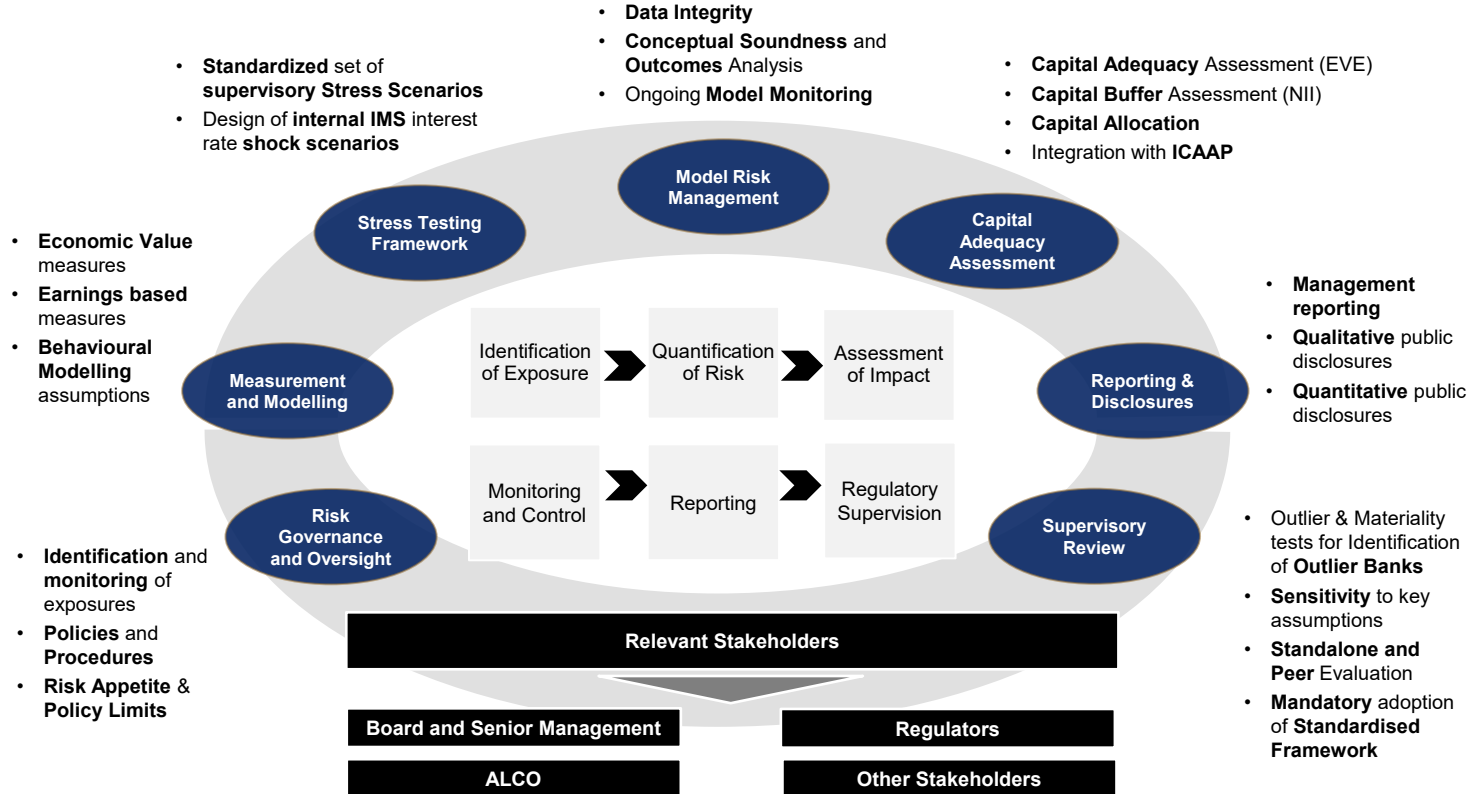
Key Highlights of the Revised BCBS Standards on IRRBB



- Revised standardized framework with 6 supervisory scenarios for stress testing
 - Usage of both Economic value (EVE) and earnings-based measures (NII) to assess IRRBB
- Option to adopt an internal measurement system (IMS), failure of which would lead to mandatory adoption of SA
 - Independent model validation framework required for IMS
- Detailed quantitative and qualitative disclosures
 - Revised disclosures to enable peer-to-peer comparison
 - Disclose IRRBB management & mitigation strategies, underlying modelling assumptions & parameters.
- Guidelines issued to supervisors on how to conduct a detailed assessment of IMS
 - Compare change in EVE to 15% of a bank's Tier 1 capital as opposed to the former 20% of the bank's total capital



Key Principles of Revised Basel Standards for IRRBB





Principle 1: Risk Governance and Oversight

Key Points	Identification and Monitoring	<ul style="list-style-type: none">• Delineation of banking book & trading book exposures• Review and testing of new products to ensure that the IRRBB risks are well understood before roll-out• Specific identification for credit spread risk in the banking book (CSRBB)
	Delegation and Resourcing	<ul style="list-style-type: none">• Dedicated governing body for IRRBB management• Separate and well-defined independent departments for identification, measurement, monitoring and control• IRRBB functions to be independent from risk-taking functions of the bank
	Policies and Procedures	<ul style="list-style-type: none">• Regular review of the level and trend of the bank's IRRBB exposures• Understand potential linkages with market, liquidity, credit and operational risk.• All IRRBB policies should be reviewed periodically (at least annually) and revised as needed
	Risk Appetite and Policy Limits	<ul style="list-style-type: none">• Clearly defined risk appetite statement• Risk limits should be identified for aggregate firm, individual business units, portfolios, instrument types & sub risk categories with systems in place to escalate breach of thresholds without delay
	Internal Control and Audit	<ul style="list-style-type: none">• IRRBB identification, measurement, monitoring and control processes to be reviewed by an internal or external auditor on a regular basis.• Reports written by internal/external auditors should be made available during supervisory review.

