



Interest rate risk in banking book: The way ahead

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Executive summary

Interest rate risk in banking book (IRRBB) refers to the current or prospective risk to a bank's capital and earnings arising from adverse movements in interest rates that affect banking book positions.

When interest rates change, the present value and timing of future cash flows change. This in turn changes the underlying value of a bank's assets, liabilities and off-balance sheet items and, hence, its economic value of equity (EVE). Changes in interest rates also affect a bank's earnings by altering interest rate-sensitive income and expenses, thus affecting its net interest income (NII).

Main components of IRRBB

Gap risk

- Describes the risk arising from the timing of instruments' rate changes.
- Derives from the term structure of banking book instruments.
- The extent of gap risk depends on whether there's a parallel or non-parallel shift in the yield curve and to what extent.

Basis risk

- Describes the impact of relative changes in interest rates for financial instruments that have similar tenures but are priced using different interest rate indices.
- Focuses on specific differences between instruments of a similar nature.

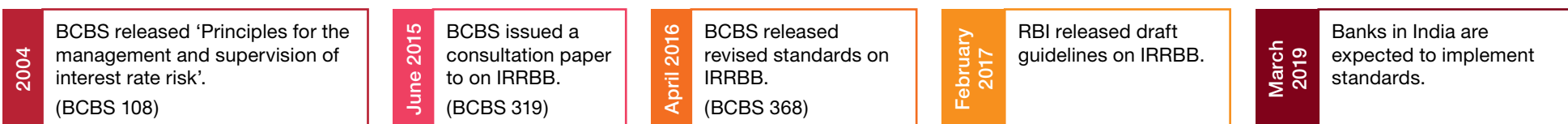
Option risk

- Arises from optional elements embedded in the bank's on- and off-balance sheet items, where the bank or its counterparty can alter the level and timing of its cash flows or from option derivative positions.
- Can be further categorised into automatic option and behavioural option.

IRRBB is a part of Pillar 2 of the Basel capital framework (Supervisory Review Process) and subject to the Basel Committee on Banking Supervision (BCBS) guidance set out in the 2004 Principles for the Management and Supervision of Interest Rate Risk (henceforth, the IRR Principles). The IRR Principles lay out the Committee's expectations for banks' identification, measurement, monitoring and control of IRRBB as well as banks' supervision.

On 2 February 2017, the RBI came up with draft guidelines focusing on the governance, measurement and management of IRRBB. The new guidelines are in line with the BCBS standards on IRRBB (finalised on April 2016). Banks in India are required to adhere to these guidelines from 1 April 2019.

The IRRBB landscape



This document details the various changes proposed in the guidelines and the possible impact on banks in India.

Key changes and their impact

The RBI expects banks to have a clearly defined risk appetite statement for IRRBB which is approved by their board and to have procedures for approving major hedging or risk-taking initiatives. Banks should identify the IRRBB inherent in all products and activities, integrate the management of their IRRBB within their broader risk management framework as well as align the management of IRRBB with their business planning and budgeting activities. The board should have oversight of the policies, procedure, assumptions, deviations and mitigation plan.

A bank should be able to compute IRRBB as impact on economic value (Δ EVE) and earnings (Δ NII) based on:

1. internally selected interest rate shock scenarios addressing its risk profile according to its Internal Capital Adequacy Assessment Process (ICAAP);
2. historical and hypothetical interest rate stress scenarios, which tend to be more severe than shock scenarios; and
3. the six prescribed interest rate shock scenarios for EVE and two scenarios for NII.

PwC's observations:

To date, banks in India were required to adhere to interest rate risk (IRR) guidelines. Under IRRBB, only parallel shocks are used to calculate the absolute level of change in NII levels. These guidelines are in addition to the existing guidelines on IRR which are applicable to the entire balance sheet.

PwC recommends that banks start working on these regulations as soon as possible. The regulations require a lot of homework in terms on data integrity, historical data maintenance, market data modelling, cost of funding computation, product lives and cash flow modelling. Additionally, banks should focus on system capability upgrade to handle a range of scenarios, higher tenure analysis and granularity.

