INTEREST RATE RISK IN THE BANKING BOOK MODULE

Central Bank of Bahrain Rulebook	Volume 1: Conventional Banks

MODULE	**IR:**	**Interest Rate Risk in the Banking Book**
CHAPTER	**IR-A:**	**Introduction**

IR-A.1   Purpose

Executive Summary

IR-A.1.1   The Interest Rate Risk in the Banking Book ('IRRBB') Module sets out the Central Bank of Bahrain's ('CBB's') Directives and guidance to conventional banks operating in Bahrain relating to the overall management of IRRBB. Specifically, the Module sets out sound practices that banks need to establish in managing IRRBB, as well as a prescribed methodology to determine the IRRBB.

IR-A.1.2   This Module must be read in conjunction with other parts of the Rulebook, mainly:

(a)   High-level Controls;
(b)   Capital Adequacy;
(c)   Liquidity Risk;
(d)   Operational Risk;
(e)   Reputational Risk
(f)   Credit Risk;
(g)   Stress Testing; and
(h)   Internal Capital Adequacy Assessment Process ('ICAAP').

Legal Basis

IR-A.1.3   **This Module contains the CBB's Directive, as amended from time-to-time, relating to the management of IRRBB and is issued under the powers available to the CBB under Article 38 of the Central Bank of Bahrain and Financial Institutions Law 2006 ('CBB Law').**

IR-A.1.4   For an explanation of the CBB's rule-making powers and different regulatory instruments, see Section UG-1.1.

IR-A.2 Module History

IR-A.2.1 This Module was first issued in DATE 2024 as part of Volume 1 of the CBB Rulebook. Any material changes that have subsequently been made to this Module are annotated with the calendar quarter date in which the change was made. Chapter UG-3 provides further details on Rulebook maintenance and version control.

IR-A.2.1 The most recent changes made to this Module are detailed in the table below:

Summary of Changes

Module Ref.	Change Date	Description of Changes

Evolution of the Module

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MODULE	**IR:**	**Interest Rate Risk in the Banking Book**
CHAPTER	**IR-1:**	**General Requirements**

IR-1.1 Scope of Application

IR-1.1.1 IRRBB refers to the current or prospective risk to the capital and earnings arising from adverse movements in interest rates that affect banking book positions. IRRBB arises because interest rates can vary significantly over time, while the business of banking typically involves intermediation activity that produces exposures to maturity mismatches and fixed-variable rate mismatches of assets and liabilities. 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, as such, its economic value. Changes in interest rates also affect earnings by altering interest rate-sensitive income and expenses, affecting its net interest income. Excessive IRRBB can pose a significant threat to a bank's current capital base or future earnings if not managed appropriately.

IR-1.1.2 **This Module is applicable to all Bahraini conventional bank licensees. However, the standardised approach for computing the impact of interest rate shocks on the economic value of equity (ΔEVE) in accordance with Chapter 2 and Appendix A is only applicable to licensees identified by the CBB as those requiring to comply with those requirements. All other licensees must, however, implement a policy and a methodology for assessing and quantifying IRRBB risk (ΔEVE and net interest impact (NII)) on the basis of a simplified approach for the purposes of their ICAAP. Such policy must be documented and agreed with the CBB.**

IR-1.1.3 Branches of foreign banks are expected to satisfy the CBB that their exposure to IRRBB is managed in accordance with sound principles consistent with the BCBS standards at their head office or relevant regional offices.

IR-1.2 Management of IRRBB

IR-1.2.1   **Bahraini conventional bank licensees must ensure that IRRBB is subject to Board and Senior management oversight. Licensees must ensure that appropriate policies and procedures are established.**

IR-1.2.2   **Bahraini conventional bank licensees must ensure that the policies and procedures for the identification, measurement, and management of IRRBB include the following:**

(a)   **Risk appetite levels and limits for IRRBB exposures;**

(b)   **Methodology and process to identify, measure and monitor IRRBB, valuing positions and assessing performance, including procedures for updating interest rate shock and stress scenarios, and key underlying assumptions driving the institution's IRRBB analysis;**

(c)   **The roles and responsibilities of Board, Senior management, treasury, head of management and specialised committees if any;**

(d)   **The need to revise the policies and procedures when there are material changes in the risk profile of the licensee; and**

(e)   **Senior management and Board level reporting of IRRBB exposures and the review process.**

IR-1.2.3   Licensees should establish processes and systems to ensure that positions that exceed or are likely to exceed limits defined by the risk appetite statement approved by the Board or its delegates receive prompt management attention. Licensees should ensure that the relevant personnel meet regularly to review the exposure positions, adherence to risk appetite, operational limits and policies; and report to the Board and / or ALCO on the level and trends of the licensee's IRRBB exposures to allow the Board to understand and assess IRRBB risk. The policy should be clear on who will be informed, how the communication will take place and what actions will be taken in the case of exceptions.

IR-1.2.4   Licensees consider interest rate risk arising from new services or strategies and determine the approach to balancing cash flows. Major hedging or risk management initiatives relating to IRRBB should be approved by and or notified to the Board, as appropriate.

IR-1.2.5   **The limits must be consistent with the licensee's underlying approach to interest rate risk measurement, and must be directed at how reported earnings and capital adequacy might be affected by changes in market interest rates. When measuring the impact of IRRBB on earnings, licensees must consider setting limits on earnings volatility in both net income and net interest income under specified interest rate scenarios, so as to quantify which portion of their interest rate risk exposure arises from non-interest income.**

IR-1.2 Management of IRRBB (continued)

IR-1.2.6 The limit setting process should consider the following:

a) Limits should be appropriate to the nature, size, complexity and capital adequacy and liquidity measures of the licensee,

b) Sub-limits may also be identified for individual business units, portfolios, instrument types or specific instruments;

c) Limits on the extent to which the floating rate exposures are funded by fixed rate sources and vice versa;

d) In the case of floating rate lending, licensees must limit the extent to which they run any basis risk that may arise if lending and funding are not based on precisely the same market interest rate; and

e) Hedging strategies including the need to control mark-to-market risks in instruments that are accounted for at market value, for example, IRS.