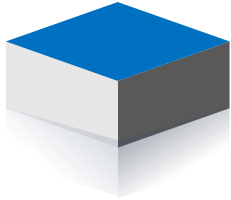


Principle 2: IRRBB Measurement: Evolution of Approaches

Evolution of IRRBB Measurement Approaches

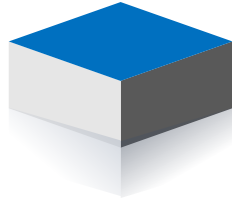
Repricing gap analysis*

Gap between interest rate sensitive assets and liabilities across time buckets



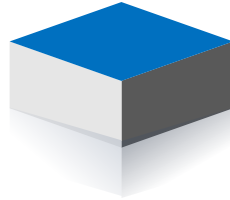
Duration gap analysis*

Modified duration gap between rate sensitive assets and liabilities



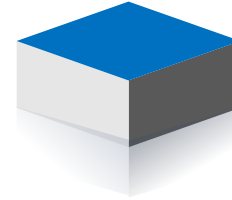
PV01

Impact on economic value due to single basis point change across all tenors



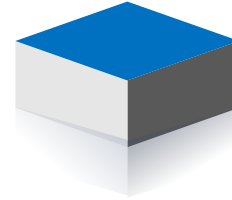
EVE simulations

Full-revaluation of EVE across parallel and non-parallel IR scenarios



NII simulations

Granular NII simulations across parallel and non-parallel IR scenarios



Evolution of Balance Sheet Projection Assumptions

Run-off balance sheet

Existing assets and liabilities run-off over time and not replaced on maturity

Constant balance sheet

Instantaneous and identical replacement of assets and liabilities as they mature

Dynamic balance sheet

Balance sheet evolves over time as per future business strategy and expectations

Specific focus of today's session



Principal 2: IRRBB Measurement: EVE vs NII

“In addition to the impact of an interest rate shock on its economic value, a bank’s policy approach should take into account its ability to generate stable earnings sufficient to maintain its normal business operations”

- Basel Committee on Banking Supervision

Criteria	Economic Value of Equity (EVE)	Net Interest Income (NII)
Outcome	<ul style="list-style-type: none">Measures change in the NPV of the bank’s assets, liabilities and off-balance sheet items subject to specific interest rate shock and stress scenarios	<ul style="list-style-type: none">Measures changes to future profitability within a given time horizon eventually affecting future levels of a bank’s own equity capital
Assessment Horizon	<ul style="list-style-type: none">Long term measure of riskReflects changes in value over the remaining life of the bank’s assets, liabilities and off-balance sheet items, i.e. until all positions have run off	<ul style="list-style-type: none">Short to medium term measure of risk (3-5 years)Does not fully capture those risks that will continue to impact profit and loss accounts beyond the period of estimation
New Business Assumption	<ul style="list-style-type: none">Calculated on a run-off balance sheetConsiders the NPV of repricing cash flows of instruments on the bank’s balance sheet or accounted for as an off-balance sheet item	<ul style="list-style-type: none">Usually calculated on a constant balance sheet i.e., assume rollover of maturing items and / or dynamic balance sheet (new business projections)

“The Committee acknowledges the importance of managing IRRBB through both economic value and earnings-based measures. If a bank solely minimizes its economic value risk by matching the repricing of its assets with liabilities beyond the short term, it could run the risk of earnings volatility.” - Basel Committee on Banking Supervision



Principal 2: IRRBB Measurement: Behavioral Modelling

Both economic value and earnings-based measures of IRRBB are significantly impacted due to presence of behavioral optionalities. A bank should use robust predictive models to make behavioral assumptions about how an instrument's actual maturity may vary from the instrument's contractual terms

Coverage of Behavioural Modelling and Assumptions

Risk Category	Product Coverage	Associated Behavioural Risk to Measure
Prepayment risk	Fixed rate loans	Risk of early prepayment on loans across various interest rate shock and stress scenarios. A bank must assess the expected average prepayment speed under each interest rate shock scenario E.g. if interest rates decrease, borrowers of fixed rate loans might increase speed of prepayment and re-finance loans at lower rate of interest
Early redemption risk	Fixed term deposits	Risk of early redemption on term deposits across various interest rate shock and stress scenarios. A bank must assess the expected average redemption speed under each interest rate shock scenario E.g. if interest rates increase, depositors might increase speed of redemption to seek higher returns on alternate investments / deposit opportunities
Drawdown risk	Committed and undrawn lines of credit	Banks may sell options to retail customers (e.g. prospective mortgage buyers or renewers) whereby, for a limited period, the customers can choose to draw down a loan at a committed rate.
NMD Volatility risk	Non-maturity deposits (NMDs)	Current and savings account deposits that have no maturity date and can be withdrawn anytime. A bank should analyze its depositor base to identify the proportion of core deposits (i.e. NMDs which are unlikely to be withdrawn even under significant changes in interest rate environment)



