Prudential Standard APS 117

Capital Adequacy: Interest Rate Risk in the Banking Book

Objective and key requirements of this Prudential Standard

This Prudential Standard sets out the requirements that an authorised deposit-taking institution must meet in relation to interest rate risk in the banking book.

The key requirements of this Prudential Standard are that an authorised deposit-taking institution must:

- have a framework to manage, measure and monitor interest rate risk in the banking book commensurate with the nature, scale and complexity of the authorised deposit-taking institution's operations; and
- apply for approval from APRA to use an internal model for determining the authorised deposit-taking institution's interest rate risk in the banking book capital charge, if it has sought or received approval from APRA to use an internal ratings-based approach to credit risk.

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Authority

1. This Prudential Standard is made under section 11AF of the *Banking Act 1959* (Banking Act).

Application

2. This Prudential Standard applies to all authorised deposit-taking institutions (**ADIs**) with the exception of **purchased payment facility providers**.

3. A reference to an ADI in this Prudential Standard, unless otherwise indicated, is a reference to:

   (a) an ADI on a **Level 1** basis; and

   (b) a **group** of which an ADI is a member on a **Level 2** basis.

4. If an ADI to which this Prudential Standard applies is:

   (a) the holding company for a group, the ADI must ensure that the requirements in this Prudential Standard are met on a Level 2 basis, where applicable; or

   (b) a **subsidiary** of an authorised **non-operating holding company** (**authorised NOHC)**, the authorised NOHC must ensure that the requirements in this Prudential Standard are met on a Level 2 basis, where applicable.

5. This Prudential Standard commences on 1 January 2022.

Interpretation

6. Terms that are defined in *Prudential Standard APS 001 Definitions* appear in bold the first time they are used in this Prudential Standard.

7. Where this Prudential Standard provides for APRA to exercise a power or discretion, this power or discretion is to be exercised in writing.

8. In this Prudential Standard, unless the contrary intention appears, a reference to an Act, Regulations or Prudential Standard is a reference to the Act, Regulations or Prudential Standard as in force from time to time.

Definitions

9. The following definitions are used in this Prudential Standard:

   (a) approved IRRBB model – means a currently APRA-approved internal model for determining an ADI's **IRRBB** capital charge;

   (b) banking book – means the set of all of an ADI's banking book items;

   (c) banking book item – means either:

(i) an on-balance sheet asset, liability or equity item that is:

(A) not part of an ADI's trading book, as determined under the ADI's trading book policy statement (refer to Attachment A to *Prudential Standard APS 116 Capital Adequacy: Market Risk* (APS 116));

(B) not deducted from an ADI's **Common Equity Tier 1 Capital** under *Prudential Standard APS 111 Capital Adequacy: Measurement of Capital* (APS 111); and

(C) not included in an ADI's Common Equity Tier 1 Capital (refer to APS 111);

or

(ii) an off-balance sheet position that alters an ADI's exposure to interest rate risk and is not part of the ADI's trading book.

(d) calculation date – means the date with reference to which an ADI's IRRBB capital charge is calculated, such that the exposures and observations of interest rates used in the calculation are recorded at the close of business on that day;

(e) earnings at risk – means the potential impact of interest rate changes on the net interest income earned on the ADI's banking book;

(f) economic value – means:

(i) fair value, where it can be determined; or

(ii) the net present value of expected cash flows, otherwise;

(g) economic value sensitivity – means the potential impact of interest rate changes on the economic value of the ADI's banking book;

(h) IRB ADI – means an ADI that has been granted approval by APRA to use the **internal ratings-based (IRB) approach to credit risk**;

(i) IRRBB capital charge – means the capital that an ADI is required to hold in relation to IRRBB;

(j) IRRBB management framework – means the organisational structures, processes and systems used in identifying, assessing, measuring, monitoring, controlling and mitigating IRRBB;

(k) IRRBB measurement system – means the systems and data used to measure IRRBB. An ADI's IRRBB measurement system forms part of its IRRBB management framework. For an ADI that has IRRBB model approval, the IRRBB measurement system includes, but is not limited to, its approved IRRBB model;

(l) IRRBB model approval – means an approval granted by APRA, for an ADI to use an internal model for determining its IRRBB capital charge;

(m) optionality risk – means the risk of loss in earnings or value due to cash flows varying from what an ADI had assumed, caused either by customers exercising stand-alone or embedded options differently from how the ADI had assumed they would, or by caps, floors and similar adjustments to interest rates or payments;

(n) rate lock – means a guarantee by an ADI that a customer may draw down a loan no larger than a nominated limit, at a specified fixed or capped rate, before a nominated expiry date; and

(o) standardised ADI – means an ADI which has not been approved by APRA to use the IRB approach to credit risk.