IR-1.2.7 **Bahraini conventional bank licensees must ensure processes have been established to ensure that positions that exceed, or are likely to exceed, limits approved by the Board must receive prompt management attention and be escalated without delay. There must be a clear policy on who will be informed, how the communication will take place and the actions which will be taken in response to an exception.**

Stress testing

IR-1.2.8 **Bahraini conventional bank licensees must measure their vulnerability to loss under stressed market conditions, including the breakdown of key assumptions, and consider those results when establishing and reviewing their policies and limits for IRRBB. IRRBB stress testing must be considered in the ICAAP, to undertake rigorous, forward-looking stress testing that identifies events of severe changes in market conditions, which could adversely affect the licensee's capital or earnings, possibly also through changes in the behaviour of its customer base.**

IR-1.2.9 Licensees should develop internal interest rate shocks and stress scenarios within their measurement systems, and should consider:

(a) Use a variety of methodologies to quantify IRRBB exposures ranging from simple calculations based on static simulations using current holdings, to more sophisticated dynamic modelling techniques that reflect potential future business activities;

(b) Ability of the licensee's management information system to retrieve accurate IRRBB information in a timely manner and captures interest rate risk data on all the material IRRBB exposures;

(c) Use data inputs that are automated as much as possible, to reduce administrative errors; and

(d) Where cash flows are slotted into different time buckets or assigned to different vertex points to reflect the different tenors of the interest rate curve, the slotting criteria is stable over time to allow for a meaningful comparison of risk figures over different periods.

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CHAPTER	**IR-1:**	**General Requirements**

IR-1.2 Management of IRRBB (continued)

IR-1.2.10   <u>**Bahraini conventional bank licensees**</u> **with significant[1] multi-currency exposures, must include, in their internal measurement systems, methods to aggregate their IRRBB in different currencies using assumptions about the correlation between interest rates in different currencies.**

IR-1.2.11   <u>Licensees</u> should determine, by currency, a range of potential interest rate movements against which they will measure their IRRBB exposures. Management should ensure that risk is measured under a reasonable range of potential interest rate scenarios, including some containing severe stress elements. In developing the scenarios, <u>licensees</u> should consider a variety of factors, such as the shape and level of the current term structure of interest rates and the historical and implied volatility of interest rates. In low interest rate environments, <u>licensees</u> should also consider negative interest rate scenarios and the possibility of asymmetrical effects of negative interest rates on their assets and liabilities.

Internal Reporting

IR-1.2.12   **Management must regularly report to the Board or its delegates:**
   (a) **A summary of the bank's aggregate IRRBB exposures and explanatory text that highlights the assets, liabilities, cash flows, and strategies that are driving the level and direction of IRRBB;**
   (b) **Reports demonstrating the bank's compliance with policies and limits;**
   (c) **Key modelling assumptions, such as non-maturing deposits characteristics, prepayments on fixed rate loans, or early redemption of term deposits;**
   (d) **Results of stress tests, including assessment of sensitivity to key assumptions and parameters; and**
   (e) **Summary of any reviews of IRRBB policies, procedures and adequacy of the measurement systems, including any findings of internal and external auditors or other equivalent external entities (such as consultants).**

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[1] A currency is considered significant if the aggregate liabilities (both on and off-balance sheet) in that currency amount to 5 % or more of the bank's aggregate liabilities (both on and off-balance sheet) in all currencies.

IR-1.3   Capital Adequacy

IR-1.3.1   **Bahraini conventional bank licensees must evaluate the level of capital that they must hold to cover IRRBB and its related risks (both, on 'solo' and 'consolidated' basis) as part of their ICAAP, and in line with their risk appetite.**

IR-1.3.2   For aggregation of exposures from foreign subsidiaries and / or branches the licensees should consider the behaviour of assets and liabilities of each individual entity when computing impact on EVE and NII.

IR-1.3.3   The computation of capital charge, if any, towards IRRBB for the purposes of ICAAP should be based on the bank's internal measurement models and outputs taking account of key assumptions and risk limits.

IR-1.3.4   **Bahraini conventional bank licensees must assess and compute the level of pillar 2 capital required to cover IRRBB, at least on a biannual basis and submit the results to CBB as part of the stress testing / ICAAP report required under Module ST, Paragraph ST-1.7.4.**

IR-1.3.5   **Bahraini conventional bank licensees must notify the CBB as soon as their IRRBB leads to an ΔEVE of more than 15% of their Tier 1 Capital (computed on solo and consolidated) as a result of applying one of the six standardised interest rate shocks.**

IR-1.3.6   Capital adequacy for IRRBB should be considered in relation to the risks to economic value, given that such risks are embedded in the bank's assets, liabilities and off-balance sheet items. For risks to future earnings, given the possibility that future earnings may be lower than expected, licensees should consider capital buffers for IRRBB.

IR-1.3.7   Capital adequacy assessments for IRRBB should factor in:
(a)   The size and tenor of internal limits on IRRBB exposures, and whether these limits are reached at the point of capital calculation;
(b)   The effectiveness and expected cost of hedging open positions that are intended to take advantage of internal expectations of the future level of interest rates;
(c)   The sensitivity of the internal measures of IRRBB to key modelling assumptions, including embedded optionality;
(d)   The impact of shock and stress scenarios on positions priced off different interest rate indices (basis risk);
(e)   The impact on economic value and net interest income of mismatched positions in different currencies;
(f)   The impact of embedded losses;
(g)   The distribution of capital relative to risks across legal entities that form part of a capital consolidation group, in addition to the adequacy of overall capital on a consolidated basis;
(h)   The drivers of the underlying risk; and
(i)   The circumstances under which the risk might evolve.

IR- 1.4   Validation Framework

IR-1.4.1   <u>Bahraini conventional bank licensees</u> must establish a model governance policy which ensures that the IRRBB measurement models are subject to internal or external independent validation and reporting. The policy must specify the management roles and designate who is responsible for the development, implementation, oversight and use of the IRRBB models and for any material changes to the input/output or other parameters of the models.

IR-1.4.2   An effective validation framework must include, but not be limited to the following three core elements:

(a)   Evaluation of conceptual/methodological soundness, including developmental evidence;

(b)   Ongoing model monitoring, including process verification and benchmarking; and

(c)   Outcomes analysis, including backtesting of key internal parameters (e.g. stability of deposits, prepayments, early redemptions, pricing of instruments).

IR-1.4.3   <u>Bahraini conventional bank licensees</u> must ensure that the independent review undertaken in accordance with Paragraphs HC-3.5.8(f), addresses the applicable requirements within Module IR.

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MODULE	IR:	Interest Rate Risk in the Banking Book
CHAPTER	IR-2:	Risk Management, Monitoring and Control

IR-2.1 Measurement of IRRBB

IR-2.1.1 **Bahraini conventional bank licensees must measure the impact of IRRBB and capture all material sources of such risk. The IRRBB measures must evaluate the potential impact of interest rate shocks and stress scenarios on its earnings and economic value accurately, and within the context and complexity of their activities in conformity with the guidance in Appendix A.**

IR-2.1.2 IRRBB has three main sub-types that may impact capital or earnings:

(a) *'Gap risk'* arises from the term structure of banking book instruments, and describes the risk arising from the timing of instruments' rate changes. The extent of gap risk depends on whether changes to the term structure of interest rates occur consistently across the yield curve (parallel risk), or differentially by period (non-parallel risk);

(b) *'Basis risk'* describes the impact of relative changes in interest rates for financial instruments that have similar tenors, but are priced using different interest rate indices; and

(c) *'Option risk'* arises from option derivative positions, or from optional elements embedded in the bank's assets, liabilities and off-balance sheet items, where the bank, or its customer, can alter the level and timing of their cash flows. Option risk can be further characterised into automatic option risk and behavioural option risk.