Principal 2: IRRBB Measurement: Behavioral Modelling

Both economic value and earnings-based measures of IRRBB are significantly impacted due to presence of behavioral optionalities. A bank should use robust predictive models to make behavioral assumptions about how an instrument's actual maturity may vary from the instrument's contractual terms

Coverage of Behavioural Modelling and Assumptions

Risk Category	Product Coverage	Commonly-used Parameters for Behavioural Modelling
Prepayment risk	Fixed rate loans	<ul style="list-style-type: none">Loan size, loan-to-value (LTV) ratio, borrower characteristics, contractual interest rates, seasoning, geographical location etc.Macroeconomic variables such as stock indices, unemployment rates, GDP, inflation and housing price indices to model loan prepayment behavior
Early redemption risk	Fixed term deposits	<ul style="list-style-type: none">Deposit size, depositor characteristics, funding channel (e.g. direct or brokered deposit), contractual interest rates, seasonal factors, geographical location etc.Macroeconomic variables such as stock indices, unemployment rates, GDP, inflation and housing price indices to model deposit redemption behavior
Drawdown risk	Committed and undrawn lines of credit	<ul style="list-style-type: none">Borrower characteristics, geographical location (including competitive environment and local premium conventions), customer relationship with bank as evidenced by cross-products)Remaining maturity of the commitment, seasoning and remaining term of the mortgage
NMD Volatility risk	Non-maturity deposits (NMDs)	<ul style="list-style-type: none">Responsiveness of product rates to changes in market interest rates, spread between a bank's offer rate and market rate, competition from other firms, geographical location and demographical factorsDepositor characteristics (e.g. retail/wholesale) and account characteristics (e.g. transactional/non-transactional)



Principal 3: IRRBB Stress Testing: Standardized Scenarios

Banks are expected to calculate impact on economic value and earnings across multiple interest rate scenarios. These scenarios should be a combination of:

- 6 supervisory interest rate shock scenarios prescribed by BCBS (Standardized shock scenarios)
- Internally selected interest rate shock scenarios addressing the bank's risk profile (ICAAP)

Standardized Shock Scenarios

- BCBS has prescribed six interest rate shock scenarios to capture parallel and non-parallel gap risks.
- These scenarios are applied to IRRBB exposures in each currency for which the bank has material positions.
- In order to accommodate heterogeneous economic environments across jurisdictions, the six shock scenarios reflect currency-specific absolute shocks as specified in **Table 1** below.

1. Parallel shock up
2. Parallel shock down
3. Steepener shock (short rates down and long rates up)
4. Flattener shock (short rates up and long rates down)
5. Short rates shock up
6. Short rates shock down

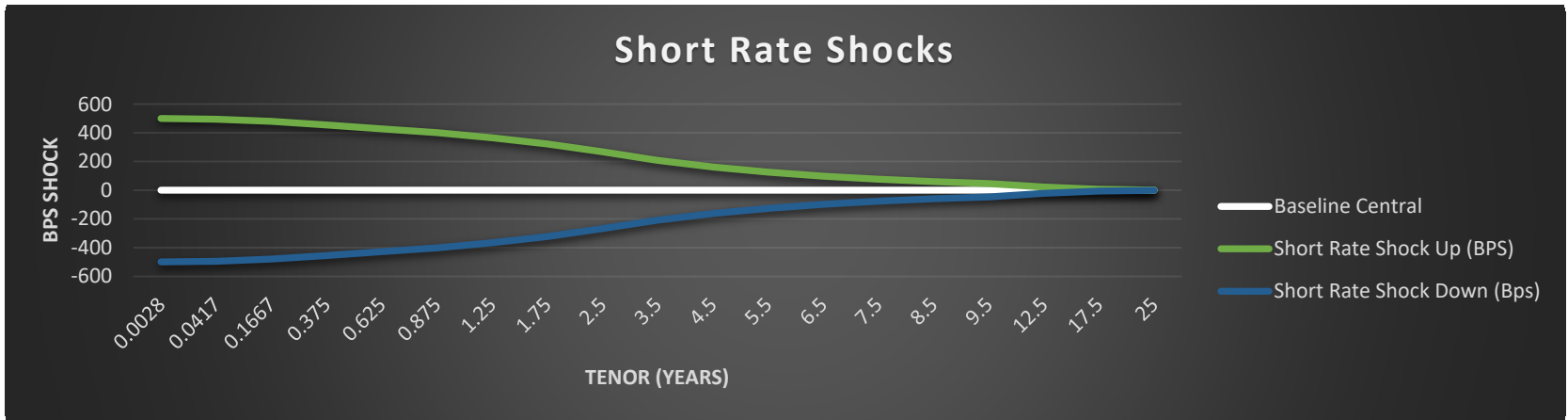
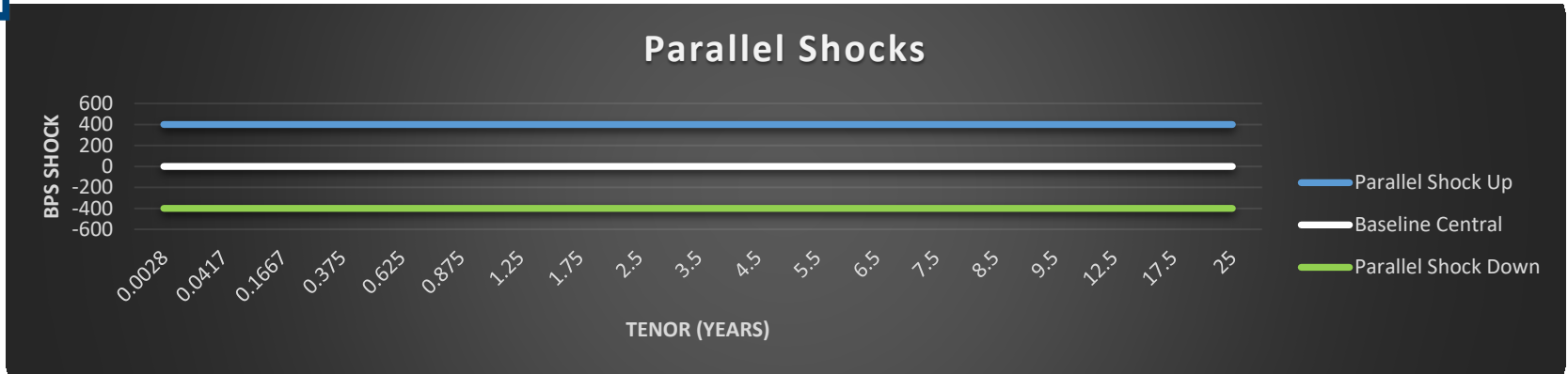
Currency-wise Interest Rate Shocks