Adjustments and exclusions

10. APRA may adjust or exclude a specific prudential requirement in this Prudential Standard in relation to one or more specified ADIs or authorised NOHCs.

Previous exercise of discretion

11. An ADI must contact APRA if it seeks to place reliance, for the purposes of complying with this Prudential Standard, on a previous exemption or other exercise of discretion by APRA under a previous version of this Prudential Standard.

Key principles

12. An ADI must have a management framework and governance arrangements that satisfy the requirements set out in Attachment A to this Prudential Standard.

13. An ADI that has sought approval from APRA to become an IRB ADI must also apply for IRRBB model approval.

14. An IRB ADI must determine its IRRBB capital charge at least quarterly.

15. For a standardised ADI, the IRRBB capital charge is zero unless APRA determines otherwise.

Internal model approval process

16. An application for IRRBB model approval must demonstrate that the model has undergone a sufficiently long period of internal monitoring and has performed satisfactorily over that period. The length of this monitoring period will depend upon the performance of the ADI's IRRBB management framework and its track record in managing and measuring IRRBB.

17. An ADI must obtain APRA's approval prior to making any material changes to its approved IRRBB model. An ADI must notify APRA of any non-material changes no later than three months after making the change.

18. An ADI that has IRRBB model approval must continue to use its approved IRRBB model to determine its IRRBB capital charge unless APRA revokes the approval.

19. An ADI that has IRRBB model approval must determine its IRRBB capital charge in accordance with Attachment B to this Prudential Standard. The ADI may rely on its own internal methods and estimates for those parts of the calculation where a method or estimate is not prescribed in Attachment B to this Prudential Standard.

20. APRA may, at any time, vary or revoke an ADI's IRRBB model approval, or impose additional conditions on the approval if it determines that:

    (a) the ADI does not comply with this Prudential Standard; or

    (b) it is appropriate, having regard to the particular circumstances of the ADI.

21. For an IRB ADI that does not have IRRBB model approval, the ADI must determine its IRRBB capital charge using a method specified by APRA.

22. APRA may require an ADI to reduce its level of IRRBB or increase its IRRBB capital charge.

Partial use of model

23. An IRRBB model approval may permit partial use, which allows an ADI to use a combination of the approved IRRBB model and an alternative approach approved by APRA for purposes of calculating its IRRBB capital charge.

24. As part of an application for IRRBB model approval, an ADI must provide APRA with appropriate written information on the proposed scope of its approved IRRBB model. An ADI must not change the scope of its approved IRRBB model unless it has obtained APRA's prior approval for the change.

25. An ADI with approval for partial use must notify APRA prior to commencing any new business activity that generates IRRBB and which the ADI did not include in the application for IRRBB model approval.

26. Approval for partial use will, at a minimum, require that:

    (a) all material sources of IRRBB across an ADI are captured within the ADI's IRRBB capital charge;

    (b) a substantial majority of an ADI's IRRBB is captured by the ADI's IRRBB measurement system; and

    (c) diversification benefits for any part of the ADI's operations that is excluded from the IRRBB measurement system are not recognised.

27. APRA may approve partial use on a short-term basis. An ADI that has received such approval must have a written, APRA-approved implementation plan that

specifies the extent and timing of the extension of the approved IRRBB model to cover all material business activities.

28. APRA will approve permanent partial use only in exceptional circumstances and where an ADI is able to demonstrate to APRA's satisfaction that the business activities not covered by the approved IRRBB model are immaterial in aggregate in terms of size and perceived risk profile. APRA may specify an amount to be added to the IRRBB capital charge in respect of business activities that are not covered.