All the three sub-types of IRRBB can potentially change the price/value or earnings/costs of interest rate-sensitive assets, liabilities and/or off balance sheet items in a way, or at a time, that can adversely affect a bank's financial condition.

IR-2.1.3 In addition, licensees should monitor and assess Credit Spread Risk in the Banking Book ('CSRBB'), which refers to any kind of asset or liability spread risk of credit-risky instruments that is not explained by the IRRBB and by the expected credit/jump to default risk.

IR-2.1.4 **Bahraini conventional bank licensees must calculate the impact on earnings and economic value through multiple scenarios, based on:**
(a) Internally-selected interest rate shock scenario addressing the bank's risk profile, according to its ICAAP;
(b) Historical and hypothetical interest rate stress scenarios, which tend to be more severe than shock scenarios;
(c) Changes in yields of 200 basis points applied to the following six interest rate shock scenarios:
(i) Parallel shock up;
(ii) Parallel shock down;
(iii) Steepener shock (short rates down and long rates up);
(iv) Flattener shock (short rates up and long rates down);

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IR-2.1 Measurement of IRRBB (Continued)

      (v)   Short rates shock up;

      (vi)   Short rates shock down; and

(d)   Any additional interest rate shock scenarios required by the CBB.

Earnings-based Measures

IR-2.1.5   Bahraini conventional bank licensees must measure the impact of IRRBB on earnings over a short to medium-term horizon (typically 1 to 3 years, and no more than 5 years), to limit the cumulative impact of the underlying assumptions and the complexity of the calculations, and to assess the ability of the bank to generate stable earnings over a medium-term horizon, which will allow it to pay a stable level of dividend and reduce the beta on its equity price and, therefore, reduce its cost of capital.

IR-2.1.6   Bahraini conventional bank licensees must compute the impact of IRRBB on net interest income on the following basis:

(a)   Determine expected cash flows (including commercial margins and other spread components) arising from all interest rate-sensitive assets, liabilities and off-balance sheet items in the banking book; and

(b)   Compute net interest income assuming a constant balance sheet, where maturing or repricing cash flows are replaced by new cash flows with identical features relating to the amount, repricing period and spread components.

IR-2.1.7   Bahraini conventional bank licensees must compute the impact of IRRBB on net interest income on the following basis:

(a)   Exclude their own equity from the computation of the exposure level;

(b)   Include all cash flows from all interest rate-sensitive assets, liabilities and off-balance sheet items in the banking book to compute the level of their exposure. Licensees must disclose whether they have excluded or included commercial margins and other spread components in their cash flows;

(c)   Cash flows must be discounted using either a risk-free rate, or a risk-free rate including commercial margins and other spread components (only if the bank has included commercial margins and other spread components in its cash flows).

(d)   Licensees must disclose whether they have discounted their cash flows using a risk-free rate, or a risk-free rate including commercial margins and other spread components; and

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IR-2.1 Measurement of IRRBB (Continued)

(e) Change in economic value must be computed with the assumption of a run-off balance sheet, where existing banking book positions amortize and are not replaced by any new business.

IR-2.1.8 Net interest income must be disclosed as the difference in future interest income over a rolling 12-month period.

Change in Economic Value

IR-2.1.9 Bahraini conventional bank licensees must adopt the standardised approach (Refer to Appendix A for the standardised approach framework) to determine the impact on capital as their internal measurement system.

IR-2.1.10 Bahraini conventional bank licensees should consider the nature and sources of its IRRBB exposures, the time it would need to take action to reduce or unwind unfavourable IRRBB exposures, and its capability/willingness to withstand accounting losses in order to reposition its risk profile. Licensees should select scenarios that provide meaningful estimates of risk and include a range of shocks that are sufficiently wide to allow the Board to understand the risk inherent in the banks' products and activities. When developing interest rate shock and stress scenarios for IRRBB, licensees should consider the following:

(a) Scenarios should be sufficiently wide-ranging to identify parallel and non-parallel gap risk, basis risk and option risk. In many cases, static interest rate shocks may be insufficient to assess IRRBB exposure adequately. Licensees should ensure that the scenarios are both severe and plausible, in light of the existing level of interest rates and the interest rate cycle;

(b) Special consideration should be given to instruments or markets where concentrations exist, because those positions may be more difficult to liquidate or offset in a stressful market environment;

(c) Licensees should assess the possible interaction of IRRBB with its related risks, as well as other risks (e.g. credit risk, liquidity risk);

(d) Licensees should assess the effect of adverse changes in the spreads of new assets/liabilities, replacing those assets/liabilities maturing over the horizon of the forecast on their net interest income;

(e) Licensees with significant option risk should include scenarios that capture the exercise of such options; and

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IR-2.1 Measurement of IRRBB (Continued)

(f) <u>Licensees</u> should specify, in building their interest rate shock and stress scenarios, the term structure of interest rates that will be incorporated, and the basis relationship between yield curves, rate indices etc. <u>Licensees</u> should also estimate how interest rates that are administered or managed by management (e.g. prime rates or retail deposit rates, as opposed to those that are purely market-driven) might change. Management should document how these assumptions are derived.

IR-2.1.11 Forward-looking scenarios must incorporate changes in portfolio composition due to factors under the control of the bank (e.g. the bank's acquisition and production plans) as well as external factors (e.g. changing competitive, legal or tax environments); new products where only limited historical data are available; new market information and new emerging risks that are not necessarily covered by historical stress episodes.

IR-2.1.12 <u>Bahraini conventional bank licensees</u> must perform qualitative and quantitative reverse stress tests in order to:
(a) Identify interest rate scenarios that could severely threaten a bank's capital and earnings; and
(b) Reveal vulnerabilities arising from its hedging strategies and the potential behavioural reactions of its customers.