Table 1. Specified size of interest rate shocks

Currency	ARS	AUD	BRL	CAD	CHF	CNY	EUR	GBP	HKD	IDR	INR
Parallel	400	300	400	200	100	250	200	250	200	400	400
Short	500	450	500	300	150	300	250	300	250	500	500
Long	300	200	300	150	100	150	100	150	100	350	300
Currency	JPY	KRW	MXN	RUB	SAR	SEK	SGD	TRY	USD	ZAR	
Parallel	100	300	400	400	200	200	150	400	200	400	
Short	100	400	500	500	300	300	200	500	300	500	
Long	100	200	300	300	150	150	100	300	150	300	

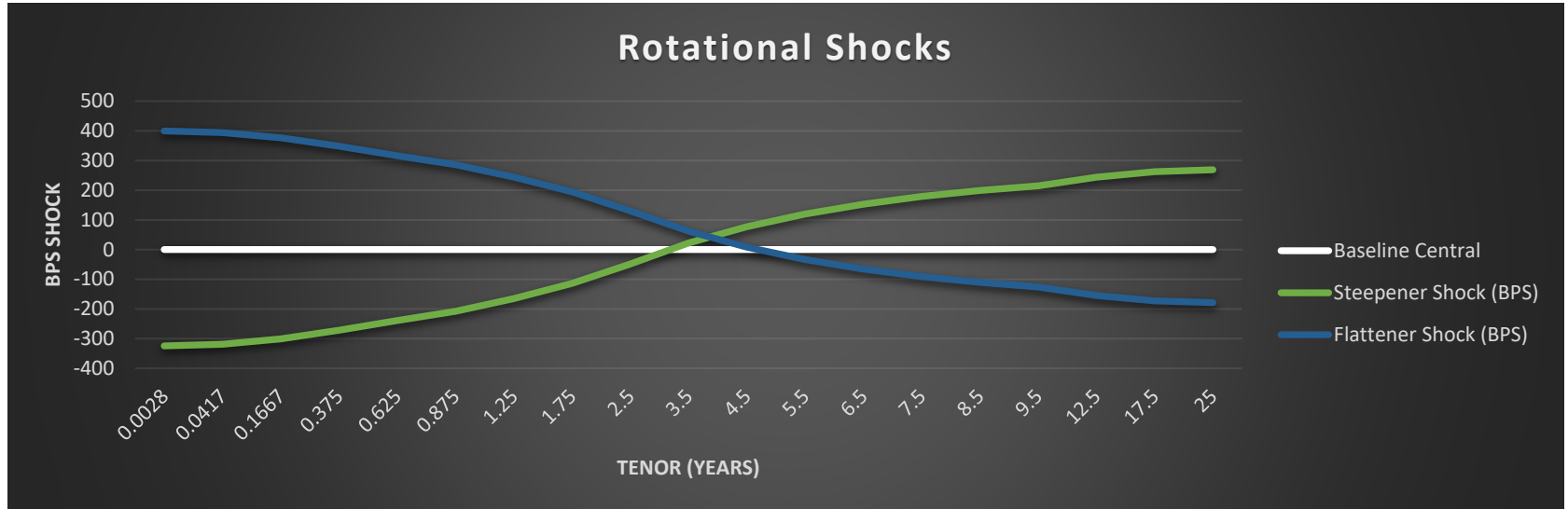


Principal 3: IRRBB Stress Testing: Standardized Scenarios





Principal 3: IRRBB Stress Testing: Standardized Scenarios



Principal 3: IRRBB Stress Testing: IMS Scenarios

Considerations to Design Internal IMS Shock Scenarios

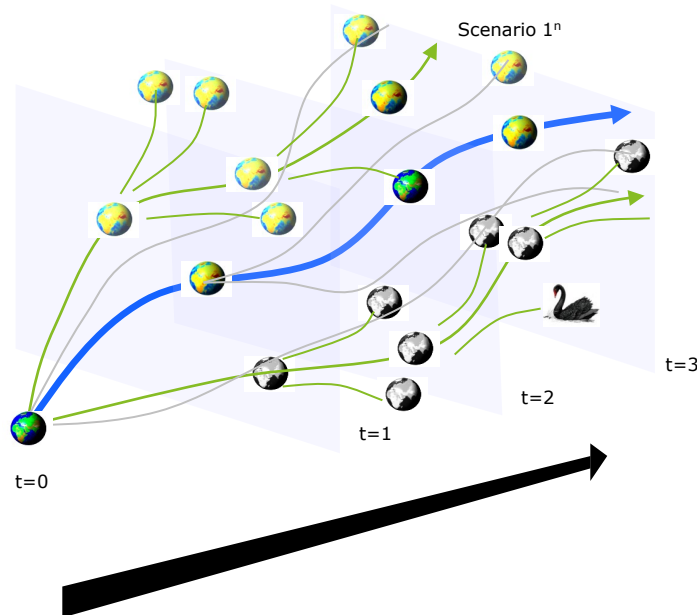
Shape and level of the current term structure of interest rates

Historical and implied volatilities of interest rate term structures

Effects of negative interest rate scenarios on assets and liabilities

Scenarios should cover parallel, non-parallel gap risk, basis risk and option risk

Interaction of IRRBB with other risks (e.g. credit risk, liquidity risk).



Adverse changes in the spreads of new assets/liabilities replacing maturing assets/liabilities maturing.

Changes in portfolio composition due to internal and external factors

Changes in portfolio composition due to internal and external factors