1.1. Capital requirements

Banks are required to consider both the short-term and long-term perspectives to identify the risks associated with changing IRRBB on their on-balance sheet and off-balance sheet exposures. Banks can decide, with the approval of the board, on the appropriate level of IRRBB which they would like to carry keeping in view their capital level, interest rate management skills and the ability to rebalance the banking book portfolios quickly in case of adverse movement in the interest rates.

Banks whose IRRBB exposure is less than a 20% drop in the EVE may be required to hold additional capital if the RBI considers the level of IRR to be high in relation to the bank's capital level or the quality of the bank's IRR management framework.

While there is an explicit capital requirement for IRR for positions in the trading book under Pillar 1, there is no capital requirement for IRRBB under Pillar 1. IRRBB is covered under Pillar 2.

PwC's observations:

Currently, banks have a limited focus on banking book specific issues like duration gap, sensitivity of instruments to interest rate, change in portfolio composition and capital needs to manage the underlying risk.

PwC recommends that banks add a few key risk matrices like percentage change in EVE, percentage change in NII and adjusted EVE in their risk dashboard at the earliest. The counterargument could be that current parallel shocks would not mirror the capital need based on the prescribed shock scenarios under this regulation. PwC agrees that sensitivities based on existing shock scenarios will not be robust, but these observations will help in understanding the future need of capital once the regulation is live.

1.2. IRRBB assumptions

The behavioural maturities of instruments with behavioural options should be well supported by sound judgments and assumptions. All modelling assumptions should be conceptually sound and reasonable, and consistent with historical experience.

The regulator expects banks to consider both interest rate shock/stress scenarios and product-specific dimensions for the computation of the core/non-core components and maturities for products having behavioural optionality. Some of the products having behavioural optionality are fixed rate loans subject to prepayment risk, fixed rate loan commitments, term deposits subject to early redemption risk and non-maturity deposits (NMDs).

As yield curves vary from currency to currency, banks need to assess behaviouralisation and hence, the exposure at the currency level.

The RBI expects banks to regularly test the appropriateness of key behavioural assumptions. The changes in the key assumptions should be well documented and clearly understood by the higher management. Banks should consider their possible impact on hedging strategies.

PwC's observations:

Increasing granularity, consideration of 'n' number of product-specific and macroeconomic scenarios and a higher number of shock scenarios would definitely result in a lot of overheads for banks. Moreover, stitching all the components together will be a complex exercise.

PwC recommends that banks divide their portfolio at the product, currency and sub-product level. The currency-level split should be for each major currency and one for all minor currencies combined. While considering the sub-product level split, banks may consider the reference rate as a key parameter.



1.3. Interest rate shock scenarios

The RBI has proposed the following six prescribed interest rate shock scenarios to capture parallel and non-parallel gap risks for EVE; two of these are also applicable to NII.

For both EVE and NII	For EVE only
1. Parallel shock up	3. Steepening of the curve (short rates down and long rates up)
2. Parallel shock down	4. Flattening of the curve (short rates up and long rates down)
	5. Short rates shock up
	6. Short rates shock down

These scenarios are applied to IRRBB exposures in each currency for which banks have material positions. In order to accommodate heterogeneous economic environments across jurisdictions, the six shock scenarios reflect currency-specific absolute shocks.

PwC's observations:

Quite prudently, rather than shocking all currency curves to the same extent, the regulator proposes different shocks for different currencies even in case of parallel shock. The approach is quite practical as some currencies are less volatile and hence, their yield may not vary to the same extent as that of more volatile currencies. The currency-wise shocks are subject to regular calibration.

NII needs to be computed for three different balance sheet projections: constant, run-off and dynamic. Additionally, currency-wise yield curves, margins and behavioural assumptions need to be adjusted accordingly. Hence, the modelling of market data, behavioural analysis and computation of EVE/NII at different shocks for different currencies would require subject matter expertise and enhanced system capabilities.

PwC recommends that banks identify their major and minor currencies based on the banking book portfolio. All minor currencies could then be combined as a group and pegged to a single currency (for example, USD or INR). As more and more currencies are moving to the negative rate zone, it makes sense to have a negative floor for them (and that too for only some specific curves).