Behavioural and Modelling Assumptions

IR-2.1.13 When assessing its IRRBB exposures, <u>licensees</u> should make judgments and assumptions about how an instrument's actual maturity, value or repricing behaviour may vary from the instrument's contractual terms because of embedded behavioural optionality. Common products with behavioural optionality include:
(a) Fixed rate loans subject to prepayment risk – <u>licensees</u> should understand the nature of prepayment risk for their portfolios and make reasonable and prudent estimates of the expected prepayments. The assumptions underlying the estimates and where prepayment penalties or other contractual features affect the embedded optionality effect, should be documented. There are several factors that are important determinants of the bank's estimate of the effect of each interest rate shock and stress scenario on the average prepayment speed. Specifically, <u>licensees</u> should assess the expected average prepayment speed under each scenario;
(b) Fixed rate loan commitments – <u>licensees</u> may include in some instruments, sell options to retail customers (e.g. prospective mortgage buyers or renewers) where, for a limited period, the customers can choose to draw down a loan at a committed rate;

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CHAPTER	IR-2:	Risk Management, Monitoring and Control

IR-2.1 Measurement of IRRBB (Continued)

(c) Term deposits subject to early redemption risk – <u>licensees</u> may attract deposits with a contractual maturity term, or with step-up clauses that enable the depositor, at different time periods, to modify the speed of redemption. The classification scheme should be documented, whether a term deposit is deemed to be subject to redemption penalties, or to other contractual features that preserve the cash flow profile of the instrument; and

(d) Non-maturing deposits ('NMDs') – behavioural assumptions for deposits that have no specific repricing date can be a major determinant of IRRBB exposures under the economic value and earnings-based measures. <u>Licensees</u> should document, monitor and regularly update key assumptions for NMD balances and behaviour used in their internal measurement system. To determine the appropriate assumptions for its NMDs, a bank should analyse its depositor base in order to identify the proportion of core deposits (i.e. NMDs which are unlikely to reprice even under significant changes in the interest rate environment). Assumptions should vary according to depositor characteristics (e.g. retail/wholesale) and account characteristics (e.g. transactional/non-transactional).

IR-2.1.14 **Modelling assumptions must be comprehensive, conceptually sound and reasonable, and consistent with historical experience. <u>Licensees</u> must carefully consider how the exercise of the behavioural optionality will vary, not only under the interest rate shock and stress scenario, but also across other dimensions, for example, considering certain product concentration.**

IR-2.1.15 <u>Licensees</u> with positions denominated in different currencies can expose themselves to IRRBB in each of those currencies. Since yield curves vary from currency to currency, <u>licensees</u> generally need to assess exposures in each currency. <u>Licensees</u> with the necessary skills and sophistication, and with significant multicurrency exposures should include in their IMS, methods to aggregate their IRRBB in different currencies using assumptions about the correlation between interest rates in different currencies.

IR-2.1.16 <u>Licensees</u> should consider the materiality of the impact of behavioural optionalities within floating rate loans. For instance, the behaviour of prepayments arising from embedded caps and floors could impact the <u>licensees</u>' economic value of equity.

IR-2.1.17 **Changes to the assumptions of key parameters must be documented and the most significant assumptions underlying the system must be documented and clearly understood by the Board or its delegates. Documentation must also include descriptions on how those assumptions could potentially affect the bank's hedging strategies.**

IR-2.1.18 **<u>Bahraini conventional bank licensees</u> must review significant measurement assumptions, on an annual basis at least, and, more frequently, during rapidly-changing market conditions.**

MODULE	IR:	Interest Rate Risk in the Banking Book
CHAPTER	IR-3:	General Disclosure Requirements

IR-3.1 General Disclosure Requirements

IR-3.1.1 <u>Bahraini conventional bank licensees</u> must on an annual basis disclose their IRRBB measurement and qualitative information concurrently with the publication of their year-end financial statements. <u>Licensees</u> must also make previous IRRBB reports available on their websites.

IR-3.1.2 <u>Bahraini conventional bank licensees</u> must disclose the measured ΔEVE and ΔNII under the prescribed interest rate shock scenarios set out in Annexure 1 of Appendix A. Disclosure must be in the format of Tables 1 and 2 (Appendix B). As well as providing quantitative disclosure, <u>Licensees</u> must provide sufficient qualitative information and supporting detail to enable the market and wider public to:
(a) monitor the sensitivity of the bank's economic value and earnings to changes in interest rates;
(b) understand the primary assumptions underlying the measurement produced by the bank's internal measurement system; and
(c) have an insight into the bank's overall IRRBB objective and IRRBB management.

IR-3.1.3 <u>Bahraini conventional bank licensees</u> must calculate their exposures for disclosures on the following basis:
(a) ΔEVE
    (i) <u>Licensees</u> must exclude their own equity from the computation of the exposure level.
    (ii) <u>Licensees</u> must include all cash flows from all interest rate-sensitive assets[2], liabilities and off-balance sheet items in the banking book in the computation of their exposure. <u>Licensees</u> should disclose whether they have excluded or included commercial margins and other spread components in their cash flows.
    (iii) Cash flows must be discounted using either a risk-free rate[3] or a risk-free rate including commercial margins and other spread components (only if the bank has included commercial margins and other spread components in its cash flows). <u>Licensees</u> must disclose whether they have discounted their cash flows using a risk-free rate or a risk-

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[2] Interest rate-sensitive assets are assets which are not deducted from Common Equity Tier 1 (CET1) capital and which exclude (i) fixed assets such as real estate or intangible assets as well as (ii) equity exposures in the banking book.

[3] The discounting factors must be representative of a risk-free zero coupon rate. An example of an acceptable yield curve is a secured interest rate swap curve.

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CHAPTER	**IR-3:**	**General Disclosure Requirements**

IR-3.1 General Disclosure Requirements (Continued)

      (iv) free rate including commercial margins and other spread components.

      (v) ΔEVE should be computed with the assumption of a run-off balance sheet, where existing banking book positions amortise and are not replaced by any new business.

    (b) ΔNII

      (i) <u>Licensees</u> must include expected cash flows (including commercial margins and other spread components) arising from all interest rate-sensitive assets, liabilities and off-balance sheet items in the banking book.

      (ii) ΔNII must be computed assuming a constant balance sheet, where maturing or repricing cash flows are replaced by new cash flows with identical features with regard to the amount, repricing period and spread components.

      (iii) ΔNII must be disclosed as the difference in future interest income over a rolling 12-month period.

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CHAPTER	IR-3:	Appendix A: The Standardised Framework

Appendix A: The Standardised Approach

Overview

The standardised framework derives an economic value of equity ('EVE') risk measure for IRRBB. It estimates the amount by which the net present value ('NPV') of the cash flows arising from a bank's on- and off-balance sheet positions under the prevailing term structure of interest rates changes under different future interest rate scenarios. The bank's exposure to IRRBB is equal to the largest negative change in EVE (ΔEVE) across all scenarios – in essence, the theoretical risk to the economic value of a bank's equity from a change in interest rates.

1. Overall Structure of the Standardised Framework

The steps involved in measuring a bank's IRRBB, based solely on EVE, are:

(a)   Stage 1. Interest rate-sensitive banking book positions are allocated to one of three categories (i.e. amenable, less amenable and not amenable to standardisation).

(b)   Stage 2. Determination of slotting of cash flows based on repricing maturities: This is a straightforward translation for positions amenable to standardisation. For positions less amenable to standardisation, they are excluded from this step. For positions with embedded automatic interest rate options, the optionality should be ignored for the purpose of slotting of notional repricing cash flows.