Attachment A – IRRBB management framework and governance

1. An ADI that has IRRBB model approval must satisfy all of the requirements set out in this Attachment. Other ADIs must satisfy all of the requirements in this Attachment with the exception of paragraphs 20(b), 28, 34 and 35, in a way that is commensurate with the nature, scale and complexity of the ADI's operations.

IRRBB management framework

2. An ADI's IRRBB management framework must be clearly documented, and commensurate with the nature, scale and complexity of its operations.

3. An ADI's risk appetite for IRRBB must be articulated in terms of the risk to both economic value and earnings and must specify limits on both those risks.

4. An ADI's IRRBB management framework must clearly assign accountabilities for monitoring its exposures against limits, approving variation on limits, and responding to and escalating any breaches of IRRBB limits.

5. An ADI's IRRBB management framework must clearly articulate the responsibilities of, and reporting relationships to, the Board and where applicable, the Board committee.

6. An ADI must notify APRA prior to making any material change to its IRRBB management framework.

Responsibilities of the Board of directors

7. An ADI's Board is responsible for the oversight of the ADI's IRRBB management framework. An ADI's Board must set the risk appetite for IRRBB.

8. The maturity profile assumed for shareholders' equity, must be approved by an ADI's Board and documented.

9. An ADI's Board, or Board committee, must ensure the framework is subject to periodic review by a suitable independent party, in accordance with paragraphs 32 and 33 of this Attachment.

10. An ADI's Board, or Board committee, must regularly (at least semi-annually) review IRRBB management reports (refer to paragraphs 24 to 26 of this Attachment) and satisfy itself that IRRBB is appropriately managed.

Responsibilities of senior management

11. Senior management must be actively involved in the implementation of the ADI's IRRBB management framework (to the extent it falls within their responsibilities) and ensure its effective operation over time.

12. An ADI must have in place an executive committee, with appropriate representation from across the ADI, which is responsible for the management and measurement of IRRBB. The executive committee must hold regular meetings to discuss matters including the performance of the framework, areas requiring improvement and the status of efforts to address previously identified deficiencies.

13. An ADI's senior management must, in conjunction with the IRRBB risk management function referred to in paragraph 17 of this Attachment, develop and implement appropriate policies relating to the IRRBB management framework.

14. An ADI's senior management must notify the Board or Board committee of material changes or exceptions from established policies that could have an impact on the operation of the IRRBB management framework, including the IRRBB capital charge.

15. Significant hedging, risk-taking or risk management initiatives by an ADI must be approved by senior management prior to implementation. An ADI must specify the scope of any power to make the ADI's interest rate exposures vary materially from the maturity profile assumed for shareholders' equity approved by the ADI's Board. An ADI must monitor and report the actual variation of exposures to senior management.

Sufficient resources

16. An ADI must have personnel skilled in the management and measurement of IRRBB sufficient to ensure that its IRRBB management framework continues to operate effectively.

IRRBB risk management function

17. An ADI must have an independent IRRBB risk management function that, at a minimum, must:

    (a) have reporting lines and responsibilities that are independent of the activities that contribute to the ADI's IRRBB profile and must provide access to the executive committee referred to in paragraph 12 of this Attachment;

    (b) ensure that roles and responsibilities of personnel and functions involved in the management of IRRBB are clearly defined and documented;

    (c) have responsibility for the design and maintenance of an ADI's IRRBB management framework; and

    (d) continuously monitor the ADI's compliance with the IRRBB management framework, and produce and analyse regular reports on the output of the IRRBB measurement system, including any approved IRRBB model.

New products

18. Prior to introducing a new product, instrument type or activity, an ADI must assess and understand the IRRBB characteristics and have adequate operational procedures and risk control systems in place.

IRRBB measurement system

19. In relation to an ADI's IRRBB measurement system:

    (a) the system must be conceptually sound, comprehensive, consistently implemented and transparent;

    (b) the system must be sufficiently comprehensive to capture all material sources of IRRBB across the ADI including, for an ADI with model approval, those events that can lead to rare and severe losses;

    (c) the system must capture reliable and accurate data about exposures in a timely fashion, and the effectiveness and accuracy of this process must be periodically tested;

    (d) the ADI must regularly monitor its IRRBB profile in terms of both earnings at risk and economic value sensitivity;[1]

    (e) the ADI's Board or Board committee must be informed of the most significant assumptions of the measurement system and how those assumptions affect any significant IRRBB hedging strategies the ADI undertakes;

    (f) the ADI must periodically review the assumptions made by the system, and the materiality of any IRRBB not captured by the system; and

    (g) the ADI must perform periodical sensitivity testing of key assumptions, including behavioural assumptions.