The computation of EVE and NII will need to be done on a monthly/quarterly basis in future. The IRRBB measure is a key input to the Asset Liability Committee (ALCO). Any delay or discrepancy in the results may provide a wrong picture to the higher management. PwC recommends that banks benchmark their systems accordingly.

1.4. Interest rate stress scenarios

Banks should consider stress test results when establishing and reviewing their policies and limits for IRRBB. These stress tests should measure their vulnerability to loss under stressful market conditions, including the breakdown of key assumptions. Banks should also develop and implement an effective stress testing framework for IRRBB as part of their broader risk management and governance processes. These should feed into the decision-making process at the appropriate management level, including strategic decisions (e.g. business and capital planning decisions) of the Board or its committee. IRRBB stress testing should be considered in ICAAP.

Further, banks should perform qualitative and quantitative reverse stress tests in order to identify interest rate scenarios that could severely threaten their capital and earnings; and to reveal vulnerabilities arising from their hedging strategies and the potential behavioural reactions of their customers.

PwC's observations:

The RBI expects banks to perform regular forward-looking stress testing with relevant stress scenarios in line with their size, nature, complexity and anticipated changes in the business and market. Reverse stress testing is a relatively new area and identification of relevant scenarios will be a challenge for banks. A dedicated and experienced team is a prerequisite for the exercise.

PwC recommends that banks consider more severe scenarios than standard shock scenarios. These scenarios should be in line with market conditions and should be reviewed at least annually. Reverse stress scenarios should be selected in such a way that they help identify gaps in the process and challenge these assumptions.



1.5. Reporting

The regulator has emphasised that the involvement of the board, IT committees and other members of the senior management is crucial for IRRBB management. They should regularly review policies, procedures and exposure with policy limits. They should also ensure that competent staff is involved in analysis and risk management activities.

The RBI expects banks to regularly report the computation results, review findings for models, policies and procedures. Banks should clearly identify portfolios that may be subject to significant mark-to-market movements.

PwC's observations:

The regulator expects banks to include key assumptions, trend analysis and stress tests results in the reports to the senior management. The senior management should be proactive and take an interest in policy formulation, limit setting and risk mitigation activities of the bank.

PwC recommends that banks establish a process such that the key IRRBB matrices become a part of reporting to the senior management. The senior management should rigorously review the change in IRRBB numbers and ask questions. The reporting should clearly highlight the major contributor of IRRBB, any deviation from the policy, outlier, specific considerations taken and mitigation plans.



1.6. Disclosure

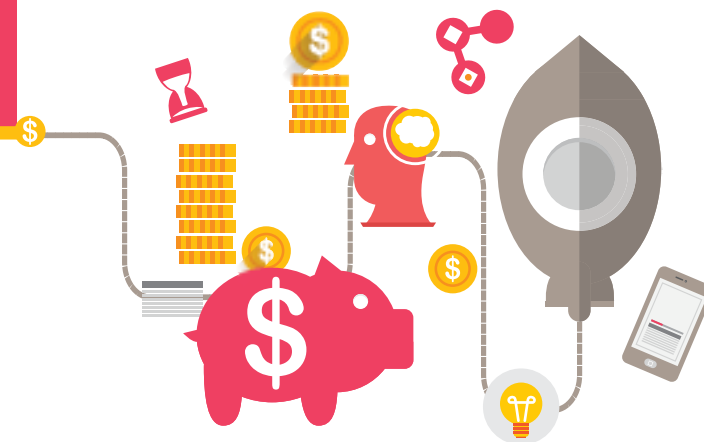
The RBI requires both qualitative and quantitative disclosures annually from banks, summarising their risk management objectives and policies concerning IRRBB. Qualitative disclosures should address the purpose, control process, periodicity of calculation, interest rate shock scenarios and assumptions considered, and hedging details with respect to IRRBB. Quantitative disclosures should provide details on the average and longest repricing maturity assigned to NMDs.

The RBI also expects banks to provide their interest rate shock scenarios results for both change in EVE and change in NII as of March end every year. The disclosure should provide information on change in EVE and NII for different interest rate shock scenarios and balance sheet projections.