For positions that are not amenable to standardisation, there is a separate treatment for:

(i)   Non Maturing Deposits (NMDs) – according to separation of core and non-core cash flows via the cash slotting approach.

(ii)   Behavioural options (fixed rate loans subject to prepayment risk and term deposits subject to early redemption risk).

(c)   Stage 3. Determination of ΔEVE for relevant interest rate shock scenarios for each currency: The ΔEVE is measured per currency for all six prescribed interest rate shock scenarios.

(d)   Stage 4. Add-ons for changes in the value of automatic interest rate options (whether explicit or embedded) are added to the EVE changes: Automatic interest rate options sold are subject to full revaluation (possibly net of automatic interest rate options bought to hedge sold interest rate options) under each of the six prescribed interest rate shock scenarios for each currency. Changes in values of options are then added to the changes in the EVE measure under each interest rate shock scenario on a per currency basis.

(e)   Stage 5. IRRBB EVE calculation: The ΔEVE under the standardised framework will be the maximum of the worst aggregated reductions to EVE across the six interest rate shocks prescribed by the CBB. Refer to IR-2.1.2 of the IR module for details of the six interest rate shocks prescribed.

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CHAPTER	IR-3:	Appendix A: The Standardised Framework

Appendix A: The Standardised Framework (Continued)

2. Components of the Standardised Framework

Cash Flow Bucketing

Banks must project all future notional repricing cash flows arising from interest rate-sensitive:
(a)   Assets, which are not deducted from Common Equity Tier 1 ('CET1') capital and which exclude (i) fixed assets, such as real estate or intangible assets and (ii) equity exposures in the banking book;
(b)   Liabilities (including all non-remunerated deposits), other than CET1 capital under the Basel III framework; and
(c)   Off-balance sheet items;

Onto (i) 19 predefined time buckets (indexed numerically by k) as set out in Table 1, into which they fall according to their repricing dates, or onto (ii) the time bucket midpoints as set out in Table 1, retaining the notional repricing cash flows' maturity. Alternatively, (ii) requires splitting-up notional repricing cash flows between two adjacent maturity bucket midpoints.

A notional repricing cash flow $CF(k)$ is defined as:
(a)   Any repayment of principal (e.g. at contractual maturity);
(b)   Any repricing of principal; repricing is said to occur at the earliest date at which either the bank or its counterparty is entitled to unilaterally change the interest rate, or at which the rate on a floating rate instrument changes automatically in response to a change in an external benchmark; or
(c)   Any interest payment on a tranche of principal that has not yet been repaid or repriced; spread components of interest payments on a tranche of principal that has not yet been repaid and which do not reprice must be slotted until their contractual maturity, irrespective of whether the non-amortized principal has been repriced or not.
    The date of each repayment, repricing or interest payment is referred to as its repricing date.

Banks have the choice of whether to deduct commercial margins and other spread components from the notional repricing cash flows, using a prudent and transparent methodology.

Floating rate instruments are assumed to reprice fully at the first reset date. As such, the entire principal amount is slotted into the bucket in which that date falls, with no additional slotting of notional repricing cash flows to later time buckets or time bucket midpoints (other than the spread component which is not repriced).

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Table 1. The maturity schedule with 19 time buckets for notional repricing cash flows repricing at t^{CF}. The number in brackets is the time bucket's midpoint							
	Time bucket intervals (M: months; Y: years)						
Short-term rates	Overnight (0.0028Y)	O/N< t^{CF} ≦1M (0.0417Y)	1M< t^{CF} ≦3M (0.1667Y)	3M< t^{CF} ≦6M (0.375Y)	6M< t^{CF} ≦9M (0.625Y)	9M< t^{CF} ≦1Y (0.875Y)	1Y< t^{CF} ≦1.5Y (1.25Y)	1.5Y< t^{CF} ≦2Y (1.75Y)
Medium-term rates	2Y< t^{CF} ≦3Y (2.5Y)	3Y< t^{CF} ≦4Y (3.5Y)	4Y < t^{CF} ≦ 5Y (4.5Y)	5Y< t^{CF} ≦6Y (5.5Y)	6Y< t^{CF} ≦7Y (6.5Y)			
Long-term rates	7Y< t^{CF} ≦8Y (7.5Y)	8Y < t^{CF} ≦ 9Y (8.5Y)	9Y < t^{CF} ≦ 10Y (9.5Y)	10Y< t^{CF} ≦ 15Y (12.5Y)	15Y< t^{CF} ≦ 20Y (17.5Y)	t^{CF} > 20Y (25Y)		

Process for Slotting and Decomposing Banking Book Instruments

All notional repricing cash flows associated with interest rate-sensitive assets, liabilities and off-balance sheet items, for each currency, are allocated to the prescribed time buckets or time bucket midpoints (henceforth, denoted by $CF_{i,c}(k)$ or $CF_{i,c}(t_k)$ under interest rate shock scenario i and currency cc) based on their amenability to standardization.

Process for Positions that are Amenable to Standardisation

Notional repricing cash flows can be slotted into appropriate time buckets or time bucket midpoints based on their contractual maturity, if subject to fixed coupons, or into the next repricing period if coupons are floating. Positions amenable to standardisation fall into two categories:

(a) Fixed rate positions: Such positions generate cash flows that are certain till the point of contractual maturity. Examples are fixed rate loans without embedded prepayment options, term deposits without redemption risk and other amortizing products such as mortgage loans. All coupon cash flows and periodic or final principal repayments should be allocated to the time bucket midpoints closest to the contractual maturity.

(b) Floating rate positions: Such positions generate cash flows that are not predictable past the next repricing date, other than that the present value would be reset to par. Accordingly, such instruments can be treated as a series of coupon payments until the next repricing and a par notional cash flow at the time bucket midpoint closest to the next reset date bucket.

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Positions amenable to standardisation include positions with embedded automatic interest rate options where the optionality (whether sold or bought) should be ignored for the purpose of slotting of notional repricing cash flows. That is, the stripped-out embedded automatic interest rate option must be treated together with explicit automatic interest rate options.

Process for Positions that are Less Amenable to Standardisation

For explicit automatic interest rate options, as well as embedded automatic interest rate options that are separated or stripped out from the bank's assets or liabilities (i.e. the host contract).

Process for Positions not Amenable to standardisation

Positions not amenable to standardisation include (i) NMDs, (ii) fixed rate loans subject to prepayment risk and (iii) term deposits subject to early redemption risk.

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3. Treatment of NMDs

Under the standardised framework, banks should first separate their NMDs according to the nature of the deposit and depositor. Banks should then identify, for each category, the core and non-core deposits, up to the limits specified in Table 2. Finally, banks should determine an appropriate cash flow slotting for each category, in accordance with the average maturity limits specified in Table 2.