20. An ADI's IRRBB measurement system must have comprehensive and detailed documentation, which must, at a minimum, include:

    (a) the specification of:

        (i) data sources and capture methods;

        (ii) calculation method and assumptions, including behavioural and other assumptions about the timing of cash flows; and

        (iii) the rationale for the calculation method and all assumptions;

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[1] The IRRBB profile includes the profile of spread risk.

and

(b) for an ADI that has IRRBB model approval:

(i) enough detail to make the approach to determining the ADI's IRRBB capital charge transparent and capable of independent review, validation and independent reproduction of results given the raw input data;

(ii) details of any dependence structures used in the measurement system, including evidence supporting their use; and

(iii) where relevant, an explanation of how the ADI ensures that the required soundness standard in paragraph 36 of Attachment B to this Prudential Standard is achieved.

21. An ADI must have a program of stress testing, which includes consideration of the impact on the economic value of the banking book and net interest earnings of sudden changes in interest rates.

22. An ADI's stress testing program must:

(a) include scenarios that are tailored to the ADI's businesses and risks;

(b) include scenarios involving changes in the level, slope and shape of yield curves, as well as changes in customer behaviour;

(c) include multiple stress scenarios, with some based on historical events and others being hypothetical and forward-looking; and

(d) have clearly defined objectives, well documented assumptions and sound methodologies.

23. An ADI's policies and limits for IRRBB must reflect the results of stress testing exercises. An ADI must regularly communicate these results to relevant senior management and the ADI's Board or Board committee.

Internal reporting of IRRBB exposures

24. An ADI must regularly (at least semi-annually) report its IRRBB exposure to the Board or Board committee, and senior management.

25. In developing an appropriate reporting framework, an ADI must consider the nature of its IRRBB exposure and the strategy adopted for managing and measuring it. Management reports must be produced and reviewed regularly and must include information on limit utilisation, the performance of risk management strategies, and the output of the ADI's risk measurement system, including its approved IRRBB model where applicable. The reviews must be conducted by management with authority to enforce, where necessary, mitigation of the ADI's exposure to IRRBB.

26. An ADI must have in place a process for ensuring that the ADI’s Board, or Board committee, and senior management are able to respond appropriately to the information contained in IRRBB management reports. This process must include escalation procedures for key IRRBB issues to facilitate appropriate action between formal reporting cycles.

Integration of IRRBB measurement system into day-to-day risk management

27. An ADI’s IRRBB measurement system must be closely integrated into the ADI’s risk management processes. This requires that the inputs and outputs of the ADI’s IRRBB measurement system, as relevant, play an integral role in the ADI’s decision-making, corporate governance, risk management and internal capital allocation processes.

28. For an ADI that has IRRBB model approval, the ADI’s IRRBB economic value exposure limits must include limits that are related to the approved IRRBB model in a manner that is consistent over time and well understood by senior management.

Data

29. An ADI must have transparent and verifiable processes for collecting and testing relevant data inputs to its IRRBB measurement system (e.g. exposure information, details about customer behaviour and product and wholesale rate histories). These processes must be consistent, timely and comprehensive across the ADI.

30. An ADI's IRRBB exposure data must comprehensively capture all material exposures from appropriate business activities, banking book items and geographic locations. An ADI must be able to demonstrate that any excluded exposures, both individually and in aggregate, would not have a material impact on the overall estimate of its IRRBB capital charge.

31. An ADI must document its IRRBB data management policies and procedures. These policies and procedures must, at a minimum, cover:

    (a) the collection of data;

    (b) processes for ensuring integrity, completeness, consistency and accuracy;

    (c) data storage;

    (d) application purposes; and

    (e) an outline of all data flows between systems, including whether any manual processes are involved in such flows.