PwC's observations:

These disclosures will help the regulator assess banks' IRRBB levels, controls in place and the hedging process. The regulator will be able to understand various key assumptions, behavioural changes and the sensitiveness of the balance sheet products. The regulator will be able to identify outlier banks (having $\Delta EVE > 15\%$ of tier 1 capital) and take corrective actions on time.

PwC recommends that banks follow the guidelines and provide the correct information to the regulator on a timely basis. While preparing the disclosure, banks themselves will identify the weakness in their IRRBB computation/modelling process and control mechanism. Banks will be able to better gauge the nature of their balance sheet. A few checks banks may include are the directionality of the sensitivity, sensitivity of a particular product, impact of change of yield curve and behaviour assumptions.



1.7. Capital assessment under ICAAP

While considering the impact of IRRBB on capital requirement, banks should develop their own methodologies for capital allocation based on their risk appetite. In determining the appropriate level of capital, banks should consider both the amount and quality of capital needed. The overall level of capital should be commensurate with both the bank's actual measured level of risk (including for IRRBB) and its risk appetite, and be duly documented in its ICAAP report.

The capital adequacy for IRBBB should be considered in relation to the risks to economic value, given that such risks are embedded in banks' assets, liabilities and off-balance sheet items. For risks to future earnings, given the possibility that future earnings may be lower than expected, banks should consider capital buffers.

PwC's observations:

As IRRBB is an integral part of ICAAP, the regulator expects banks to factor in risk appetite, driving factors, internal limits, hedge effectiveness, sensitivity of internal measures, embedded losses, and shock and stress test impact on IRRBB.

PwC recommends that banks regularly review their model assumptions, intrinsic risks and options in products, and stress test and reverse stress test scenarios in consideration with their risk appetite, market trend and business forecasts.



1.8. Data and measurement systems

Measurement systems and data integrity are of utmost importance for accurate and timely measurement of IRRBB. Due to increasing balance sheet sizes, it becomes more important for banks to ensure that all inputs are validated before processing begins.

Banks should focus on the areas below to enhance their IRRBB framework:

- Clearly defined and extensive policies and a robust governance structure
- Accurate and appropriate measurement system and data
- Internal system capable of computing IRRBB measures
- Consideration of a variety of quantification methodologies
- Consideration of all interest rate-sensitive products, currencies, behaviour options and cash flows
- A robust validation framework and updated documentation
- Model risk management (MRM)
- Accurate, timely and detailed management information system (MIS)
- Internal audit of IRRBB models and procedures

PwC's observations:

A complete balance sheet with correct information is the base for correct IRRBB computation. The regulator expects banks to have all interest-sensitive instruments with proper details, key behaviour assumptions, correctly interpolated market data and shock scenarios as input to the model. Along with inputs, the output of the model depends on its internal logic. Hence, a proper validation framework, model risk management, regular review and enhancement are needed. Banks can't rely on one method of computation and need to consider multiple options.

PwC recommends that banks have dedicated teams to ensure that the various components of the IRRBB framework (data, assumptions, scenarios, models and documentation) are complete and up to date. The assumptions and model should reflect the latest market condition. The system should be robust enough to identify leakages, wrong outputs and help the bank take corrective actions at the earliest.