New products and markets where only limited historical data are available;

Qualitative and quantitative reverse stress testing



Principal 4: Model Risk Management

Models Required for IRRBB

Balance sheet projection models

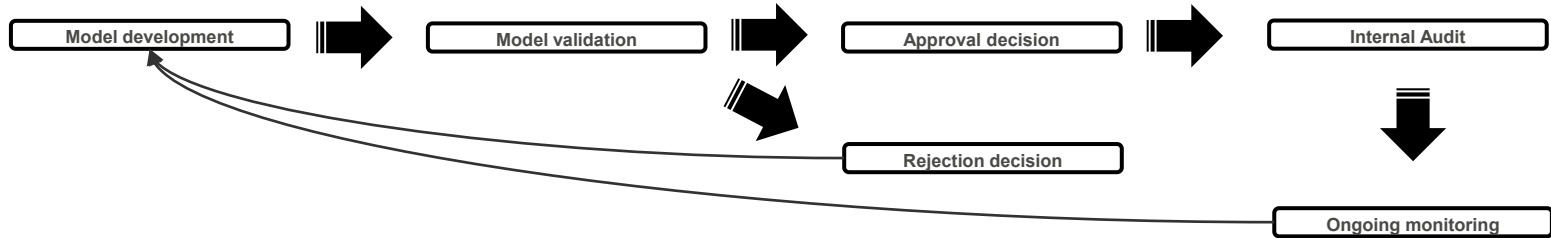
Interest rate forecasting models

Behavioural models

Models for embedded optionality's

FX & Volatility forecasting models

Model Risk Management Cycle



Three Pillars of Model Validation

Data integrity

Conceptual soundness and stability

Ongoing model monitoring



Principal 4: Model Risk Management

Data Integrity

Reliable
Data Sources

Automated
Data Inputs

Periodic Review of
Data Mapping

Conceptual Soundness Assessment and Stability Analysis

- Assess modelling assumptions, limitations & methodologies
- Assess segmentation, variable selection and pricing techniques for instruments
- Assess stability of NMDs, early redemptions and prepayments
- Usage of conceptual, statistical and performance tests

Conceptual
Soundness

Stability Analysis

Back-testing
Analysis

Ongoing Model Monitoring

- Document detailed developmental evidence & analysis for IMS
- Establish back testing thresholds for ongoing model monitoring
- Draft policies and set frequency for re-calibration and re-validation of IMS models
- Articulate policies for model transition, including change and version control authorizations.