Independent review of IRRBB management framework

32. An ADI must periodically subject its IRRBB management framework, including the IRRBB measurement system, to effective and comprehensive independent review. Such reviews must be conducted by functionally independent, appropriately trained and competent personnel and must cover both the activities of relevant business units and the IRRBB management function. For an ADI with an approved IRRBB model, such reviews must take place at the time of IRRBB model approval and thereafter at least once every three years and when a material change is made to the IRRBB management framework. A summary of the results of the review must be provided to the Board or a Board committee. An ADI must provide a report on the review to APRA within three months of its completion.

33. For the purpose of paragraph 32 of this Attachment, 'functionally independent' means that the party or parties conducting the reviews:

    (a) do not contribute to the ADI's IRRBB profile through the origination or alteration of risk; and

    (b) must not be, or have been:

        (i) involved in the development, implementation or operation of the IRRBB measurement system; or

        (ii) part of, or reporting to, the risk management function referred to in paragraph 17 of this Attachment.

    It is not necessary that the same party undertake all aspects of the review.[2]

Regular model testing

34. An ADI that has IRRBB model approval must have a documented process in place to test the accuracy and consistency of its internal model and assumptions. The ADI must satisfy APRA that the process enables it to assess the performance of its internal model in a meaningful and consistent manner. The process must include regular comparison of actual loss experience against prior model estimates for those losses to ensure their reasonableness. An ADI must also document and regularly review the materiality of all model limitations and risks not captured by its internal model.

35. An ADI that has IRRBB model approval must have a robust and documented process for testing changes to its internal model, including assumptions and information that flows into that model.

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2 In most cases, the independent reviews could be facilitated by an ADI's internal audit function but it may require the engagement of independent parties outside of this function.

Management and measurement of market risk on liquid assets

36. ADIs hold liquid assets in order to meet liquidity and prudential requirements. An ADI must not materially change the distribution of such liquid assets and associated hedges between the ADI's trading and banking books, either in volume or in type, unless it has obtained prior approval from APRA.

Attachment B – Approved IRRBB models

1. This Attachment applies to an ADI that has an approved IRRBB model.

IRRBB capital charge

2. The IRRBB capital charge at a calculation date d is the greater of zero and:

$$\max\left(ICC_d, \frac{1}{3}(ICC_{d1} + ICC_{d2} + ICC_{d3})\right) + EL_d + OCC_d + OAA_d$$

where:

$ICC_d, ICC_{d1}, ICC_{d2}, ICC_{d3}$ are respectively the prospective capital charges at the calculation date and the latest three month-ends, determined in accordance with paragraph 17 of this Attachment;

EL_d is the embedded loss at the calculation date, which is the sum of the book value of all banking book items[3] minus $PreShockEV$ determined in accordance with paragraph 17 of this Attachment;

OCC_d is the optionality capital charge at the calculation date, determined in accordance with paragraph 36 of this Attachment; and

OAA_d is any other amount that APRA has notified the ADI it must include in the calculation of its IRRBB capital charge, or that has been calculated in accordance with a method specified by APRA.

Classification of banking book items

3. For the purpose of calculating its IRRBB capital charge, an ADI must classify banking book items in accordance with paragraphs 4 to 9 of this Attachment.

Market-related items

4. A banking book item is classified as market-related if it is:

   (a) a market-related security, which is a security in the banking book, excluding debt, **Additional Tier 1 Capital** and **Tier 2 Capital** issued by the ADI and derivatives;

   (b) a derivative that is in an effective hedge relationship with a market-related security; or

   (c) a derivative that is not in an effective hedge relationship with any other banking book item.

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[3] For the avoidance of doubt, banking book items do not include the earnings offset.

5. If a banking book item does not satisfy the criterion in paragraph 4 of this Attachment, then it is classified as a non-market-related item.

Non-market-related items

6. A non-market-related item is classified as principal-and-interest if it:

   (a) is a deposit; or

   (b) can be represented to an acceptable level of accuracy as a sequence of principal and interest cash flows. For this purpose, cash flows that are economically equivalent to interest, but are not described as such in the contract, must be treated as interest.

7. A derivative that is a non-market-related item should be decomposed, if possible, into notional long and short principal-and-interest items whose combined exposure is the same as that of the derivative. Non-market-related items that are not principal-and-interest are classified as non-principal-and-interest items for the purpose of this Prudential Standard.