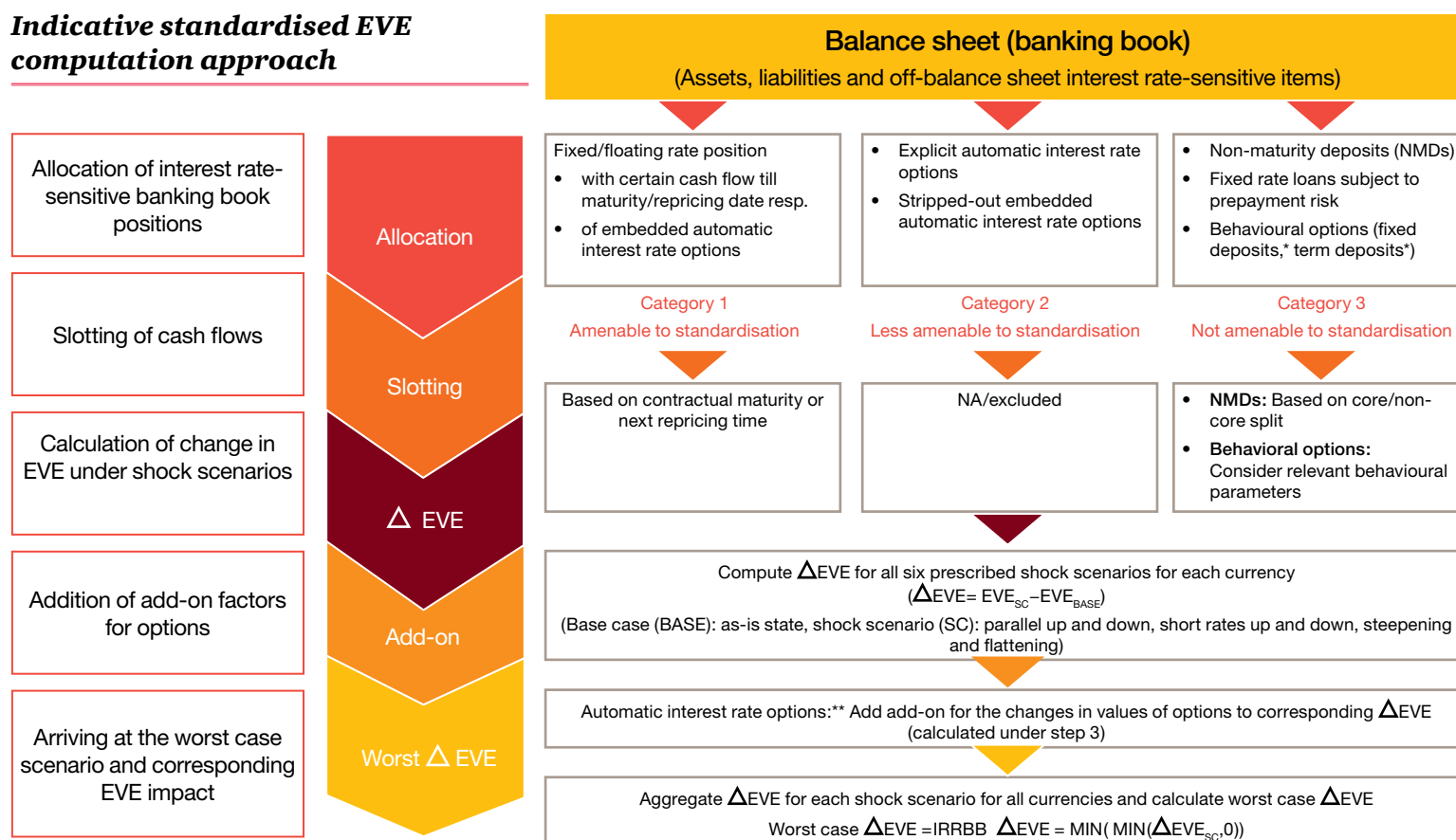


1.9. Standardised framework

Banks which are not able to estimate behavioural patterns related to products with optionality are required to follow the standardised framework approach.

Below is the indicative five-step methodology for EVE computation:

Indicative standardised EVE computation approach



*Fixed deposits subject to prepayment risk, term deposits subject to early redemption risk

**Automatic interest rate options sold are subject to full revaluation (net of automatic interest rate options bought to hedge sold interest rate options wherever permitted or possible) under each shock scenario/currency

PwC's observations:

The standardised approach needs to be followed if a bank is unable to estimate behavioural patterns for such products and place them into appropriate buckets. The practice is commonly used by banks globally and assists them in reaching core and non-core split and corresponding lives easily. Globally, regulators are pushing banks to follow the standardised framework approach.

PwC recommends that banks have at least 10 years of required data available for trend analysis of each class of behaviour product. Banks should use statistical models and review the results at least biannually. They should also provide higher weightage to the latest data. This will result in core/non-core split in line with current customer behaviour.

Questions?

PwC clients who have questions about this In depth should contact their engagement partner. Engagement teams who have questions should contact the Financial Risk & Regulations (FRR) Team.



Kuntal Sur

Partner, FRR

Email: kuntal.sur@pwc.com



Mohit Gulati

Manager, FRR

Email: mohit.gulati@pwc.com



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