High Risk

Medium Risk

Low Risk

Restrict Usage

Corrective Action

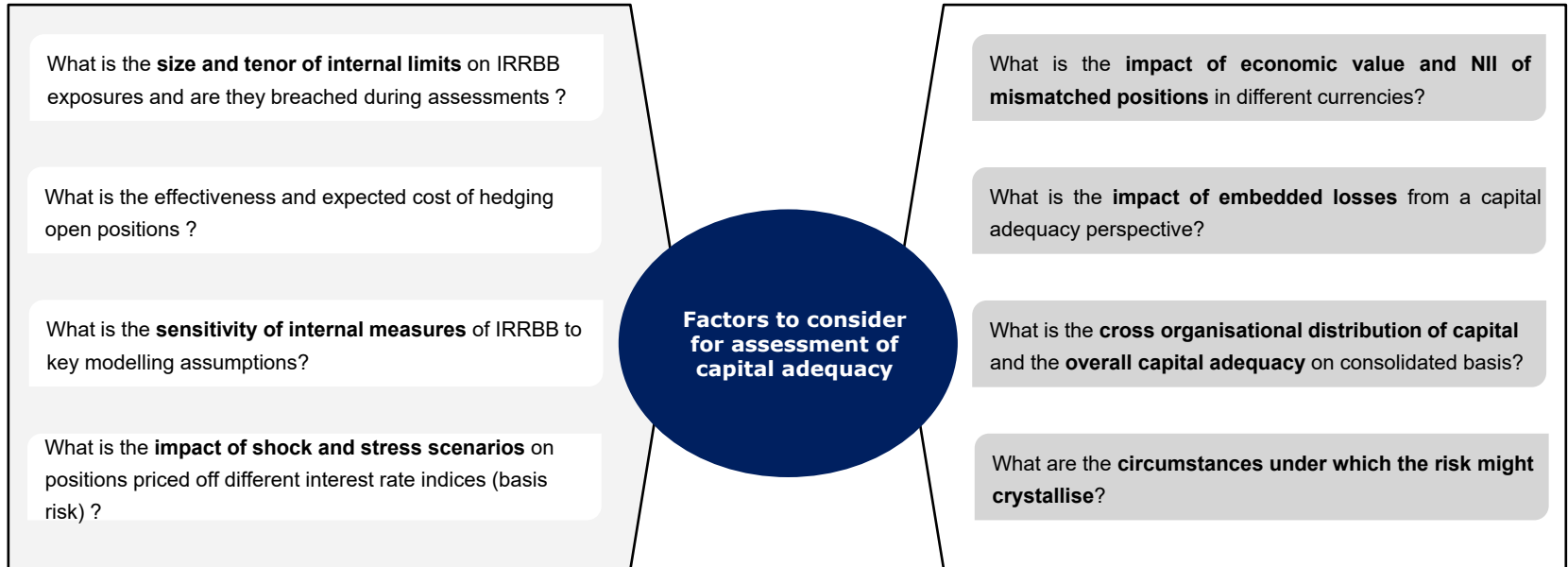
Monitor



Principal 5: Capital Adequacy Assessment (ICAAP)

“Banks are responsible for evaluating the level of capital that they should hold, and for ensuring that this is sufficient to cover IRRBB and its related risks. The outcomes of the capital adequacy for IRRBB should be considered in a bank’s ICAAP and flow through to assessments of capital associated with business lines.”

– Basel Committee on Banking Supervision





Principal 6: Reporting and Disclosures

The revised standards on IRRBB require extensive MIS reporting to internal management and detailed qualitative and quantitative public disclosures illustrating impact on EVE and NII across supervisory interest rate scenarios

Management Reporting	
Minimum Reporting Requirements	<ul style="list-style-type: none"> Summaries of aggregate IRRBB exposures and explanatory text to highlight the key drivers of IRRBB Reports demonstrating compliance with IRRBB policies and limits Key modelling assumptions and stress test results (NMD, prepayments, currency aggregation etc.) Summaries of the reviews of IRRBB policies, procedures and adequacy of measurement systems and findings of internal/external auditors
Monitoring Metrics	<ul style="list-style-type: none"> Current exposure v/s policy limits Results of periodic model reviews and audits Past modelling forecasts v/s actual results Focus on portfolios with significant MTM impact
Management Review	<ul style="list-style-type: none"> Regular and detailed reviews Ensure that analysis and risk management activities related to IRRBB are conducted by competent staff with technical knowledge and experience

Public Disclosures	
Qualitative Disclosures	<ul style="list-style-type: none"> How the bank defines IRRBB for purposes of risk control and measurement. Description of the bank's overall IRRBB management and mitigation strategies (Role of ALCO, hedging, limits, audit etc.) Description of measures and scenarios used to calculate IRRBB and periodicity of calculation Description and rationale for modelling assumptions
Quantitative Disclosures (Δ EVE)	<ul style="list-style-type: none"> Assume run-off balance sheet Include cashflows from all interest rate sensitive assets, liabilities and off-BS items Disclose if cashflows discounted using risk-free rates or spread adjusted risk-free rates Exclude own equity for computation
Quantitative Disclosures (Δ NII)	<ul style="list-style-type: none"> Assume constant balance sheet Change in projected NII over a forward-looking rolling 12-month period compared with the bank's own best estimate 12-month projections

Principal 6: Reporting and Disclosures

Illustrative Reporting Formats Prescribed by the Regulator for Public Disclosures

Table A : Qualitative Disclosures

Table A

Purpose: To provide a description of the risk management objectives and policies concerning IRRBB.

Scope of application: Mandatory for all banks within the scope of application set out in Section III.

Content: Qualitative and quantitative information. Quantitative information is based on the daily or monthly average of the year or on the data as of the reporting date.