8. A principal-and-interest item is classified as either:

   (a) a non-maturity deposit, which is a deposit that has no specified maturity date and can be withdrawn at any time without notice; or

   (b) an other principal-and-interest (OPI) item.

9. A core deposit is a non-maturity deposit that:

   (a) is either a stable deposit or an operational deposit, as defined under *Prudential Standard APS 210 Liquidity*; and

   (b) pays an interest rate that:

      (i) is managed by the ADI;

      (ii) is generally materially below wholesale market rates for overnight lending; and

      (iii) does not usually change in response to movements in wholesale market rates.

10. Subject to APRA's approval, an ADI may split a banking book item, or a portfolio of such items, into two or more parts, each of which can be classified or modelled differently. For the purpose of this Attachment, a reference to a banking book item may also refer to such a part and a reference to a portfolio of banking book items may refer to a portfolio of such parts.

Interest rate data

11. For the purpose of this Prudential Standard, a risk factor is a stochastic process indexed by time, whose values are used in calculating economic values of banking book items, and for which negative values are possible. For stochastic processes that can never attain negative values (e.g. implied volatilities), the logarithm of the stochastic process must be used as a risk factor. A reference to a risk factor at a specified date designates the random variable indexed by that date, in the process.

12. For each currency to which an ADI has a material exposure in the banking book, the ADI must identify and collect data to enable modelling of a single, maturity-indexed, collection of risk factors. This is the non-market-related curve or NMR curve for that currency. The risk factors in each NMR curve must correspond to wholesale interest rates suitable for discounting cash flows. Currencies to which the ADI has non-material exposures may be combined into one or more groups and a single NMR curve selected for each group based on rates in a currency, or composite of currencies, broadly reflective of the interest rate characteristics of the group.

13. An ADI must also identify and collect data to enable modelling of all risk factors for which changes in their values can cause material changes in economic value of the ADI's market-related items. Where available, different risk factor collections ('curves') must be used for modelling the yields on different types and grades of debt issuers and different payment frequencies.

14. An ADI must use an observation period of eight years, ending on a date no earlier than three months before the calculation date. The method used to choose the end date of the observation period for each calculation date must be specified. Observation dates are the business days in the observation period.

Calculation of prospective capital charge

15. The economic value of the banking book or augmented banking book (see paragraph 27 of this Attachment) is the sum of the economic values of all items it contains.

16. The economic value (EV) of a banking book item, given a set of repricing assumptions and risk factor values, is:

    (a) for a non-market-related item, the net present value, as at the calculation date, of expected future notional cash flows (see paragraph 23 of this Attachment), using discount rates from the relevant NMR curve; and

    (b) for a market-related item, the fair value of the item, based on the relevant risk factor values.

17. An ADI's prospective IRRBB capital charge is the ADI's estimate of the 97.5 per cent expected shortfall of the prospective loss[4] where, for each possible scenario s in the distribution the prospective loss is equal to:

$$ProspLoss_s = PreShockEV - \min_{m \in \{central, shorter, longer\}} PostShockEV_s^m$$

where

$PreShockEV$ is the EV of the augmented banking book under the central assumptions (see paragraph 27 of this Attachment), using the values of risk factors at the calculation date; and

for repricing assumption set $m \in \{central, shorter, longer\}$ (see paragraph 22 of this Attachment), $PostShockEV_s^m$ is the EV at the calculation date of the augmented banking book (see paragraph 27 of this Attachment), calculated using repricing assumptions m, together with simulated risk factor values obtained by applying to risk factors at the calculation date, a shock determined for scenario s in accordance with paragraph 18 of this Attachment. $PostShockEV_s^m$ is a random variable, whereas $PreShockEV$ is not.

18. The distribution of each $PostShockEV_s^m$ must be estimated using a simulation method under which:

(a) the ADI designates every risk factor to be either perturbed or derived. This designation forms part of the approved IRRBB model, must be documented, and any change to it constitutes a model change;

(b) there is one simulated scenario for each observation date;

(c) for each perturbed risk factor and observation date, the simulated value of the risk factor to be used in the scenario for that observation date is:

$$F_s^{sim} = F_d + \sqrt{50} \cdot (F_s - F_{s-5} - adj_F)$$

where:

F_d, F_s, F_{s-5} are the values of the risk factor at the calculation date, the observation date and five business days before the observation date respectively; and

adj_F is the average of $(F_{s'} - F_{s'-5})$ over all observation dates s$'$;

(d) for each derived risk factor and observation date, the ADI must derive the simulated value of the risk factor at that date to be used in the scenario from the values simulated for other risk factors for the scenario.