(a)   NMD Categories

NMDs must be segmented into retail and wholesale categories. Retail deposits are defined as deposits placed with a bank by an individual person. Deposits made by small business customers and managed as retail exposures are considered as having similar interest rate risk characteristics to retail accounts and, as such, can be treated as retail deposits (provided the total aggregated liabilities raised from one small business customer are less than BD 500,000).

Retail deposits should meet any of the following conditions:
(i)   They are held in a transactional account when regular transactions are carried out in that account (e.g. when salaries are regularly credited);
(ii)   The depositors have other established relationships[4] with the bank that make deposit withdrawal highly unlikely;
(iii) the deposit is non-interest bearing.

Other retail deposits should be considered as held in a non-transactional account. Deposits from legal entities, sole proprietorships or partnerships are captured in wholesale deposit categories.

(b)   Separation of NMDs

Banks should distinguish between the stable and the non-stable parts of each NMD category using observed volume changes over the past 10[5] years. The stable NMD portion is the portion that is found to remain undrawn with a high degree of likelihood. Core deposits are the proportion of stable NMDs, which are unlikely to reprice, even under significant changes in the interest rate environment. The remainder constitutes non-core NMDs.

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[4] An established relationship is deemed to exist between the depositor and the bank, if:
- The bank has an active contractual relationship with the depositor of at least 12 months duration;
- The depositor has a borrowing relationship with the bank for residential loans or other long-term loans; or
- The depositor has a minimum number of active products, other than loans, with the bank.

[5] Incase, 10 years daily data is not available, Banks can use available daily data below 10 years but shall start building its data in order to reach a minimum of 10 years observation period.

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Banks are required to estimate their level of core deposits using this two-step procedure for each deposit category, and then to aggregate the results to determine the overall volume of core deposits subject to imposed caps as shown in Table 2.

(c)   Cash Flow Slotting

NMDs should finally be slotted into the appropriate time bucket or time bucket midpoint. Non-core deposits should be considered as overnight deposits and, accordingly, should be placed into the shortest/overnight time bucket or time bucket midpoint.

Banks should determine an appropriate cash flow slotting procedure for each category of core deposits, up to the maximum average maturity per category as specified in Table 2.

Table 2. Caps on core deposits and average maturity by category		
	Cap on proportion of core deposits (%)	Cap on average maturity of core deposits (years)
Retail/transactional	90	5
Retail/non-transactional	70	4.5
Wholesale	50	4

Banks may refer to Appendix C for a sample "uniform slotting approach" to assist in the cash-flow slotting of core deposits and application of caps defined in Table 2.

4.   Treatment of Positions with Behavioural Options Other than NMDs

The treatment set out in this section applies only to behavioural options related to retail customers. Where a wholesale customer has a behavioural option that may change the pattern of notional repricing cash flows, such options must be included within the category of automatic interest rate options.

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Standardised Framework for Positions with Behavioural Options Other than NMDs

The standardised framework is applied to fixed rate loans subject to prepayments and term deposits subject to early redemption risk. In each case, the customer has an option, which, if exercised, will alter the timing of a bank's cash flows. The customer's exercise of the option is, among other factors, influenced by changes in interest rates. In the case of the fixed rate loan, the customer has an option to repay the loan early (i.e. prepay); and for a fixed-term deposit, the customer may have an option to withdraw their deposit before the scheduled date.

Under the standardised framework, the optionality in these products is estimated using a two-step approach. Firstly, baseline estimates of loan prepayments and early withdrawal of fixed-term deposits are calculated given the prevailing term structure of interest rates.

In the second stage, the baseline estimates are multiplied by scenario-dependent scalars that reflect the likely behavioural changes in the exercise of the options.

Fixed Rate Loans Subject to Prepayment Risk

Prepayments, or parts thereof, for which the economic cost is not charged to the borrower, are referred to as uncompensated prepayments. For loan products where the economic cost of prepayments is never charged, or charged only for prepayments above a certain threshold, the standardised framework for fixed rate loans subject to prepayments set out below, must be used to assign notional repricing cash flows.

Banks must determine the baseline conditional prepayment rate[6] ($CPR^p_{0,c}$) for each portfolio p of homogeneous prepayment-exposed loan products denominated in currency c, under the prevailing term structure of interest rates.

The CPR for each portfolio p of homogeneous prepayment-exposed loan products denominated in currency c, under interest rate scenario i, is given as:

$$CPR^p_{i,c} = \min(1, y_i \cdot CPR^p_{0,c})$$

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[6] Banks must determine the baseline conditional prepayment rate using historical data of at least 5 years. In case reliable historical data is not available, Banks can use data less than 5 years (as they build-up data) to identify the rate or apply a baseline conditional prepayment rate of 1%, which-ever is higher.

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Where $CPR^p_{o,c}$ is the (constant) base CPR of a portfolio pp of homogeneous prepayment-exposed loans given in currency c[21] and given the prevailing term structure of interest rates. γ_i is a multiplier applied for scenario i, as given in Table 3.

Prepayment speeds vary according to the interest rate shock scenario. The multipliers (γi) reflect the expectation that prepayments will generally be higher during periods of falling interest rates and lower during periods of rising interest rates.

Table 3. CPRs under the shock scenarios		
Scenario number (i)	Interest rate shock scenarios	γ_i (scenario multiplier)
1	Parallel up	0.8
2	Parallel down	1.2
3	Steepener	0.8
4	Flattener	1.2
5	Short rate up	0.8
6	Short rate down	1.2

The prepayments on the fixed rate loans must ultimately be reflected in the relevant cash flows (scheduled payments on the loans, prepayments and interest payments). These payments can be broken up into scheduled payments adjusted for prepayment and uncompensated prepayments:

$$CF^p_{i,c}(k) = CF^s_{i,c}(k) + CPR^p_{i,c} \cdot N^p_{i,c}(k-1)$$

Where $CF_{pi,c}(k)$ refers to the scheduled interest and principal repayment, and $N_{pi,c}(k-1)$ denotes the notional outstanding at time bucket $k–1$. The base cash flows (i.e. given the current interest rate yield curve and the base CPR) are given by $i=0$, while the interest rate shock scenarios are given for $i=1$ to 6.

Term Deposits Subject to Early Redemption Risk

Term deposits lock in a fixed rate for a fixed term and would usually be hedged on that basis. However, term deposits may be subject to the risk of early withdrawal, also called early redemption risk. Consequently, term deposits may only be treated as fixed rate liabilities and their notional repricing cash flows slotted into the time buckets or time bucket midpoints up to their corresponding contractual maturity dates if:

(a) The depositor has no legal right to withdraw the deposit; or

(b) An early withdrawal results in a significant penalty that, at least, compensates for the loss of interest between the date of withdrawal and the contractual maturity date, and the economic cost of breaking the contract.

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If neither of these conditions is met, the depositor holds an option to withdraw and the term deposits are deemed to be subject to early redemption risk. Furthermore, if a bank issues term deposits that do not meet the above criteria to wholesale customers, it must assume that the customer will always exercise the right to withdraw in the way that is most disadvantageous to the bank (i.e. the deposit is classified as an automatic interest rate option).