Frequency: Annual.

Format: Flexible.

Qualitative disclosure

a	A description of how the bank defines IRRBB for purposes of risk control and measurement.
b	A description of the bank's overall IRRBB management and mitigation strategies. Examples are: monitoring of EVE and NII in relation to established limits, hedging practices, conduct of stress testing, outcomes analysis, the role of independent audit, the role and practices of the ALCO, the bank's practices to ensure appropriate model validation, and timely updates in response to changing market conditions.
c	The periodicity of the calculation of the bank's IRRBB measures, and a description of the specific measures that the bank uses to gauge its sensitivity to IRRBB.
d	A description of the interest rate shock and stress scenarios that the bank uses to estimate changes in the economic value and in earnings.
e	Where significant modelling assumptions used in the bank's IMS (ie the EVE metric generated by the bank for purposes other than disclosure, eg for internal assessment of capital adequacy) are different from the modelling assumptions prescribed for the disclosure in Table B, the bank should provide a description of those assumptions and of their directional implications and explain its rationale for making those assumptions (eg historical data, published research, management judgment and analysis).
f	A high-level description of how the bank hedges its IRRBB, as well as the associated accounting treatment.
g	A high-level description of key modelling and parametric assumptions used in calculating ΔEVE and ΔNII in Table B, which includes: For ΔEVE , whether commercial margins and other spread components have been included in the cash flows used in the computation and discount rate used. How the average repricing maturity of non-maturity deposits in (I) has been determined (including any unique product characteristics that affect assessment of repricing behaviour). The methodology used to estimate the prepayment rates of customer loans, and/or the early withdrawal rates for time deposits, and other significant assumptions. Any other assumptions (including for instruments with behavioural optionalities that have been excluded) that have a material impact on the disclosed ΔEVE and ΔNII in Table B, including an explanation of why these are material. Any methods of aggregation across currencies and any significant interest rate correlations between different currencies.
h	(Optional) Any other information which the bank wishes to disclose regarding its interpretation of the significance and sensitivity of the IRRBB measures disclosed and/or an explanation of any significant variations in the level of the reported IRRBB since previous disclosures.

Quantitative disclosures

1	Average repricing maturity assigned to NMDs.
2	Longest repricing maturity assigned to NMDs.

Table B: Quantitative Disclosures

Table B

Scope of application: Mandatory for all banks within the scope of application set out in Section III.

Content: Quantitative information.

Frequency: Annual, as at the bank's financial year-end.

Format: Fixed.

Accompanying narrative: Commentary on the significance of the reported values and an explanation of any material changes since the previous reporting period.

In reporting currency	ΔEVE		ΔNII		
	Period	T	T-1	T	T-1
Parallel up					
Parallel down					
Steeper					
Flattener					
Short rate up					
Short rate down					
Maximum					
Period		T			T-1
Tier 1 capital					

Definitions

For each of the supervisory prescribed interest rate shock scenarios, the bank must report for the current period and for the previous period:

- (i) the change in the economic value of equity based on its IMS, using a run-off balance sheet and an instantaneous shock or based on the result of the standardised framework as set out in Section IV if the bank has chosen to adopt the framework or has been mandated by its supervisor to follow the framework; and
- (ii) the change in projected NII over a forward-looking rolling 12-month period compared with the bank's own best estimate 12-month projections, using a constant balance sheet assumption and an instantaneous shock.



Principal 7: Supervisory Review

The revised guidelines have enhanced the supervisory review process to elaborate on the factors which supervisors should consider when assessing the Banks level and management of IRRBB exposures.

Collection of Information



- NMD assumptions
- Behavioral optionality assumptions
- Repricing cashflows
- Types of yield curves and scenarios used for stress testing
- Level of exposure to AIRO
- Significant currencies
- EVE across scenarios
- NII across scenarios
- Treatment of own equity
- Spread / Margin assumptions
- Currency aggregation

Adequacy Assessment



- Adequacy of governance and oversight
- Level of bank's knowledge on IRRBB
- Robustness of internal model validation
- Internal MIS and monitoring
- Risk limits and controls
- Robust stress testing
- Independent review and audits
- Effective hedging strategies
- Level of capital
- Peer benchmarking

Outlier Tests and Actions



- Outlier / materiality tests that compare Δ EVE to at least 15% of Tier 1 capital
- Corrective actions if Bank's IRRBB framework is deemed to be inadequate:
 - ✓ Reduce IRRBB exposure via hedging
 - ✓ Raise additional capital
 - ✓ Constraints on IMS parameters used by bank
 - ✓ Improve risk management framework

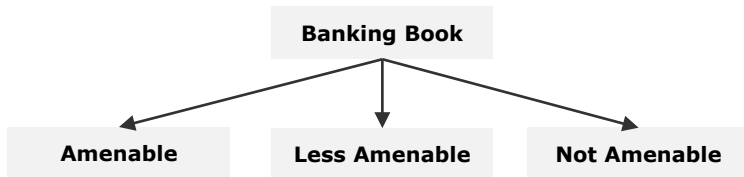
Illustrative case study for IRRBB modelling and EVE calculation

Case Study for Standardized EVE calculation

Stage-wise Framework for Calculation of Standardized EVE Measure

Stage 1 – Allocation of positions in the banking book

Interest rate-sensitive banking book positions need to be allocated to one of three categories i.e. amenable, less amenable and not amenable to standardization.