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4 The 97.5 per cent expected shortfall is the expected loss conditional on the loss being in the worst 2.5 per cent of potential losses.

19. For non-market-related items, only the risk factor values in the NMR curves that are used to discount notional cash flows may differ between the calculation of Pre-shock and Post-shock EVs for a given set of repricing assumptions (see paragraph 23 of this Attachment). The notional cash flows in the Pre-shock and Post-shock EVs must be the same.

20. For market-related items, Post-shock EVs must be determined using either full revaluation or a sensitivity-based method approved by APRA. Risk factors whose values differ between the calculations of Pre-shock and Post-shock EVs are not limited to discount curves.

Repricing Assumptions

21. An ADI's repricing assumptions consist of:

    (a) the classification of banking book items into the categories described in paragraphs 4 to 9 of this Attachment;

    (b) the allocations of types of OPI items to contractual or behavioural repricing profiles (see paragraph 31of this Attachment); and

    (c) the method of determining the cash flow profile (see paragraph 23 of this Attachment) for non-market-related items, including the method for adjusting it in response to unexpected changes to the items, such as prepayments different from expectations.

22. In the calculations set out in paragraphs 15 to 20 of this Attachment, an ADI must use the following sets of repricing assumptions:

    (a) the central assumptions, which are the ADI's own repricing assumptions, chosen in accordance with paragraphs 23 to 34 of this Attachment;

    (b) the shorter assumptions, determined in accordance with paragraph 35 of this Attachment; and

    (c) the longer assumptions, determined in accordance with paragraph 35 of this Attachment.

Central assumptions

23. An ADI must have a method of allocating a cash flow profile to each non-market-related item, consisting of a series of notional cash flows and associated dates at which they are assumed to occur.

24. The total value at a non-market-related item's inception date of all its notional cash flows, each discounted using the NMR curve for its currency, must equal the consideration paid to establish the item, or the initial book value of the item if there is no such consideration.

25. The notional cash flows of a principal-and-interest item must be classified into notional principal cash flows and notional interest cash flows. The repricing

profile of a principal-and-interest item is the set of notional principal cash flows and associated dates, which are called repricing dates. At any date, the future notional principal cash flows must sum to the principal then outstanding.

26. An ADI must have a documented method of determining the notional interest cash flows of a principal-and-interest item based on its notional principal cash flows, such that:

    (a) the notional interest cash flows occur on the dates upon which interest is actually required to be paid under the item, except that a notional interest cash flow associated with any notional principal cash flow occurring on the next business day after the calculation date may occur at the same time as the notional principal cash flow; and

    (b) projections of notional interest cash flows may be changed only to the extent that the change is necessitated by changes to the item's repricing profile.

27. An ADI's augmented banking book is the ADI's banking book together with an earnings offset, which is a notional principal-and-interest item. For the earnings offset, the ADI must choose a repricing profile consisting of at least twelve equal-sized notional principal cash flows, spaced evenly over the year following the calculation date and summing to the book value of the banking book at the calculation date.

28. For each type of core deposit, the repricing profile of the portfolio of all core deposits of that type must consist of:

    (a) a notional principal cash flow on the next business day after the calculation date, of amount no less than 20 per cent of the balance; and

    (b) a non-increasing series of notional principal cash flows spaced evenly over the period from the calculation date to the last in the series, which must be no more than five years after the calculation date.

29. For all non-maturity deposits that are not core deposits, the repricing profile must have only one notional principal cash flow, occurring on the next business day after the calculation date, unless APRA approves an alternative treatment.