Banks must determine the baseline term deposit redemption ratio[7] $TDRR^p_{o,c}$ applicable to each homogeneous portfolio pp of term deposits in currency c and use it to slot the notional repricing cash flows. Term deposits which are expected to be redeemed early are slotted into the overnight time bucket ($k=1$) or time bucket midpoint (t_1).

The term deposit redemption ratio for time bucket k or time bucket midpoint t_k applicable to each homogeneous portfolio p of term deposits in currency c and under scenario i is obtained by multiplying $TDRR^p_{o,c}$ by a scalar u_i that depends on the scenario i, as follows:

$$TDRR^p_{i,c} = \min (1, u_i \cdot TDRR^p_{o,c})$$

Where the values of the scalars u_i are set out in Table 4.

Table 4. Term deposit redemption rate (TDRR) scalars under the shock scenarios		
Scenario number (i)	Interest rate shock scenarios	Scalar multipliers u_i
1	Parallel up	1.2
2	Parallel down	0.8
3	Steepener	0.8
4	Flattener	1.2
5	Short rate up	1.2
6	Short rate down	0.8

The notional repricing cash flows which are expected to be withdrawn early under any interest rate shock scenario i are described as:

$$CF^p_{i,c} (1) = TD^p_{o,c} \cdot TDRR^p_{i,c}$$

Where $TD^p_{o,c}$ is the outstanding amount of term deposits of type p.

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[7] Banks must determine the term deposit redemption ratio using historical data of at least 5 years. In case reliable historical data is not available, Banks can use data less than 5 years (as they build-up data) to identify the ratio or apply a term deposit redemption ratio of 1%, which-ever is higher.

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5. Automatic Interest Rate Options

This section describes the method for calculating an add-on for automatic interest rate options, whether explicit or embedded. This applies to sold automatic interest rate options. Banks have a choice to either include all bought automatic options or include only automatic options used for hedging sold automatic interest rate options:

(a)   For each sold automatic option o in currency c, the value change, denoted $\Delta FVAO^o_{i,c}$, is calculated for each interest rate shock scenario i. The value change is given by:

    (i)   An estimate of the value of the option to the option holder, given:

- A yield curve in currency c under the interest rate shock scenario i; and
- A relative increase in the implicit volatility of 25 percent;

    Minus:

    (ii)   The value of the sold option to the option holder, given the yield curve in currency c at the valuation date.

(b) Similarly, for each bought automatic interest rate option q, the bank must determine the change in value of the option between interest rate shock scenario i and the current interest rate term structure combined with a relative increase in the implicit volatility of 25percent. This is denoted as $\Delta FVAO^q_{i,c}$.

(c) The bank's total measure for automatic interest rate option risk under interest rate shock scenario i in currency c is calculated as:

$$KAO_{i,c} = \sum_{o=1}^{n_c} \Delta FVAO^o_{i,c} - \sum_{q=1}^{m_c} \Delta FVAO^q_{i,c}$$

Where n_c (m_c) is the number of sold (bought) options in currency c.

If the bank chooses to only include bought automatic interest rate options that are used for hedging sold automatic interest rate options, the bank must, for the remaining bought options, add any changes in market values reflected in the regulatory capital measure of the respective capital ratio (i.e. CET1, AT1 or total capital) to the total automatic interest rate option risk measure $KAO_{i,c}$.

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6. Calculation of the Standardised EVE risk measure

First, the loss in economic value of equity $\Delta EVE_{i,c}$ under scenario i and currency c is calculated for each currency with significant exposures, i.e. those accounting for more than 5 percent of either banking book assets or liabilities, as follows:

(a) Under each scenario i, all notional repricing cash flows are slotted into the respective time bucket $k \in \{1,2,\ldots,K\}$ or time bucket midpoint $t_k, k \in \{1,2,\ldots,K\}$. Within a given time bucket kk or time bucket midpoint t_k, all positive and negative notional repricing cash flows are netted to form a single long or short position, with the cancelled parts removed from the calculation. Following this process across all time buckets or time bucket midpoints leads to a set of notional repricing cash flows $CF_{i,c}(k)$ or $CF_{i,c}(t_k)$, $k \in \{1,2,\ldots,K\}$.

(b) Net notional repricing cash flows in each time bucket k or time bucket midpoint t_k are weighted by a continuously compounded discount factor:
$$DF_{i,c}(t_k) = \exp(-R_{i,c}(t_k) \cdot t_k)$$
That reflects the interest rate shock scenario i in currency c as set out in Annex 2, and where t_k is the midpoint of time bucket k. This results in a weighted net position, which may be positive or negative for each time bucket. The cash flows should be discounted using either a risk-free rate or a risk-free rate, including commercial margin and other spread components (only if the bank has included commercial margins and other spread components in its cash flows).

(c) These risk-weighted net positions are summed to determine the EVE in currency c under scenario i (excluding automatic interest rate option positions):

$$EVE_{i,c}^{nao} = \sum_{k=1}^{K} CF_{i,c}(k) \cdot DF_{i,c}(t_k) \text{ (Maturity buckets) or}$$

$$EVE_{i,c}^{nao} = \sum_{k=1}^{K} CF_{i,c}(t_k) \cdot DF_{i,c}(t_k) \text{ (Maturity buckets midpoints)}$$

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(d) Then, the full change in EVE in currency c associated with scenario i is obtained by subtracting $EVE^{nao}_{i,c}$ from the EVE under the current interest rate term structure $EVE^{nao}_{0,c}, ccnnnnn$ and by adding the total measure for automatic interest rate option risk $KAO_{i,c}$, as follows:

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

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

Finally, the EVE losses $\Delta EVE_{i,c} > 0$ are aggregated under a given interest rate shock scenario i and the maximum loss across all interest rate shock scenarios is the EVE risk measure.

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

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Annexure 1 - The standardised interest rate shock scenarios

Banks should apply six prescribed interest rate shock scenarios to capture parallel and non-parallel gap risks for EVE and two prescribed interest rate shock scenarios for NII. These scenarios are applied to IRRBB exposures in each currency for which the bank has significant 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.