Stage 2 – Cashflow generation and bucketing across scenarios

- **Positions amenable to standardization:** Vanilla fixed and floating rate loans without any optionality (Refer to **Table 1 in Annexure II**)
- **Positions less amenable to standardization :** Explicit or embedded options (Swaptions, cap / floors etc.) that are excluded from this step and considered as part of Stage 4
- **Positions that are not amenable to standardization:** Separate treatment for:
 - (a) NMDs
 - (b) Fixed Rate Loans with prepayment risk
 - (b) Term Deposits with early redemption risk

Stage 3 – Calculation of EVE (without AIRO adjustment)

Determination of Δ EVE for relevant interest rate shock scenarios for each currency. The Δ EVE is measured per currency for all six prescribed interest rate shock scenarios.

$$EVE_{i,c}^{nao} = \sum_{k=1}^K CF_{i,c}(k) \cdot DF_{i,c}(t_k) \quad DF_{i,c}(t_k) = \exp(-R_{i,c}(t_k) \cdot t_k)$$

Stage 4– Calculation of Δ EVE (with AIRO adjustment)

- Explicit and embedded options excluded in Stage 1 are revalued under each interest rate shock scenario
- Add-ons for changes in the value of automatic interest rate options (whether explicit or embedded) are added to the EVE measure under $e\epsilon$

$$\Delta EVE_{i,c} = \sum_{k=1}^K CF_{0,c}(k) \cdot DF_{0,c}(t_k) - \sum_{k=1}^K CF_{i,c}(k) \cdot DF_{i,c}(t_k) + KAO_{i,c}$$

Stage 5– Calculation of standardized EVE measure

The Δ EVE under the standardized framework will be the maximum of the worst aggregated reductions to EVE across the six supervisory prescribed interest rate shocks. (Refer to Annexure IV)

$$\text{Standardised EVE risk measure} = \max_{i \in \{1,2,\dots,6\}} \left\{ \max \left(0; \sum_{c: \Delta EVE_{i,c} > 0} \Delta EVE_{i,c} \right) \right\}$$



Stage 5 – Calculation of Standardized EVE Measure

Standardized EVE Measure after Currency Aggregation

$$\text{Standardised EVE risk measure} = \max_{i \in \{1,2,\dots,6\}} \left\{ \max \left(0; \sum_{c: \Delta \text{EVE}_{i,c} > 0} \frac{\Delta \text{EVE}_{i,c}}{\text{loss in currency } c} \right) \right\}$$

Scenario	Capped Δ EVE		Δ EVE (CCY Aggregated*)
	INR	USD	
Parallel-Up	30	20	1530
Parallel-Down	0	0	0
Steeper	33	5	408
Flattener	0	0	0
Short-Rate Up	0	20	1500
Short-Rate Down	0	0	0
Max (Standardized EVE Measure)			1530
15% of Tier 1 Capital			1500
Breach / No Breach			Breach



**Standardized EVE materiality
test result = Outlier Bank !**

*Assuming an INR/USD FX rate of 75

Challenges, opportunities and Q/A



Challenges and Opportunities in IRRBB Measurement

Term Structure Modelling

Need for stochastic interest rate term structure models for forward looking IR scenarios that consider negative rate regimes

Behavioral Modelling

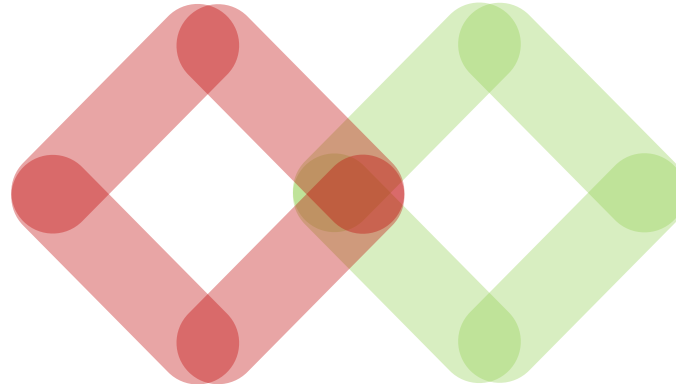
Robust behavioral models based on statistical / regression / machine-learning techniques for exposures with uncertain cashflow profiles (NMDs, prepayments and early redemptions)

Balance Sheet Projection

Sophisticated projection models required to reflect evolution of business assumptions and reinvestment strategies

AIRO Valuation

Extensive volatility and option pricing models required for AIRO valuation based on tree-based and simulation approaches



Data Integrity and Processing

Automated data pipelines that can handle huge volumes of data integrity checks and processing to facilitate IRRBB measurement and modelling

New-Age Compute and Technology

New-age technology stack capable of handling big data and parallel-processing required to practically implement IRRBB models

Model Risk Management

Need to maintain a strong model risk management cycle covering inventory of all models required for IRRBB

Detailed Reporting and Disclosures

Extensive reporting and disclosures required by supervisors both at deal and aggregated levels. Failure would lead to increased capital requirements

Questions ?

Comments

Thank you



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