30. An ADI must choose the repricing date of each notional principal cash flow of an OPI item as the earliest date at which:

    (a) the ADI has the right to change the interest rate on the principal, or the rate is contractually required to be reset in line with an external benchmark; or

    (b) the cash flow will be paid, based on:

        (i) if the ADI designates the OPI item to have a contractual repricing profile, an assumption that all principal payments occur at the contractually-scheduled dates;

(ii) if the ADI designates the OPI item to have a behavioural repricing profile, an assumption that the timing of all principal payments will be in line with best estimate expectations in the case of payments that do not attract economic adjustments for the impact of breaking term, and with the contractually scheduled dates for payments that would otherwise attract such economic adjustments.[5]

31. An ADI must designate an OPI item to have a repricing profile that is:

(a) contractual for a deposit, unless agreed otherwise with APRA; and

(b) behavioural for all non-deposit items, except that:

(i) contractual may be used if significant deviation from the contractual repricing profile is not expected; and

(ii) contractual must be used if there is insufficient relevant data on which to base a behavioural repricing profile.

32. Where an ADI has nonlinear derivatives such as swaptions, caps or floors that are treated as non-market-related items because they are in an effective hedging relationship with banking book items that are not market-related securities, the ADI must use a method that has been approved by APRA to measure its IRRBB on those derivatives.

33. An ADI's repricing assumptions form part of its approved IRRBB model and must be clearly documented, conceptually sound, reasonable and, except where compelling reasons are provided to do otherwise, consistent with historical experience.

34. APRA may review the appropriateness of an ADI's repricing assumptions and may require the ADI to use different assumptions for the purpose of determining its IRRBB capital charge.

Shorter and longer assumptions

35. The shorter and longer assumptions are used to take account of the most common sources of optionality risk where customer payments differ from what was assumed in a behavioural repricing profile. These assumptions must be the same as the central assumptions for all items except fixed-rate loans, rate locks and core deposits, for which the differences are:

(a) for notional principal cash flows:

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5 An economic adjustment on early repayment (prepayment) of principal restores the ADI's position to what it would have been if the principal prepaid had remained unpaid until contractually scheduled. A behavioural repricing profile is intended to reflect the interest-rate sensitivity of the item, given expected payment behaviour. Hence prepayments that are economically adjusted are effectively ignored by treating them as if they did not occur.

(i) each prepayment rate CPR^m that is used in determining the repricing profile for fixed-rate, non-market-related assets must be determined as:

$$CPR^m = \min(CPRmax, CPR \times CPRfac^m)$$

where CPR is the corresponding prepayment rate used in the central assumptions, $CPRmax$ is the highest possible prepayment rate, and the factor $CPRfac^m$ is specified in Table 1;

(ii) each drawdown rate DD^m that is used in determining the repricing profile for a rate lock must be determined as:

$$DD^m = \min(1, DD \times DDfac^m)$$

where DD is the corresponding drawdown rate used in the central assumptions and the factor $DDfac^m$ is specified Table 1;

(iii) for a core deposit, the notional principal cash flow at any date t that is more than one business day after the calculation date is:

$$NPCF_t \times (1 - Wfac^m)$$

where $NPCF_t$ is the corresponding notional principal cash flow for that date in the central assumptions, $Wfac^m$ is specified in Table 1 and the balance of the principal is assumed to reprice on the next business day after the calculation date.

and

(b) all notional interest cash flows must be recalculated to be consistent with the revised notional principal cash flows, in accordance with paragraph 26 of this Attachment.

Table 1: Behavioural optionality factors

Repricing Assumptions m:	**Shorter**	**Longer**
Prepayment modification factor $CPRfac^m$	1.2	0.8
Drawdown modification factor $DDfac^m$	0.8	1.2
Withdrawal factor $Wfac^m$	0	0.1

Additional optionality risk

36. An ADI must assess, at least annually, any risk to which it is exposed to from sources of optionality risk not captured by paragraph 17 of this Attachment and determine whether the potential loss from all such sources is material. Where the loss is assessed as material, the ADI must extend its approved IRRBB model to determine a capital charge for those losses, which is the optionality capital charge. That capital charge must meet a soundness standard whereby it is no less than the 97.5 per cent expected shortfall from all such sources over a one-year period. An ADI must also assess new products and variations of existing products as to whether they introduce material additional optionality risk.

37. For each independent review conducted in accordance with paragraph 32 of Attachment A to this Prudential Standard, an ADI must assess the materiality of its exposure to sources of optionality risk that are not covered by its approved IRRBB model.