Under this approach, IRRBB is measured by means of the following six scenarios:

(a) parallel shock up;
(b) parallel shock down;
(c) steepener shock (short rates down and long rates up);
(d) flattener shock (short rates up and long rates down);
(e) short rates shock up; and
(f) short rates shock down

The final calibration of the interest rate shock size determined is as follows:

Table 1. Specified size of interest rate shocks $\overline{R}_{shocktype,c}$

	ARS	AUD	BRL	CAD	CHF	CNY	EUR	GBP	HKD	IDR	INR
Parellel	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

	JPY	KRW	MXI	RUB	SAR	SEK	SGD	TRY	USD	ZAR	BHD
Parellel	100	300	400	400	200	200	150	400	200	400	200
Short	100	400	500	500	300	300	200	500	300	500	300
Long	100	200	300	300	150	150	100	300	150	300	150

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Given Table 1, the instantaneous shocks to the risk-free rate for parallel, short and long, for each currency, the following parameterisations of the six interest rate shock scenarios should be applied:

(a)   Parallel shock for currency c: a constant parallel shock up or down across all time buckets.

$$\Delta R_{parellel,c}(t_k) = \pm \overline{R}_{parellel,c}$$

(b)   Short rate shock for currency c: shock up or down that is greatest at the shortest tenor midpoint. That shock, through the shaping scalar $S_{short}(t_k) = (e^{\frac{-t_k}{x}})$, where x=4, diminishes towards zero at the tenor of the longest point in the term structure[8,9].

$$\Delta R_{short,c}(t_k) = \pm\overline{R}_{short,c} \cdot S_{short}(t_k) = \pm\overline{R}_{short,c} \cdot e^{\frac{-t_k}{x}}$$

(c)   Long rate shock for currency c (note: this is used only in the rotational shocks): Here the shock is greatest at the longest tenor midpoint and is related to the short scaling factor as: $S_{long}(t_k) = 1 - S_{short}(t_k)$.

$$\Delta R_{long,c}(t_k) = \pm\overline{R}_{long,c} \cdot S_{long}(t_k) = \pm\overline{R}_{long,c} \cdot \left(1 - e^{\frac{-t_k}{x}}\right)$$

(d)   Rotation shocks for currency c: involving rotations to the term structure (i.e. steepeners and flatteners) of the interest rates whereby both the long and short rates are shocked and the shift in interest rates at each tenor midpoint is obtained by applying the following formulas to those shocks:

$$\Delta R_{steepner,c}(t_k) = -0.65 \cdot \left| \Delta R_{short,c}(t_k) \right| + 0.9 \cdot \left| \Delta R_{long,c}(t_k) \right|$$

$$\Delta R_{flattener,c}(t_k) = +0.8 \cdot \left| \Delta R_{short,c}(t_k) \right| - 0.6 \cdot \left| \Delta R_{long,c}(t_k) \right|$$

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[8] the value of x in the denominator of the function $e^{\frac{-t_k}{x}}$ controls the rate of decay of the shock. This should be set to the value of 4 for most currencies and the related shocks unless otherwise determined by national supervisors.

[9] t_k is the midpoint (in time) of the kth bucket and t_k is the midpoint (in time) of the last bucket K. There are 19 buckets in the standardised framework, but the analysis may be generalised to any number of buckets.

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Appendix B: Common Disclosure Template

Table 1

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.
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 (i.e. the EVE metric generated by the bank for purposes other than disclosure, e.g. for internal assessment of capital adequacy) are different from the modelling assumptions prescribed for the disclosure in Table 2, the bank should provide a description of those assumptions and of their directional implications and explain its rationale for making those assumptions (e.g. historical data, published research, management judgment and analysis).

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Table 1 (continued)

(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 2, 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 (1) 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 2, 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.

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Table 2

Scope of application: Mandatory for all banks within the scope of application.

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				
Steepener				
Flattener				
Short rate up				
Short rate down				
Maximum				
Period	**T**		**T-1**	
Tier 1 Capital				

Definitions

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

(a) the change in the economic value of equity based on the result of the standardised framework as set out in Appendix A; and

(b) 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.

MODULE	IR:	Interest Rate Risk in the Banking Book
CHAPTER	IR-3:	Appendix C: Core Deposit Distribution

Appendix C: Guidance for Core Deposit Distribution

Following is an example for unified distribution approach on core portion of NMDs.

Banks may apply the following weights to distribute / bucket cash-flows for the core portion of NMDs, in order to meet the weighted average maturity caps mentioned in the table 2, page 5 of the Appendix A).

1. <u>Distribution weights by bucket for average weighted maturity of 5 Years</u>

	ON	O/N < t_2 ≤ 1 M	1M < t_3 ≤ 3 M	3M < t_4 ≤ 6 M	6M < t_5 ≤ 9 M	9M < t_6 ≤ 1 Y	1Y < t_7 ≤ 1.5 Y	1.5Y < t_8 ≤ 2 Y	2Y < t_9 ≤ 3 Y	3Y < t_{10} ≤ 4 Y	4Y < t_{11} ≤ 5 Y	5Y < t_{12} ≤ 6 Y	6Y < t_{13} ≤ 7 Y	7Y < t_{14} ≤ 8 Y	8Y < t_{15} ≤ 9 Y	9Y < t_{16} ≤ 10 Y
Weights	-	0.95%	1.82%	2.73%	2.73%	2.73%	5.46%	5.46%	10.92%	10.92%	10.92%	10.92%	10.92%	10.92%	10.92%	1.68%

2. <u>Distribution weights by bucket for average weighted maturity of 4.5 Years</u>

	ON	O/N < t_2 ≤ 1 M	1M < t_3 ≤ 3 M	3M < t_4 ≤ 6 M	6M < t_5 ≤ 9 M	9M < t_6 ≤ 1 Y	1Y < t_7 ≤ 1.5 Y	1.5Y < t_8 ≤ 2 Y	2Y < t_9 ≤ 3 Y	3Y < t_{10} ≤ 4 Y	4Y < t_{11} ≤ 5 Y	5Y < t_{12} ≤ 6 Y	6Y < t_{13} ≤ 7 Y	7Y < t_{14} ≤ 8 Y	8Y < t_{15} ≤ 9 Y	9Y < t_{16} ≤ 10 Y
Weights	-	1.03%	2.04%	3.06%	3.06%	3.06%	6.12%	6.12%	12.23%	12.23%	12.23%	12.23%	12.23%	12.23%	2.13%	-

3. <u>Distribution weights by bucket for average weighted maturity of 4 Years</u>

	ON	O/N < t_2 ≤ 1 M	1M < t_3 ≤ 3 M	3M < t_4 ≤ 6 M	6M < t_5 ≤ 9 M	9M < t_6 ≤ 1 Y	1Y < t_7 ≤ 1.5 Y	1.5Y < t_8 ≤ 2 Y	2Y < t_9 ≤ 3 Y	3Y < t_{10} ≤ 4 Y	4Y < t_{11} ≤ 5 Y	5Y < t_{12} ≤ 6 Y	6Y < t_{13} ≤ 7 Y	7Y < t_{14} ≤ 8 Y	8Y < t_{15} ≤ 9 Y	9Y < t_{16} ≤ 10 Y
Weights	-	1.18%	2.31%	3.47%	3.47%	3.47%	6.94%	6.94%	13.89%	13.89%	13.89%	13.89%	13.89%	2.77%	-	-